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CANADA'S EXTENDED CONTINENTAL SHELF PROGRAM

(Second Formative Evaluation)

Final Report

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ABBREVIATIONS, ACRONYMS AND SYMBOLS

ADM	Assistant Deputy Minister
AUV	Autonomous Underwater Vehicle
BIO	Bedford Institute of Oceanography
CDN	Canadian
CCGS	Canadian Coast Guard Ship
CHS	Canadian Hydrographic Service
CLCS	Commission on the Limits of the Continental Shelf
DEC	Departmental Evaluation Committee
DFAIT	Department of Foreign Affairs and International Trade
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
DPR	Departmental Performance Report
DRDC	Defence Research and Development Canada
EAC	Evaluation Advisory Committee
EC	Environment Canada
EEZ	Exclusive Economic Zone
GSC	Geological Survey of Canada
GoC	Government of Canada
INAC	Department of Indian and Northern Affairs Canada
MC	Memorandum to Cabinet
NM	Nautical Mile
NRCan	Natural Resources Canada
OGDs	Other Government Departments
PAA	Program Activity Architectures
PCSP	Polar Continental Shelf Program
RPP	Report on Plans and Priorities
SPLOS	States Parties to the United Nations Convention on the Law of the Sea
TBS	Treasury Board Secretariat
TORs	Terms of Reference
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea

USCGC	United States Coast Guard Cutter
ZID	Office of the Inspector General
ZIE	Evaluation Division, Office of the Inspector General

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EXECUTIVE SUMMARY

As a party to the United Nations Convention on the Law of the Sea (UNCLOS), Canada is obligated to prepare and present its submission to the Commission on the Limits of the Continental Shelf (CLCS). This submission is required to define as precisely as possible the outer limits of Canada's continental shelf beyond 200 nautical miles (NM) from its coastal baselines and to gain international recognition for these limits. The goal of the Extended Continental Shelf Program is to define these outer limits through the collection and analysis of supporting scientific data, to submit these outer limits to the CLCS and to receive favourable recommendations from the Commission. This process defines with precision where Canada may exercise its existing sovereign rights over the natural resources of the seabed and subsoil of the extended continental shelf.

Given that this Program is a horizontal initiative, this formative evaluation was led by the Evaluation Division (ZIE) at the Department of Foreign Affairs and International Trade (DFAIT) in collaboration with evaluators from the Department of Natural Resources Canada (NRCan) and the Department of Fisheries and Oceans (DFO). The Extended Continental Shelf Program was assessed to fulfill Treasury Board Secretariat (TBS) requirements to evaluate its relevance and performance, covering the time period from January 2009 to March 2011.

This second formative evaluation focused on the Program's activities and expected outputs related to the Arctic region, although any outstanding data collection activities in the Atlantic not included in the first formative evaluation (completed in 2009 by DFO) were also examined. The activities of the dedicated legal unit at DFAIT and progress towards achievement of its legal and diplomatic expected outputs were also assessed.

Key Findings

Relevance

Findings indicate that the Extended Continental Shelf Program continues to be relevant. The Program continues to be needed for Canada to fulfill its obligations as a party to UNCLOS. As well, the Program is relevant in its scientific contributions in improving understanding of the Arctic seabed and its technological innovations in data acquisition methods for harsh climate conditions in the North. Program objectives and activities are aligned with Government of Canada priorities and support the priorities of NRCan, DFO and DFAIT. The Program is also aligned with the roles and responsibilities of each participating department given their respective legal and mandated responsibilities. A federal role was found to be essential and required because establishing the limits of the extended continental shelf and the coordination of related international activities fall within federal jurisdiction and outside the jurisdiction of other levels of government and organizations.

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Performance

The Program has made progress towards achieving its expected outputs and is on track to complete a Canadian submission by December 2013 as planned, with a clear mandate and objectives to guide this progress. From January 2009 to March 2011, 100% of scientific data collection was completed for the Atlantic and most of the Arctic regions, with a plan in place to complete the remaining 30% of data required for the Eastern Arctic. The Program has cooperated with opposite and adjacent states in joint missions for data acquisition and has tracked CLCS and State best practices in order to increase the likelihood for a successful Canadian submission. Serious consideration has also been made to run a Canadian candidate for the CLCS in the June 2012 elections.

This demonstrates that the Program has made clear progress towards a completed Canadian submission. The analyses of collected scientific data and coordination with adjacent and opposite states have been ongoing but evidence indicates that these activities will accelerate as the Program moves towards the preparation of the submission. DFAIT is expected to play a larger role as data acquisition is completed and as the Program moves towards the legal and peer review of the submission.

The Program's performance, however, was hampered or could be hampered by external factors outside its direct control. These include unstable weather and ice conditions in the Arctic that created challenges for the Program in its data acquisition activities and the international political environment that affects Canada's relationships with opposite and adjacent states, which are reported to be positive currently. The Program has employed appropriate mitigation strategies to address these factors.

The external factor having more direct implications for the Program's performance involves the heavy workload for the CLCS. Findings indicate that the CLCS had 40+ submissions in its queue for review at the time of the evaluation. This could severely delay when the Commission reviews the Canadian submission unless the CLCS accelerates its current pace of work. According to the evidence, this delay could extend into decades after the Program files its submission.

Overall, the governance structure of the Program was found to be appropriate for reaching its objectives, structural or operational changes were implemented within each participating department to enhance efficiencies, and there is ongoing communication and effective information sharing at all levels. However, no formal succession planning strategy was observed for the Program, despite expressed concerns related to the expected delays by CLCS. Because the Program requires specialized scientific and legal expertise, its human resource capacity is fundamental to its performance. With the anticipated delays for the CLCS to review the Canadian submission, adequate knowledge and history on the Program may not be available to support the submission and respond to CLCS recommendations in the future.

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Overall, the Program is practicing sound judgement and observing fiscal responsibility in its financial spending. There is also some evidence that suggests the Program's budget has been appropriate for meeting its data collection needs and that the Program has engaged in activities to save costs (e.g., conducting joint surveys with adjacent and opposite states). A funding shortfall, however, is expected for 2012-13 as the Program prepares the Canadian submission for December 2013, particularly for DFAIT that did not receive funding beyond March 31, 2012. As well, resource pressures are anticipated over the next decade due to the CLCS delays in reviewing submissions. Although the Program appears to be taking steps to address the short-term funding gap, there is little evidence to suggest the longer-term funding issues have been adequately addressed.

Recommendation

Based on these findings, this evaluation makes the following recommendation:

Recommendation: **That NRCan, DFO and DFAIT develop a plan to address future human resource and financial resource challenges.**

Evidence demonstrates that the Program currently has sufficient scientific and legal expertise to address its performance needs but there are funding shortfalls both prior to submission in December 2013 and for activities following submission. This is especially evident for DFAIT. Evidence suggests that the Program will not have the capacity to meet its objectives if these funding issues are not addressed.

Lengthy delays are anticipated for the CLCS to review the Canadian submission and the officers most knowledgeable about the Program may be retired by the time Canada is required to engage with the Commission. Adequate knowledge, expertise and corporate memory on the Program may not be available to support the submission and respond to CLCS recommendations in the future. As well, the lengthy delay before the CLCS's review creates significant challenges for how data and expertise will be maintained and the activities related to Canada's engagement with the CLCS will be funded in the future.

Findings suggest that the Program is aware of these challenges but there was no clear evidence of a robust plan to address these financial resource issues and future human resource capacity. It is a challenge to develop a plan going forward, particularly since there are no clear precedents to follow and CLCS processes could change before the Canadian submission is reviewed. The Program could, however, engage with other parties to UNCLOS to explore how others are addressing similar challenges and the Program develop appropriate strategies for Canada.

Evidence demonstrates that the Extended Continental Shelf Program is needed for Canada to fulfill its obligations as party to UNCLOS. Without a plan to address resource issues, however, there may be challenges in the future for Canada to exercise its

existing sovereign rights over the natural resources in its extended continental shelf, which could have a negative impact on the potential for long-term economic and environmental benefits for the country.

1.0 INTRODUCTION

The Evaluation Division (ZIE) at the Department of Foreign Affairs and International Trade Canada (DFAIT) is housed within the Office of the Inspector General (ZID). According to the 2009 Evaluation Policy, the Evaluation Division is mandated by Treasury Board of Canada Secretariat (TBS) to conduct evaluations of all of DFAIT's direct program spending (including Grants & Contributions). This formative evaluation is being conducted to fulfill these TBS requirements.

Canada's preparation and presentation of its submission to the Commission on the Limits of the Continental Shelf (CLCS) under the United Nations Convention on the Law of the Sea (UNCLOS) is referred to as "The Extended Continental Shelf Program." This program is a horizontal initiative comprising three federal departments: Fisheries and Oceans Canada (DFO), Natural Resources Canada (NRCan) and DFAIT.

Given that this program was new in conception and given the potential economic and scientific benefits of the program, the overall review strategy for the Program calls for two formative evaluations and a summative evaluation. DFO led the first formative evaluation in 2009, covering April 2004 to December 2008, while this second formative evaluation was led by DFAIT and covers January 2009 to March 2011. DFAIT will also lead the summative evaluation in 2014-15.¹ Although the primary target audiences for this second formative evaluation are DFO, NRCan and DFAIT, the potential scientific, technical and economic benefits gained from this Program will likely be far-reaching and this formative evaluation may therefore be of interest to a broader audience.

1.1 Background and Context

The purpose of the Extended Continental Shelf Program is to define as precisely as possible the outer limits of Canada's continental shelf beyond 200 nautical miles (NM) from its coastal baselines, to submit these limits to the CLCS and to receive favourable recommendations from the CLCS. As a party to the Convention, Canada has an obligation to make this submission to the Commission. By following the process set out in UNCLOS and establishing its outer limits based on the recommendations of the Commission, Canada will gain international recognition for the outer limits of its extended continental shelf. This process defines with precision where Canada may exercise its existing sovereign rights over the natural resources of the seabed and subsoil of the extended continental shelf, bringing legal certainty to exploration and exploitation activities.

UNCLOS was adopted in 1982 and entered into force in 1994. UNCLOS provides that where a state intends to establish the limits of its extended continental shelf beyond 200

¹ The Evaluation Plan was approved by DFAIT's Departmental Evaluation Committee (DEC) in February 2011.

nautical miles it shall make a submission to the CLCS within ten years of becoming party to the Convention. Canada signed the Convention in 1982 and ratified it on November 7, 2003. The Convention entered into force for Canada one month after ratification; Canada's deadline for submission to the CLCS therefore is December 6, 2013. Parties to the Convention also have decided that a state's deadline can be satisfied through the provision of preliminary information signalling intent to make a full submission at a later date. A partial submission (i.e., relating to only one portion of a state's continental shelf) can also satisfy the timing requirement. The Convention has broad membership. As of 2010, there were 161 states parties to UNCLOS. Some 85 coastal states are estimated to have an extended continental shelf. As of December 2010, 54 submissions² and 58 communications³ of preliminary information had been received by the Commission. All but 17 of the submissions were made in or after 2009; all preliminary information was submitted in or after 2009. Also as of December 2010, the Commission had made recommendations on 11 submissions.⁴

1.1.1 Legal framework

The Convention sets out the legal framework for ocean activities. At its core is the establishment of maritime zones and the rights and duties of states within them. The maritime zones as outlined by UNCLOS are the territorial sea, the contiguous zone, the exclusive economic zone (EEZ), the continental shelf, the high seas and the "Area" (seabed, ocean floor and subsoil outside national jurisdiction). Pursuant to UNCLOS, a coastal state exercises sovereign rights over its continental shelf for the purpose of exploring it and exploiting its natural resources. Subject to the limits of the continental shelf of states with opposite or adjacent coasts, states are entitled to exercise these rights over a continental shelf measuring 200NM from coastal baselines. Where the natural prolongation of a coastal state's land territory extends beyond 200NM, it may exercise sovereign rights over this "extended" continental shelf.

1.1.2 Submission Procedure

Article 76 of UNCLOS sets out the procedure by which a coastal state may make a submission to the CLCS to delineate the outer edge of its extended continental shelf. Based on the information provided by the coastal state, the CLCS will make

² United Nations Division for Ocean Affairs and Law of the Sea, "Submissions, through the Secretary-General of the United Nations, to the Commission on the Limits of the Continental Shelf, pursuant to article 76, paragraph 8, of the United Nations Convention on the Law of the Sea of 10 December 1982." http://www.un.org/Depts/los/clcs_new/commission_submissions.htm. Date Modified: 2010-12-07

³ United Nations Division for Ocean Affairs and Law of the Sea, "Preliminary information indicative of the outer limits of the continental shelf beyond 200 nautical miles." http://www.un.org/Depts/los/clcs_new/commission_preliminary.htm. Date Modified: 2010-11-30

⁴ United Nations Division for Ocean Affairs and Law of the Sea, "Recommendations issues by the Commission on the Limits of the Continental Shelf." http://www.un.org/Depts/los/clcs_new/commission_recommendations.htm. Date Modified: 2010-05-13

recommendations on the outer limits of its shelf. Limits established by a coastal state on the basis of these recommendations are final and binding. The CLCS has no mandate to determine whether a dispute exists or to resolve disputes. The Commission will not review a submission where an opposite or adjacent state indicates the submission relates to an area in dispute. States making a submission usually work with their neighbours to avoid this sort of indication being provided to the Commission so that their submission is reviewed. Should the continental shelves of states be found to overlap, the states concerned will delimit the area in accordance with international law.

1.2 Program Objectives, Activities and Targeted Results

1.2.1 Objectives

Canada, through its Extended Continental Shelf Program, aims to prepare a submission based on reliable and valid science that has been informed by relevant legal provisions and CLCS practice. Since Canada's potential shelf is anticipated to overlap with those of other states, Canada will work with adjacent and opposite states to ensure its submission will receive full consideration by the Commission.

1.2.2 Key Activities

The Extended Continental Shelf Program was designed to support a successful submission to the CLCS regarding the outer limits of Canada's continental shelf through completion of the necessary and inter-related scientific, technical and legal work. NRCan and DFO are jointly responsible for preparing the submission from a scientific and technical standpoint and supporting engagement with the CLCS as it considers the Canadian submission. DFAIT is responsible for ensuring the submission is legally sound, for undertaking associated diplomatic work and for overall engagement with the CLCS. The three departments collaborate very closely to fulfil these responsibilities. The following lists describe the Program's activities by department, though many activities are conducted jointly by two or more departments as a result of the close collaboration across departments.

Data Acquisition/Scientific Activities/Submission preparation and production (NRCan and DFO)

Work is being carried out with regard to five regions: the Scotia margin, the Grand Banks and the Labrador margin in the Atlantic, and the Eastern and Western Arctic.

- Collection and analysis of bathymetric information, to locate the 2,500 m contour and foot of the slope for both the Atlantic and Arctic Oceans;
- Collection and analysis of seismic information to determine the outer limit for the Atlantic Ocean and to establish natural prolongations on Grand Banks;
- Combination of the results for the Atlantic margin to create outer limit to maximum extent;

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- Collection and analysis of the refraction data to establish natural prolongation of Arctic Ridges in the Arctic Ocean;
- Combination of the results for the Arctic margin to create outer limit to maximum extent;
- Establishment and maintenance of databases of the above-mentioned information;
- Preparation of the submission from a scientific and technical perspective, including text, maps, diagrams and databases;
- Physical production of the submission and supporting documents in paper and digital form; and
- Communications and outreach on scientific aspects of the Program.

Legal Activities, International Relations, and Submission Preparation and Presentation (DFAIT)

- Creation of a dedicated legal unit for this initiative;
- Monitoring and analysis of CLCS practice and relevant law;
- Preparation of legal aspects of the submission;
- Arranging for external peer review of the submission;
- Management of diplomatic contacts with opposite and adjacent states regarding submission best practices, potential overlaps and conclusion of “without prejudice” or other appropriate agreements to ensure consideration of Canada’s full submission;
- Monitoring and advocating on CLCS issues in broader UN context;
- Development of a dedicated public website to outline Canada’s efforts on the Extended Continental Shelf program as a means to respond to media and public interest in the Program overall;
- Determining whether to put forward a Canadian candidate for election to the CLCS in 2012 and, if so determined, running the election campaign; and
- Providing a grant to a trust fund established to assist developing states in the preparation of their submission so as to demonstrate Canadian support for the integrity of the Article 76 process and advance Canadian ocean-related interests abroad.

Table 1 outlines the phases for the Program as originally conceptualized, many of which overlap.

Table 1: Phases of the Extended Continental Shelf Program

Phase	Activity
Preparation (2004 – 2007)	Design a survey plan. Prepare Memorandum to Cabinet and Treasury Board Submission. Establish a governance framework.
Data Collection (2005 to 2012)	Data collection in the Atlantic. Data collection in the Arctic. Review Pacific situation. Additional data collection if required based on interpretation.
Analysis / Interpretation / Submission Preparation (2009 to 2013)	Analyze and interpret data. Prepare submission. Deliver submission to CLCS.
Submission presentation and follow up (post 2013)	Present submission to CLCS Engagement with CLCS.

1.2.3 Results

This second formative evaluation assesses, to the extent possible, whether systems and processes are in place for a successful Canadian submission to CLCS. It also assesses the continued relevance and performance of the Program to date. The achievement of intermediate and long-term outcomes will be assessed in the summative evaluation planned for 2014-15. In addition, the summative evaluation will examine Program activities and achieved expected outputs as Canada moves through the CLCS submission process.

1.3 Governance

The responsibility and accountability for the Extended Continental Shelf Program is shared by DFAIT, DFO and NRCan. While DFO and NRCan are responsible for providing technical and scientific expertise through the collection of scientific data to produce and support the submission,⁵ DFAIT is responsible for the preparation of legal aspects of the submission as well as its presentation and engagement with the CLCS. An Assistant Deputy Minister (ADM) Steering Committee, a Management Board and the

⁵ Each department has specialized expertise: NRCan's Geological Survey of Canada has expertise in seismic interpretation while DFO's Canadian Hydrographic Service is responsible for the interpretation of bathymetric data.

Operations Office are responsible for the Program, with consultations as required with a Federal Advisory Committee.

The ADM Steering Committee

The Steering Committee is responsible for the strategic direction and oversight of the Program. It consists of The Legal Advisor (DFAIT), the ADM Ecosystems and Oceans Science Sector (DFO) and the ADM Earth Sciences Sector (NRCan). The ADM Steering Committee meets two to three times a year or as required.

The Program Management Board

The Program Management Board reports to the ADM Steering Committee and is responsible for the day-to-day delivery of the Program. This includes the collection of scientific data, legal issues, diplomatic advice, collection of information, and preparation of the submission, including any supporting databases, maps and reports. The Management Board consists of the Director, Continental Shelf Division at DFAIT, the Director of the UNCLOS Program at NRCan and the Director, Law of the Sea Project at DFO. Members of the Board are in frequent contact through email, telephone calls and in-person meetings. The Board meets with the ADM Steering Committee when the latter body convenes and provides written weekly updates to the ADM Steering Committee and the Federal Advisory Committee.

The Federal Advisory Committee

The Federal Advisory Committee is chaired by the DG from the Canadian Hydrographic Service (DFO) and consists of the DGs of DFO Policy, DFO's Canadian Coast Guard Fleet, NRCan's Policy and Coordination Branch, NRCan's Geological Survey, DFAIT's Legal Bureau, Department of Indian and Northern Affairs of Canada's (INAC's) Northern Strategic Policy Branch, and Defence Research Development Canada. The Federal Advisory Committee provides advice to the ADM Steering Committee and the Management Board on relevant issues.

The Operations Office

The Operations Office coordinates the collection of scientific data for the Extended Continental Shelf Program. The Operations Office was established in 2004-05 and is housed at the Bedford Institute of Oceanography in Dartmouth, Nova Scotia. It is managed by the NRCan and DFO Program Management Board Directors.

1.4 Program Funding

In Budget 2004, Canada announced \$69 million CAD in funding to NRCan and DFO to support the scientific work for Canada's submission under UNCLOS to delineate the outer limits of its continental shelf. No funds were allocated to DFAIT at this time but in-kind services were contributed to the Program by this department.

Budget 2008 provided an additional \$40 million to the Program. The majority of these additional funds were dedicated to DFO and NRCan but \$6.5 million CAD was allocated to DFAIT from 2008-09 to 2011-12 to create an expert legal unit to work on preparation of the submission and support diplomatic efforts in this regard.

Table 2 below describes the allocation of these funds across fiscal years from 2008-09 to 2013-14.

Table 2: Funding Received in 2004 and 2008 (\$000,000's, CDN)

	Fiscal Year						
	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	Total
Natural Resources							
Budget 2004 ^a	\$16.2	\$7.5	\$7.5	\$2.5	\$0.261	\$0.358	\$34.3
Budget 2008	\$1.7	\$12.3	\$5.2	\$0.7	--	--	\$19.9
NRCan Sub Total	\$17.9	\$19.8	\$12.7	\$3.2	\$0.261	\$0.358	\$54.2
Fisheries and Oceans							
Budget 2004 ^a	\$3.0	\$3.0	\$2.9	\$1.1	\$0.26	\$0.359	\$10.5
Budget 2008	\$1.0	\$3.7	\$6.7	\$2.4	--	--	\$13.8
DFO Sub Total	\$4.0	\$6.7	\$9.6	\$3.5	\$0.26	\$0.359	\$24.3
Foreign Affairs and International Trade							
Budget 2004 ^b	--	--	--	--	--	--	\$0.0
Budget 2008	\$0.36	\$1.1	\$2.2	\$2.8	--	--	\$6.5
DFAIT Sub Total	\$0.36	\$1.1	\$2.2	\$2.8	--	--	\$6.5
Total All Departments							
Budget 2004	\$19.2	\$10.5	\$10.4	\$3.6	\$0.521	\$0.717	\$44.8^c
Budget 2008	\$3.1	\$17.1	\$14.1	\$5.9	--	--	\$40.2
Total	\$22.3	\$27.6	\$24.5	\$9.5	\$0.521	\$0.717	\$85.0

^a These amounts exclude O&M funds from DFO and NRCan that were re-profiled to advance the work in the Arctic by one year.

^b No funds were allocated to DFAIT in the 2004 Budget but the department provided in-kind services.

^c This total reflects funding allocations from 2008-09 to 2013-14 only, not the full \$69M allocated through Budget 2004.

As presented in Table 2, the Extended Continental Shelf Program has funds available until 2013-14; however, the distribution of these funds varies among the three participating departments. Both DFO and NRCan have annually allocated funds up to 2013-14, the year of Canada's submission to CLCS. These funds, however, drop significantly after March 31, 2012. As well, DFAIT has only received funds until 2011-12. The mandate of all three departments is to deliver Canada's submission in 2013 and to maintain sufficient data and expertise to engage with the Commission when it considers Canada's submission, which is anticipated to be some years later. Retention of sufficient capacity to cover the period immediately prior to Canada's filing of its submission with the CLCS and to support follow-up activities to filing is a significant issue for all three federal departments.

1.5 Previous Evaluation Findings

The first formative evaluation was completed in 2009 and covered the Program's activities from April 2004 to December 2008. Findings indicated that the Program was relevant to the mandates and priorities of all three participating federal departments (DFO, NRCan and DFAIT) as well as to the strategic priorities of the Government of Canada. The Program was considered to be well-designed with an appropriate delivery mechanism, cost-efficient, effective and engaged governance structure. The Program identified risks and implemented mitigation strategies. Given that the Program's main focus was on the acquisition of scientific information, significant progress was made to complete data collection as planned. At the end of December 2008, 45% of the time allocated for data acquisition had elapsed, while 43% of the work was completed and 38% of funds expended.

Two recommendations were presented. The first recommendation noted the need for detailed performance reporting to address the percentage of activities completed as compared to planned objectives. The evaluation also recommended that a proactive financial and human resources management approach continue to ensure funding levels remain sufficient, which is especially pertinent for DFAIT since the department has no funding past March 2012.

1.6 Evaluation Objectives and Scope

The specific objectives of this second formative evaluation are as follows:

- To evaluate the relevance of the Program by assessing its continued need, its consistency with federal roles and responsibilities and the extent to which it is aligned with federal government priorities and with the strategic priorities of participating departments; and,
- To evaluate the Program's performance in achieving its objectives efficiently and economically with its allocated resources.

This second formative evaluation covers the time period from January 2009 to March 2011 and focuses its assessment of progress towards achievement of its scientific expected outputs on Program activities related to the Arctic region,⁶ although any outstanding data collection activities in the Atlantic were also examined. In addition to assessing the Program's progress in achieving its scientific expected outputs, this second evaluation examined the activities of the dedicated legal unit at DFAIT and progress towards achievement of its legal and diplomatic expected outputs.

⁶ This complements the last formative evaluation that focussed on the Program's scientific activities and expected outputs for data collection in the Atlantic region.

2.0 EVALUATION METHODOLOGY

2.1 Evaluation Design

The conduct of the evaluation was guided by an Evaluation Advisory Committee (EAC) comprised of representatives from the Continental Shelf Division at DFAIT, the UNCLOS Program at NRCan, DFO's Law of the Sea Project, and representatives from the evaluation divisions of the three participating departments.

Although available quantitative data were examined, this evaluation relied more heavily on qualitative research methods to obtain evidence to support findings. Qualitative analysis is more appropriate to capture the full performance story of the Program given that its expected outputs and outcomes (e.g., coordination with states, tracking of CLCS practice and state best practices) cannot be meaningfully quantified.

A review of program documents was used to assess the Program's relevance and performance. Financial information was examined to explore economy and assess efficiencies for the collection of scientific and technical data as well as for the overall management of the program. Face-to-face interviews (n=13) were conducted with senior management and stakeholders to obtain views on issues related to accountability and governance as well as scientific, legal and diplomatic issues affecting the Program's performance. An onsite visit to the Bedford Institute of Oceanography (BIO) in Dartmouth, Nova Scotia supplemented the evidence collected through document review and interviews. These data were triangulated to explore the convergence and divergence of evidence from the different methods used and to identify areas for further examination, strengthening the findings.

2.2 Data Collection

Data collection for this evaluation occurred from January, 2011 to April, 2011.

2.2.1 Evaluation Framework

This formative evaluation was structured around an evaluation framework that presents a summary of the following:

- The main themes and issues that were covered by the evaluation including the specific evaluation questions; and
- The sources of data and methods for collection.

This framework acts as a general guide for the evaluation and provides the basis for data collection.

2.2.2 Lines of Evidence

The evaluation collected evidence primarily through document review and key informant interviews, supplemented with an onsite visit to the Bedford Institute of Oceanography (BIO) in Dartmouth, Nova Scotia, to observe Program activities firsthand.

Document Review

Key documentation related to the CLCS and the preparation of the submission was reviewed. These documents and files included:

- United Nations Convention on the Law of the Sea (UNCLOS);
- CLCS-specific documents, including the Rules of Procedure, Modus Operandi, Scientific and Technical Guidelines;
- Results-based management information (logic model, governance structure, performance reports);
- Program-related corporate documents (DPR, RPP, information on activities and outcomes; annual performance reports - DFO, NRCan, and DFAIT);
- Inter-departmental documents (MOUs; documents relating to inter-departmental governance and operational arrangements such as the terms of reference for the ADM Steering Committee, Federal Advisory Committee, and Management Board; major correspondence);
- First Formative Evaluation (DFO, 2008);
- Financial management records and data;
- News articles (2008-10; public websites of the departments);
- Documentation prepared for interdepartmental committee meetings (e.g., records of decisions); and
- Relevant websites.

Key Informant Interviews

Interviews with 13 key informants took place. Interviews were conducted with members of the ADM Steering Committee and the Program Management Board as well as key program management and delivery staff from DFO, NRCan and DFAIT.

A field visit to the Bedford Institute of Oceanography (BIO) provided an opportunity to conduct interviews with Program staff onsite, review key budgetary and sensitive documents as well as observe key operations.

Data Analysis

Data were analyzed from both primary and secondary sources and were triangulated to determine the findings and conclusions. Evaluation results were validated with the EAC.

2.3 Limitations

The nature and scope of the Program dictated the kinds of evaluation methods that could be used. Given that the Program is contained to a relatively small number of key players within the Canadian federal government and internationally, the use of quantitative methods such as surveys and experimental designs was limited. As well, the Program operates within a changing environment both in terms of evolving CLCS practices and Canada's relations with other states. As a result, qualitative analyses were better suited to capture a full understanding of the Program's performance story. Quantitative data, however, were used where available (e.g., financial information).

This second formative evaluation relied heavily on interview data across a limited number of key informants to demonstrate relevance and performance. While these key informants were identified as being the most knowledgeable of the Program, their views may be inherently biased because of this intimate knowledge. Interviews with scientists in the international scientific community, with members of the CLCS or with coastal states and other parties to UNCLOS were not possible since it is imperative to maintain the integrity of Canada's approach and reduce any potential for the disclosure of Canada's position or any action that may compromise Canada's submission. Therefore, interview data were triangulated with data collected through document reviews and from data collected through the field visit. This was done to reduce a potential for bias and to strengthen findings.

3.0 RELEVANCE

3.1 Issue 1: Continued Need for the Program

Finding #1: The Program continues to be needed for Canada to fulfill its obligations as a party to the United Nations Convention on the Law of the Sea (UNCLOS).

Canada signed the United Nations Convention on the Law of the Sea (UNCLOS) in 1982 and ratified the Convention on November 7, 2003. As a party to UNCLOS, Canada is obligated to determine the full extent of its extended continental shelf. Article 76 provides a process and criteria for delineating the extended continental shelf beyond 200NM from coastal baselines while article 83 speaks to delimitation of the continental shelf between states with opposite or adjacent coasts. Under annex II, article 4 of UNCLOS, Canada has ten years (until December 6, 2013) to make a submission to the Commission on the Limits of the Continental Shelf (CLCS), including all supporting scientific and technical data. By virtue of subsequent decisions taken by the Meeting of States Parties to the Convention, this deadline can be satisfied by the provision of preliminary information indicating an intention to make a submission. The Program continues to be needed to collect and analyze data, to prepare Canada's submission and all supporting documentation and to engage with the CLCS to present and defend the submission.

Finding #2: Delineation and delimitation of Canada's extended continental shelf beyond the 200NM limit will determine with precision where Canada may exercise its existing sovereign rights over the natural resources of the seabed and subsoil. This could have long-term economic and environmental benefits for the country.

Article 77 of UNCLOS reflects the sovereign rights of coastal states over the continental shelf for the purpose of exploring it and exploiting the natural resources of the seabed and subsoil. Evidence from interviews identifies the potential for future economic benefits through successfully delineating and delimiting Canada's boundaries beyond the 200NM limit. Drilling off the eastern coast of Canada has already taken place and the unexplored potential for oil and mineral deposits in the Arctic seabed remains to be realized. A successful Canadian submission to the CLCS would secure international recognition for the outer limits of Canada's extended continental shelf, bringing legal certainty to exploration and exploitation activities.

Evidence from interview data and documents also suggests that additional long-term benefits could be derived for the environment. As a coastal state, Canada has jurisdiction over certain activities on the extended continental shelf such as drilling (UNCLOS article 81) and the obligation to adopt laws and regulations preventing pollution from seabed activities (UNCLOS article 208). Clearly defining where Canada

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may exercise this jurisdiction and international recognition of this area will help minimize negative impacts on the environment. According to interviewees, this regulation of activities could have positive long-term environmental impacts that reach beyond the Program's outcomes, particularly in the Arctic where the environment is more fragile.

Finding #3: The Program continues to be relevant to improving the understanding of the Arctic seabed through its scientific contributions as well as its technological innovations such as a seismic array and an Autonomous Underwater Vehicle (AUV) both modified to collect data under ice.

Although the primary objective of the Program is to prepare the Canadian submission to the CLCS to delineate Canada's extended continental shelf, program activities have also contributed significantly to the body of scientific research on the Arctic. It is difficult to conduct scientific research in the Arctic due to the harsh weather and ice conditions in the North and there is a paucity of scientific information and understanding of the Arctic region. The Program's data collection activities, therefore, have made important scientific contributions towards a deeper understanding of the Arctic seabed.

Evidence from interviews and documents indicates that the Program has uncovered new details on the morphology of the continental shelf through its scientific surveys and has explored a previously unknown Arctic seamount.⁷ All interviewees who were knowledgeable about the Program's scientific data collection activities reported that these data are of good quality and provide valuable insights on areas of the Arctic that were unknown. Because these data collection activities are the first time certain areas in Arctic waters have been explored to this extent, new scientific information is becoming available on the formation of the Arctic Ocean. According to some interviewees, this scientific discovery and exploration contributes new knowledge for the scientific community and has contributed to a rejuvenation of interest in Arctic research.

In addition to its scientific contributions, the Program is also relevant through its technological innovations. For example, a seismic system was modified⁸ to collect high quality data under extremely difficult conditions with solid ice coverage. The Program indicated that this was the most important innovation since this seismic system allowed the collection of large amounts of high quality seismic data in the Arctic, which is anticipated to form the cornerstone of the Arctic section in the Canadian submission.

⁷ This previously unknown Arctic seamount was discovered by the *United States Coast Guard Cutter (USCGC) Healy* during the third joint survey with Canada in 2009. Samples were taken from the seamount during a subsequent expedition in 2010.

⁸ Some of these modifications are out of scope for this evaluation. The seismic system was first tested in 2006 and modified in 2007, with ongoing improvements every year from 2008 to 2010. The improvements increased the reliability (from a non-stop operation of several hours in 2007, before repairs were required, to over 60 hours non-stop in 2009), the quality of the data (by changing the depth of the equipment towing below the ice), and the towing system (which allowed much faster deployment and recovery of the system).

Autonomous Underwater Vehicles (AUVs) were modified to function effectively in deep and frigid Arctic waters. Interview data suggest that these modifications provided innovative technological advances for data collection that can be applied in other circumstances and environmental conditions, thereby increasing the potential for future scientific discoveries.

3.2 Issue 2: Alignment with Government Priorities

Finding #4: Program objectives and activities are aligned with federal priorities.

Canada's Extended Continental Shelf Program was a commitment in the October 2007 Speech from the Throne.⁹ While not directly identified in the Speeches from the Throne during the evaluation period (2008, 2009 and 2010), the Program's activities and objectives contribute to the strategic priorities captured in these Speeches related to the Government's sustained focus on the North and exercising Arctic sovereignty.

The evaluation found that program activities were also aligned with Canada's 2009 Northern Strategy and the 2010 Arctic Foreign Policy (both of which directly identify the Program). Media releases by federal ministers provide further evidence that the Extended Continental Shelf Program is aligned with federal priorities. These releases noted the priority of the federal government to enhance knowledge and understanding of the Arctic and its dedication to determining where Canada can exercise its sovereign rights over seabed resources.

Funding commitments also demonstrate evidence of the Program's alignment with federal priorities with a total of \$109 million provided through Budgets 2004 and 2008.

In addition, all interviewees agreed that the Program contributes to the Government of Canada's strategic priority to exercise sovereignty in the Arctic. Interviewees also reported that the Program's contributions extend beyond sovereignty issues by supporting federal priorities for:

- economic development through the potential for untapped natural resources within Canada's extended continental shelf;
- international diplomatic relations through the Program's co-operation with other states; and

⁹ The 2007 Speech from the Throne is out of scope for this formative evaluation.

- environmental sustainability, conservation and protection through the new scientific data and information on marine conservation¹⁰ collected by the Program.

As well, the Program was invited to speak in front of Cabinet Committees on three or four occasions with other experts from academia and industry, underlining the interest of Parliament and the Senate in Program activities.

Finding #5: Program objectives and activities support the priorities of participating departments.

Corporate documents,¹¹ covering 2008-09 to 2010-11, demonstrated that Program activities and objectives are aligned with the priorities of participating departments. For NRCan, this Program supports Canada's Arctic strategy and resource development in the North, specifically through continued geoscience and related seabed mapping activities. For DFO, this Program contributes to ensuring sustainable development of fisheries and oceans and implementing Canada's Northern Strategy such that Canada's northern waters can be used and off-shore resources exploited. For DFAIT, this Program contributes to shaping the international agenda to Canada's benefit and advantage in accordance with Canadian interests and values.

The Program has also been fully integrated into approved Program Activity Architectures (PAA) of each participating department. The Program has been integrated into NRCan's "Sovereignty and legal boundaries," into DFO's "Safe and Accessible Waterways" and into DFAIT's "International Legal issues Policy Development" sub-sub-activity levels within each department's respective PAA. The Program is also integrated into each department's budget and planning process.

¹⁰ The collection of data on marine conservation was not part of the Program's objectives but this data collection was completed since it could be accommodated during the survey and there was added scientific value.

¹¹ Report on Plans and Priorities, Departmental Performance reports and Program Activity Architecture.

3.3 Issue 3: Consistency with Federal Roles and Responsibilities

Finding #6: The Program is aligned with the roles and responsibilities of each participating department given their respective legal and mandated responsibilities.

The Program is aligned with the roles and responsibilities of each of the participating departments, as outlined in their respective legal mandates.

- *The Department of Natural Resources Act (1994)* gives NRCan responsibility for federal resource policies and science and technology that support the sustainable development and competitiveness of the energy, minerals and metals sectors. This Act also enables the federal government to address resource issues in a comprehensive manner from a national perspective. Program activities that explore the physical boundaries for potential federal resources within the seabed and subsoil are aligned with these responsibilities of the department.
- *The Department of Fisheries and Oceans Act (1978-79)* gives responsibility to the department for policies and programs in support of Canada's economic, ecological and scientific interest in oceans and fresh waters. The Department's guiding legislation includes the *Oceans Act*, which charges the Minister with leading oceans management and providing Coast Guard and hydrographic services on behalf of the Government of Canada. The scientific data collection activities of the Program in the Atlantic and Arctic oceans are aligned with these responsibilities.
- *The Department of Foreign Affairs and International Trade Act (1995)* mandates DFAIT, on behalf of Canada, to conduct and manage diplomatic and international relations, conduct all official communication between the federal government and any international organizations, and foster the development of international law and its application in Canada's external relations. Program activities that involve coordinating internationally with other states, communicating with the CLCS and running a candidate for the CLCS are aligned with these responsibilities.

Interview data support these findings from documents. Interviewees from each of the participating departments agreed that the Program is aligned with their respective departmental responsibilities, noting the responsibility of DFO over the oceans, NRCan over the seabed and subsoil, and DFAIT for international relations and law.

Finding #7: A federal role is essential and required because establishing the limits of the extended continental shelf and the coordination of related international activities fall outside the jurisdiction of other levels of government and organizations.

All interviewees indicated that they believed there is a clear federal role for the Government of Canada to deliver the Program, noting that rights and jurisdiction over the extended continental shelf lie with the federal government under Canadian law as does the responsibility for determining Canada's international boundaries. Interviewees also indicated that they were unaware of any other organizations or levels of government that could deliver Program activities. The objectives of this Program fall outside the jurisdiction of provincial or territorial governments and are a federal responsibility that cannot be delegated.

4.0 PERFORMANCE

Since this is a formative evaluation, focus was placed on operational issues around efficiency and economy and the achievement of expected outputs. Progress towards the achievement of expected outcomes was also assessed, where possible.

4.1 Issue 4: Achievement of Expected Outcomes

Finding #8: The Program has made progress towards achieving its expected outputs and is on track to complete a Canadian submission by December 2013, with a clear mandate and objectives to guide this progress.

Evidence from interviews and document review indicates that the Program's objectives, mandates and expectations of results are clear. Interviewees indicated that article 76 of UNCLOS, the Commission's technical guidance, and CLCS practice provide a framework for submission preparation and an indication of what constitutes the "recipe" for a successful submission. The Program also has a logic model identifying intended outputs and outcomes that interviewees reported is relevant for defining program objectives. The Program also uses a detailed and evolving GANTT chart for planning that outlines specific tasks to help the Program remain on-track to prepare and file a Canadian submission in December 2013.

There is demonstrated evidence that the Program is on track to achieve its intended outputs. At the end of the first formative evaluation in December 2008, approximately 40% of data acquisition activities had been completed.¹² From January 2009 to March 2011, 100% of data collection was completed for the Atlantic and most of the Arctic regions, except for approximately 30% of bathymetric data in the Eastern Arctic that remained.¹³ The high quality of this data is imperative for a successful Canadian submission. Analyses of these data have been ongoing to inform additional data collection activities, for inclusion in the Canadian submission and for publication and presentation to the scientific community.

This evidence is described in more detail in the following sections, by expected output: scientific data, information and papers; cooperation with states; tracking CLCS practice and State best practices; advancing Canadian interests related to its submission in the broader UN context; and completed Canadian submission.

¹² Department of Fisheries and Oceans (2009). *An Evaluation of Canada's Submission to the Commission on the Limits of the Continental Shelf Under the United Nations Convention on the Law of the Sea (The Continental Shelf Program)*

¹³ *Canada's Extended Continental Shelf Program: Performance Report for 2009 and Canada's Extended Continental Shelf Program: Performance Report for 2010.*

Scientific data, information and papers

The scientific data to support the Canadian submission have been collected by Canada alone, collected jointly with other coastal states (U.S. and Denmark) or purchased from other countries (Denmark). Arctic data on the extended continental shelf have been collected using four methods: by using individual seismic recorders set up in sequence on the ice and using explosives to generate sound waves; by using icebreakers to break through the ice and high pressured air to generate sound waves, whose reflections are recorded by towed recording systems;¹⁴ by using helicopters to land on ice and measure water depths at individual locations (spot soundings); and by operating autonomous underwater vehicles (AUVs) from ice camps or icebreakers to maneuver through the water under the ice to record the contours of the oceanic seabed. These data were collected as a result of innovative approaches and new technologies developed by the Program.¹⁵

100% of planned data collection in the Atlantic was completed by 2009. All three major data acquisition surveys were completed under contract to the private sector¹⁶ and a portion was acquired through the purchase of existing data from Denmark. Preliminary analysis of the Atlantic data continued through 2010 and has not yet identified any areas requiring additional data to significantly strengthen the submission.¹⁷

Although the Program contracted out data collection activities in the Atlantic, this was not possible in the Arctic due to the different methods required for data collection in this harsh climate. There are no privately owned icebreakers and no company in the private sector has demonstrated that they have the necessary experience in seismic data acquisition in ice covered waters.

As described in Table 3, the Program had completed almost all of its planned scientific data acquisition in the Arctic Ocean as of 2009-10. In the Western Arctic, the Program collected approximately 84% of the required data by the end of 2009 and almost 100% by the end of 2010. The 2009 joint survey with the U.S. using the *Canadian Coast Guard Ship (CCGS) Louis S. St-Laurent* and the *United States Coast Guard Cutter (USCGC) Healy* icebreakers yielded approximately 50% more data than was planned,

¹⁴ These recording systems are more formally called, "hydrophones."

¹⁵ Refer to Finding #3.

¹⁶ Data acquisition in the Atlantic was commissioned by NRCan and DFO. This was possible because there are survey companies in the private sector with the required resources. Arctic data could not be acquired through private companies because of differing requirements (e.g., icebreakers to break through Arctic ice).

¹⁷ *Canada's Extended Continental Shelf Program: Performance Report for 2009 and Canada's Extended Continental Shelf Program: Performance Report for 2010.*

although the Program reports not all of these data are relevant to identify the outer limits of the extended continental shelf.¹⁸

Table 3: Status of Data Acquisition in the Arctic Ocean, 2009-10 (% complete)

Area	Data type	Plan	2009	2010-addition	2010-cumulative
Eastern Arctic	Seismic (Refraction)	1065 km	1065 km (100%)	--	1065 km (100%)
	Seismic (Reflection) ^a	--	45 km	--	
	Bathymetry	7500 km	3910 km (52%)	1125 km	5035 km (67%)
Western Arctic	Seismic	7200 km	6075 km (84 %)	1045 km	7120 km (99%)
	Bathymetry	8100 km	6800 km (84%)	1080 km	7880 km (97%)

Source: *Canada's Extended Continental Shelf Program: Performance Report for 2010*

^a No reflection seismic data were planned in the Eastern Arctic because the natural prolongation of the ridges are best captured through refraction seismic and bathymetric data. However, the Program was able to partner with Denmark to acquire additional data for the Eastern Arctic.

The fall 2010 joint Canada-U.S. survey in the Western Arctic was not as successful, however. Two medical evacuations were required during this trip, resulting in loss of time to acquire data. While bathymetric data could be collected during the evacuation to port, seismic data could not be collected due to the higher speed of the vessel. As well, this high speed may have compromised the quality of this bathymetric data and the Program has planned to redo this data collection during the 2011 survey.¹⁹

As described in Table 3, 100% of refraction seismic data collection was completed in 2009 as planned but more than 30% of planned bathymetric data collection remains for the Eastern Arctic. In 2009, Canada conducted joint surveys with both the U.S. and Denmark. Bathymetric data were collected with Denmark near Ward Hunt Island and off Alpha Ridge. An aero-gravity survey was conducted with Denmark north of Ellesmere Island to define the continuity of the structures of the Lomonosov and Alpha Ridges as well as a seismic/bathymetric survey on board the Swedish icebreaker, *Oden*

¹⁸ *Canada's Extended Continental Shelf Program: Performance Report for 2009*, p.6.

¹⁹ *Canada's Extended Continental Shelf Program: Performance Report for 2010*, p.4-5. The 2011 survey is scheduled for August/September and is out of scope for this evaluation.

(LOMROG II),²⁰ to collect data on the Lomonosov Ridge near the North Pole.²¹ In spring 2010, bathymetry data was collected in the Eastern Arctic using helicopters from an ice camp near Borden Island; during this operation, the AUVs were used for the first time but data acquisition was hampered by bad weather. According to the 2010 Performance Report, only approximately 25-30% of the overall planned data were collected due to delays getting started and ongoing weather delays.²²

The Program, therefore, planned a survey for autumn 2011 to complete the remaining data collection for the Eastern Arctic. According to interviewees, data collection is on track and will be completed on time, despite some delays, and contingency plans are in place to continue data collection activities in 2012 if the 2011 fieldwork is not successful. This 2012 excursion is planned in the Program's work plan for August/September 2012, if necessary, with analyses of these data and related writing to be completed by year's end.

Evidence demonstrates that the Program is producing strong scientific data to support the Canadian submission. While the CLCS requires that the outer limit be determined by points that are no further apart than 60NM, the Program has gone beyond these requirements and collected data along profiles that are roughly 40NM apart. This increases the overall number of data points to be included in the analyses, thereby providing stronger scientific evidence for the delineation of the extended continental shelf. Interviews also demonstrate that these scientific data are strong, with most interviewees involved in data collection activities reporting that the Program has exceeded the minimum data targets set by CLCS and expressing confidence in the Program's scientific data. The quality of these data is also validated by the Program through comparisons to data collected by other countries.

Most interviewees reported that they think Canada will be able to prepare a successful submission to the CLCS by December 2013. As a strategy to improve the likelihood of a successful submission, the Program is making a concerted effort to publish scientific papers in peer-reviewed publications using these data. According to interviewees, the credibility of the science that supports the Canadian submission will be strengthened if the Program's data are accepted by the international scientific community through peer-reviewed publications and presentations. To this end, the Program has published four papers during the scope of this evaluation, with two more papers in press at the time of this evaluation, and completed 33 scientific presentations at conferences. In addition, 3 open files have been produced (technical, detailed and often lengthy public documents) and approximately 40 presentations have been given to a wider audience, including

²⁰ The Swedish icebreaker was chartered by Denmark to conduct this survey. Canada was a junior partner in this data collection activity.

²¹ *Canada's Extended Continental Shelf Program: Performance Report for 2009*, p.6.

²² *Canada's Extended Continental Shelf Program: Performance Report for 2010*, p.4.

briefings and public lectures. All of these publications are multi-authored and over 75% are with international collaborators. By 2010, more than 75% of the data collected had been presented.²³ These data will be released in the public domain after publication of the scientific paper, following the Program's modified policies around the public disclosure of data.²⁴ / ²⁵

Cooperation with states (submission co-ordination, overlaps)

Canada has cooperated with Denmark and the US to conduct several joint missions for data collection in the Arctic under MOUs concluded for this purpose. Since 2009, Canada has cooperated with Denmark on four data acquisition projects in the Arctic and Atlantic. In 2009 and 2010, Canada conducted the Program's second and third joint surveys in the Arctic with the U.S. using both Canadian and American icebreakers. Joint data collection saves time and resources and also minimizes duplicate data collection in sensitive environmental areas. The two ships complement one other in the type of data collected since the *CCGS Louis S. St-Laurent* collects seismic data and the *USCGC Healy* collects multi-beam bathymetry data. The quality of data (especially seismic) was improved by having one vessel break ice while the other collected data. Interviewees contend that collaboration with coastal states increases the credibility of the science supporting the Canadian submission since coastal states will be using the same information in their submissions. If coastal states engage in data collection activities together, there is less likelihood for disputes around the science when delimiting overlapping areas of the extended continental shelf.

Interview data suggest that progress on the Canadian submission has been facilitated through continued cooperation with other states. This is supported through Program documents that indicate Canada has engaged with Denmark, the U.S. and Russia.²⁶ For example, meeting minutes and interview data demonstrate evidence of Canada-U.S. and Canada-Denmark meetings to plan data collection activities. Program documents indicate that Canada and the US are engaged in a dialogue of experts regarding the Beaufort Sea maritime boundary and the extended continental shelf. Documents also

²³ *Canada's Extended Continental Shelf Program: Performance Report for 2010*, p.5.

²⁴ The Program originally recommended that its data be released after the Canadian submission has been reviewed by the CLCS. This view has changed, however, partly in light of the now much lengthier time before the review is expected to occur. The release policy is being revised so that data can be released after they have been analyzed and published, provided that, in the case of joint ownership with either Denmark or the US, the partner agrees to the release.

²⁵ The U.S. Extended Continental Shelf Task Force makes its data publicly available within a period of months following collection. Interviewees note, however, that there is mutual understanding between Canadian and U.S. Programs on the different policies governing these data and efforts are made by both countries to practice due diligence when releasing data.

²⁶ The U.S. is not party to UNCLOS but is collecting data on the extended continental shelf and engaging with coastal states.

demonstrate that, through a Joint Task Force, Canadian and Danish Extended Continental Shelf Programs are exploring issues such as coordinating submissions to the CLCS.

Tracking CLCS and State best practices

Program documents indicate that Canada is applying the Convention, the CLCS Guidelines and the Rules of Procedure in good faith and with what the Program believes to be the most appropriate and reasonable interpretation. However, given what interviewees identified as the evolving nature of CLCS processes and approaches for submissions, the Program is implementing a multi-level approach to prepare a successful Canadian submission by tracking CLCS practices and observing best practices from other parties.

The Program completed a detailed review of all materials filed with the CLCS by 2010 and identified trends from the 54 submissions, 11 recommendations, and 45 filings of preliminary information and communications made by states.²⁷ Interviewees reported that these reviews are used to make observations on CLCS practices from the Canadian perspective and to assess the optimal method for preparing and presenting Canada's submission. For example, the Program examined available recommendations to gain insight on how the CLCS has treated various morphologies of the extended continental shelf, where certain interpretations of prolongations of seafloor features like ridges were accepted and where they were rejected in order to apply to the Canadian context.

As well, the Program has been observing the Commission's progress in its submission review process since this has implications for the Program. Evidence suggests that, given its current workload, the CLCS may experience significant delays in reviewing Canada's submission. Some interviewees estimate a delay of decades and note the implication for planning and available resources, and the negative impacts this may have on Canada's likelihood for a successful submission.

The Program's strategic approach also includes obtaining lessons learned from other parties to UNCLOS who have already submitted to CLCS. Interviewees noted that this guidance from successful parties is fundamental to help improve Canada's understanding of CLCS expectations and processes and is also helpful regarding submission structure, format and presentation.

²⁷ *Canada's Extended Continental Shelf Program: Performance Report for 2010.*

Advancing Canadian interests in the broader UN Context

Program documents indicate that Canada has engaged in the meetings of States Parties to the Law of the Sea, including an ad hoc working group, regarding the workload of the Commission. Program documents and interviews also show that Canada is seriously considering running a candidate for the Commission on the Limits of the Continental Shelf in the June 2012 elections and that the Program has engaged in the internal approval processes necessary to put forward a candidate. The Program has also begun to determine the mechanism by which a Canadian candidate could be remunerated if elected, as the nominating state must defray the expenses of its Commission member. If put forward and elected, the candidate would serve from 2012 to 2017.

Completed Canadian Submission

The additive effect of these outputs demonstrates that the Program has made clear progress towards a completed Canadian submission. Canada intends to complete and file a full submission to the Commission. Supporting evidence indicates that there is a preliminary draft of the first chapter of the submission that sets the legal and technical context for Canada. Interviewees reported that the Program is moving to its next phase: the analyses of data, the writing and production of the submission and its supporting documents and coordination with adjacent and opposite states. The analyses of data collected and coordination with coastal states have been ongoing but the Program's planning documents indicate that these activities will ramp up as it moves towards the preparation of the submission. DFAIT is expected to play a larger role as data acquisition is completed and as the Program moves towards the legal and peer review phase. According to the Program's approved milestone chart, legal and peer review of the submission should begin in the first quarter of 2012-13. All interviewees who were asked reported that they were confident that Canada would submit to the CLCS by the December 2013 deadline.

Finding #9: The heavy workload for the CLCS, changing weather conditions and unstable ice conditions in the Arctic, and the international political environment are external factors to the Program that have had or could have an impact on its performance.

External factors are circumstances outside the control of a program that could have an impact on its progress towards achievement of expected outputs and outcomes. For the Extended Continental Shelf Program, external factors that could affect the Program's performance in the future include the backlog for the CLCS in reviewing submissions that could result in delays for Canada. Weather and ice conditions in the Arctic impeded the Program's progress in data collection in 2009 and 2010 and high fuel costs for data collection in the Arctic created increased demand for financial resources. As well, the political relationships within the larger international context could have an impact on how

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Canada proceeds in eventual delimitation of potential overlaps of extended continental shelf.

CLCS Workload

Submissions to the CLCS are placed in a queue for review by the Commission. At the time of this evaluation, the CLCS had 40+ submissions in this queue to review. Given this heavy workload and the low, unpredictable funding situation for the CLCS, the Program is expecting serious delays for the CLCS to consider submissions later in the queue if the current pace of work is not accelerated. According to interviewees and Program documents, a Canadian submission filed in December 2013 may not be examined until 2030 given the CLCS' current workload. For Canada, the CLCS workload and related delays could have serious implications since most of the key officers currently involved will likely be retired or in other positions by the time Canada is required to engage with the CLCS on its submission review.

This delay has likewise created a number of concerns among other parties to UNCLOS, particularly around the logistical challenges and required resources for keeping a team together long enough to engage with the CLCS. Other concerns include the potential effect of delayed international recognition of outer limits established through the CLCS process on commercial exploration and exploitation. Parties to UNCLOS have raised concerns over these delays and have joined efforts to find a way to accelerate the work of the Commission.

This issue of CLCS workload has been considered without resolution at past meetings of States Parties to the United Nations Convention on the Law of the Sea (SPLOS). An informal, ad hoc working group of concerned states parties has also not been able to develop a clear solution but is due to report again to the SPLOS in June 2011. The Program has contributed to these efforts through participation on the informal ad hoc working group of parties created to address CLCS workload.

Weather and Ice Conditions

Canada faces unique challenges in surveying the Arctic seabed beneath ice-covered waters. The breaking up of ice can create dangerous conditions for ice camps far offshore as well as creating delays in data acquisition. Interviewees reported that the complexity and logistical challenges of data collection on ice in remote areas of Canada necessarily require well-trained officers and well-informed decision-making for the Program to collect good data. In the field, decisions need to be made quickly in response to rapidly changing weather and ice conditions to ensure personnel safety and to minimize financial loss for lost or damaged equipment due to weather and ice conditions.

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For example, changing and unstable ice conditions in the Eastern Arctic required the Program's remote ice camp to be evacuated in 2009 and equipment broke down frequently due to the harsh conditions, creating challenges for data collection. In 2010, storms and fog conditions hampered helicopter flights in and out of ice camps, causing further delays in data collection. As well, cracks developed in the ice floe on which the remote ice camp was located 300km offshore, creating additional risk to personal safety and data collection activities.²⁸

Although bad weather created challenges for the Program, interviewees also reported that unanticipated good weather conditions created other challenges for planning. Because of good weather, the Program was often able to collect more data than was scheduled.

International Political Environment

Both Program scientists and those involved in the legal component of the Program report that Canada's relationships with opposite and adjacent states are currently positive. This positive relationship creates an environment conducive to joint activities and cooperation, which in turn reinforces this positive relationship. This may assist in concluding a "without prejudice" or other appropriate arrangement to ensure the Commission considers Canada's full submission. Interviewees agreed that future cooperation on submission preparation will be facilitated by drawing on jointly collected data.

Finding #10: The Program actively assesses risks and develops risk mitigation strategies as part of its planning and program delivery. This has facilitated data collection activities and the Program's progress in the achievement of expected outputs.

Data from interviews and program documents indicate that the Program learns from the previous year's experiences in the field, assessing potential risks to data collection and developing mitigation strategies to address these risks. For example, the Program lost a week of data collection during the 2010-11 survey due to a medical emergency on the icebreaker. Because data are collected in remote areas in the North, ships must travel to areas accessible by plane or helicopter in order to transport the injured or ill to medical facilities. This results in loss of Program time in the field to collect data. The Program attempted to minimize this loss by collecting scientific information as the ship travelled to where the sick could be transported, but the required evacuation speed of the icebreaker was too fast to provide accurate and meaningful data. As a result, the Program planned to have a medical doctor on board the icebreaker for the 2011-12 survey to provide assistance during medical emergencies.

²⁸ Other countries report similar experiences in the Arctic. Russia had to evacuate their NP-37 ice camp in May 2010 due to melting ice.

Interviewees noted that contingency plans are always developed for data collection activities in the event that all of the planned data are not collected within the allotted time period in the unpredictable Arctic conditions. Support for this risk mitigation was found in program documents. According to the Program's milestones for data collection, another year of data collection in 2012-13 was tentatively planned for the Eastern Arctic if the 2011-12 field work was not successful.

For data collection, there is a constant risk that equipment will breakdown in harsh ice conditions. The Program developed plans of action to mitigate against this risk, ensuring that appropriate resources were available to complete the necessary repairs. On icebreakers in the Arctic, for example, the Program has a complete duplication of equipment to ensure that they can be immediately replaced if they break down. Data collection can then continue and repairs can be completed by skilled staff onboard. This approach minimized the risk of disruption to data acquisition in the field.

4.2 Issue 5: Demonstration of Efficiency and Economy

Finding #11: Overall, the governance structure of the Program is appropriate for reaching its objectives. Roles and responsibilities are well-defined and direct lines of reporting from directors to ADMs facilitate timely decision-making in response to unanticipated challenges. The DG-level Federal Advisory Committee has not convened since 2008 but this is generally not viewed as problematic for the Program's progress.

The responsible ADMs from each participating department sit on the ADM Steering Committee, which has typically met twice a year with alternating chairs across departments. Conference calls were also arranged to discuss urgent issues as required. Authority for decision making was shared equally among committee members but interviewees reported that leadership changes depending on the Program's life cycle. For example, DFAIT deferred to the scientific expertise of NRCan and DFO during the data collection phase and interviewees noted that DFAIT's role on the Committee will become increasingly important as the Program moves towards the analyses and preparation of the submission. Some ADMs noted their appreciation of their direct access to the working-level, technical experts, which helped them to understand the situation or issues more clearly and to make quick decisions, particularly when dealing with the Arctic. Committee members recognized the need for flexibility and open dialogue for decision-making, debating on key challenges and issues but acknowledging the need for agreement or consensus to achieve Program objectives. Some interviewees noted that more senior management involvement will likely be required as the Program prepares the submission.

The Management Board consists of directors from NRCan, DFO and DFAIT who are responsible for the day-to-day activities of the Program. Formal teleconferences were held weekly with board members to discuss specific management issues. Larger meetings were held with the entire team at the Bedford Institute of Oceanography (BIO) approximately every three to four months to discuss broader issues, depending on need. The Management Board briefed the ADM Steering Committee directly on significant issues for decision-making.

While the ADM Steering Committee and the Management Board were active, the DG-level Federal Advisory Committee has not met since 2008. Some DGs noted that this DG level committee may have stopped meeting because of high turnover among the DGs or simply because the meetings were not scheduled. This Federal Advisory Committee provided policy advice during the early years of the Program but most interviewees reported that the committee is no longer relevant or advantageous for meeting its objectives given the Program's current, more technical and legally-focussed, activities. Interview data suggest that there is no immediate need for formal, DG-level meetings since the directors on the Management Board are experienced officers and reportedly do not require extensive advice from the DGs. Some DGs reported that directors newer to the position may require more DG-level involvement to mitigate against potential risks but the lack of an active formal DG-level committee within the governance structure does not seem to affect the progress of the Program.

While the level of involvement of this Federal Advisory Committee declined, DGs from NRCan, DFO and DFAIT responsible for the Program continued to be actively engaged. Responsible DGs across participating departments were regularly updated on the Program's progress and acted in an advisory capacity as required. Responsible DGs reported that they were sufficiently briefed on the Program and there were regular discussions at the DG-level via informal channels. Some interviewees indicated that more communication across departments and across all levels will likely be required to increase as the Program's preparations for submission accelerate, noting that this may require more formal mechanisms for information exchange and more face-to-face meetings.

All interviewees felt that their respective departments were sufficiently engaged in the governance of the Program and that the existing governance structure was appropriate. Evidence demonstrates that the governance of the Program is facilitating its progress towards expected outputs and outcomes. Roles and responsibilities were clearly understood by all Program officers, with cohesion across the departments at the ADM level, despite some turnover, and observed unity in the team at the working levels.

Finding #12: Structural and operational changes were implemented within each participating department to enhance efficiencies.

Earlier in the program life-cycle at NRCan, the Program was delivered through the Geological Survey of Canada in the Atlantic region as part of a larger suite of geoscience research. A separate Director of UNCLOS position, however, was created in March of 2008, specifically dedicated to the Program in anticipation of upcoming demands. Similarly, a Continental Shelf Section dedicated to the Program was created in the Legal Bureau at DFAIT in September 2008, which evolved into the Continental Shelf Division in March 2009.²⁹ At DFO, operational changes in the reporting structure were made such that the Director of the Law of the Sea Project reported directly to the Director General at headquarters rather than reporting to the Regional Director General, as is customary.

Evidence demonstrates that these structural and operational changes were implemented to improve the Program's efficiencies. Interview data suggest that it became apparent to the key players involved that the demands for collecting necessary scientific information and preparing the Canadian submission would require dedicated teams. Interviewees reported that, given that the Arctic Strategy is a priority for the federal government and the contributions that the Program makes to this strategy, creating the operational and structural mechanisms to facilitate the Program's progress was strategic and advantageous. Interviewees from DFO, for example, reported that circumventing the usual reporting structures and associated procedures from officers to the Regional Director General improved communication and direct access to senior management, streamlining activities. These changes facilitated progress towards expected outputs and increased efficiencies for the Program.

Finding #13: Human resource capacity is fundamental to the Program's performance but there is no formal succession planning strategy in place, despite expressed concerns that the CLCS process could be severely delayed.

There is unanimous agreement among interviewees that the Program's success is dependent on its officers. All interviewees noted that the personalities involved enhance the Program's performance. Leadership and guidance in the Program is strong, balanced against a respect for expertise offered at the working levels. Senior management noted that the directors of the Program are extremely capable and adept at planning, knowing when and how to brief them on key issues, identifying concerns quickly and efficiently, and anticipating areas to address for the future. There were

²⁹ The need for a dedicated legal team at DFAIT was identified in the original funding request for the Program, although some interviewees noted that they did not anticipate the level of effort that would be required from these legal experts during the data collection phase. It had been anticipated that the legal unit would be primarily involved during the latter part of the Program when preparing the submission.

serious discussions when key decisions were required but a spirit of professional cooperation and cohesiveness was the underlying principle that guided these deliberations at all levels of the Program and across participating departments, both in the field and at HQ. This collegial relationship was also observed firsthand during the site visit to BIO.

Some concern was expressed, however, that the Program's reliance on its key players may create a knowledge gap and lack of expertise in the future. The Program currently has sufficient scientific and legal expertise to address its performance needs but, given the anticipated lengthy delays for the CLCS to review the Canadian submission and given that the most knowledgeable officers may be retired when Canada is called to engage with the Commission, a lack of continuity within the Program could be an impediment to success. Adequate knowledge and history on the Program may not be available to support the submission and respond to CLCS recommendations in the future.

Interview data suggest that the Program is aware of this potential knowledge and expertise gap but there is no clear evidence of a formal succession plan to address human resource capacity in the future. Interviewees expressed their concern over the lack of a robust plan, noting the challenges in building on expertise and knowledge since the Program has experienced difficulties in retaining younger scientists to continue the work and most people in the Program are approaching retirement. Corporate memory has to be safeguarded and made available to the Program in the future, beyond the maintenance of data and technologies for data retrieval for the presentation to the CLCS.

Finding #14: There is ongoing communication and effective information sharing at all levels. Evidence also demonstrates that outreach activities help the Program engage with interested external stakeholders and that more formal involvement is not required at this time.

Evidence from interviews and program documents demonstrate that the Program is effectively sharing information and maintaining communication with its key stakeholders. The Program circulates weekly information emails every Sunday evening to the ADM Steering Committee, describing in one or two bullets the Program's progress over the past week and areas for consideration in the upcoming week. Monthly updates are also produced (within DFAIT) as well as information decks containing detailed information on the Program's performance, priority areas and lessons learned. Senior management expressed their satisfaction with these tools for communication and information sharing. Annual performance reports³⁰ are also produced for the ADM Steering Committee,

³⁰ These annual performance reports are produced in response to the recommendations from the first formative evaluation in 2009.

detailing the Program's yearly accomplishments and lessons learned. Progress on data acquisition, data analysis and submission preparation is provided through these annual reports. When reporting up to Deputy Ministers of participating departments, common briefing notes were used to ensure that common messaging and recommendations were provided across departments.

Evidence, however, demonstrates that the sharing of information was sometimes impeded across participating departments because of incompatible networks or systems, particularly for classified documents. NRCan, DFO and DFAIT each have independent secure networks for their individual departmental material and providing interdepartmental access to necessary Program files was sometimes a challenge. Some interviewees reported that it was sometimes more efficient and effective to print out hard copies of documents and share these with Program colleagues. The Program has been proactive in overcoming these challenges but considerable frustration was expressed during interviews that incompatible platforms across departments delayed their work. The Program has since provided all NRCan and DFO officers responsible for submission preparation with access to NRCan's network system, facilitating the sharing of documents, data and information. DFAIT officers, however, are not part of this shared network and it is not clear how this will affect the day-to-day functioning of the Program.

The Program's communication and outreach activities also facilitate information sharing. The Program provided media interviews and joint media briefings with the U.S.,³¹ issued news releases and responded to a number of additional requests for media lines.³² Program officers were also invited to speak to Parliamentary Committees, provincial and territorial governments and universities about the data collected and the Program in general. As well, the Program has engaged with communities to share information, giving lectures to professional associations and organizing a contest for school children in Nunavut and the Northwest Territories to name the AUVs. A photographer accompanied the Program to an ice camp and a videographer travelled on the CCGS *Louis S. St-Laurent* icebreaker to document the field work in the Arctic for a larger audience.³³

Although the Program continues to inform external stakeholders and interest groups on issues around Canada's submission under UNCLOS, evidence suggests that there is no

³¹ The Program co-organized a technical briefing in 2009 and again in 2010 with the U.S. related to the joint Canada-U.S. survey in the western Arctic, which was attended by most major Canadian media outlets

³² Canada's Extended Continental Shelf Program: Performance Report (2010), p.8

³³ The photographer produced a photo-book of the ice camp and data collection activities and the videographer produced a CD/DVD depicting the Arctic environment. The photo-book was reviewed during the site visit to BIO while a copy of the CD/DVD was provided by the Program to support evaluation findings. Because the photo-book was produced on the photographer's own initiative, the Program was not involved in its distribution. The Program reports that the CD/DVD was shared with a larger audience during the 2010 Winter Olympics in Vancouver.

immediate need to involve these groups more formally in the Program. Interviewees reported that these external stakeholders have been satisfied with the current level of involvement and information sharing,³⁴ although some noted the potential for increased participation after the outer limits of the extended continental shelf have been established through the CLCS process.

Finding #15: Co-location for NRCan and DFO at BIO is essential to facilitate daily communication and management of activities among scientists. There is some concern that DFAIT is not also co-located, but it is unclear how this will impact the Program's performance as the submission is prepared.

Co-location of NRCan and DFO scientists at BIO in Dartmouth, Nova Scotia facilitated the governance and day-to-day management of program activities. Daily interaction was noted by interviewees to be critical for the Program to operate efficiently and effectively. This interaction was also observed firsthand during the site visit to BIO. Interview data indicate that these informal lines of communication facilitate the more formal mechanisms in place, which ultimately enhances the exchange of information overall. This is likely to be further enhanced with the move to shared office space at BIO among core NRCan and DFO Program officers involved in the preparation of the submission.³⁵

Some concern was expressed that DFAIT is not co-located with the scientists. DFAIT officers visited BIO for meetings every few months during the data collection phase but evidence suggests that demands may increase for the legal component as the Program moves towards data analyses and submission preparation. DFAIT is expected to play a bigger role in coordinating with opposite and adjacent states as the Program prepares the submission. There are, however, some benefits to having at least one component of the Program located in Ottawa with easier access to other government operations as well as foreign Embassies. Interview data suggest that the Program is generally satisfied with the current arrangement but officers acknowledged that some changes may be required as the Program moves closer to submission, including enhanced capability for virtual collaboration and document sharing.

³⁴ This is an expressed view of Program officers. No external stakeholders were interviewed for this evaluation due to the Program's concerns around potential disclosure of confidential information during the data collection process.

³⁵ NRCan officers were the first to occupy the shared offices at BIO in 2009. DFO officers who occupied these shared offices were primarily located in Ottawa and St. John's, and used this shared space when at BIO. It was only at the beginning of 2011 that DFO staff from BIO moved in.

Finding #16: Overall, the Program is practicing sound judgment and observing fiscal responsibility in its financial spending.

Table 4 describes Program spending for the years from 2008-09 to 2010-11. In general, the Program spent 96.8% of its planned budget. Almost 100% of the funds allocated for scientific data collection were spent or re-profiled to subsequent years, in the case of postponement of surveys, compared to one-third of funds allocated for legal and diplomatic activities (approximately 33%). Program funds were first provided to DFAIT in 2008-09 but funds arrived very late in the fiscal year (March 2009), which may account for some of the under-spending.

Most interviewees reported that the scientific component of the Program was sufficiently funded to meet its data collection needs. Overall, NRCan and DFO exhausted all salary dollars and spent approximately 99.7% of their operational budgets across all fiscal years within the scope of this evaluation. According to interviewees, the Program spent a high proportion of O&M funds on equipment purchases and most agreed that this was a good investment of program funds. Renting the specialized seismic equipment and AUVs required for data collection was expensive and was not viewed as being more economic than purchasing. Higher quality but more expensive equipment was purchased rather than the least expensive models because the higher quality equipment tended to break down less frequently in the harsh Arctic weather and ice conditions. Time and money were lost when data collection was interrupted to repair broken or faulty equipment and early investments in quality equipment ultimately was value added for the Program.

For DFAIT, approximately one-third of allocated funds were spent from 2008-09 to 2010-11. Interview data suggest that there was uncertainty as to the level of involvement that would be required by DFAIT for its legal activities during the scientific data collection phases of the Program, given that Canada had not previously engaged in this type of work and there was almost no information to draw on from other countries. Because the Program is new and external requirements have been evolving (e.g., CLCS procedures and processes), there was a lack of clarity on funding requirements for the legal and diplomatic component of the Program. Some interviewees reported that there were some challenges providing strong rationales for the appropriate distribution of funds across departments in light of these ambiguities, and some felt that DFAIT was over-funded during these earlier years as a result.³⁶ Interview data indicate that surplus funds were released to the departmental reserve early in each fiscal year when it became apparent that money would be lapsed.

³⁶ As designed, a separate legal unit was created at DFAIT: the Continental Shelf Section was created in September 2008 as part of the Oceans & Environmental Law Division and this section evolved into the Continental Shelf Division in March 2009. Given its structure during most of 2008-09 and the late arrival of Program funds, the Oceans and Environmental Law Division managed the budget for the Program for this fiscal year.

Finding #17: There is some evidence that suggests the Program's budget has been appropriate for meeting its data collection needs.

One of the challenges in examining this Program's value for money is that there is no clear comparison against which to assess the appropriateness of its spending. The Program's objectives are unique, which limits meaningful comparisons with existing programs, and the Program is new, which precludes comparisons against its previous iterations. As well, exact comparisons cannot be made between Canada's data collection costs against the costs for other parties to UNCLOS because data needs vary from country to country and the conditions under which the data must be collected also vary.³⁷ Countries like New Zealand, for example, have lower costs for data acquisition activities (approximately \$35M CDN over ten years from 1996 to 2006) because the data do not have to be collected in harsh climates and ice conditions as they do in Canada. According to interviewees, the Arctic's climate conditions significantly increase the cost for data acquisition because specialized equipment is required as well as increased expenses for logistical operations. For example, it cost the Program approximately \$13M for the acquisition of about 12,000km of seismic data in the Atlantic compared to approximately \$35M for about 13,000km of data in the Arctic.

Although not an exact comparison, interviewees noted that Australia's investments in data acquisition in Antarctica may provide an appropriate benchmark to compare the costs for Canada's data collection activities in the Arctic during the scope of this evaluation. As for Canada in the Arctic region, part of Australia's data were required to be collected in harsh weather and ice conditions in the Antarctica region around Australia's southern borders.³⁸ As described in Table 4, the Program spent approximately \$46M CDN on NRCan and DFO's data collection activities from 2009-10 to 2010-11.³⁹ Australia spent a comparable amount for completed data collection in Antarctica. Compared to Australia's expenditures, the Program's budget for its data acquisition in the Arctic appear to be reasonable, suggesting that the Program's budget was appropriate for the conditions under which the data were collected.

³⁷ Although the costs for Russia's 2001 submission to the CLCS are not available, Russia announced an additional \$50M for data collection in 2010-11 while Denmark allocated a total of \$69M over 10 years for its data collection activities. The U.S. receives yearly funding and does not have a total budget for their data collection activities.

³⁸ Australia offers only an approximate comparison to Canada, however, because the two countries are different in the challenges they face for data acquisition. Although they share similar weather and climate conditions in the Antarctica region for Australia and the Arctic region for Canada, these regions pose different challenges for data collection because Antarctica is a continent land mass while the Arctic region is mostly water surrounded by land masses. The costs for data collection in these areas, therefore, are different.

³⁹ Other program documents indicate that, over a five-year period (2004-2009), Canada spent \$87M CDN in data collection and expenditures are anticipated to be \$42M CDN in 2010-12 for data collection in the Arctic.

Table 4: Planned vs Actual Spending for the Extended Continental Shelf Program, 2008-09 to 2010-11
(\$000,000's, CDN)

	2008-09 ^a			2009-10			2010-11			2008-09 to 2010-11		
	Planned	Actual	Planned vs Actual	Planned	Actual	Planned vs Actual	Planned	Actual	Planned vs Actual	Total Planned	Total Actual	Planned vs Actual
DFAIT												
Salary	0.2	0.1	50.0%	0.4	0.2	50.0%	0.5	0.4	80.0%	1.1	0.7	63.6%
O&M	0.1	0.04	40.0%	0.6	0.2	33.3%	1.5	0.2	13.3%	2.2	0.4	18.2%
Total	0.3	0.14	46.7%	1.0	0.4	40.0%	2.0	0.6	30.0%	3.3	1.1	33.3%
NRCan												
Salary	0.4	0.4	100.0%	0.4	0.4	100.0%	0.4	0.4	100.0%	1.2	1.2	100.0%
O&M	12.5 ^b	12.5	100.0%	22.3 ^c	22.3 ^c	100.0%	9.7 ^d	9.6	98.9%	44.5	44.4	99.8%
Total	12.9	12.9	100.0%	22.7^e	22.7	100.0%	10.1^f	10.0	99.0%	45.7	45.6	99.8%
DFO^g												
Salary	0.3	0.3	100.0%	0.3	0.3	100.0%	0.3	0.3	100.0%	0.9	0.9	100.0%
O&M	3.6	3.7	102.7%	6.3	6.3	100.0%	6.3 ^h	6.3	100.0%	16.2	16.3	100.0%
Total	3.9	4.0	100.0%	6.6	6.6	100.0%	6.6	6.6	100.0%	17.1	17.2	100.0%
PROGRAM TOTAL	17.1	17.0	99.4%	30.3	29.7	98.0%	18.7	17.2	91.9%	66.1	63.9	96.8%

Source: Program documents and Budget documents

- a The scope of this evaluation is from January 2009 to March 2011. Although out of scope for this evaluation, financial information for 2008-09 has been included to account for the time period from January to March, 2009. It was not possible to identify the proportion of spending during this last quarter of 2008-09.
- b Includes new funding allocated in the 2008 Budget, as well as the funding for PCSP. \$5M was re-profiled to future years (\$3M to 2009-10 and \$2M to 2011-12).
- c Includes costs associated with PCSP.
- d \$2.5M was re-profiled to 2011-12 due to change in Arctic survey plan to use icebreakers and AUVs rather than ice camps for data collection.
- e Includes \$3M re-profiled from 2008-09.
- f Includes new funding allocated in the 2008 Budget as well as funding for PCSP.
- g Includes new funding allocated in 2008 Budget.
- h \$2.5M was re-profiled to 2011-12 due to change in Arctic survey plan to use icebreakers and AUVs rather than ice camps for data collection. Also, \$500K was put in carry-forward to the next fiscal year.

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Finding #18: Support from external sources has facilitated cost-sharing of data collection activities. Other cost-sharing strategies such as engaging the expertise of the Polar Continental Shelf Program (PCSP) helped to reduce the overall costs of the Program.

There is evidence to demonstrate that the Program has engaged in cost-sharing for data collection activities. From 2009 to 2011, there was consistent support from sources external to the Extended Continental Shelf Program, as described in Table 5. These external contributions⁴⁰ account for approximately 23% of the Program's total contributions. Program documents indicate that Denmark contributed financial resources for shared data collection activities in the Labrador Sea and the Eastern Arctic in 2009 and the U.S. contributed in-kind resources (the *USCGC Healy*) to collect data in the Western Arctic across all years. Interviewees reported that this external support helped to reduce Program costs. As well, the Program's participation in Denmark's *Oden* surveys provided cost-savings since data were acquired for less than the full amount by sharing the expenses for mobilization and de-mobilization.⁴¹

⁴⁰ The external contributions described in Table 5 are a combination of in-kind contributions and actual transfers of funds. The amount of the in-kind contribution is only an estimate of the actual cost.

⁴¹ Mobilization costs generally include all costs to prepare for a survey. For data collection by ship, this often includes, for example, putting equipment and containers on board and cost of transit. Demobilization costs occur after a survey to pay for transit back to home port and removal of equipment. These costs are often large for an Arctic survey. For instance, for the *Oden* survey, mobilization and demobilization costs more than doubled the day rate for surveying.

Table 5: External and Internal Financial and In-Kind Contributions for Data Collection, 2009-2011 (\$,000,000's CDN, % of Total Contributions)

		Annual Contributions ^a			TOTAL
		2009	2010	2011	2009 to 2011
External Contributions^b					
International	Denmark	\$3.9	\$0.0	\$0.0	\$3.9
	U.S	\$3.0	\$3.0	\$3.0	\$9.0
Total (% of External)		\$6.9 (92.0%)	\$3.0 (100.0%)	\$3.0 (100.0%)	\$12.9 (95.6%)
Canadian ^c		\$0.6	\$0.0	\$0.0	\$0.6
Total (% of External)		\$0.6 (8.0%)	\$0.0 (0.0%)	\$0.0 (0.0%)	\$0.6 (4.4%)
Total External (% of Total)		\$7.5 (19.7%)	\$3.0 (14.9%)	\$3.0 (20.4%)	\$13.5 (22.7%)
Internal Contributions					
NRCan and DFO		\$30.5	\$17.2	\$11.7	\$59.4
Total Internal (% of Total)		\$30.5 (80.3%)	\$17.2 (85.1%)	\$11.7 (79.6%)	\$59.4 (81.5%)
TOTAL		\$38.0	\$20.2	\$14.7	\$72.9

Source: Program and Budget Documents

- ^a Financial information provided for calendar year, not by fiscal year, because international contributors do not follow the same reporting cycle.
- ^b Financial contributions external to the Program include in-kind contributions that approximate actual costs.
- ^c External Canadian financial contributions were provided by Defence Research and Development Canada (DRDC), an agency of the Canadian Department of National Defence (DND) to fund the AUVs used for data collection in the Arctic.

External contributions were also provided from Canadian sources, although these were a fraction (4.4% of total contributions) compared to international contributions. Defence Research and Development Canada (DRDC), an agency of the Canadian Department of National Defence (DND), contributed \$0.6M in 2009 for the AUVs used for data collection in the Arctic.⁴² According to interviewees, these AUVs were purchased from contractors and were refurbished to accommodate the specific data needs for the Program. There is an agreement between NRCan/DFO and DRDC that the ownership of these AUVs would be transferred to DRDC after the Program's data collection activities are completed. However, NRCan/DFO can access the equipment if required.

⁴² In 2008, DRDC contributed \$1.8M to pay half of the acquisition costs of the AUVs with NRCan.

Other cost-sharing or cost-saving strategies employed by the Program include using the services of the Polar Continental Shelf Program (PCSP) at NRCan to help coordinate data collection activities in the Arctic. Interview data suggest that any Arctic operations require experienced people who have established networks with the appropriate authorities in the territorial governments and who are familiar with the unique administrative processes in the North. PCSP licensing experts were engaged to acquire appropriate licenses in the North (e.g., water licenses, fuel licenses, land use permits), saving the Program time and money by using existing federal government expertise to facilitate its activities.

Finding #19: A funding shortfall is expected for 2012-13 as the Program prepares the Canadian submission for December 2013. As well, resource pressures are anticipated over the next decade as a result of delays by CLCS in reviewing submissions. While the Program appears to be taking steps to address the short-term funding gap, there is little evidence to suggest the longer-term funding issues have been addressed.

A short-term funding gap was identified for all participating departments for the 2012-13 fiscal year to December 2013. Interview data as well as documents indicate that the Program has not received any funding beyond 2011-12 to support its activities leading up to the submission to the CLCS in 2013, beyond the nominal amounts allocated to NRCan and DFO in the 2004 budget. Evidence suggests that this time period is critical for the Program. Analyses and write-up of Western and Eastern Arctic data is planned for the first and second quarter of 2012-13 as well as the collection of any remaining data in the Eastern Arctic. This period is especially significant for DFAIT as critical legal and diplomatic discussions with adjacent and opposite states must be completed during this time in preparation for the submission. All interviewees familiar with the Program's finances expressed serious reservations that the Program would be able to continue without this funding.

Longer-term funding shortfalls were also identified. Evidence indicates that post-submission activities will likely require additional funding beyond 2013 but there is uncertainty on when and for how long this funding will be required. The original request for funding acknowledges the funding need for the legal analyses, finalization of the submission, presentation to the CLCS and defense of the submission, noting that DFAIT is to take the lead in preparing a request for additional funding in 2012. This funding, however, was anticipated to be required up to 2015 only. Because of the CLCS workload and backlog in reviewing submissions, it may be decades before the Commission will be able to review the Canadian submission. The Program is not clear how to proceed in planning for this anticipated funding shortage, particularly since there are no clear precedents to follow and CLCS processes could change before the Canadian submission is reviewed. Should a Canadian candidate be elected to the

CLCS for the 2012-2017 term, funding would also be required for this period to defray the expenses of the candidate in accordance with the Convention.

Evidence from both interviews and document review demonstrates that the Program is acutely aware of the impact these funding shortages may have. Interview data suggest that the Program is in the process of preparing appropriate funding requests to address the short-term funding gap up to the December 2013 submission. However, the evidence is not clear on the steps that the Program has taken to address the longer-term funding issue beyond identifying the need or if such planning is even feasible.

Finding #20: One of the key strengths of the Program is its capacity for strategic planning, balanced against its flexibility to redirect activities when faced with unforeseen challenges. This adaptability stems from the experience and expertise of Program directors combined with the willingness of senior management to accommodate changes to the Program.

Almost all interviewees reported that the Program is exceptional in its ability to plan its activities within an ambiguous and changing context. The Extended Continental Shelf Program faces many unknowns, given that it is a new program for the federal government and is influenced by external factors such as the unpredictable Arctic conditions for its data collection activities and evolving CLCS processes for its preparation of Canada's submission. In this context, the Program's strategic planning and its ability to adapt are paramount to its performance.

Both documents and interview data indicate that the Program continually learns from previous data collection expeditions and adapts its approaches as required. Most interviewees acknowledge the work of Program directors for ensuring this adaptability and the good will of senior management to accommodate the changes. For example, seismic recorders put on the ice and bathymetric spot soundings were used for data collection earlier in the Program's life cycle but this requires setting up ice camps that are logistically challenging and operationally expensive.

Given that the last phase for Canada's data acquisition would require an ice camp to be located at least 400km offshore and given the risks associated with inclement weather and unpredictable ice conditions, the Program strategically revised its approach and decided to conduct its remaining surveys using ice breakers rather than collect data from ice camps. According to senior management, funds were re-profiled to accommodate the additional costs for these ship-based surveys. Evidence demonstrates that, from year to year, the Program continually improved its understanding of the logistics and operations of data collection in the Arctic, providing flexibility within the known parameters to be able to address and accommodate the unknown.

5.0 CONCLUSIONS

The Extended Continental Shelf Program continues to be relevant for Canada. The Program continues to be needed to fulfill Canada's obligations as party to UNCLOS and supports federal priorities as well as the priorities of participating departments. A federal role is essential given the Program's international activities and objectives for establishing the limits of the extended continental shelf, which fall outside the jurisdiction of other levels of government and organizations.

The Program is also relevant in providing potential long-term benefits for the environment and Canada's economy as well as its contributions to the scientific community. The Program delivers on the Government's priority of securing international recognition for the full extent of Canada's extended continental shelf, thereby drawing the last line on the map of Canada. This will provide legal certainty for resource exploration and exploitation and for regulation (e.g., preventing marine pollution from activities on the extended continental shelf). As well, the Program is relevant to the scientific community by contributing new information and data on areas of the Arctic seabed that were previously unexplored.

The Program has made progress towards the achievement of expected outputs and, despite some challenges in data collection, the Program is on track to complete a submission to the CLCS by December 2013 as planned. This is facilitated by an efficient governance structure that has appropriate mechanisms for information sharing across departments and to senior management for decision making. Roles and responsibilities are clearly understood at all levels of the Program, with a shared desire to make the best use of existing committee structures (e.g., direct reporting by Management Board to senior management) and implement structural changes (e.g., dedicated Program units at NRCan and DFAIT) or operational changes (e.g., direct reporting to HQ at DFO) to improve efficiency. As the Program moves closer to submitting to the CLCS, there may be an increased demand for information sharing overall. Improvements have been made by providing access to a shared network for all DFO and NRCan staff at BIO who are involved in the preparation of the submission. DFAIT, however, does not have access to this shared network and it is not yet clear how this will impact the Program.

The Program displayed sound judgment in its spending by cost-sharing for data collection activities. NRCan and DFO were sufficiently funded for their data collection activities while DFAIT was over-funded over the period from 2009-10 to 2010-11 due to the uncertainty around the level of involvement that would be required from DFAIT during this time. As the Program moves to the analysis and submission preparation phase in 2011-12, however, DFAIT's responsibilities will likely increase as the need for legal expertise increases. It is unclear how the Program will be able to include this legal perspective in its submission preparation since DFAIT was not allocated any funding

after 2011-12. It is highly likely that the Program will experience serious challenges in achieving its expected outcomes with this funding shortfall.

Longer-term financial pressures are expected that result from the CLCS backlog in reviewing submissions by parties to UNCLOS. By some accounts, it could be decades before the CLCS reviews the Canadian submission. This delay will create knowledge gaps for the Program since most of the officers currently involved will likely be retired. As well, there will be financial challenges since there will be costs associated with the Program's future engagement with the CLCS. Although these concerns were acknowledged by the Program, there is no definitive plan to address the future challenges after Canada has filed its submission.

Overall, this Program provides a positive example of how horizontal initiatives could be delivered. Evidence demonstrates that senior managers made it a priority to be engaged and provide timely advice. As well, directors and working level officers of the Program were experienced in dealing with bureaucratic processes and coordinating data collection operations in difficult field conditions as well as implementing effective strategic planning. While there were some challenges, the willingness of key players in the Program to be flexible and adapt to changing circumstances facilitated the Program's progress and improve efficiencies as well as providing innovative approaches for data acquisition and new knowledge to the scientific community on the Arctic.

6.0 RECOMMENDATIONS

Recommendation: **That NRCan, DFO and DFAIT develop a plan to address future human resource and financial resource challenges.**

Evidence demonstrates that the Program currently has sufficient scientific and legal expertise to address its performance needs but there are funding shortfalls both prior to submission in December 2013 and for activities following submission. This is especially evident for DFAIT which has no allocated funding beyond March 31, 2012. Evidence suggests that the Program will not have the capacity to meet its objectives if these funding issues are not addressed.

Lengthy delays are anticipated for the CLCS to review the Canadian submission and the officers most knowledgeable about the Program may be retired by the time Canada is required to engage with the Commission. Adequate knowledge, expertise and corporate memory on the Program may not be available to support the submission and respond to CLCS recommendations in the future. As well, the lengthy delay before the CLCS's review creates significant challenges for how data and expertise will be maintained and the activities related to Canada's engagement with the CLCS will be funded in the future.

Findings suggest that the Program is aware of these challenges but there was no clear evidence of a robust plan to address these financial resource issues and future human resource capacity. It is a challenge to develop a plan going forward, particularly since there are no clear precedents to follow and CLCS processes could change before the Canadian submission is reviewed. The Program could, however, engage with other parties to UNCLOS to explore how others are addressing similar challenges and the Program develop appropriate strategies for Canada.

Evidence demonstrates that the Extended Continental Shelf Program is needed for Canada to fulfill its obligations as party to UNCLOS. Without a plan to address resource issues, however, there may be challenges in the future for Canada to exercise its existing sovereign rights over the natural resources in its extended continental shelf, which could have a negative impact on the potential for long-term economic and environmental benefits for the country.

7.0 MANAGEMENT RESPONSE AND ACTION PLAN

RECOMMENDATION

That NRCan, DFO and DFAIT develop a plan forward to address future human resource and financial resource challenges.

Associated Findings: 9, 13, 16, 19

MANAGEMENT RESPONSE

The Management Board and the Assistant Deputy Minister (ADM) Steering Committee agree with the recommendation.

The ADM Steering Committee consists of:

- The Legal Adviser, Department of Foreign Affairs & International Trade
- the Assistant Deputy Minister, Earth Sciences Sector, Natural Resources Canada
- the Assistant Deputy Minister, Ecosystems and Oceans Science Sector, Fisheries & Oceans Canada

The Management Board consists of:

- Director, Continental Shelf Division, Department of Foreign Affairs & International Trade
- Director, UNCLOS Program, Geological Survey of Canada, Natural Resources Canada
- Director, Law of the Sea Project, Canadian Hydrographic Service, Fisheries & Oceans Canada

Management Response & Action Plan	Responsibility Centre	Time Frame
<p>In July 2011, the Program initiated a process of consultation with central agency analysts and within each department, and departmental forward planning, to assure funding is in place for 2012/13 through 2017/18 to cover the costs of preparing the submission, maintaining data and expertise while waiting for consideration of the submission and supporting a Canadian member of the Commission on the Limits of the Continental Shelf, if elected.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Pending the results of these consultations, the Management Board will prepare the necessary documentation to reprofile funds from 2011/12 and to assure funds are in place until 2017/18. The likelihood of requiring funding beyond this period will be flagged in this documentation. 	ADM Steering Committee	August - December 2011

October 2011

RECOMMENDATION		
<p>Maintaining expertise and corporate knowledge regarding Canada's submission for the unknown but lengthy interval between the time the submission is filed and the time it is considered by the Commission on the Limits of the Continental Shelf is a challenge.</p> <p>Actions:</p> <ul style="list-style-type: none"> The Management Board will draw up a plan to address future human and financial resource challenges for review and approval by the ADM Steering Committee. If required, the plan will be updated annually. The Management Board will ensure that decisions taken by the Program regarding the submission are recorded and filed to facilitate retention of corporate knowledge. The Management Board will continue to engage with other states parties to the United Nations Convention on the Law of the Sea to obtain best practices in maintaining expertise and data. The Management Board will continue to monitor Commission practice in order to best predict when Canada's submission will be considered. DFAIT will continue to engage in Meetings of States Parties to the United Nations Convention on the Law of the Sea regarding the Commission's workload in order to accelerate the Commission's pace of work to the extent possible. 	<p>ADM Steering Committee</p> <p>ADM Steering Committee</p> <p>ADM Steering Committee</p> <p>ADM Steering Committee</p> <p>The Legal Adviser (DFAIT)</p>	<p>plan will be submitted and approved by 31 January 2012</p> <p>ongoing, in particular until December 2013</p> <p>ongoing, in particular until December 2013</p> <p>ongoing</p> <p>ongoing</p>