

Canadian Coast Guard Search and Rescue Needs Analysis 2007

Recommendations to Improve Maritime SAR Services

Table of Contents

| | |
|--|----|
| <u>Table of Contents</u> | 3 |
| <u>Acronyms and Definitions</u> | 4 |
| <u>Introduction</u> | 6 |
| <u>Background</u> | 6 |
| <u>Methodology</u> | 7 |
| <u>Findings and Recommendations</u> | 9 |
| Summary of Findings | 9 |
| SAR Effectiveness..... | 9 |
| Future Trends | 10 |
| 1 Northern Canada, including Labrador and Northern Québec..... | 10 |
| 2 Level of Service..... | 12 |
| 2.1 Shoulder Seasons..... | 12 |
| 2.2 Standby Posture | 14 |
| 2.3 VHF Coverage..... | 14 |
| 3 SAR Service Delivery | 15 |
| 3.1 Mission Coordination | 15 |
| 3.2 Service during Missions | 15 |
| 3.3 SAR Equipment..... | 16 |
| 3.4 SAR Response – Fast Rescue Craft..... | 16 |
| 3.5 Performance Measurement | 16 |
| 3.6 Technology Support | 17 |
| 4 SAR Service Capacity | 17 |
| 4.1 Quebec - Lower North Shore..... | 17 |
| 4.2 Gulf of St. Lawrence – Central Gulf..... | 18 |
| 4.3 Southeastern Canada, including Cabot Strait..... | 18 |
| 4.4 Great Lakes – North Channel (Lake Huron)..... | 19 |
| 4.5 Great Lakes – Western Lake Erie | 20 |
| 5 SAR Operations..... | 20 |
| 5.1 Coverage Capacity..... | 20 |
| 5.2 SAR Communications | 21 |
| 5.3 SAR Coordination | 22 |
| 5.4 Statistics..... | 24 |
| 5.5 Major Maritime Disasters | 25 |
| 5.6 Ongoing Analysis | 25 |
| 5.7 Measurable Standards..... | 25 |
| 6 SAR Partnerships | 26 |
| 6.1 Canadian Coast Guard Auxiliary | 26 |
| 6.2 Department of National Defence | 30 |
| 6.3 Parks Canada | 30 |

Acronyms and Definitions

CASARA – Civil Air Search and Rescue Association: A volunteer organization which provides aeronautical SAR support.

CCGA – Canadian Coast Guard Auxiliary: A volunteer organization made up of five non-profit associations and a national council which assists the Canadian Coast Guard (CCG) in search and rescue (SAR) response and prevention activities. Each year the Auxiliary receives a small amount of government funding to cover certain expenses and insurance while engaged in authorized SAR operations and activities. Tax-deductible donations from the public and other organizations also help fund the auxiliary. The CCG assists the CCGA with the specialized SAR training necessary to become and remain a member. In return, the CCG relies on the approximately 3400 members and 1300 vessels of the Auxiliary to augment its maritime SAR capability.

FRC – Fast Rescue Craft: A rigid-hull inflatable with a V-shaped, fibreglass hull and inflatable sponsons around the perimeter.

IRB – Inshore Rescue Base/Boat: A seasonal CCG program in which university students operate a Fast Rescue Craft and provide response to local SAR cases.

LMSAR – Lead Minister for Search and Rescue: In 1976 Cabinet designated the Minister of National Defence to be Lead Minister for Search and Rescue (LMSAR) in the Government of Canada and as such the spokesperson on SAR matters.

Primary SAR response unit/vessel (SRU): A specially designed, equipped and crewed vessel that has SAR as its main responsibility. These vessels are stationed in areas that have a high risk of SAR incidents. They maintain a maximum 30-minute state of readiness but are typically ready to respond on a moment's notice.

SAR Area: Sub-divisions of the three SAR Regions (SRRs), SAR Areas are statistical areas with like characteristics, created by the Department of National Defence for data-collection purposes.

SAR system: the federal search and rescue (SAR) system, comprised of Canadian Coast Guard maritime units, Department of National Defence aeronautical resources, volunteer response units and vessels of opportunity.

SAR system coverage capability: the ability of vessels/crews to provide response to SAR cases, as evaluated by vessel features such as size, speed, manoeuvrability, power, equipment on board, etc.

SAR system coverage capacity: the number of vessels in an area capable of providing SAR response.

Secondary SAR response unit/vessel: All other government aircraft or vessels established for purposes other than SAR, but which can be expected to respond (when available) to SAR taskings.

Standby posture: State of readiness maintained by a SAR response unit; the time in which the resource must be capable to respond after being tasked to provide SAR response (i.e., 30-minute standby posture means a vessel must be capable of being en route to the position of a SAR incident within 30 minutes of being tasked).

Risk: The uncertainty that surrounds future events and outcomes; the expression of the likelihood and impact of an event that has the potential to influence the achievement of the organization's objectives.

Risk assessment: Identifying risks and assessing their effects on program delivery and effectiveness.

Risk management: A systematic approach to setting the best course of action under uncertainty by identifying, assessing, acting on and communicating risk issues.

Risk to the client: Any and all factors which contribute to SAR incidents (e.g., weather, ice conditions, environmental hazards, mariner experience, etc.).

Vessel of opportunity: Any other vessel which is close enough to provide assistance to a vessel in distress. Under the *Canada Shipping Act* and international law, every vessel at sea is required to assist in a distress situation.

Introduction

This document is based on the results of the *Canadian Coast Guard SAR Needs Analysis, 2007 - Technical Report*.

The SAR Needs Analysis studied Canada's maritime search and rescue (SAR) system over the five-year period 2000–2004 (inclusive). It evaluated each of Canada's 39 statistical SAR Areas, using the same methodology in each Area. The SAR system was assessed to identify opportunities for improvement based on:

- level of service (i.e., rate of effectiveness);
- the system's coverage *capacity* and *capability* in each statistical area; and,
- future implications of client activity trends.

The analysis found that, overall, the delivery of SAR services by the federal SAR system is extremely effective. During the study period, the SAR system – comprised of Canadian Coast Guard maritime units, Department of National Defence aeronautical resources, volunteer response units and vessels of opportunity – achieved a 96.2% success rate of **lives saved** from **lives at risk**. The lives of 18,185 individuals in maritime distress or urgent maritime situations were saved and another 62,896 people were assisted.

Notwithstanding this good record, the study identified some concerns which, if addressed, would make Canada's waters even safer.

Background

The Minister of the Department of National Defence holds overall responsibility for the federal SAR system as the Lead Minister for Search and Rescue (LMSAR). The CCG provides primary maritime SAR response vessels, multi-tasked and secondary SAR response vessels, and maritime personnel, in support of the SAR system. It also oversees the activities of the volunteer Canadian Coast Guard Auxiliary (CCGA).

Effective program monitoring and management ensures that the SAR program operates at maximum efficiency, within its financial limitations. To achieve this goal, the CCG must make decisions concerning the short- and long-term strategic placement of SAR assets. SAR Needs Analysis results, in part, inform this decision making.

In 1993, a SAR needs analysis was conducted in an attempt to quantify resource requirements. Updated in 1999, this document is considered to be the driver behind

Canada is internationally recognized as having one of the most effective SAR systems in the world.

Across Canada, between the years 2000 - 2004, statistical analysis indicates that 96.2% of lives at risk were saved during maritime distress cases of all classifications.

The SAR Needs Analysis reveals the Canadian Coast Guard has opportunities to further improve the current SAR system.

capital projects such as the Lifeboat Replacement Project and the SAR Program Integrity initiative, the latter resulting in the establishment of eight new search and rescue stations in Canada.

In January 2006, the SAR Needs Analysis began, integrating up-to-date risk assessment management techniques into the analysis process. In the future, the SAR Needs Analysis is to be an ongoing, cyclical process of annual review.

Methodology

To best identify SAR “needs” – that is, areas in which improvement to the SAR system or SAR response is necessary – the analysis evaluated three aspects of the CCG SAR program:

- **SAR response capacity** – the current system’s capacity and capability, in line with CCG-approved levels of service and service standards, and an assessment of risk and risk management;
- **SAR communications** – the current SAR communications system and the extent to which it assists in the delivery and success of SAR services; and,
- **SAR coordination** – operational capabilities and risk affecting SAR mission coordination.

Understanding the environment: The first step in the analysis was to better understand the environment in which SAR response units operate; specifically, the risk involved in SAR service provision and the risk to clientele. To do this, an environmental scan of each SAR Area was conducted. To do this, an environmental scan of each SAR Area was conducted; to study the geographic, meteorological, topographic, hydrographical, societal, technological and cultural aspects of each SAR Area. Client activity trends, both present and future, were also examined.

Determining effectiveness: Statistical analysis demonstrated the degree to which the levels of service and service standards (as set by the CCG) were being met. At this stage, SAR system effectiveness was determined (i.e., lives saved vs. lives at risk).

Examining incidents and response: A risk assessment was conducted, using spatial analysis to examine historical incidents. As well, the Maritime Activity and Investigation Network (MARIN) at Dalhousie University conducted a study of the maritime activity and incident levels of SAR clients. The study, *Canadian Maritime Traffic Patterns in 2000-2004*, evaluated traffic density, incident density, and seasonal activity trends. The response capacity and capabilities of the existing SAR system (in 2006) were also evaluated using hypothetical models and spatial analysis.

One aspect of the response capacity analysis involved an evaluation of CCG SAR unit response times (to historical incidents). Response time analysis served as one indicator among many which contributed to a comprehensive analysis of SAR system effectiveness

(the CCG does not use response time analysis in isolation to evaluate SAR program effectiveness).

Determining risk mitigation: Taking into consideration the risk analysis results, the response capacity of the SAR system was tested using a series of “triggers” (proposed hypotheses) to determine if further risk mitigation measures should be considered.

The “triggers” analysis evaluated the following:

- whether the SAR system met the defined level of service standard of 90% or above (if the level of service exceeded 97%, the area was assessed for the possibility of overcapacity of SAR response units);
- whether the SAR system provided appropriate SAR coverage capacity (numbers) and capability (operational limitations of response units); and,
- whether the existing SAR system coverage capacity/capability was sufficient to meet anticipated future demand.

The CCG’s level of service for SAR is determined by SAR system effectiveness – that is, the percentage of lives saved out of the total number of lives at risk. For the purposes of the Needs Analysis, 90% effectiveness was chosen as a national benchmark. As defined in the *Canadian Coast Guard Level of Service – Service Standards*, June 2006 (the document against which CCG program performance is measured), 90% effectiveness is expected to be achieved during “conventional incidents” in which:

- resources are able to respond within a short period of time;
- the search object is located by the responding resource on scene in a timely manner;
- environmental, geographic, and hydrographic conditions have little impact on the successful resolution of the incident; and,
- the responding resource has the necessary capability and capacity to effectively resolve the incident.

If SAR system effectiveness in a given SAR Area exceeded 97%, an assessment of the capacity and capability of SAR response units was conducted to determine if (1) there was an overcapacity of SAR response units and (2) any CCG vessels could be re-allocated to areas showing lower SAR effectiveness. The overcapacity assessment indicated that although SAR system effectiveness did exceed 97% in some Areas, none had an overcapacity of response units.

The results of the triggers analysis led to consideration of risk mitigation measures in 27 out of 39 SAR Areas.

Findings and Recommendations

Summary of Findings

The SAR Needs Analysis found that, notwithstanding the overall effectiveness of the SAR system, there are opportunities for the CCG to improve, develop or further study the provision of SAR service in Canada. These opportunities are grouped into six categories.

- 1. Northern Canada, including Labrador and northern Québec.** These areas are incomparable with other SAR Areas and the provision of SAR services presents unique challenges for the CCG and SAR partners. Further study of SAR in the Arctic, continued efforts to increase local resources for SAR in these areas and a specialized approach to CCGA, are necessary.
- 2. Changes to SAR level of service.** Adjustments to the CCG's existing SAR level of service need to be made in specific areas of Canada to mitigate identified risks and ensure the effective provision of SAR service. The operational seasons of CCG maritime units need to be extended and made more flexible. Standby posture procedures need to be respected. VHF and VHF-DX coverage and systems need to be improved.
- 3. Delivery of consistent SAR service.** Inconsistencies in CCG SAR service delivery require attention and action so that all parts of the country benefit from the same level of service. Consistent application of existing policy, development of new policy for improved service provision, and a way to track performance are considered necessary.
- 4. Expanding SAR service capacity.** To meet client needs and manage risk, the CCG needs to expand its SAR service in specific areas of Canada. Expansion of the CCG Fleet is necessary to meet SAR demand.
- 5. Adjusting SAR operations.** Operational adjustments are necessary to address issues with CCG SAR service delivery. Further study to improve certain aspects of SAR operations, re-evaluation of current practices, upgrades to existing technology, and improved program measurement are considered necessary.
- 6. Strengthening SAR partnerships.** The CCG relies on SAR partners to deliver SAR service. As such, the CCG must continue to foster and support SAR partnerships to ensure an effective SAR system. Continued support to the CCGA, enhanced response capacity in specific areas, extended partnership with Parks Canada, and working with DND to improve program delivery are recommended.

SAR Effectiveness

With the exception of the Arctic Areas and the western Lake Erie Area, SAR effectiveness in each SAR Area exceeded 90%. In western Lake Erie, SAR effectiveness

was brought below the benchmark (82.98%) due to an airplane crash which occurred during one winter, in which 10 lives were lost.

The SAR Needs Analysis, 2007 methodology states: “Unless otherwise indicated, statistics resulting from unique circumstances are removed so as not to misrepresent the true data average.” With the removal of this unique circumstance, SAR effectiveness in the western Lake Erie Area was brought above 90%.

Taking into account the exceptional circumstances of the Arctic (discussed below), results indicated that SAR effectiveness is acceptable for each SAR area evaluated.

Future Trends

An evaluation of future trends in each SAR area revealed that generally client activity will increase and that the current SAR system in many areas of Canada may not be able to meet the increased demand.

1 Northern Canada, including Labrador and Northern Québec

The Arctic cannot be compared to other regions of Canada. The hydrographic and climatological conditions of the Arctic maritime environment make the provision of SAR services in this region particularly challenging. Despite these challenges, the SAR system effectiveness evaluation revealed higher-than-expected levels of service: 69.23% for the waters of the Northwest Territories Area; 86.67% for the James Bay Area; 81.48% for the eastern Arctic Area; and, 93.10% for the Nunavut Area.

Although these levels do not consistently meet the 90% level of service standard, they are considered acceptable given that they were achieved during Arctic SAR incidents. For the most part, Arctic SAR incidents are not termed ‘conventional incidents,’ as they involve harsh and difficult conditions. Incidents in the Arctic are more accurately termed ‘difficult incidents,’ for which a **50+**% level of service is typically acceptable.

Despite the acceptable levels of service in these areas, issues regarding SAR system resource capacity were noted. Of primary concern was the overall lack of SAR response units northern Canada – no primary maritime units are designated for northern Canada and secondary SAR units, when present (and available), are not always positioned to provide SAR service in areas of high risk.

Evaluation of other SAR system components revealed that past attempts to establish additional CCGA units in northern Canada have failed and, among existing SAR partners, there are jurisdictional issues with regard to SAR service delivery (particularly in James Bay).

The level of service achieved on the Labrador coast (97.04%) would normally call for an assessment of “overcapacity.” However, given that this level was achieved with no primary CCG SAR response units designated to the Area and secondary CCG SAR vessels available only on occasion, the Area was considered **not** to have an overcapacity

of SAR response units. The SAR system level of service on the Labrador coast was therefore deemed acceptable.

With regard to SAR response capacity in this Area, a CCG patrol vessel from an adjacent Area typically provides response for the southernmost part of the Labrador coast, contributing to the unusually high level of SAR effectiveness for a northern area. However, response by this CCG vessel is limited to the southernmost part of the Labrador coast area and, with no primary or secondary SAR response units designated to the area, the SAR system relies on 28 CCGA units and a limited number of vessels of opportunity to provide response for SAR cases along 600 nm of coastline.

Increases in client activity are forecasted in all of the northern areas, and it is postulated that the current SAR system capacity will not be able to meet the increased demand. In the Arctic, more pleasure boaters are establishing cottages which will increase activity in these areas. Along the Labrador coast, recreational traffic and float plane activity is increasing in the Lake Melville area; ecotourism activity is increasing out of Goose Bay; commercial shipping, once seasonal, is now year-round; a new mine has been established at Voisey Bay, causing an increase in traffic; and, maritime recreational activity has increased following the creation of new national parks.

To address these issues, the SAR Needs Analysis recommends that:

- 1. Under the leadership of the Department of National Defence (DND) (the leading governmental SAR authority), the Canadian Coast Guard work with other partners to conduct a comprehensive study of Northern Canada, with the objective of establishing SAR service criteria specific to Northern Canada, including the Labrador Coast and Northern Québec.**
- 2. Until such a study has been completed, the CCG should take SAR demand into consideration during periods when CCG vessels are available to be positioned in areas where clients are active.**
- 3. Along the Labrador coast, capable primary SAR coverage should be provided by existing CCG vessels, as practicable, from late spring until fall. To address increases in client activity in the Lake Melville area (Labrador coast): continue efforts to increase local resources in the area which would be available to provide SAR service when necessary (for example, more community vessels, CCGA, SAR partners, charter vessels, etc).**
- 4. The CCG increase its support of the CCGA and augment SAR resource capacity by supporting further development of the 3 existing CCGA units in Rankin Inlet, Cambridge Bay, and Iqaluit. Furthermore, as an organization, the CCGA in Nunavut and the North West Territories should be considered separately when dealing with contribution agreement issues such as funding, insurance, guidelines and by-laws, training and operational standards.**
- 5. Finally, SAR needs should be taken into account as part of any Arctic strategies.**

2 Level of Service

The SAR Needs Analysis revealed that, in specific areas of Canada, adjustments to the existing CCG SAR level of service are required to mitigate identified risks and ensure the effectiveness of SAR service. The analysis found that the CCG level of service could be improved by addressing shoulder-season service, adhering to standby posture requirements, and enhancing VHF and VHF direction-finding coverage.

2.1 Shoulder Seasons

A key issue is the availability of SAR system resources during the shoulder seasons. For the SAR program, a “shoulder season” is defined as the period of time during which neither icebreakers nor primary SAR vessels (i.e., lifeboats) are active. Shoulder seasons are typically in the early spring and late fall (before and after the ice season).

Risk to clients increases during the shoulder seasons due to the reduced SAR system response capacity and capability—that is, primary SAR units are non-operational, secondary units are unavailable, fewer CCGA units are active, and vessels of opportunity are limited.

This increased risk, found in many areas across Canada, is of significant concern to the CCG. To address this risk, the following risk mitigation measures are recommended.

Saint John River (Bay of Fundy): CCG coverage is seasonally provided (late May to August 31) by a 6–7 metre fast rescue craft (FRC) positioned on the Saint John River. However, ferries and other clients remain active in the shoulder seasons and vessels of opportunity and CCGA units are limited during these seasons. To address risk during the shoulder seasons, it is recommended that:

- 6. SAR coverage be provided to the Saint John River outside the IRB season by using a truck and trailer to transport the FRC at the Courtenay Bay lifeboat station around the river’s reversing falls.**
-

Upper St. Lawrence River: SAR coverage capacity is provided by seasonal, part-time IRBs (operating 12 hours a day, rather than 24); however, clients are active outside the IRB season. Until the icebreakers assume operations, a limited number of capable resources are available to respond to SAR incidents. To mitigate risk, the SAR Needs Analysis recommends the following:

- 7. The multi-tasked Air Cushioned Vehicle (ACV), located in Trois-Rivières, provide primary SAR coverage (maintaining 30-minute SAR standby) to the St. Lawrence River from the end of the ice season (ice-out) to start of the IRB season, and from the end of IRB season to the start of the ice season (ice-in). Prior to implementing this recommendation, conduct further analysis of the**

implications of providing SAR services from ‘ice-out to ice-in,’ taking into account seasonal demand for SAR, climatological risks of providing SAR service, budget implications of program flexibility, etc.

Great Lakes: To mitigate the risk to clients active during the shoulder seasons:

- 8. Allow for flexibility in the start and end dates of the primary SAR Lifeboats’ operational periods to mitigate risk to the client. Prior to the implementation of this recommendation, conduct further analysis of the implications of providing SAR services from the end of the ice season (ice out) to the beginning of the ice season (ice-in); taking into account seasonal demand for SAR, climatological risks of providing SAR service, budget implications of program flexibility, etc.**
-

Gulf of St. Lawrence: SAR planners estimate the arrival and departure of ice in the Gulf of St. Lawrence each year in an effort to ensure that SAR resources are available year-round. However, when the ice season differs from SAR planning estimates, the large-ship fleet does not deploy to the Gulf of St. Lawrence for icebreaking as planned. When this occurs, SAR resources available to respond in the Gulf are minimal.

To address this issue, the SAR Needs Analysis recommends that:

- 9. Each year, the large-ship fleet deploy to the Gulf and maintain SAR standby on the planned dates of the deployment plan.**

And, to ensure SAR coverage is provided from ice-out to ice-in:

- 10. Existing lifeboat stations remain 100% operational until November 30 (Quebec) and December 31 (Maritimes), or until ice forms in the lifeboat harbour (whichever occurs first).**
-

In the specific case of PEI, where the aquaculture industry remains active near the shore:

- 11. If the lifeboats in PEI are laid-up before Dec 31st, then the crew can maintain a 30-min SAR standby posture and use the FRC on a trailer to provide SAR response until Dec. 31. Prior to the implementation of this recommendation, further analysis of the implications of ice-out to ice-in SAR service provision needs to be conducted, taking into account seasonal demand for SAR, climatological risks of providing SAR service, budget implications of program flexibility, etc.**
-

2.2 Standby Posture

The CCG requires that vessels programmed as primary SAR vessels maintain a 30-minute standby posture. When vessels classified as secondary SAR are programmed to provide primary SAR coverage, the same standby requirements apply. The SAR Needs Analysis noted that, in some circumstances, this requirement was not being met. Therefore, it is recommended that:

12. The CCG ensure adherence by all primary and secondary SAR vessels to the applicable procedure as listed in the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR) under section A2.55:

“CCG primary SRUs and CCG units multi-tasked to the SAR program, when fully operational, shall be capable of responding to SAR tasking immediately or shall otherwise maintain a 30-minute standby posture.”

In other words, fully operational CCG vessels which have been requested by the Joint Rescue Coordination Centre (JRCC) or the Maritime Rescue Sub-Centre (MRSC) to assume primary SAR duties, shall be capable of responding to a SAR tasking immediately, or shall otherwise maintain a 30-minute standby posture. All other CCG units, when fully operational, shall, regardless of program, maintain a one-hour standby posture.

It is also recommended that:

13. IRBs adhere to the 30-minute standby posture and be available to provide coverage 24 hours a day during the IRB operational season.

2.3 VHF Coverage

The SAR communications assessment revealed that the VHF radio and VHF direction-finding (VHF-DF) coverage is in need of improvement. VHF and VHF-DF coverage is important to ensure that clients are able to notify the SAR system when necessary and to facilitate communication between SAR response units and vessels in distress during SAR missions. The SAR Needs Analysis recommends that:

14. To address areas of unreliable VHF coverage within a reasonable budget, the SAR program collaborate with the Marine Communications and Traffic Services branch and the Technical Integrated Services branch to determine:

- **areas of priority for SAR (as identified in SAR Needs Analysis and Levels of Service – Service Standards review results);**
- **areas of poor or non-existent VHF coverage which can be improved with reasonable investment, and the investment required for this improvement;**
- and,**

- **areas of poor or non-existent VHF coverage which cannot be improved with reasonable investment, and how VHF coverage in these areas may be addressed.**

3 SAR Service Delivery

The SAR program strives to deliver SAR services equitably to all those at risk in the marine environment. As such, inconsistencies in SAR service delivery are thought to require attention and action to ensure that all Canadians benefit from the same level of CCG service. The Needs Analysis identified inconsistencies in six key areas and recommends that the CCG concentrate efforts in these areas.

3.1 Mission Coordination

SAR mission coordination is essential for the successful resolution of maritime incidents. Assisted by the Department of National Defence (DND), the CCG is responsible for conducting, coordinating and controlling maritime SAR operations in Canadian waters. This work is conducted through the Joint Rescue Coordination Centres (JRCCs) and Maritime Rescue Sub-Centres (MRSCs).

As part of the JRCC/MRSC organizational structure, a Rescue Centre Regional Supervisor of Maritime SAR (RSMS) is responsible for managing centre operations and staff. The RSMS is also required to act as a mission coordinator, but certification for this duty (SAR Mission Controller (SMC) certification) is not a stated employment requirement. This has led to problems in rescue centres where the RSMS is not qualified to perform the duties of the position to the full extent required. The SAR Needs Analysis recommends that:

15. Persons in the RSMS position be required to obtain and maintain certification as an SMC.

3.2 Service during Missions

In addition to the coordination of missions, the CCG is also concerned with the level, or quality, of the SAR service provided *during* SAR missions. With regard to first aid services, Coast Guard Fleet Order (CGFO) 535.00, section 1.2, states: “It is the policy of the Canadian Coast Guard to carry rescue specialists on board all CCG ships commensurate with their Search and Rescue (SAR) role...” There is currently a lack of qualified personnel who may provide advanced-level first aid and/or offshore survival and rescue techniques (rescue specialist duties). As such, it is recommended that:

16. The CCG develop an action plan to ensure the consistent application of the Rescue Specialist policy across the country.

3.3 SAR Equipment

Coast Guard Fleet Order (CGFO) 207 states that: “SAR equipment be carried at all times on Fleet units as per this Order, and that equipment be maintained in good operational order.” The SAR Needs Analysis revealed that not all small vessels in the CCG Fleet currently meet this requirement. It is therefore recommended that:

17. Members of the SAR program work with Fleet to ensure SAR equipment is carried aboard all CCG vessels, as required by CGFO 207.

3.4 SAR Response – Fast Rescue Craft

With regard to SAR response, the Needs Analysis revealed that many CCG Lifeboat stations are equipped with a Fast Rescue Craft (FRC); a rigid-hulled, inflatable vessel powered by twin 70 HP outboard motors. These small crafts provide an alternative means to deliver SAR services. Generally, the SAR Needs Analysis has identified FRCs as useful for the provision of SAR service; however, not all Lifeboat stations are equipped with an FRC. The analysis thus makes the following recommendation:

18. The SAR program work with the Fleet branch to:

- **determine under what circumstances FRC capability will be provided at a lifeboat station;**
 - **develop an appropriate policy for use of an FRC during SAR cases; and,**
 - **determine how a truck and trailer for the FRC could augment SAR service.**
-

3.5 Performance Measurement

At this time, the CCG does not have a nationally consistent means of tracking or measuring the annual delivery of SAR services, as per the annual deployment plans. To ensure the continued high quality of SAR service and appropriate coverage by SAR units, the Needs Analysis recommends that:

19. The SAR program take the initiative to develop a nationally consistent tool to track and measure SAR service delivery as provided by Fleet, as a means of measuring SAR system performance.

3.6 Technology Support

The *Canadian Coast Guard Level of Service and Service Standards, June 2007* sets a standard of service delivery for search and rescue which is in accordance with Canada's international commitments: "Search and rescue mission co-ordination services are provided 24 hours a day, 365 days a year....[and].... all maritime SAR alerts/incidents will be investigated and assessed."

To meet these standards and uphold Canada's SAR commitments, it is essential that the distress and safety systems (i.e., communications systems) be reliably maintained in good working order at all times.

To address inconsistencies in the availability of after-hours technical support for the distress and safety systems, it is recommended that:

20. The CCG develop:

a) a service-level agreement with the Integrated Technical Services branch to ensure adequate support services are available for distress and safety systems, and

b) service-level agreements with third-party providers to ensure adequate support services for externally operated distress and safety systems, when necessary (e.g., telephone lines, etc.).

4 SAR Service Capacity

The main objective of the SAR Needs Analysis, 2007 was to identify and analyze areas of risk to clients and to propose changes to the SAR system to mitigate these risks. To accomplish this, the analysis first examined the capacity of the existing SAR system. The system is comprised of primary and secondary Coast Guard SAR response units (SRUs), CCGA units, other government vessels, and vessels of opportunity.

In some areas, a lack of CCG or CCGA units was noted and an overly heavy reliance on vessels of opportunity to provide SAR response was apparent. In these areas, expansion of the CCG-provided SAR service is required to improve SAR system capacity and capability and to mitigate risk. The risk created by these coverage capacity and capability issues will be compounded as client activity increases.

4.1 Quebec - Lower North Shore

Along the **Lower North Shore of Quebec**, SAR system response relies heavily on vessels of opportunity and CCGA units. Along this extensive coastline, few CCGA units are available to respond. The analysis recommends that:

21. The CCG supply a vessel capable of providing adequate SAR response for the Quebec Lower North Shore from May 01 to November 30.

4.2 Gulf of St. Lawrence – Central Gulf

In the **central Gulf of St. Lawrence**, outside the ice season, there are areas of high traffic and high risk where CCG SAR units cannot provide response. In addition, the SAR system in the Gulf zone lacks a vessel which can carry out extended searches (i.e., two to three days) in all weather conditions.

To address these issues, the SAR Needs Analysis recommends:

22. In the central Gulf of St. Lawrence, evaluate the capacity/capability which will be added to the SAR system by the new mid-shore security patrol vessels; the new vessels are expected to be positioned in the Gulf of St. Lawrence, pursuant to the CCG business plan.

If the evaluation reveals that the added coverage capacity/capability is insufficient to mitigate identified risk, replace the ARUN lifeboat positioned at Cap-aux-Meules (Iles de la Madeleine) with a vessel capable:

- **providing SAR coverage for the entire Gulf of St. Lawrence**
- **performing SAR operations in all weather conditions**
- **performing extended missions (two to three days)**
- **providing response in areas of high risk or remaining on patrol until called to respond**

The operational period of this vessel would remain the same as the existing vessel (ARUN).

4.3 Southeastern Canada, including Cabot Strait

In this Area, issues with SAR system coverage capacity were noted, primarily offshore. Though response to inshore cases was found to be excellent – attributed to well-placed SAR resources – response to cases offshore was problematic. The only exception to this was in the area around Cape Race, NL, an inshore area with high traffic activity, in which the SAR system relies heavily on vessels of opportunity to provide response inshore.

Offshore coverage capacity issues are complex. Along the southeast coast of Nova Scotia, there is one CCG patrol vessel designated to provide SAR services offshore. Around the Cabot Strait and its approaches, response is typically provided by the ARUN lifeboats positioned along the south coast of Newfoundland, in Burgeo and Burin. Unfortunately, with regard to offshore cases, ARUN lifeboats have certain capability limitations: limited range to transit offshore; limited capability to respond in severe

environmental conditions; as well, they are not capable of conducting SAR searches for extended periods (beyond one day).

Since many cases occur in offshore fishing banks, these limitations have a negative impact on SAR response in the Cabot Strait and approaches. To compound this, recreational, commercial, and oil and gas traffic is expected to increase in the Cabot Strait and off the coast of southeastern Canada.

CCGA units are able to provide offshore response, as they are commonly active around offshore fishing banks, but they are not always available and are often difficult to contact.

SAR “needs” in this area include a vessel capable of responding to offshore cases (to meet the forecasted increase in risk around Sable Island and other offshore fishing areas) and of providing extended searches. The expected mid-shore security patrol vessels may provide these capabilities, but the capacity/capability they will add has yet to be evaluated. If it is determined that these mid-shore security vessels cannot provide the necessary capability, the following is recommended:

23. Upgrade the capability of the primary CCG SAR units located at Port Bickerton and Burin as part of the normal vessel replacement program.

4.4 Great Lakes – North Channel (Lake Huron)

In the **Great Lakes** areas, SAR system coverage capacity and capability were such that the level of service was met and, for the most part, sufficient SAR coverage was provided. However, issues were noted in the North Channel and in western Lake Erie.

In the North Channel, SAR response is provided by vessels of opportunity, CCGA, and other SAR partners. The North Channel is within the area of responsibility of the CCG SRU located at Tobermory (at the tip of the Bruce Peninsula). However, geographic restrictions prevent this unit from providing effective response to incidents in the North Channel.

To reach the North Channel, this SRU must transit from Tobermory, around the southeast of Manitoulin Island, and enter the North Channel through the narrow waterway between Goat Island and Manitoulin Island. To transit this channel, arrangements must be made in advance to open the Little Current Swing Bridge. Typically, SAR response in the North Channel is provided by vessels of opportunity and existing CCGA units (five). The CCGA units however are not consistently available, and recreational activity and vessel numbers are increasing.

To mitigate the risks to clients in the North Channel, an increase in SAR response unit capacity is needed. The SAR Needs Analysis recommends:

24. Establish two Inshore Rescue Boats (IRBs) in the North Channel (Lake Huron) to provide response to clients during peak seasons. To ensure risks are being

adequately mitigated, SAR response capacity and effectiveness in the North Channel should be re-assessed after a few years.

4.5 Great Lakes – Western Lake Erie

Western Lake Erie has no designated primary SAR unit and, at this time, response to SAR cases is provided primarily by vessels of opportunity and CCGA.

Primary CCG search and rescue units (SRUs) located in Amherstburg (47' MLB), Port Dover (47' MLB), and Longpoint (seasonal IRB) are capable of providing SAR response to western Lake Erie. These SRUs provide some support to the existing SAR system in western Lake Erie, but are typically kept busy with cases in their own Areas. The expected increase in pleasure craft activities for the entire Great Lakes will add to the demand on all Great Lakes SRUs, thus minimizing the extent to which these units can respond in western Lake Erie and straining the current SAR system in this Area.

To mitigate these risks and increase SAR system capacity, the SAR Needs Analysis recommends that:

25. An IRB be established in Lake Erie, positioned in any location east of Wheatley and west of Port Stanley.

5 SAR Operations

5.1 Coverage Capacity

Providing appropriate year-round SAR coverage across Canada is logistically complicated. The SAR Needs Analysis revealed a need to make operational adjustments in certain areas to address issues with SAR system coverage capacity.

Lake Superior: One CCG primary SAR unit located in Thunder Bay provides primary CCG SAR response. In the rest of Lake Superior (east and west of Thunder Bay), the SAR system relies heavily on response from a limited number of vessels of opportunity and CCGA. Response from these SAR system components is influenced by severe weather conditions.

The SAR Needs Analysis revealed that, in Lake Superior, the amount of client activity and demand for SAR services is such that an appropriate risk mitigation measure would be that:

26. The CCG be aware of the level of risk in Lake Superior as indicated by the SAR Needs Analysis and make a commitment to place secondary SAR vessels in Lake Superior, when available.

Southeastern Canada: Provision of SAR coverage offshore becomes problematic during periods when the offshore patrol vessel responsible for providing SAR services off the southwest coast of Nova Scotia is scheduled to operate in the upper Bay of Fundy.

As offshore patrol vessels have a delineated zone of operations, when an offshore patrol vessel is in its specified zone (i.e., off the southwest coast of Nova Scotia), it has specific responsibilities in that zone. In this specific case, those responsibilities involve upholding Canada's international commitment to provide SAR services offshore of Nova Scotia. If the offshore patrol vessel transits out of the zone to conduct operations elsewhere (i.e., in the Bay of Fundy), the zone is left without an appropriate vessel and international commitments are not being upheld.

Although the offshore vessel is still capable of responding to offshore incidents, there is, from a programming standpoint, a 'gap' in SAR coverage. To address this programming dilemma, the SAR Needs Analysis recommends:

27. Re-align the western offshore patrol area to encompass the Bay of Fundy, Georges Bank, Lehave Bank and east to Lunenburg, to allow for both multi-tasking and SAR requirements.

Off the *southeastern* coast of Nova Scotia, another offshore patrol vessel is responsible for providing offshore SAR coverage. However, analysis revealed that, for many SAR cases, the ARUN lifeboats positioned along the south coast of Newfoundland were relied upon to respond in this area. As previously discussed, ARUN lifeboats have limited response capability offshore due to transit range limitations, which applies also to the Cabot Strait.

The needs analysis recommends a similar solution to that suggested for the *southwest* coast of Nova Scotia:

28. Re-align the eastern offshore patrol area (off the coasts of Nova Scotia and Newfoundland) to encompass St. Pierre Bank, Laurentian Channel, Cabot Strait, and Banquereau Bank. This solution would also ensure a large ship presence in the Cabot Strait.

5.2 SAR Communications

The assessment of SAR communications also revealed the need for operational adjustments to address issues with SAR service delivery.

VHF-DF: The CCG uses direction-finding (DF) equipment to pinpoint the location of vessels in need of assistance. DF equipment allows Marine Communications and Traffic

Services centres (coast stations) or CCG ships (mobile stations) to triangulate a vessel's position using VHF signals, or ascertain a line of bearing along which a search can begin. The use of VHF-DF equipment saves valuable time when searching for a distressed or disabled vessel and can limit the number of resources required to carry out a search or rescue. Without VHF-DF, search object location may require the use of multiple maritime and aeronautical resources, a costly alternative.

Though the VHF Direction Finding (VHF-DF) system supports effective SAR response, existing VHF-DF equipment is deteriorating and, in some cases, sites are not electronically linked together, preventing the benefits of the system from being fully exploited. Recognizing that the DF system is expensive to maintain or expand, it is recommended that:

29. A business case be developed to determine the benefits of supporting refurbishment and expansion of the existing VHF-DF network to improve direction-finding capabilities during SAR cases.

EPIRB: In distress cases where the vessel is not equipped with VHF or where there is insufficient time to use a radio (VHF, MF or HF), an Emergency Position Indicating Radio Beacon (EPIRB) may be the only way to notify the SAR system.

EPIRBs are used to alert rescue authorities of a vessel in distress anywhere in the world. EPIRB activation is detected by the Global Maritime Distress and Safety System (GMDSS), which uses the COSPAS-SARSAT Satellite System. When an EPIRB is activated, COSPAS-SARSAT satellites register the activation and the Canadian Mission Control Centre (CMCC) officer receives the alert and the position of the EPIRB. The CMCC officer gathers all necessary information and notifies the appropriate rescue centre. If the vessel does not have an EPIRB on board, SAR system response to vessels involved in a severe incident can be delayed. The CCG recommends that mariners always register their EPIRBs and keep their information up to date. In this regard, the needs analysis recommended that:

30. The CCG continue to promote the carriage of EPIRBs.

5.3 SAR Coordination

Assessment of SAR coordination also revealed the need for operational adjustments to address issues with SAR service delivery.

At Joint Rescue Coordination Centres (JRCCs) and Maritime Rescue Sub-Centres (MRSCs), qualitative analysis revealed that current manning levels do not adequately address the recent changes in responsibilities, procedures, and use of technological equipment for coordination, control, and support of SAR operations. Changes in demand

for SAR services, as well as changes in the technology used by clients and SRUs, have altered the way SAR coordination service is delivered.

In addition, quantitative analysis revealed that Rescue Centres are handling a rising number of cases. Therefore, it is generally agreed that current manning levels at single-stand centres (i.e., one SAR coordinator on duty) have created a safety issue with regard to a solitary mission coordinator being able to handle the immediate and concurrent tasks involved in coordinating emergency response. To respond to these findings, the SAR Needs Analysis recommends that:

31. Canadian Coast Guard Headquarters conduct an independent workload analysis of each Rescue Centre (5 in Canada) to investigate minimum manning levels and the appropriate staffing factor per position. Until such time that the workload study is completed, the staffing factor of 5.88 continue to be utilized for all positions, and existing policy be applied, such that JRCCs provide mission support as necessary to MRSCs.

Analysis results also indicate that no national standard or structure is in place to ensure that SAR mission coordinators (SMCs) are kept current with changing technology, policies, practices and procedures. As this could negatively affect the quality of SAR service, it is recommended that:

32. The CCG ensure that continued refresher training and proficiency certification is provided for maritime SAR mission coordinators.

Marine Communications and Traffic Services (MCTS) centres assist JRCCs/MRSCs by handling communications with both vessels in need of assistance, and vessels involved in SAR response. They collect information, necessary for the successful resolution of a case, and relay it to the rescue centre via telephone. The JRCCs/MRSCs use specialized software to collect all case information received from MCTS centres, SAR partners, responding vessels, the public, etc. MCTS centres, on the other hand, use software vastly different from that used by the Rescue Centres. The SAR Needs Analysis found that technological disparities between rescue centres and MCTS centres encourage disconnect, which could lead to the loss of essential information during SAR cases. It is therefore recommended that:

33. The potential to harmonize data collection technology at rescue centres/sub-centres and MCTS be investigated to improve mission coordination (e.g., use of similar software to record case details, etc.).

During prosecution of a SAR mission, SAR coordinators have limited information regarding the location of nearby vessels. As nearby vessels are possible response units,

access to this information could improve SAR response. Therefore, it is recommended that:

34. Options be explored to improve the ability of maritime SAR coordinators to access existing electronic vessel tracking systems which could provide the position of Coast Guard vessels, Coast Guard helicopters, CCGA vessels, commercial vessels (including tugs), and fishing vessels including, but not limited to, AIS, LRIT, and INNAV.

With regard to tracking CCG assets, the SAR Needs Analysis revealed that rescue centres are not consistently able to track CCG assets because CCG assets are not equipped with a fleet tracking system. As the ability to track CCG assets would increase the effectiveness of SAR mission coordination, it is recommended that:

35. All CCG fleet vessels, helicopters, and IRB units be fitted with electronic tracking.

5.4 Statistics

The ability to track CCG assets and potential vessels of opportunity would improve the efficiency of SAR response. But, an understanding of the seasonal availability of vessels of opportunity, a vital SAR component, could be used to inform strategic risk analysis and determine optimal CCG vessel placement and operational periods for the provision of SAR services. Therefore, it is recommended that:

36. A user-friendly method or system be developed for the collection and extraction of statistics on vessel response to distress, urgency, and MARBs. It is furthermore advised that this system be compatible, or able to be integrated, with the SAR data collection system SISAR and be capable of automatically recording data in real time.

In the coordination of SAR missions, the likelihood of a successful outcome is increased if the crews operating the SAR response vessels are familiar with the area. The needs analysis revealed that, due to the recent implementation of pooled crewing, whereby crew members from one area are transferred to another area to relieve staffing issues, local knowledge of Lifeboat crews has diminished. To ensure continued effective and efficient SAR mission prosecution, the SAR Needs Analysis recommends that:

37. The SAR program and Fleet work together to ensure SAR crews are appropriately familiarized with their local area of operation.

During cases involving several response units, one unit must assume the duties of On-Scene Commander (OSC) to coordinate the SAR response. SAR lifeboats are often called upon to assume these duties, as they are often the sole resource on-scene with crew trained to act in this capacity. However, due to manning levels, it is a challenge for primary SAR lifeboat units to perform the duties of OSC. Therefore, the needs analysis recommends that:

38. The SAR program work with Fleet to investigate the issues associated with the manning level on lifeboats and find solutions to address issues affecting the provision of OSC duties.

5.5 Major Maritime Disasters

Risk analysis, conducted as part of the overall SAR Needs Analysis, involved analyzing future client numbers and activity trends. In most areas across Canada, an increase in client activity and numbers is expected. These increases point to a rise in the potential for a major maritime disaster (MMD) to occur. While the SAR program has specialized plans for SAR response to an MMD, these plans are incomplete. In addition, although the SAR program ensures that MMD plans are exercised to improve effective response, a national exercise schedule does not yet exist and therefore MMD plans are not being consistently exercised. As such, it is recommended that:

39. The CCG work with SAR partners to ensure that MMD plans are completed and kept current. Furthermore, a process for ongoing improvement of MMD plans be established, involving planning, exercising and monitoring of MMD plans, coordinated at the national level.

5.6 Ongoing Analysis

To further develop the SAR program and achieve more effective, efficient operations, a method for more systematically analyzing SAR system response is required. The cyclical SAR needs analysis process can serve this purpose if it is based on a CCG-approved methodology. Thus, it is recommended that:

40. The existing SAR Needs Analysis methodology be reviewed and further developed to provide a valid analytical process which ensures the continuation of the SAR Needs Analysis.

5.7 Measurable Standards

To best carry out the above recommendation, consideration must first be given to reviewing the current maritime SAR level of service and service standards. As the

standards are currently defined, SAR system performance cannot be precisely measured, which makes program evaluation challenging. Therefore, it is recommended that:

41. The existing maritime SAR level of service and service standards be reviewed and revised to ensure measurable and realistic service standards. Specifically, the incident classification evaluation system (90%, 75%, 50%) needs to be revised to achieve measurable SAR standards.

6 SAR Partnerships

Partnerships are an essential aspect of the Canadian maritime SAR system. The CCG relies on SAR partners to fulfill its SAR mission “to save and protect lives in the maritime environment.” Without these partnerships, the Canadian SAR system would not be considered one of the best in the world. To maintain the integrity of the existing SAR system, and with the objective of continual improvement, the CCG must continue to build on existing SAR partnerships.

6.1 Canadian Coast Guard Auxiliary

The six CCGA corporations are federally incorporated non-profit volunteer organizations that engage in cost-effective maritime search and rescue activities throughout Canada. The CCGA provides humanitarian assistance when required, under the leadership of the CCG. In existence since 1978, the CCGA makes a valuable contribution to CCG SAR missions and SAR prevention activities. The mission of the CCGA is “to support CCG SAR activities as they relate to saving lives.” The CCGA is recognized as a key player and a dependable SAR partner.

Strait of Juan de Fuca, B.C.: There is currently no designated primary SAR unit in the Strait of Juan de Fuca. The SAR system in this area relies heavily on CCGA units (operating 24/7) to address most of the SAR demand. The closest CCG primary SAR unit is located in Ganges and serves the northern part of this area; it does not typically respond to cases in the southern or western parts of the strait.

Fortunately, the CCGA is extremely active in this area and willing to assist to the extent of its capability. However, it is a challenge for the CCGA to provide all-weather SAR-capable vessels, or vessels which are sufficient to sustain operations for prolonged periods. And, as the CCGA is an organization which augments Coast Guard services, there is no requirement for the CCGA to provide services 24/7.

The SAR Needs Analysis revealed that more challenging SAR cases might benefit from CCG expertise, as SAR system capability in this area is a concern. Despite the unparalleled SAR coverage *capacity* provided by the CCGA, generally CCGA members have no required qualifications above a pleasure craft licence; there is no requirement for SAR On-Scene Commander (OSC) training or advanced first aid. In addition, CCGA

units do not possess electronic navigation training for reduced visibility operations, nor are they capable of fulfilling the CCG multi-tasking duties the area demands.

As well in this area, secondary SAR resources from SAR partners are limited. DND could offer one tug from Esquimalt to assist in emergencies and there are a few small boats which could be provided from Victoria harbour authority or police. Also, for two days every month, a CCG buoy tender and FRC is available from Victoria. However, analysis of future trends indicates that the SAR system in this area will not be capable of handling the forecasted increase in activity; pleasure craft, commercial and cruise traffic are all expected to increase in this area.

In 1993, the SAR Needs Analysis recommended that a CCG resource be established in this area. The results of the SAR Needs Analysis, 2007 indicate the need for a resource still exists. As such, it is recommended:

42. Explore the implications (policy, legal, operational, etc.) and potential benefits of working further with SAR partners to address capability gaps.

Saint John River (Bay of Fundy): CCG coverage in this area is partially provided by a seasonal IRB in the Saint John River. However, clients remain active before and after the IRB operational season. During these times, vessels of opportunity and CCGA units in the area are limited.

Minas Basin (Bay of Fundy): The Minas Basin has limited SAR coverage; SAR response relies primarily on one CCGA unit, which is not consistently available.

To augment the SAR system in the Saint John River and Minas Basin, it is recommended that:

43. The CCG work with the CCGA to enhance response capacity by recruiting new owner-operated vessels in the Minas Basin, Saint John River, and along the Bay of Fundy coast of Nova Scotia from Digby to Minas Basin.

Bras d'Or Lakes, Petit de Gras and Arichat (Nova Scotia): The SAR Needs Analysis revealed that a limited number of vessels of opportunity, diminishing numbers of CCGA units, and a lack of primary SAR response units is having a negative effect on SAR response. It is recommended that:

44. The CCG work with the CCGA in these areas to enhance response capacity by recruiting new owner-operated vessels.

Fortune Bay (south coast of Newfoundland): The study found that there are few CCGA units available to provide SAR response and that the available CCG primary SAR units are not able to effectively mitigate risk. It is recommended that:

45. The CCG work with the CCGA to enhance the small vessel response capacity by recruiting new owner-operated vessels for the CCGA in Fortune Bay.

Lake Superior: As previously mentioned, there is one CCG SAR unit located in Thunder Bay which provides primary SAR response. In the remainder of Lake Superior (east and west of Thunder Bay), the SAR system relies heavily on a limited number of vessels of opportunity and CCGA. Response from these SAR components is heavily influenced by the severe weather conditions common in this area. To augment SAR capacity in this area and to meet future demand, it is recommended that:

46. The CCG work with the CCGA to enhance response capacity by recruiting new owner-operated vessels in Lake Superior.

North Channel, Lake Huron: The primary CCG SAR unit is restricted in its ability to provide response to incidents in the North Channel. As a result, SAR response is provided primarily by vessels of opportunity and existing CCGA units (five) which are not consistently available. As recreational activity and vessel numbers are expected to increase, it is recommended that:

47. The CCG work with the CCGA to enhance response capacity by recruiting new owner-operated vessels in the North Channel, Lake Huron.

Western Lake Erie: Response is provided primarily by vessels of opportunity and CCGA. CCG primary SAR units in adjacent Areas provide SAR response, but these primary SAR units have an already-high workload. As activity trends indicate an increase in pleasure craft numbers and client activity, the SAR Needs Analysis recommends that:

48. The CCG work with the CCGA to enhance response capacity by recruiting new owner-operated vessels in western Lake Erie.

Upper St. Lawrence River: The SAR Needs Analysis revealed that during the shoulder seasons there is no CCG primary SAR coverage available in the upper St. Lawrence River. During these times, the risk to the client is high due to low water temperatures and delays in response time caused by the river's lock system. It is therefore recommended that:

49. The CCGA consider increasing the number of CCGA units providing SAR service during the shoulder seasons in the upper St. Lawrence River.

Gulf of St. Lawrence: Similarly, in several geographic areas of the Gulf of St. Lawrence, the Needs Analysis identified that the SAR system relies heavily on vessels of opportunity and a minimal number of CCGA units to provide SAR response.

- Off the **north coast of PEI**, SAR system coverage was found to be poor. The system relies heavily on a limited number of CCGA units and vessels of opportunity. Similar problems were found off the **south shore of Newfoundland (Port-aux-Basques/St. Georges Bay area)** and the **Lower North Shore of Quebec**.

- In the **lower St. Lawrence River** (entrance to the Gulf), the SAR system relies heavily on CCGA, municipal and local authorities, and vessels of opportunity. In this area, SAR coordinators find it challenging to find response resources and SAR response is often delayed as a result.

The Needs Analysis recommends that:

50. The CCG work with the CCGA to enhance response capability by recruiting new owner-operated vessels in areas where CCGA membership is minimal (i.e., north shore PEI, south shore Newfoundland, Lower North Shore of Quebec and Labrador, lower St. Lawrence River, etc.), recognizing that previous attempts at recruitment have failed.

The assessment of SAR coordination revealed that SAR coordinators spend considerable time and effort to find CCGA assets to respond in emergency situations. Often, numerous calls are made to CCGA members which either go unanswered or the member is unable to be tasked. To address this issue, it is recommended that:

51. The CCG work with the CCGA to enhance CCGA availability, accessibility, and reliability.

More in-depth review of the CCGA is considered necessary as inconsistencies were found in the application of SAR coverage, training requirements, and/or funding among the five CCGA regions. It is therefore recommended that:

52. The CCG conduct a comprehensive review of the CCGA's operational requirements, taking into consideration coverage, training standards and funding in line with modern SAR requirements.

As previously discussed, the provision of maritime SAR in Canadian northern areas cannot be compared with that in any other area of Canada. Because the CCGA in the North faces unique operational challenges, it is recommended that:

53. The CCGA in Nunavut and Northwest Territories be considered separately from the CCGA of the southern areas when dealing with issues such as funding, insurance, guidelines and by-laws, training, and operational standards.

6.2 Department of National Defence

The needs analysis revealed that the national standards used to evaluate maritime SAR program delivery are being inconsistently applied. As DND is the lead department of Canada's SAR service delivery, it is recommended that:

54. The CCG, in partnership with DND, establish a quality management/standards review system to conduct cyclical evaluation of all aspects of SAR program delivery and operational standards, in accordance with recognized quality assurance practices.

6.3 Parks Canada

Previous recommendations address the limited SAR system response capacity in much of **Lake Superior**. They propose that CCG secondary SAR units be positioned in the lake to mitigate risk when possible and that the CCG work with the CCGA to increase the number of CCGA units on the lake.

Risk could be further mitigated by working with Parks Canada in eastern Lake Superior, north of Wawa, where the water boundary of Pukaskwa National Park borders Lake Superior. The needs analysis found that clients using kayaks, canoes, etc. are often active in this area. Therefore, to further mitigate risk in Lake Superior, it is recommended that:

55. The CCG and Parks Canada determine how they can work together to mitigate risk to clients in eastern Lake Superior.