



Fisheries and Oceans Canada

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# International Science Strategy

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## **DFO INTERNATIONAL SCIENCE STRATEGY**

### **1. INTRODUCTION**

Canada is blessed with abundant aquatic resources, including the world's longest coast line and largest reserves of fresh water. Fisheries and Oceans Canada (DFO) is responsible for the sustainable management of these resources to ensure long-term economic prosperity for those depending on the wealth of our oceans, lakes and rivers for their livelihoods, and the health of the ecosystems supporting those resources.

The global context for fisheries and oceans management is increasing in complexity as concepts formulated in the international arena, such as the precautionary approach (PA) and the ecosystem approach to management (EAM), are incorporated into domestic policy and management programs. Moreover, the traditional approaches to fisheries and oceans management are facing fundamental challenges. Traditionally, international regulation and management in the marine realm has been sector based. For example, the International Maritime Organization (IMO) focused on the safety regulation of shipping while Regional Fisheries Management Organizations and Arrangements (RFMO/As) focused on fisheries management, usually based on the single-species model. More recently, and especially since the signing of the Convention on Biological Diversity (CBD) in 1992, there has been an increasing number of broad-based conservation initiatives that have resulted in pressures to change the models upon which DFO manages Canada's fisheries and oceans.

These international developments in fisheries and oceans policy and management have led, in part, to increased demands for scientific information and advice. As a result of the increasing complexity in fulfilling DFO's mandate, and the concurrent expanded role for scientific advice, products and services, the *Science Framework for the Future* (<http://www.dfo-mpo.gc.ca/Science/Publications/framework-cadre/index-eng.htm>) was developed to ensure that DFO's Science program is capable of responding to increased demands for applied and time sensitive advice. It also provides for a balance among long-term issues and the flexibility to address emerging pressures, evolving priorities and maintaining sufficient capacity for forward looking science.

An essential element of the Science Framework for the Future is collaboration. This will involve key partners across all levels of government, academia and the private sector, both domestically and internationally.

The purpose of the *International Science Strategy* is to guide the international elements of DFO's Science Program aimed at fulfilling Departmental priorities and international obligations. As well, it seeks to develop international partnerships to increase scientific knowledge and capacity and to influence the direction of research and development of

standards. The Strategy also details how the Science program will support DFO Sectors engaged in international policy development and fisheries and oceans management.

## **2. THE GLOBAL NATURE OF SCIENCE**

Most fields of scientific endeavour, by their very nature, necessitate international cooperation. These include such complex and broad-ranging topics as biodiversity, impacts of climate change, the Arctic, ocean processes requiring global-scale monitoring, hydrographic charting, data management, and studies of straddling stocks and highly migratory species such as bluefin tuna and leatherback turtles. Other types of scientific inquiry are inherently borderless, such as the study of the effects of sound on aquatic species, or the methods for assessing the status and trends of marine populations.

While Canada has many leading experts in marine sciences, there are a great many others in foreign countries that possess relevant expertise in this field. International scientific cooperation provides access to this expertise and alleviates some of the limited human and financial capacities that are often an impediment to undertaking a comprehensive science program in support of oceans policy and management. This is especially significant given the fact that Canada possesses the world's longest coast line and largest reserves of fresh waters.

Taking advantage of the expertise in a wide variety of disciplines from other countries not only leverages resources, it accelerates scientific progress in addressing complex issues by building on existing knowledge and leading edge research. It is only when information and expertise is shared amongst scientists from various countries that an accurate picture emerges of global environment and biodiversity trends. In addition, the value of the challenge format found in international science venues, guards against scientific cultures from becoming entrenched and isolated.

Like Canada, many countries face similar challenges in managing their aquatic resources and ask similar questions of their scientific advisors. Collaboration among scientists from different nations takes advantage of a greater pool of knowledge generated in response to policy and management demands that are often similar and can be shared to mutual benefit.

There are additional advantages to international collaboration, in that having a common scientific understanding of sustainable management and biodiversity conservation issues, often provides an unbiased and common footing upon which to build international conventions, regulation and codes of practice.

### **3. RATIONALE FOR AN INTERNATIONAL SCIENCE STRATEGY**

DFO has a very broad mandate that extends far beyond fisheries management to include leadership in the development and implementation of policies and programs that support Canada's economic, ecological and scientific interests in marine and freshwaters, as well as safe navigation in these waters.

DFO's domestic science activities are undertaken with the objective of contributing to Departmental and Government of Canada mandates and priorities. For example, science produces reliable nautical charts and other navigational products that contribute to safe and accessible water ways; conducts research to address the impacts of human activities on fish and fish habitat; provides decision-making advice that affects the health and productivity of aquatic ecosystems; and conducts regular stock surveys to underpin decisions for sustainable fisheries management.

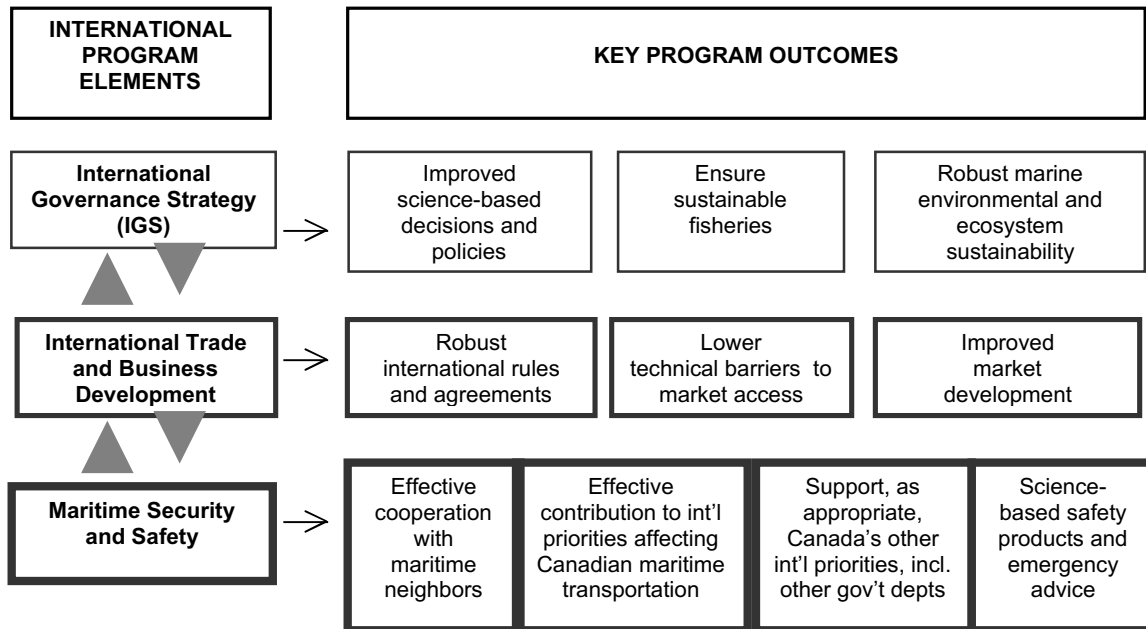
Opportunities for international scientific collaboration are numerous and range from multinational science marine science organizations such as the International Council for the Exploration of the Sea (ICES) and the North Pacific Marine Science Council (PICES) to large scale monitoring and data management projects orchestrated by UNESCO's Intergovernmental Oceanographic Commission (IOC). While DFO can benefit from participation in these international fora, these activities must be undertaken with clear objectives to ensure that they serve as an extension of domestic science programs, and are consistent with the Department's mandate and priorities.

Given the potential impacts of international developments on domestic policies and management regimes, DFO plays a strong proactive role in international fora. The Department has very specific goals for this international leadership which are consistent with DFO's international agenda:

- 1) to identify international risks and opportunities critical to the advancement and protection of DFO priorities and broader Canadian interests;
- 2) to influence international agendas, laws, policies, standards, programs and relations in a manner that protects and advances DFO priorities and broader Canadian interests, and
- 3) in doing so, enable the willing translation of international trends, priorities, policies and regulatory initiatives into the appropriate domestic action needed to ensure that Canada meets international norms and expectations.

The three program elements and key program outcomes for these international leadership goals are illustrated in Figure 1:

**Figure 1: Integrated Agenda for International Leadership**



Science plays a key role in achieving the key program outcomes of DFO's international agenda by providing the foundation for improved science-based decisions and policies and by producing navigational safety products and emergency advice. The International Science Strategy is designed to support the Department's international agenda goals, outcomes, priorities and program elements.

At the broadest international level the United Nations General Assembly (UNGA) regularly passes resolutions that affect fisheries and oceans policy and management. A recent example of this is UNGA Resolution 61/105. This wide-ranging resolution on sustainable fisheries includes a call for states to take immediate action to protect vulnerable marine ecosystems including seamounts, hydrothermal vents and cold water corals from destructive fishing practices. Canada has committed to apply international standards as a minimum within its jurisdiction. In fact, DFO has often sought increased sustainability measures for internationally managed stocks to deal with such issues as the depletion of straddling stocks on the Grand Banks. Thus, resolution 61/105 will have a significant impact on DFO's management measures because of our international commitments and the occurrence of seamounts, hydrothermal vents and coldwater corals in areas that are subjected to bottom trawling in Canadian waters.

Science advice is required to support DFO's position in developing the international management measures to implement such resolutions (e.g. development of criteria for identifying vulnerable marine ecosystems). It is in Canada's best interest that it's negotiating positions are underpinned by sound, peer-reviewed science.

There are several other United Nations conventions and bodies related to DFO's mandate where Science involvement is required. They include the 1982 United Nations Convention on the Law of the Sea (UNCLOS), the United Nation Fish Stock Agreement (UNFSA), the Food and Agriculture Organization (FAO) Committee on Fisheries and the IMO. Other significant global conventions include the CBD and the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES). There are also a number of Regional Fisheries Management Organizations (RFMOs) where DFO science has a strong contribution to make (e.g. NAFO, ICCAT, IPHC, etc).

Trade organizations and agreements often include an element of sustainable development or environmental protection. DFO engages in the Asia-Pacific Economic Council (APEC), the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA) Commission on Environmental Cooperation. Trade issues, such as market access are sometimes linked to environmental and sustainability issues. Eco-certification has become a factor that countries seeking international market share must now address. Fish health (i.e. ensuring fish are disease free for export) is also a critical issue in ensuring that Canadian seafood is widely accepted by global consumers. DFO is active in the World Organisation for Animal Health (OIE) which is responsible for improving animal health globally.

There are also international environmental non-governmental organizations (e.g. the World Wildlife Fund WWF) and other organizations such as the International Union for Conservation of Nature (IUCN) which has both non-governmental organization and government membership that influence the decision-making process for setting international conservation policies.

The policies, standards and positions that are developed and driven by international bodies ultimately impact the manner in which DFO conducts its management activities. DFO Science needs to support the Department's policy and management sectors as they defend Canada's interests in these international fora.

Extending beyond the Department, DFO's Science program operates within the larger federal vision for Canadian science and technology. In 2007, the Government of Canada released its science and technology strategy "***Mobilizing Science and Technology to Canada's Advantage***". A key federal policy commitment is to assess Canada's presence in the international scene and to explore options to further improve Canada's contribution to and benefits from international science and technology developments. The goal is to make Canada a global leader in science and technology through stronger domestic and international partnerships.

"S&T developments are increasingly costly and complex, taking place at the interface of disciplines and coming on-stream more rapidly than ever before. To be at the leading edge, and stay there, domestic and international S&T collaborations have become essential. And as we increasingly focus our efforts domestically, we need to tap resources beyond our borders to benefit from the many discoveries that originate outside Canada." From: *Mobilizing Science and Technology to Canada's Advantage*, May 2007  
[\[http://www.ic.gc.ca/epic/site/ic1.nsf/en/h\\_00231e.html\]](http://www.ic.gc.ca/epic/site/ic1.nsf/en/h_00231e.html)

DFO's international science activities will be consistent with the Government of Canada's international science and technology objectives and priorities as laid out in the 2007 strategy.

#### **4. THE INTERNATIONAL SCIENCE STRATEGY**

DFO Science has long been engaged in international scientific advisory bodies that contribute to the development of new conservation concepts (e.g. ecosystem and precautionary approaches) and their operationalization by both RFMOs and DFO's own fisheries and oceans managers. DFO researchers also have a significant history of collaboration with international colleagues in the areas of research, ocean monitoring and data management.

Science support continues to be vital to DFO's success in negotiating international aquatic policy and management measures. The foreseeable demand for this support has the potential to exceed resources. With the Department's objectives and priorities clearly articulated in DFO's international agenda, and with an associated planning process in place, the Science program can allocate its limited resources to respond to the Department's most crucial demands for policy and management support.

The International Science Strategy was developed to clearly articulate major priority areas, objectives, desired outcomes, program priorities and instruments for engaging in international science activities as outlined in Figure 2. It is designed to provide clear direction to DFO Science staff regarding their international activities and is also intended to provide client sectors with an understanding of Science program services and how they will be provided to support the Department's international policy and management goals.

Figure 2: International Science Strategy

PRIORITY AREA	Scientific Knowledge, Products and Standards			Science Advice for Fisheries and Oceans Management	Scientific Support for International Policy
<b>OBJECTIVES</b>	<ul style="list-style-type: none"> <li>- Increase scientific knowledge</li> <li>- Safe Navigation</li> <li>- Market Access</li> </ul>			<ul style="list-style-type: none"> <li>- Sustainable Fisheries and Oceans</li> <li>- Economic Prosperity</li> </ul>	<ul style="list-style-type: none"> <li>- Sustainable Aquatic Ecosystems</li> </ul>
<b>DESIRED OUTCOMES</b>	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>- Influence the international science agenda</li> <li>- Increase capacity</li> <li>- Increase expertise</li> <li>- Leverage resources</li> </ul>	<p><b>Products</b></p> <ul style="list-style-type: none"> <li>- Reliable navigational aids</li> <li>- Advance warning</li> <li>- Successful emergency response</li> </ul>	<p><b>Standards</b></p> <ul style="list-style-type: none"> <li>- Develop and negotiate acceptable science-based standards</li> </ul>	<ul style="list-style-type: none"> <li>- Science-based management of international fisheries and oceans</li> <li>- Incorporation of best practices for providing science advice</li> </ul>	<ul style="list-style-type: none"> <li>- Science-based international fisheries and oceans policy and governance</li> </ul>
<b>PRIORITIES</b>	<ul style="list-style-type: none"> <li>- Ecosystem functioning</li> <li>- Human impacts on ecosystems</li> <li>- Climate &amp; Arctic</li> <li>- Sustainable use</li> <li>- Data management and monitoring</li> </ul>	<ul style="list-style-type: none"> <li>- Standardized hydrographic products and data</li> <li>- Emergency Advice</li> </ul>	<ul style="list-style-type: none"> <li>- Aquatic animal health</li> <li>- Ocean and ecosystem measurements</li> <li>- Eco-certification</li> <li>- Genomics &amp; biotechnology tools</li> <li>- Ecological risk assessment</li> <li>- Hydrography</li> </ul>	<ul style="list-style-type: none"> <li>- Precautionary approach</li> <li>- Ecosystem approach</li> <li>- Management plan evaluations</li> <li>- Stock and species at risk status</li> <li>- Illegal, unreported and unregulated fishing</li> <li>- Vulnerable Marine Ecosystems</li> <li>- Protected Areas</li> <li>- Best practices for sustainable aquaculture</li> <li>- Aquatic invasive species</li> </ul>	<ul style="list-style-type: none"> <li>- International governance</li> <li>- Biodiversity</li> <li>- Protected Areas</li> <li>- Illegal, unreported and unregulated fishing</li> </ul>
<b>INSTRUMENTS</b>	<ul style="list-style-type: none"> <li>- International science organizations</li> <li>- Multilateral science programs</li> <li>- Bilateral agreements</li> </ul>	<ul style="list-style-type: none"> <li>- International standard setting bodies</li> <li>- International ocean measurement and prediction programs</li> </ul>	<ul style="list-style-type: none"> <li>- International standard setting bodies</li> </ul>	<ul style="list-style-type: none"> <li>- Canada-US fisheries conventions and treaties</li> <li>- Bi- and Multilateral-treaties and conventions</li> <li>- Regional Fisheries Management Organizations</li> </ul>	<ul style="list-style-type: none"> <li>- United Nations conventions and organizations</li> <li>- Trade agreements and organizations</li> <li>- International environmental non-governmental groups</li> </ul>

#### 4.1 PRIORITY AREAS AND OBJECTIVES

The International Science Strategy is built around three Priority Areas:

	Priority Area 1	Priority Area 2	Priority Area 3
	<b>Scientific Knowledge, Products and Standards</b>	<b>Science Advice for Fisheries and Oceans Management</b>	<b>Scientific Support for International Policy</b>
<b>OBJECTIVES</b>	<ul style="list-style-type: none"> <li>➤ Increase scientific knowledge</li> <li>➤ Safe Navigation</li> <li>➤ Market Access</li> </ul>	<ul style="list-style-type: none"> <li>➤ Sustainable Fisheries and Oceans</li> <li>➤ Economic Prosperity</li> </ul>	<ul style="list-style-type: none"> <li>➤ Sustainable Aquatic Ecosystems</li> </ul>

Priority Area 1, “*Scientific Knowledge, Products and Standards*”, is aimed at building scientific capacity and expertise by accessing, sharing and leveraging knowledge and resources through international cooperation. Developing and negotiating science-based standards and influencing the international science agenda in support of Canada’s oceans policy and management goals are also key objectives of this priority area. In addition, science activities and products that support safe navigation and rescue operations, as well as participation in international organizations and projects to predict coastal threats (e.g. tsunamis and storm surges) and to respond to environmental emergencies (e.g. oil spills) are included in Priority Area 1.

Priority Area 2, “*Science Advice for Fisheries and Oceans Managers*”, targets the advisory needs of DFO’s managers engaged in international management fora. The activities under this priority area are in response to specific requests for advice to support international management negotiations and decisions. This requires science advice that is internationally respected and that can withstand the criticisms that are often brought to bear on Canada’s negotiating positions. Under the International Science Strategy, the Science program will work closely with departmental fisheries, aquaculture, oceans, fish habitat and species at risk managers to provide timely and effective advice and support for RFMOs, for sustainable approaches for international fisheries management (e.g. ecosystem approach, precautionary approach), and for broader ocean management initiatives (e.g. protected areas).

Priority Area 3, “*Science Support for International Policy*”, focuses on the provision of forward looking science advice to support the development of future international laws, conventions and norms that touch on DFO’s mandate and ultimately impact the management and use of Canada’s aquatic resources. The Science program will work

proactively with DFO Policy and other Departmental Sectors to strengthen Canada's positions in agenda setting of international oceans use policies through science-based support in negotiating international conventions and agreements.

## 4.2 DESIRED OUTCOMES, PRIORITIES AND INSTRUMENTS

### Priority Area 1: Scientific Knowledge, Products and Standards

	<b>KNOWLEDGE</b>	<b>PRODUCTS</b>	<b>STANDARDS</b>
<b>DESIRED OUTCOMES</b>	<ul style="list-style-type: none"> <li>- Influence the international science agenda</li> <li>- Increase capacity</li> <li>- Increase expertise</li> <li>- Leverage resources</li> </ul>	<ul style="list-style-type: none"> <li>- Reliable navigational aids</li> <li>- Advance warning</li> <li>- Successful emergency response</li> </ul>	<ul style="list-style-type: none"> <li>- Develop and negotiate acceptable science-based standards</li> </ul>
<b>PRIORITIES</b>	<ul style="list-style-type: none"> <li>- Ecosystem functioning</li> <li>- Human impacts on ecosystems</li> <li>- Climate</li> <li>- Arctic</li> <li>- Sustainable use</li> <li>- Data management and monitoring</li> </ul>	<ul style="list-style-type: none"> <li>- Standardized hydrographic products and data</li> <li>- Emergency Advice</li> </ul>	<ul style="list-style-type: none"> <li>- Aquatic animal health</li> <li>- Ocean and ecosystem measurements</li> <li>- Eco-certification</li> <li>- Genomics &amp; biotechnology tools</li> <li>- Ecological risk assessment</li> <li>- Hydrography</li> </ul>
<b>INSTRUMENTS</b>	<ul style="list-style-type: none"> <li>- International science organizations</li> <li>- Multilateral science programs</li> <li>- Bilateral agreements</li> </ul>	<ul style="list-style-type: none"> <li>- International standard setting bodies</li> <li>- International ocean measurement and prediction programs</li> </ul>	<ul style="list-style-type: none"> <li>- International standard setting bodies</li> </ul>

While Canada produces much first class marine science it cannot be a leader in all fields of aquatic science due to limits on human and financial resources. One way to boost the productivity of Canadian aquatic scientists is to take advantage of international collaborations. The desired outcomes related to “**Knowledge**” are to: influence the international science agenda such that it focuses on DFO’s priorities; increases scientific capacity; leverages resources; and increases expertise. Due to the complex nature of aquatic ecosystems and the need to incorporate the influences of the natural forcing and human disturbances, priority should be given to the development of knowledge on ecosystem functioning; human impacts on ecosystems; climate change and the Arctic; sustainable use; and data management and monitoring. This will be achieved by

participating in international science organizations, engaging in multilateral science programs and developing bilateral agreements with like-minded countries facing similar challenges and possessing complementary expertise.

International science organizations provide a broad-based venue for sharing information and generating new knowledge through study and working groups that address emerging and ongoing issues in aquatic sciences. Active participation in major scientific organizations like ICES, PICES and IOC is key to developing expertise and leveraging resources. Multilateral science initiatives, such as the Argo Float Program, provide increased capacity and leverage resources. Bilateral cooperation agreements will be used to implement joint research activities. Bibliographic analysis will be used to identify nations that possess strengths in the priority areas identified above for possible bilateral cooperation.

The desired outcomes related to “**Products**” are the creation of reliable navigational aids and supporting products, advance warning of marine threats and successful emergency response measures. Priority will be given to the provision of standardized hydrographic products and data and oceanographic advice in response to emergencies such as tsunamis, search and rescue and cargo spills. This will be accomplished through actively participating in international standard setting bodies such as the International Hydrographic Organization (IHO), IMO and international oceans measurement and prediction programs.

Science-based standards underpin many scientific activities and management programs. The desired outcome related to “**Standards**” is to develop and negotiate acceptable science-based standards such that they support DFO’s science activities and management goals. Priority activities will focus on: aquatic animal health, ocean and ecosystem measurements, eco-certification, genomics and biotechnology tools, ecological risk assessment, and hydrography. This will be realized through participation in international standard setting bodies such as the OIE, IOC, IHO and IMO.

### **Priority Area 2: Science Advice for Fisheries and Oceans Management**

<b>DESIRED OUTCOMES</b>	<b>PRIORITIES</b>	<b>INSTRUMENTS</b>
<ul style="list-style-type: none"> <li>- Science-based management of international fisheries and oceans</li> <li>- Incorporation of best practices for providing science advice</li> </ul>	<ul style="list-style-type: none"> <li>- Precautionary approach</li> <li>- Ecosystem approach</li> <li>- Management plan evaluations</li> <li>- Stock &amp; species at risk status</li> <li>- Illegal, underreported and unregulated fishing</li> <li>- Vulnerable Marine Ecosystems</li> <li>- Protected Areas</li> <li>- Best practices for sustainable aquaculture</li> <li>- Aquatic invasive species</li> </ul>	<ul style="list-style-type: none"> <li>- Canada-US fisheries conventions and treaties</li> <li>- Bi- and Multilateral-treaties and conventions</li> <li>- Regional Fisheries Management Organizations</li> </ul>

The two objectives of this priority area, sustainable fisheries and oceans and economic prosperity, are intrinsically linked. Canada has a long, rich history of subsistence, commercial and recreational fisheries. More recently, aquaculture has become an important segment of our aquatic industries. Sustainable fisheries and oceans management is the key to long term economic prosperity resulting from the exploitation of living aquatic resources and other oceans sectors such as renewable and non-renewable energy development.

The first desired outcome related to this priority area is “***international fisheries and oceans management will be based on reliable science advice***” that is respected and accepted by the international community. This is dependent on the second desired outcome which is “***incorporating best practices for providing science advice***” to international fisheries and oceans managers.

A number of priorities have been identified to achieve these two outcomes. These include scientific advice on the precautionary approach, the ecosystem approach, stock and species’ status, illegal, unreported and unregulated fishing, vulnerable marine ecosystems, protected areas, sustainable aquaculture, species at risk and invasive species.

Canada has committed to implementing the precautionary approach and ecosystem approach in both its domestic and international management decisions. Pressure has come from within and internationally to implement both these concepts as there is now an increased recognition that a multitude of ecosystem components must be considered to manage sustainably.

Canada has also committed to ensure that international trade does not threaten the survival of species in the wild as signatory to the Convention on International Trade in Endangered Species (CITES), a legally binding UNEP Convention. The international community has recently shifted its attention to aquatic species, particularly those subject to commercial exploitation (e.g. tuna, sharks and sturgeon) and see CITES as the proper instrument for the international conservation of commercial fish species, when domestic or regional structures have difficulties in demonstrating sustainable use. Timely science advice is required to enable sustainable management of these species so they do not need additional protection under CITES.

As RFMOs are required to manage harvests of fisheries, stock status advice will continue to be a key component of science support for international fisheries management. As these management organizations increase efforts to reduce illegal, unreported and unregulated fishing, science advice will be vital in identifying fish that fall under these categories.

The international community has identified vulnerable marine ecosystems and ecologically and biologically significant areas as a priority for management action. This is in addition to protected areas that have long been viewed as a key tool for sustainable oceans use and conservation. Science has an important role to play in identifying

vulnerable marine ecosystems and areas that should be protected to ensure sustainable oceans management.

Globally, aquaculture is increasingly viewed as an alternative protein source to address global needs for food security and market demands that exceed wild production. Many countries are facing the challenge of managing aquaculture to minimize environmental impacts and conflicts with traditional fisheries. The long-term sustainability of aquaculture requires science advice on ecologically appropriate production technology and environmentally sustainable practices.

Aquatic invasive species are a major threat to aquatic biodiversity and ecosystem health. They have the potential to displace domestic species that support traditional fisheries and have a significant negative impact on aquaculture. Invasive species are truly an international management issue given that the major vector affecting transport of invasive species is the global shipping industry. Science advice is required to support Canada's positions as it negotiates international standards for ballast water and other ship-based vectors.

The instruments used to achieve the desired outcomes and address the priorities are bilateral conventions and treaties with the United States and France, RFMOs, and multilateral treaties and conventions.

### **Priority Area 3: Scientific Support for International Policy**

<b>DESIRED OUTCOMES</b>	<b>PRIORITIES</b>	<b>INSTRUMENTS</b>
- Science-based international fisheries and oceans policy and governance	- International governance - Biodiversity - Protected Areas - Illegal, unreported and unregulated fishing	- United Nations conventions and organizations - Trade agreements and organizations - International environmental non-governmental groups

DFO is committed to maintaining sustainable aquatic ecosystems within Canada's maritime boundaries and can be an influential presence in the international fora occupied with these issues. The desired outcome for this priority area is that "***international fisheries and oceans policy and governance be science-based***".

Recent developments in international oceans governance have made managing oceans resources much more complex both in terms of involvement of non-traditional stakeholders and concepts and goals for conservation of biodiversity.

The legal basis for international fisheries management is UNCLOS. From this convention, the United Nations Fish Stock Agreement (UNFSA) was developed to

address the conservation and management of straddling fish stocks and highly migratory fish stocks. Under this United Nations framework, RFMOs are obligated to implement the principles of the PA and EAM. Additionally, the FAO through its Committee on Fisheries, has produced a number of “soft law” tools such as the Code of Conduct on Responsible Fishing which countries such as Canada have agreed to follow both domestically and internationally. In addition, international trade of endangered species is regulated by CITES, many aquatic species are already included in the CITES Appendices, and it is expected that many more will be proposed for inclusion in the coming years. As signatory Party to the Convention, Canada has legal obligations (which are implemented through national legislation) to regulate trade of any CITES listed species. All of these international fisheries governance mechanisms focus predominantly on “target” species and are science-based.

Extending beyond fisheries management governance are broader efforts to conserve biological diversity, primarily through the CBD and the associated marine program of work known as the Jakarta Mandate (1995). In addition to the CBD, major drivers of oceans policy are resolutions passed by the United Nations General Assembly. These resolutions are very wide ranging and are relevant to many of DFO’s fisheries and oceans management activities including marine protected areas and species at risk. Also contributing to the global debate on broad oceans policy issues are the IUCN, the Global Forum on Oceans, Coasts and Islands and various non-government organizations such as the WWF and Greenpeace. These organizations utilize scientific knowledge to promote their positions on oceans policy and governance.

The CBD has been ratified by Canada and by most other countries that have also ratified the UNCLOS and the UNFSA. Theoretically, these countries should all be striving for the same objectives for fisheries management and biodiversity conservation in the marine environment; this has proven to be an elusive goal.

While there has been some interaction, policy development for fisheries management and broader biodiversity conservation have been developed in separate and sometimes divergent fora, all claiming to be “science-based”. This international divergence is often reflected in national governance regimes. Canada is fortunate in that fisheries management and most broad oceans policy and governance, including biodiversity, are housed under one department with a solid legislative foundation in the *Canada Oceans Act* and the *Fisheries Act* among others. This provides for domestic integration that can be projected onto the international debate in all relevant oceans policy governance fora.

Science plays a key role in providing consistent and rigorous science advice to support Canada’s positions. Priority will be given to the development of international governance policies with particular attention paid to issues related to biodiversity, protected areas and illegal, unreported and unregulated fishing. The Science Program will provide advice as DFO engages in the international instruments including United Nations conventions and organizations, trade agreements and organizations and international environmental non-governmental groups.

## 5. From Strategy to Action

The International Science Strategy outlines the rationale, priority areas, objectives, desired outcomes and instruments for engaging in international science activities. An action plan will be developed to put the strategy into effect that will align available resources with the three priority areas: 1. Scientific Knowledge, Products and Standards; 2. Science Advice for Fisheries and Oceans Managers; 3. Science Support for International Policy. The action plan will comprise three components: *“planning”*, *“execution”* and *“evaluation”*.

An annual planning process will be established to identify international activities required to achieve the objectives and outcomes for Priority Area 1 and provide for formal consultations with policy and management sectors to assess their requirements for science advice and support under Priority Areas 2 and 3.

Criteria for engagement in international science activities will be detailed in the action plan and will include direct links to Departmental mandates and priorities, contribution to achieving the vision for science in the Framework for the Future, related to the priorities contained in the Five-Year Research Agenda and Plan meeting client needs for science advice and support.

Activities will be executed based on the planning process to achieve the objectives and outcomes of the Strategy. These activities will include direct support for DFO’s management and policy sectors engaged in international fora. Development of co-operative science arrangements (e.g. memoranda of understanding) with other countries will be supported by a strategic analysis of their strengths and DFO’s needs in priority areas. DFO’s engagement in international science fora such as ICES, PICES and IOC will also be based on an analysis of our priorities and needs.

The evaluation process will commence with the development of performance measures to assess the success of the International Science Strategy in achieving its objectives and outcomes. A preliminary evaluation of existing international activities to determine their relevance to the International Science Strategy will be conducted in the first year of implementation. Decisions to continue, modify or cease these activities will be based on this evaluation. An evaluation of the effectiveness of International Science Strategy in achieving its objectives and outcomes will be conducted triennially.