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SCIENCE AT DFO ADAPTING TO CLIMATE CHANGE



© Christelle Fortin-Vaillancourt

We can no longer ignore the effects of climate change or the potential implications for the health of aquatic ecosystems. That said, the issue raises significant questions about the impacts on coastal communities and economies, particularly with respect to fishing, commercial navigation and tourism.

Although the overall aspects of climate change are increasingly well understood, there is currently too little documented scientific knowledge about specific aspects to enable governments and industry to comprehend all the implications. Certain activities will have to be adjusted to deal with new realities such as variations in water levels due to ice melting or altered distribution of fishery resources linked to changes in water temperature.

In 2011, Fisheries and Oceans Canada launched the Aquatic Climate Change Adaptation Services Program (ACCASP). Its objective is to support the research and development required to better integrate climate change considerations into departmental policies and decision making. This five-year program (to 2016) has three interrelated components:

1) Assessing climate change risks

Risk assessments were conducted in 2011 for four large Canadian aquatic basins: the Northeast Pacific basin, the Northwest Atlantic basin (including the

Gulf of St. Lawrence and Estuary), the Canadian Arctic basin (including Hudson's Bay) and the Central Freshwater Ecosystems basins (Prairies and Great Lakes). The assessments dealt with six risk factors associated with the Department's various mandates:

- Degradation of ecosystems and fishery resources;
- Changes in biological resources;
- Reorganization and movement of species;
- Increased demand for emergency response;
- Deterioration of infrastructure;
- Changes in the accessibility and navigability of waterways.

Assessment of these risk factors is based on two syntheses of scientific information. The first deals with climate trends and projections for the affected aquatic ecosystems. It considers the historical data available and climate change modelling from the activities of the Intergovernmental Panel on Climate Change (IPCC) and the Department's regional modelling initiatives.

» CONTINUED ON PAGE 4

SPECIES AT RISK ODANAK ABENAKIS COMMITTED TO THE LAKE STURGEON'S RECOVERY

Since 2007, the Odanak Land and Environment Office has relied on the community's commitment and abilities to protect species at risk. Over the last year, with support from the Government of Canada Aboriginal Fund for Species at Risk, the Office has turned its attention to Lake Sturgeon recovery in the Saint-François River (south of Trois-Rivières). The species, also called *kabasa*, was once abundant there and the Odanak community used the sturgeon shape as a signature.

Promising Sampling

Last spring, over 100 sites suitable for Lake Sturgeon spawning were sampled from Drummondville to the Pierreville islands at the Saint-François River mouth. Eighty egg collectors were set in swift water on rocky ground or coarse gravel to determine signs of the species' active presence. These are the places most likely to harbour freshly deposited eggs because they are sheltered from predators and well oxygenated. The collectors were checked every two days and caught eggs from walleye, mooneye, and various redhorse and sucker species.

Fruitful Efforts

In early May, several opaque olive-greenish eggs measuring 3 to 5 mm were discovered and confirmed Lake Sturgeon spawning in two sectors developed in 2001 but not subject to diligent monitoring since. Locating and characterizing spawning sites is important to help properly direct potential conservation measures such as developing sensitive areas or implementing best practices to avoid disturbing sturgeon during spawning. In doing this, the project founders hope to contribute to the Lake Sturgeon's return to the Saint-François River.



Odanak Land and Environment Office

Émilie Paquin, a biologist at the Odanak Land and Environment Office, sets egg collectors in the water in various areas of the Saint-François River suitable for sturgeon spawning.

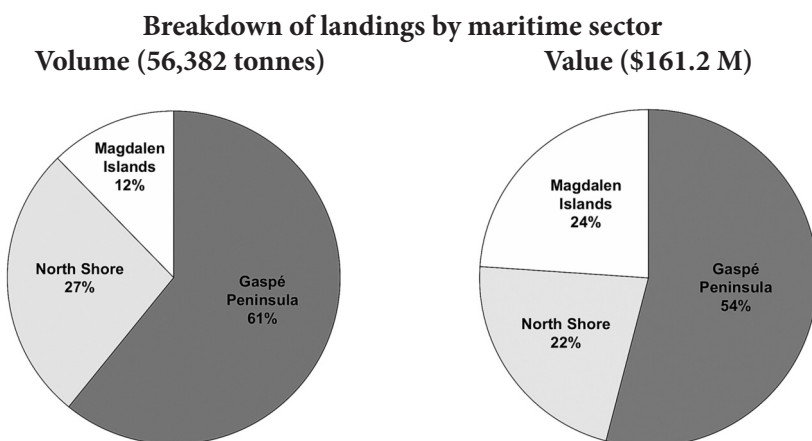
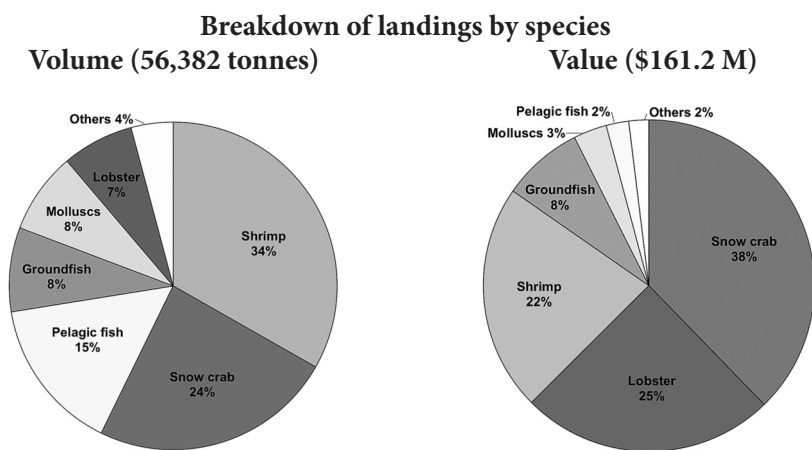
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COMMERCIAL FISHERIES — PRELIMINARY RESULTS 2012 SEASON

In 2012, preliminary data for the commercial fishing season in Quebec show aggregate landings of 56,382 t with a value of \$161.2 million. The landed value does not yet take into account supplementary purchase slips (SPS) and year-end discounts granted to some buyers. These data will be compiled within the next few months.

It is important to point out that 2012 was marked by a 5% increase in landing volume and an 8% increase in value. The increase in landing volume is mainly due to increased landings of snow crab (+ 37%) and herring (+ 14%), while the increase in landing value is attributable mostly to an appreciable hike in landing prices for shrimp (+ 29%) in 2012.

Shrimp, snow crab and lobster remain the most landed species with 65% of the landed volume and 85% of the landed value. Groundfish follow with 8% of the landed volume and value in 2012.



Landing value totalled \$86.8 million on the Gaspé Peninsula (54% of all landings), \$35.4 million on the North Shore (22%) and \$38.4 million on the Magdalen Islands (24%).

Shrimp, snow crab and lobster are the principal species landed on the Gaspé Peninsula. Lobster is the largest catch on the Magdalen Islands while snow crab dominates catches on the North Shore.

* Supplementary purchase slips (SPS) include all landings that were not reported on the general purchase slips. This information is based on estimates drawn from four different sources: direct sales to the public, personal consumption (fish harvesters and their families, sport fishing), fish processed by fish harvesters and fish used as bait.

Martial Ménard
Policy and Economics

CONTINUED FROM PAGE 1 - LAKE STURGEON

The Aboriginal Fund for Species at Risk

Since 2004, the Aboriginal Fund for Species at Risk has supported Aboriginal peoples and organizations in their commitment to implementing the *Species at Risk Act*, which recognizes the role that Aboriginal people play in wildlife conservation.

DID YOU KNOW?

Distinguished by its bony plates and caudal fin similar to that of sharks, the Lake Sturgeon is one of the largest freshwater fish in Canada. The largest observed specimen was 3 m long and weighed 180 kg. Lake sturgeon are eaten smoked and their eggs are sold as caviar. In 2006, the Committee on the Status of Endangered Wildlife in Canada deemed the species endangered in the St. Lawrence River and Great Lakes areas.

Myriam Bourgeois
Ecosystems Management

THE CANADIAN COAST GUARD BROADENS ITS HORIZONS

The new Central and Arctic Region, which includes Quebec, represents the major St. Lawrence–Great Lakes navigation corridor and the great Arctic region. The Canadian Coast Guard's services to navigators are indispensable on these key waterways passing between settled shores and through fragile ecosystems. Our mission in the Arctic is evolving and expanding given the dramatic changes in climate and ice conditions in this northern environment, which is drawing increased attention both nationally and internationally.

This winter, you have no doubt noticed the more frequent presence of the CCGS *Louis S. St-Laurent*, CCGS *Griffon* and CCGS *Henry Larsen* in waters they used to visit only occasionally. These deployments are among the improved services resulting from the new organizational structure.

In the fall of 2013, the Central and Arctic Region will move its administrative offices to a new location on the fifth floor of 105 McGill Street in Old Montréal. Employees of the Assistant Commissioner's Office, Regional Operations Centre, Ice Operations Centre, Notices to Mariners (NOTMAR) office and Fleet Directorate team will all work there. However, to facilitate a gradual transition, temporary offices have been set up in Montréal's Place Bonaventure since early February 2013.

To ensure continuous, high-quality service, the technical staff responsible for aids to navigation services, Marine Communications and Traffic Services (MCTS), search and rescue, environmental response and waterways management will remain at their current bases in Québec and Sarnia or in operations centres across the territory. Ships will also remain at their usual bases, though they may be deployed throughout the greater region.

Mario Pelletier, Assistant Commissioner
Canadian Coast Guard

THE FORUM SAINT-LAURENT FOR INTEGRATED MANAGEMENT OF THE ST. LAWRENCE



The Forum Saint-Laurent is an annual event that promotes concerted action and collaboration by bringing together various stakeholders involved in managing the St. Lawrence's resources and uses, thereby contributing to the integrated management of the River. The first edition of the Forum took place in March 2012 with the aim of fostering contact among stakeholders by examining the theme of integrated management of the St. Lawrence.

The second edition of the Forum was held in Québec on November 6 and 7, 2012, with the theme of areas of ecological interest. Its objective was to encourage cooperation among stakeholders to promote better conservation of these areas of the St. Lawrence. Some 100 people participated in the event, including six representatives from Fisheries and Oceans Canada and the Canadian Coast Guard.

Participants focused on four sub-themes: identifying priority habitats to protect, wetlands, protecting the landscape and environmental heritage, and creating protected areas. A concrete case study requiring a coordinated approach was presented for each sub-theme. Participants were asked to define the challenges of and conditions conducive to creating partnerships in each area. They then identified possible solutions aimed at establishing a collaboration framework for the conservation of areas of ecological interest.

Anthropologist Serge Bouchard was invited to share his vision of the St. Lawrence. He spoke passionately about the people who live on its shores, their use of this majestic river and the inevitable conflicts they face. His speech clearly reflected the St. Lawrence Action Plan's spirit and objectives. In addition to highlighting our successes in protecting and rehabilitating the St. Lawrence and its species, Mr. Bouchard emphasized the time and patience required to resolve conflicts between this major resource's users.

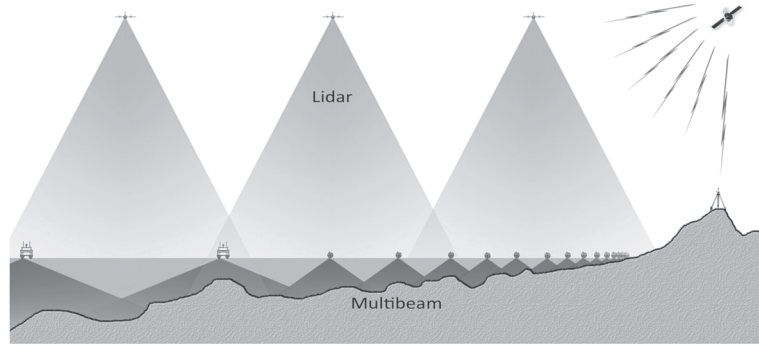
The Forum Saint-Laurent is part of the intergovernmental Canada-Quebec Agreement on the St. Lawrence (2011–2026), which provides the framework for the St. Lawrence Action Plan. The next edition of the Forum will take place in the fall of 2013. For more information, visit the St. Lawrence Action Plan website at www.planstlaurent.qc.ca/en.

Evelyne Dufault
Policy and Economics

HYDROGRAPHERS *IN FULL FLIGHT* AERIAL SURVEY TECHNIQUE

Conducting hydrographic surveys in remote regions is an ongoing challenge for hydrographers. This is why last August the Canadian Hydrographic Service (CHS), Quebec Region, used the CCGS *Matthew* to survey various areas east of Anticosti Island and the Vieux Fort archipelago on the Lower North Shore. This ship and the two hydrographic vessels on board are equipped with the latest multibeam sounding systems.

Given the significant autonomy of the three vessels, it was possible to conduct extremely precise bathymetric surveys along the ranges and around the harbours in these areas. However, this technology has its limitations. Given that the width of the scan swaths is directly proportional to the depth, multibeam sounding systems become much less efficient in low depths, particularly when there are large areas to cover. This is where LiDAR comes in.



LiDAR (an acronym for *Light Detection and Ranging*) uses the same properties as a laser to model the earth's surface but can also measure depths where the nature of the water allows it. The clearer the water and the fewer the suspended particles, the more deeply light can penetrate. The system uses a laser beam in the infrared band and another laser beam that is green. The green beam penetrates the water while the infrared beam is reflected off the water surface or land. The difference in transit time between the two beams determines the depth. These systems are generally mounted on small airplanes or helicopters and can cover a 250-metre-wide swath at an altitude of 500 metres and speeds of 150 knots or more. With depth soundings every 4 to 5 metres, the survey is less dense than multibeam sounding system surveys, but the compromise saves time and money.

In November, the CHS used LiDAR technology to cover an area of about 700 km² between Mistanoque Island and Blanc-Sablon (including the Vieux Fort archipelago) and the results were very positive. It took only four days in the air to survey almost all the areas between the shoreline and maximum depths of 15 to 30 metres, thus covering areas critical to coastal navigation. This survey will partly replace earlier surveys conducted between 1936 and 1939 using sextants and plumb bobs. Unfortunately, due to the nature of the water at the mouths of the Saint-Paul and Salmon rivers, it was not possible to measure the depths there.

The correlation between multibeam and LiDAR data is very good and the combination of the two will help CHS update nautical charts for this area more affordably and quickly than with conventional vessels. This approach fits perfectly with streamlining efforts over the past few years. The CHS will also benefit from reviewing the sectioning of nautical charts to improve its portfolio without compromising user safety or CHS product quality.

Roger Côté
Science

HARBOUR AUTHORITY RECOGNITION PROGRAM

For several years now, Joël Mercier has been the Harbour Master (wharfinger) for the L'Anse-à-Brillant and Saint-Georges-de-Malbaie Port Authorities. He has always shown exemplary dedication, not only for the Port Authority, but also to users of both wharves under his responsibility. From day one he has shown remarkable commitment, especially in raising awareness with wharf users on keeping the premises clean. The Regional Small Craft Harbours Branch is very proud to present him with the Individual Commitment Distinction Award, as part of the *Harbour Authority Recognition Program*.



Joël Mercier, on the right, receiving his prize from Jean-Pierre Huet, Area Programs Manager.

Joël Mercier spares no time or effort in solving problems that require immediate action. Maintenance under his supervision is carried out exceptionally well and always within the time frames set out in contracts.

Since he joined the Port Authority, the community has seen significant progress in the cleanliness of the facilities, all of which is to his credit.

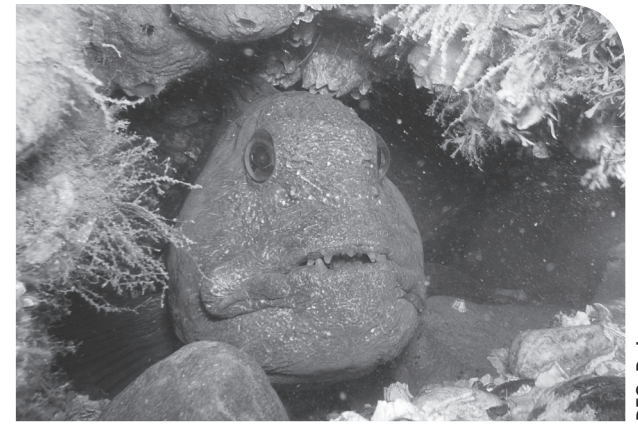
The *Harbour Authority Recognition Program* has been in place for five years now. Regional distinction awards are presented in three distinct categories: the Individual Commitment Award, Harbour Authority Achievement Award and Harbour Authority Environmental Stewardship Award.

We offer our congratulations to Joël Mercier!

Lyne Beaumont
Small Craft Harbours

GOOD NEWS FOR SPECIES AT RISK

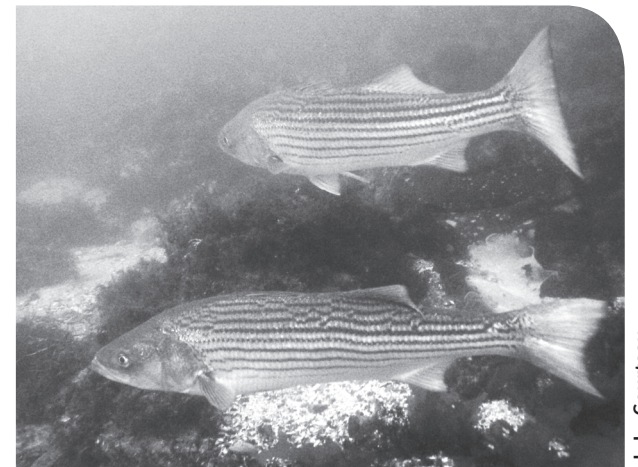
Wolffish



DFO R. Larocque

In 2003, the Spotted Wolffish, the Northern Wolffish and the Atlantic Wolffish were protected under the *Species at Risk Act* (SARA) due to declining populations. These declines were caused by overfishing as bycatch of other groundfish fisheries. Conservation measures imposed under SARA now require the release of wolffish bycatch. Although still below abundance levels seen in the 1970s, all three species show recent signs of recovery as a result of protection and management measures. At the last assessment meeting of the Committee on the Status of Endangered Wildlife in Canada, Spotted and Northern Wolffish were assessed as "threatened" and the Atlantic Wolffish as a "special concern."

St. Lawrence Striped Bass



J. L. Courteau

In 2004, the St. Lawrence Striped Bass population was assessed as "extirpated." The reintroduction of the species in the early 2000s has produced impressive results, and reproduction in the natural environment has been confirmed. The increasing abundance and good distribution of the Striped Bass observed since then are encouraging signs. A review of the status of the population resulted in a change from "extirpated" to "endangered" in November 2012.

NEW SCIENCE ADVISORY REPORTS ONLINE

The following science advisory reports are now available on the Canadian Science Advisory Secretariat's website, www.dfo-mpo.gc.ca/csas, in the *Publications section, Science Advisory Reports (2005+)* for 2012:

- Assessment of the impact of northern shrimp trawling on benthic habitats communities in the Estuary and northern Gulf of St. Lawrence (2012/054)
- Assessment of the Green Sea Urchin Fishery in the Estuary and the Gulf of St. Lawrence in 2011 (2012/055)

The second synthesis assesses the impacts, vulnerabilities and possibilities resulting from climate change for aquatic species and the Department's activities (infrastructure, navigation, emergency response). It considers the climate trends and projections from the first synthesis.

A third assessment of socio-economic aspects is underway and is based on the scientific information from the first two assessments. These three documents will foster discussion at risk assessment workshops to be held during the winter of 2013 for the four large aquatic basins.

2) Understanding the impacts of climate change

Research projects are underway to deal with knowledge gaps concerning the impacts of climate change. The research is based in part on knowledge gaps identified in the course of the risk assessments but also on certain significant concerns. This is the case in particular for the Arctic, where major climate changes have been observed over the last few years. In the St. Lawrence marine ecosystem, research is being conducted in Quebec on the impacts of the acidification of the Laurentian channel's deep waters; modelling impacts on physical processes and the production of phytoplankton; cod exposure to a lack of oxygen (hypoxia); and long-term trends in storm surges.

3) Developing tools for adapting to climate change

There will be a growing focus in 2013 and subsequent years on the development of climate change adaptation tools that can be integrated into departmental management and decision making. These tools will draw on new scientific knowledge and identify concerns with the highest risks. This will make it easier to target the needs for long-term adaptation in various programs. Two projects were created in Quebec in 2011: tools to assess waves and extreme water levels, and a tool for consulting, viewing and downloading a high-resolution relief chart to support the assessment of problems in coastal zones (erosion, wave propagation, storm surges, etc.) under conditions of climate change.

Seizing the opportunity

The results of the ACCASP will foster the integration of physical, chemical and biological changes in aquatic ecosystems into the Department's activities. The strategy should prompt changes in DFO's approaches to its management activities and long-term planning. It will ensure better support for the economic development of the industry and coastal communities that depend on Canada's aquatic ecosystems. The program could ultimately make it possible to benefit from new development opportunities as climate change should not be seen as only negative, especially over the long term. Certain changes could promote the development of new sectors of activity or the expansion of current activities, thereby tempering some of the negative impacts.

Michel Gilbert
Science

CONVICTIONS FOR FISHERIES ACT VIOLATIONS

Fisheries and Oceans Canada (DFO), Quebec Region, has released the names of fish harvesters who have received fines for violations of the *Fisheries Act*. DFO continues to strictly enforce its zero tolerance policy for offenders. The Department has a mandate to protect and conserve fishery resources and is ever vigilant in its efforts to prevent poaching of marine resources. **Fisheries and Oceans Canada encourages the public to report poaching incidents by calling 1-800-463-9057. All calls are confidential.**

OFFENDER/ RESIDENCE	OFFENCE/FINE
Gérald Boudreau Jean-Guy Leblanc Îles-de-la-Madeleine	Fishing for lobster before 5:00 a.m. \$1,000 (G.B.) \$750 (J.-G.L.)
Cédéric Bourgeois Danny Vigneau Îles-de-la-Madeleine	Exceeding the daily quota for clam harvesting. \$500 each
Dean Boyle Percé	Possession of lobster under the legal size limit. \$1,000
Antonio Bujold Saint-Siméon	Fishing for winter flounder without valid licence conditions. Possession of rock crab under the legal size limit. \$1,000
O'Neil Cloutier Percé Pierre-Paul Couture Grande-Rivière	Possession of a female lobster with eggs attached. \$1,000 each
Israël Coderre Fred Leblanc Îles-de-la-Madeleine	Possession of surf clams under the legal size limit. \$500 each
Fernand Delarosil Paspébiac	Fishing for rock crab without valid licence conditions. \$750
Bertrand Duclos Îles-de-la-Madeleine	Under the rock crab fishery, failure to hail in at least one hour prior to arrival at the dock. \$800
Gilles Duguay Saint-François-de-Pabos	Possession of a V-notched female lobster. \$500
Renaud Duguay Percé	Fishing for lobster without a licence. \$500
Steeve Duguay Saint-François-de-Pabos	Possession of claws separated from the lobster's thorax or shell. \$500
Camille Griffin Rivière-Saint-Paul	Fishing for cod and salmon without a licence. \$1,000
Jonathan Huard Newport	Fishing for lobster without a licence. Possession of a lobster under the legal size limit. \$500 + 100 h of community service + prohibited from being on the Grande-Rivière, Chandler and Newport docks between 5:00 p.m. and 5:00 a.m. for the next 15 months.
Jean-Richard Joncas Blanc-Sablon	Failing to comply with crab fishing licence conditions for the 2011 season by refusing to allow an at-sea observer to board the fishing vessel to carry out observer duties. \$750
Serge Joncas Grande-Rivière	Obstructing the duties of a fishery officer. Fishing for lobster without a licence. Fishing for lobster with gear other than traps. \$1,000 + 100 h of community service + prohibited from being on the Grande-Rivière, Chandler and Newport docks between 5:00 p.m. and 5:00 a.m. for the next 18 months.
Dany Labillois Carleton	Possession of rock crab under the legal size limit. \$500
Ferland Leblanc Maurice Leblanc Îles-de-la-Madeleine	Softshell clam harvesting in a closed area. \$300 each
Ellias Martin Saint-Augustin	Failing to comply with the conditions of his bait licence for the 2011 season by setting net on the water's surface. \$500
Alfred Poirier Îles-de-la-Madeleine	Surf clam harvesting in a closed area. \$300
Luc Richard Grande-Vallée	Recreational fishing of groundfish during a closed time. \$300
Marcel Roussy Sainte-Thérèse-de-Gaspé	Exceeding the authorized limit for cod. \$2,100
Paul Vigneau Îles-de-la-Madeleine	Possession of a female lobster with eggs attached. \$2,000

Martin Bourget
Communications

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