



2022 Director's Report to the Members

MISSION

FORCE is the catalyst for the safe development of clean tidal energy technology.

STRATEGIC GOAL

Demonstrate the viability, sustainability and safety of tidal stream technologies.

SUCCESS IN 2022

FORCE:

- Presents tidal as an integral contributor to our national and provincial strategies for a clean energy future
- Presents tidal as a positive narrative
- Recognized as a global leader in environmental monitoring and science
- Critical resource for successful operation of tidal devices in the Bay of Fundy
- Demonstrates and communicates the value of local supply chain and partners

STRATEGIC DIRECTIONS AND INITIATIVES:

Facilitate the demonstration of the technology

- Enable the resources and conditions to test turbines
- Prove the technology
- Create a shared infrastructure
- Develop a robust business case for tidal energy

Become a leading centre for research and development

- Understand the resource and the environment
- Retain and promote our expertise
- Build meaningful collaborations with research partners
- Nurture innovation and integrate learning

Demonstrate environmental management

- Identify and appreciate the potential effects of tidal energy
- Establish best practice measures
- Develop our credibility as an environmental steward
- Consider long-term sustainability

Build awareness, understanding and support

- Foster internal and external collaboration
- Educate through a balanced story of successes and challenges
- Secure continued, predictable and sustainable government support
- Engage and involve key stakeholders and industries
- Advocate and facilitate to align expectations

Pursue business opportunities

- Grow and refine our knowledge and skills for export
- Explore additional tidal demonstration opportunities at FORCE and beyond
- Identify and evaluate various forms of revenue generation
- Advance opportunities that align with our core mandate

PROVINCIAL GOVERNMENT OBJECTIVES

FORCE was first envisioned by the Province to pursue two key strategic goals:

- To attract innovators, entrepreneurs, and developers by reducing risk and barriers to entry and by creating synergies between developers.
- To earn regulator and public confidence by being a credible operator and environmental manager.

FORCE is intended as an instrument of public policy to be utilized by a variety of people in a variety of ways. It is agnostic to tidal stream energy devices. It enables learning about tidal stream technology; it does not promote devices in general or any of them in particular. But the creation of FORCE is premised on two beliefs:

- FORCE can accelerate tidal energy development in an environmentally responsible way; and
- Tidal stream energy devices have the potential to produce reliable, renewable energy in Nova Scotia on commercial terms in the next seven to ten years and provide manufacturing and service-sector opportunities for Nova Scotians in a worldwide industry.

FORCE STRATEGIC INITIATIVES: PROGRESS

1. FACILITATE THE DEMONSTRATION OF THE TECHNOLOGY

Facility Maintenance

Central to FORCE's goal to demonstrate technology is the ability to transmit power to the electricity grid. Our facility includes the transmission system, the collector circuits and switchgear, cable vaults, subsea cables, communications systems for real time monitoring and data transfer, the real property and easements and the visitor center. All of which, must be maintained to acceptable standards, as described in the sublease.

2022 Hurricane Fiona necessitates substation road repair; this work will commence shortly.

30MW Upgrade Project

In 2018, FORCE completed a capacity upgrade to the interconnection facility. This action was initiated via GIAs (516) Black Rock Tidal Power and (517) Cape Sharp Tidal Ventures.

The upgrade resulted in the facility becoming transmission connected at 69kV as opposed to operating a distribution connection at 25kV, requiring different level of oversight by NSPI. These interconnection agreements (GIAs) are between NSPI and the Interconnection Customers (ICs). The costs associated with operating the facility and the interconnection are outlined in these agreements.

A meeting between NSPI, ICs, Strum Engineering and FORCE was held on May 16th, 2022 to discuss various aspects related to GIA costs and substation metering. Topics included network upgrade costs, notice of GIA applications, payments and billing, and metering.

The FORCE facility was energized in early January following a period of down time arising from a copper theft at the facility. To reduce O&M costs from transmission connection, station services have been powered via the FORCE owned meter feed from the West Bay distribution grid (usage over winter months is about 300kwh/day translating to about \$1500/month). NSPI indicates that the utility intends to evenly divide the transmission usage bill amongst all current ICs. NSPU indicates the General Tariff will be applied and that the estimated total costs for all ICs combined will be in the \$2,000 per month range. This power usage arises from transmission line and transformer losses inherent within the system. FORCE may reimburse ICs for this expense as a common cost, pending consideration and review of actual bills to ICs.

The final phase of the substation upgrade is a curtailment test of the facility with a connected generator. The original plan was to complete this work once the CST turbine

was installed and commissioned; this did not happen. FORCE asked NSPI to finalize the project and defer the curtailment test until the next turbine is connected to the substation.

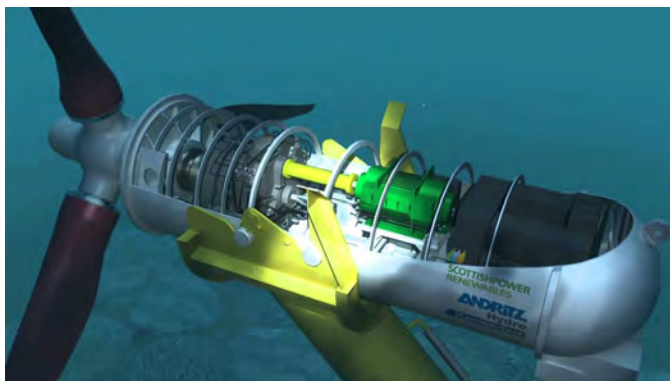
Operations

FORCE maintains a business office at 75 Alderney Drive in Dartmouth, an equipment storage and mobilization facility at 60 Trider Crescent in Burnside, and a visitor centre and substation along West Bay Rd. Operations in Minas Passage over the last year included the successful deployment of a cabled sensor platform to gather resource data and marine mammal monitoring data; a lobster study as part of the EEMP, and continuous data capture as part of the Risk Assessment Program (RAP) via the array of acoustic receivers through the site. FORCE also stores a spare composite marine cable and auxiliary equipment in the Port of Saint John, NB. Modernization and expansion activities at the Port of Saint John required movement of the cable reel, reel stand and reel drive unit to a new location in March 2022.

Technology Development

DP Energy

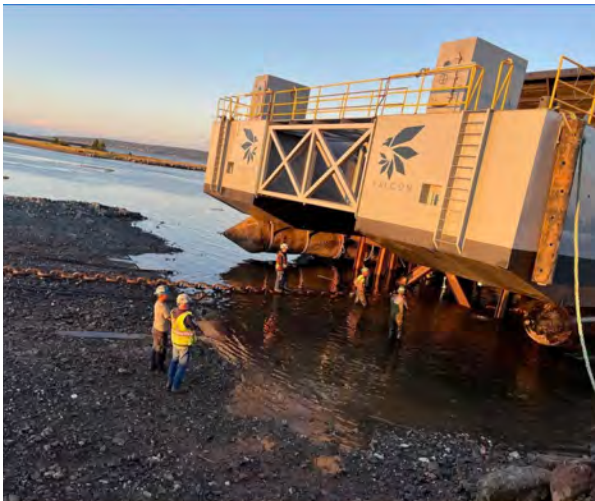
From November 2021 to April 2022, Haligonian Tidal Energy (DP Energy) deployed and retrieved a small monitoring platform in Berth E. The monitoring platform contained sensors used to demonstrate equipment functionality at the FORCE site. DP Energy plans to deploy 6 Andritz Hammerfest Hydro (AHH) MK1s; the Mk1 has an 18.4 m diameter rotor and rated power of 1.5 MW for a project total of 9MW. The turbine is a horizontal axis, 3 bladed, seabed mounted tidal turbine, which has been successfully deployed (3 machines) at MeyGen in Scotland. The first of the MK1 turbines is scheduled to be installed and commissioned in mid 2024, subject to regulatory approval and final investment decision by the parties.



DP Energy's Andritz Hammerfest Hydro technology

BigMoon Power

In 2021-2022, BigMoon has been engaged in the assembly of its first device at East Coast Metal Fabrication in the Sydport Industrial Park. BigMoon plans to build a total of 18 devices, each generating about half a megawatt of electricity, or enough to power about 500 homes. East Coast Metal Fabrication has stated that assembling the unit creates up to 20 full-time jobs for up to six months. Each unit has a large wheel suspended between the pontoons of a 30-metre barge anchored to the ocean floor. The barge swivels to face the current in both directions. The “Falcon” was first launched Sept 15, 2022 and is currently in trials.



BigMoon Power’s “Falcon” tidal energy device.

Sustainable Marine

In May 2022, Sustainable Marine announced it had delivered the first floating in-stream tidal power to Nova Scotia's grid, using the 420kW *PLAT-I 6.40* floating tidal energy platform built in Nova Scotia. The platform was deployed and supported by its multipurpose construction vessel called the *Tidal Pioneer*, and moored via the company's *Swift Anchors* technology. The *Tidal Pioneer* is a multicat, and is 26 metres long and 11 metres wide. Its offset superstructure allows for a large working deck area, and the square bow is equipped for pushing barges.

Sustainable Marine is preparing to deliver the world's first floating tidal array at FORCE, using its demonstration site at Grand Passage to prove up its technology and environmental monitoring systems, before commencing deployments in the Minas Passage.

In September 2022, Sustainable Marine announced its remotely operated rock anchor installation system called *Swift Anchors*. The system is designed to facilitate faster and more cost-effective mooring installations for offshore renewables. It includes large helical screw anchors in sand, shingle and clay and rock anchors into a range of rocks and grouted piles for mixed seabed geologies. The system consists of a control cabin and constant tension umbilical winch which is integrated into a 20' container. The remotely operated machine features a 150kW subsea HPU enabling operation at depths of circa 200m, with the ability to extend up to 1,000m by using a longer electrical and control umbilical to support the offshore floating wind sector. *Swift Anchors* can install anchors with more than a thousand tonnes of holding capacity. The system will be demonstrated using the *Tidal Pioneer* to install anchors to moor the *PLAT-I* at FORCE; it's then scheduled to install anchors for ORPC's *TidGen* deployment in Maine, USA.

Also in September 2022, Sustainable Marine began full-scale testing on a smart-grid project in Grand Passage that connects tidal to solar and other energy sources with partners that include Rainhouse Manufacturing Canada, the University of Victoria, and Turtle Island Innovations. The consortium is aiming to design, build, and test a smart grid controller which integrates multiple energy sources and regulates energy distribution on a microgrid. The project is designed to increase the use of renewable energy for islands and remote communities while reducing their dependence on diesel power generation.



(clockwise from top) Sustainable Marine PLAT-I delivers power; smart grid system; Swift Anchors system

New Berth (F)

The Province has approved, in principle, BigMoon's intention to migrate its demonstration project from the south side of Minas Passage) to the FORCE site. Moving BigMoon's demonstration permit to FORCE enables access to electrical infrastructure: if connected to the FORCE substation, BigMoon could immediately begin transmitting power to the Nova Scotia grid. BigMoon's technology would also be integrated into more than 10 years of baseline research and monitoring, bolstering the integrity of both FORCE's science program as well as any monitoring work conducted by BMP. The migration also adds oversight: the permit holder would become subject to the terms of FORCE's Environmental Assessment (EA), would have the oversight and support of FORCE's science team, and would receive ongoing review by FORCE's Environmental Monitoring Advisory Committee. NSE will not give advice on how an increase in licensed capacity at the site will be viewed until a full EA addendum is submitted. Subject to board approval of the creation of Berth F, FORCE has committed to providing this addendum to NSE by Dec. 31.

2. BECOME A LEADING CENTRE FOR RESEARCH AND DEVELOPMENT

Risk Assessment Program (RAP) for Tidal Stream Energy

FORCE is now in the third and final year of a \$2M research projects funded by NRCan's Emerging Renewable Power Program to support greater regulatory clarity around tidal project development.

Regulators perceive the greatest potential risk of tidal turbine operations as collisions between marine animals and turbines blades. However, these types of interactions are difficult to observe directly: both because of the fast flowing, turbid waters of tidal energy sites and because of the limitations of monitoring instruments which have been designed for use in more benign marine environments.

The Risk Assessment Program (RAP) for tidal stream energy is designed to create a way forward. RAP is a collaborative effort between Acadia University, Fundy Ocean Research Centre for Energy (FORCE), Marine Renewables Canada, Mi'kmaw Conservation Group, Ocean Tracking Network at Dalhousie University, and local fishers to create a detailed, credible assessment tool to gauge the probability that fish will encounter a tidal device.

Encounter rate modelling, or ERM (i.e., estimating the predicted frequency with which a stationary entity encounters a moving one), has become a standardized permitting tool for offshore wind projects, but little work has been done to date in North America to apply that concept to assessing risks presented by tidal turbine projects.

RAP is assessing the co-occurrence of fish and tidal turbines in the Bay of Fundy's Minas Passage, where the probability of encounter will be determined by combining two data sets: physical oceanographic (hydrodynamics, or Flow Atlas) and biological (fish distribution, or Fish Atlas).

Key achievements to date include:

Flow Atlas: Breakthrough, radar-based data collection, delivering real-time ocean mapping. RAP has established a high-resolution radar network in the Minas Passage, which is now generating spatiotemporal (space and time) data on physical oceanographic features. This is the basis for real-time mapping and flow atlas development for the Minas Passage. This includes:

- Radar network installation: Installed two radars providing full coverage of Minas Passage
- Assembly and commissioning of a third mobile radar system for further coverage



Installing a high-resolution marine radar at the FORCE facility

Fish Atlas: Through collaboration of Dalhousie University, Ocean Tracking Network (OTN), Mi'kmaw Conservation Group (MCG), Acadia University, and fishing community members, RAP is building the largest spatiotemporal, multi-species fish map in the Bay of Fundy ever created. The fish atlas is an unprecedented collaborative effort to collect, combine and analyze multiple data sets of hydroacoustic fish-tagging studies – both existing and new. The studies cover nine (9) species: alewife, American shad, American eel, Atlantic salmon, Atlantic sturgeon, Atlantic tomcod, spiny dogfish, striped bass, and white shark. The species were chosen based on historic tagging data availability, conservation concern and value to commercial, recreation, and Mi'kmaq fisheries, and current coverage through prior and ongoing acoustic tracking studies. This includes

- Acoustic tag detection data from 22 data holders for nine species.
- Species distribution models (SDMs), beginning with striped bass detections
- Deployment of 12 receivers within Minas Passage.
- Commencement of fish tagging program using different collection methods:
 - *alewife* (captured using dipnets): Avon and Gaspereau Rivers
 - *American shad* (captured using beach seines): Kennetcook River
 - *Atlantic salmon* (captured in collaboration with Fisheries and Oceans Canada): Gaspereau River
 - *Atlantic sturgeon* (captured using a gillnet): Minas Basin
 - *Spiny dogfish* (captured using baited longline): Minas Basin
- Engagement with regulators to confirm relevance of RAP to inform decision-making
- Publishing peer-reviewed research paper outlining the RAP program and SDM approach in June 2022 in *Frontiers in Marine Science*.



(clockwise from top) Tagging Atlantic sturgeon; tagging America shad; MCG truck on site for tagging

Engagement: RAP success/credibility depends on partnership, representation, and inclusion of the many groups with an interest in offshore renewable energy activity. RAP is built on engagement with regulators, industry, Rights Holders, fishers, community members, the academic community and more. Mi'kmaw Conservation Group, Ocean Tracking Network and FORCE have coordinated engagement efforts with Bay of Fundy mainland Mi'kmaq communities. Goals of this work include increased participation in fish tagging, gathering visual material and learning, combining traditional and scientific knowledge to understand how principles of Netukulimk (appropriate resource use) and Etuaptmumk (two-eyed seeing) align with the biological atlas, reaching out to community members for information sharing to support the graphic user interface. This includes:

- Creating an advisory group consisting of academic, regulatory, and Mi'kmaw members
- Completion of Mi'kmaw Ethics Watch application
- Rights holder/stakeholder interviews for GUI design
- Scoping and design of user interface

- Presentation at Fisheries Conference for Atlantic Policy Congress of First Nations Chiefs
- Open house for Mi'kmaw community engagement



Online Open House

Fish and Tidal Energy:
Assessing the Risk

April 27th, 2022
5:30 - 7:30 PM

ACADIA UNIVERSITY force

The Confederacy of Mainland Mi'kmaq OCEAN TRACKING NETWORK marine renewables canada

Advertisement in the Mi'kmaq Maliseet Nations News for the MCG-led RAP online open house

Advancing Research

As tidal stream projects compete for support, there remains a pressing need to identify and validate sites favourable for development. Instrument developers need to advance the hardware and software to capture data in these extreme sites, and while some of these tools exist, many cannot function reliably in high flows. Nor do we have standard methods to deploy and recover the instruments, nor standard methods of analysis.

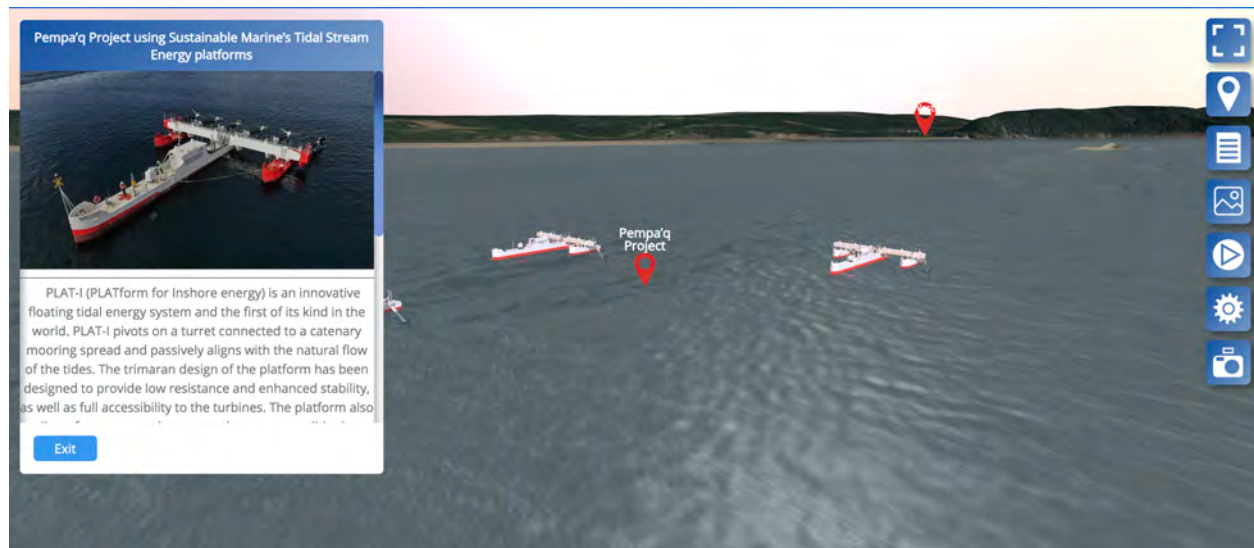
The Fundy Advanced Sensor Technology (FAST) program was designed to address this research gap – combining both onshore and offshore monitoring assets. Onshore assets include a meteorological station, video cameras, an X-band radar system, and tide gauge. Offshore assets include modular subsea platforms for both autonomous and cabled data collection and a suite of instrumentation for a variety of research purposes. Real-time data collected through FAST assets is broadcasted live on the Ocean Networks Canada's website, as well as FORCE's own data site: <https://fundyforcelive.ca/>

FAST development priorities are based on consultation with regulators, other Fundy users, academics, and industry. Each of these represents an opportunity to reduce cost and risk. Work is underway at FORCE in a number of key areas:

- **VITALITY:** a subsea cabled platform was successfully deployed in the Minas Passage in May 2022 to stream live site and marine mammal monitoring data back to the FORCE visitor centre; work is underway to make those data sets accessible to the Canadian Integrated Ocean Observing System (CIOOS). The project is a subset of a larger VITALITY innovation ecosystem activity project, supported by Canada's Ocean Supercluster. VITALITY-FORCE is broadly focused on integrating tidal stream data from the FORCE site into the. CIOOS is a national online platform for sharing, discovering and accessing ocean data in Canada.
- As part of the CIOOS project, an online, 3D data visualization tool of the site
- Integration of FORCE data into CIOOS, assessment of CIOOS as data sharing tool
- **Vectron:** FORCE's R&D efforts related to the characterization of tidal currents and turbulence are leading the world. The Vectron is the world's first stand-alone instrument to remotely measure, in high resolution, turbulence in the mid-water column.
- **Radar:** An X-band marine radar has been continuously operating atop the FORCE Visitor Centre since 2015; as part of RAP, from 2020 to 2022, this radar was upgraded, a new radar was added on Cape Sharp headland, and a mobile radar system was created.
- Continued data collection to better characterize wake effects of turbines
- **Accelerated Data Processing:** FORCE and DeepSense created Echofilter, which uses machine learning to assist in the identification of non-biological signals contained in hydroacoustic data.
- **Automated Reporting:** FORCE and DeepSense also developed software that can synthesize 500,000 data points into a single, organized, readable report in 15 minutes – including text, figures, and data tables.



Deployment of VITALITY cabled subsea platform (May 2022)



3D data visualization tool

3. DEMONSTRATE ENVIRONMENTAL MANAGEMENT

Leadership

FORCE has increased its capacity for science leadership significantly in recent years, enabling FORCE to speak with authority to regulators, scientists, academics and stakeholders on fisheries management, and is also able to work with EMAC to design studies in-house as FORCE continues to adaptively manage its environmental effects monitoring programs. After an initial focus on engineering design and capital construction of onshore and offshore assets, FORCE is has expanded its focus on environmental stewardship in response to regulatory, stakeholder, and rightsholder feedback. New additions this year include:

- **Shaun Allain:** Environmental Program Manager. Shaun has worked as a marine environmental biologist and project manager in collaboration with private sector clients and government regulators and has 10+ years of marine field experience conducting habitat surveys, population dynamics studies, and environmental assessments throughout Atlantic Canada.
- **Carlos Serratos:** Community Science Liaison. Carlos is a marine biologist in Parrsboro, who has worked as a graduate research technician at the University of Alaska, a federal fisheries science technician in Wyoming, a GIS technician for the National Park Service in South Dakota, and an airframe and hydraulics mechanic with the US Marine Corps in South Carolina.
- **Greg McDermott:** Marine Facilities and Logistics Manager. Greg comes to FORCE with 20 years' experience as a logistics management consultant in the offshore oil and natural gas industry in drilling and production operations, as well as 14 years in production/quality assurance in automated technology.
- **Also:** Neil Wagstaff returned for his second summer as a VC summer student through the Canada Summer Jobs Program

Environmental Effects Monitoring

Monitoring activities began at FORCE in 2009; the most recent phase began in May 2016 with academic and research partners including Acadia University (Wolfville, NS), Envirosphere Consultants (Windsor, NS), GeoSpectrum Technologies Inc. (Dartmouth, NS), JASCO Applied Science (Dartmouth, NS), Luna Ocean Consulting (Shad Bay and Freeport, NS), Nexus Coastal Resource Management (Halifax, NS), Ocean Sonics (Great Village, NS), Sea Mammal Research Unit Consulting (Canada) (Vancouver, BC), University of Maine (Orono, ME), Fishermen and Scientists Research Society (Halifax, NS), and local commercial fishers.

Working in partnership with universities, research entities, and local marine operators, FORCE has led a monitoring program focused on the five key variables mentioned above: fish, marine mammals, lobster, seabirds, and marine sound. Since 2016, FORCE has completed:

- Over 560 hours of hydroacoustic fish surveys
- Over 5,000 'C-POD' marine mammal monitoring days
- Bi-weekly shoreline observations
- 49 observational seabird surveys
- Four drifting marine sound surveys and additional sound monitoring, and
- 11 days of lobster surveys

Also this year, FORCE hired Dr. Graham Daborn of Acadia University to lead a fish synthesis project to bring together existing literature from stock assessments, prior hydroacoustic surveys and acoustic telemetry-based surveys.



4. BUILD AWARENESS, UNDERSTANDING AND SUPPORT

Social license for tidal stream technology depends on public and regulator confidence that its effects on marine life and the environment are understood and acceptable. Most residents of Nova Scotia have limited knowledge about the project, however polling indicates that many support both renewable energy use and tidal stream demonstration. Media coverage this past year has been generally positive, covering deployment progress by Sustainable Marine and BigMoon and advances in monitoring by FORCE and its partners.



Still: CBC reporter Brett Ruskin covers Sustainable Marine's success in Grand Passage

FORCE's Community Liaison Committee has representation from the Nova Scotia Mi'kmaq and fishing communities. FORCE also has ongoing involvement with lobster fishers who work near the test area and has engaged some of them in its monitoring program. However, there remains a pressing need to take additional measures to engage with groups from around the province, with a focus on fishing and First Nations communities, to understand concerns. FORCE recognizes that there are still many more individuals and communities to connect with and that, ultimately, tidal energy needs to co-exist with other users of the marine environment.

Outreach activities in 2021/2022 focused on four key engagement areas:

- Online brand and reach
- Engagement with Indigenous groups/organizations and individual communities
- Government relations
- Visitor Centre activities, including outreach to the local community in Parrsboro and Cumberland County

Some of the highlights for 2021/2022 year included:

- New video, photo and social media content of lobster study, RAP fish tagging, sturgeon gillnetting, cabled platform deployment
- Co-led engagement with the Mi'kmaq Conservation Group as part of RAP, including MCG-led online open house as well as:
 - RAP fish tagging / stakeholder engagement meetings w/ MCG

- RAP GUI Interview with MCG
- Atlantic Policy Congress of First Nations Chiefs presentation and booth presence
- Collaboration on CMM-led funding proposal for a tidal liaison position
- Precautionary Principle Workshop to bring stakeholders, rights holders and regulators together to better understand the precautionary principle and the benefits and challenges it brings to regulating and advancing tidal development
- FORCE met with DFO's fish & fish habitat protection to discuss RAP modelling approach for SDM
- Completion of an online site visualization tool by contracting Indigenous-owned and operated 3D Wave Design

Online Reach/Branding

Web presence, including social and traditional media, is a critical part of FORCE's ability to reach audiences, share information, and protect its brand as a world-leader in tidal stream energy research and development. This year, FORCE created 5 stories as part of awareness/education efforts that were delivered to audiences via mailchimp, web, and social media.

Social Media

Since our last AGM, our social media presence has increased slightly; the largest growth being on Instagram (21% increase to 657 followers). Social media interactions are mixed to positive: many specific questions about technology and generally positive response to any industry progress; negative comments typically question potential fish impacts and the use of tax payer dollars without any technology advance/success. Technology progress receives the most interactions, followed by environmental research (e.g. RAP program).

Top posts (over 5000 people reached, over 500 people clicking on post) include:

1. New site animation (11,354 person reach)
2. Live ocean data from VITALITY (4,848 reach)
3. Sustainable Marine delivers power (3,636 reach)

Content ⓘ Sort by: Reach ▼

 Thu Jan 20, 4:42am SITE ANIMATION: Check o... Post Reach 11,354	 Wed Jun 8, 6:33am Live ocean data: VITALITY ... Post Reach 4,848	 Wed May 11, 12:51pm Sustainable Marine deliver... Post Reach 3,636
 Fri May 13, 9:03am VIDEO: Sustainable Marine... Post Reach 1,328	 Mon Apr 11, 10:28am We're hiring for one positio... Post Reach 1,095	 Thu Jan 27, 11:34am This summer the FORCE te... Post Reach 819

Media

The tidal sector in Nova Scotia had increased coverage in regional print/radio/broadcast media, which focused on activity from Sustainable Marine in Grand Passage. There was some coverage of RAP research; coverage was generally positive. Headlines included:

- CTV: Tidal power: How the Bay of Fundy can be used as renewable energy
- Global TV: Sustainable Marine delivers first floating tidal power to Nova Scotia grid
- Offshore Energy: Nova Innovation showcases tidal turbine ahead of installation
- Toronto Star: An East Coast project is harnessing the power of the world's largest tides. Will it succeed where others have failed?
- CBC: How do tides and turbines affect sealife? Fundy study hopes to find out
- CBC: Regulators have denied an application from Nova Scotia Power to make customers pay it \$27.7 million over the next decade to write off the idle Annapolis tidal generating station.

Attendance at Conferences/Events

FORCE staff regularly participate in events and conferences locally, regionally and internationally to strengthen relationships with partners and stakeholders in government, academia, First Nations communities, and industry. In addition, ongoing public engagement work takes place in the community of Parrsboro. In 2020-21 there have been very few in-person events and meetings due to the COVID-19 pandemic, and most engagements have been virtual. Events, presentations, meetings in the past year include:

Cumberland Community

- Community Liaison Committee
- Parrsboro Board of Trade
- Bay of Fundy Ecosystem Partnership (BOFEP)
- Parrsboro Shore Historical Society

Government

- Ongoing with SNRR, NSE, DFO, NRCAN staff
- Meetings with NRR, NRCAN, ECCC Ministers
- Updates + funding discussion with ACOA
- RAP technical meetings with DFO

Fishers

- Fishermen and Scientists Research Society re: lobster study
- Darren Porter (ongoing)

Science Community

- RAP Post-doc Advisory Committee meetings (ongoing)
- OES Environmental (ongoing)
- Innovasea – testing acoustic tagging technology and receivers
- Eastern Shore Fisherman's Protective Association (ESFPA)
- Lobster survey results presented at FSRS annual conference & AGM

- Presentation at Dalhousie University's Coastal Ecology program

Industry

- Berth holders (ongoing)
- MRC (ongoing)
- Marine operators and suppliers (ongoing)
- NRR-brokered meetings with offshore wind sector, Nova Innovation

Public

- Exhibit booth at H2O conference

International collaboration

- Presentation, session chairs at the Pan American Marine Energy Conference
- Presentation at American Fisheries Society (AFS) conference
- Presentation, chair at Ocean Energy Systems meeting re: monitoring
- Presentation at International Conference on Ocean Energy (ICOE) (upcoming)
- Presentation at Oceans 2022 Hampton Roads

First Nations Engagement

FORCE continued to engage indigenous groups and communities throughout 2021/2022. As mentioned in the highlights above, FORCE partnered with the Mi'kmaw Conservation Group (MCG) to conduct fish tagging and engagement work as part of the RAP project.

In terms of providing formal input into FORCE's activities, the Mi'kmaq Rights Initiative/Kwilmu'kw Maw-klusuaqn (KMK) has a representative on FORCE's Community Liaison Committee. Previously, the Mi'kmaw Conservation Group (MCG) had a representative on FORCE's Environmental Monitoring Advisory Committee (EMAC). However, MCG stated they are now under-resourced to provide ongoing participation on EMAC.

FORCE continues to consider other ways to ensure Mi'kmaw rights holders are regularly engaged in providing input.

FORCE holds quarterly meetings with KMK staff engaged on the energy file and has facilitated meetings/introductions with berth holders when requested. FORCE also engages the benefits group at KMK when posting jobs/RFPs online, and meets with Atlantic Policy Congress staff to provide updates.

Government Relations

In 2021/2022, FORCE continued to engage politicians and the public service at the municipal, provincial, and federal levels. At the municipal level, the Cumberland Energy Authority has been dissolved but ongoing engagement with the Municipality of Cumberland continues to be a valuable relationship and the source of future partnerships. In addition, two municipal councilors sit on FORCE's Community Liaison Committee. FORCE continues to meet with the Department of Natural Resources and Renewables on a regular basis, along with Fisheries and Oceans Canada. This year, FORCE met directly with NRR Minister Tory Rushton and ECCC Minister Steven Guilbeault. In ministerial meetings FORCE discussed the need to clarify the regulatory path to project authorization (via DFO), as well as the related regulatory and infrastructure concerns in the ascendant offshore wind sector.

Visitor Centre

The Visitor Centre is the flagship of our engagement efforts. In response to the COVID-19 pandemic, FORCE opened the VC with reduced operating hours: five days a week, Thursday – Monday, 10AM – 4PM, with comprehensive public health protocols in effect. The centre has still attracted approximately 1800 visitors to date this year. FORCE also completed several upgrades:

- New touch screen kiosks with video content (for use at VC and at conferences)
- New signage
- New displays and display updates (including five panels related to monitoring activities near the entrance)



New environmental effects monitoring program panels were installed at the VC in June 2022.

Ongoing Engagement

In addition to the focus areas listed above, FORCE continued to build relationships with key stakeholder groups and organizations, including World Wildlife Fund-Canada, Herring Science Council, the European Marine Energy Centre, Annex IV, and other key research bodies locally and internationally. At the community level, FORCE is on the Parrsboro Board of Trade, Parrsboro Shore Historical Society Board, Bay of Fundy Tourism Association, and the Bay of Fundy Ecosystem Partnership.

5. PURSUE BUSINESS OPPORTUNITIES

- A. As a result of meeting our ongoing berth holder, government, and other sponsor obligations – including marine and substation operations, environmental monitoring, FAST, R&D partnerships, regulatory compliance and outreach – the project generates a considerable amount of expertise and knowledge. Opportunities exist to leverage this know-how to assist other regions in developing their MRE resource while, at the same time, generating funds to augment our own research and development activities.

FORCE continues to explore a number of initiatives to offer its capabilities and gain experience as a service provider to other projects beyond our own immediate objectives. FORCE has done so through the provision of highly specialized advice, equipment or knowledge that is generally not available from the local supply chain. These opportunities make sense: they serve a dual role of developing our ability to deliver expert support to the sector as well as providing additional funding.

With this in mind, FORCE recently released an RFP to assist with the preparation of an assessment of FORCE's structure and governance to optimize the delivery of its mandate, ensure strategic alignment with provincial and federal goals for marine renewable energy, and pursue strategic business opportunities related to MRE. The areas to be covered include:

- Key infrastructure, knowledge and capacities at FORCE
- Funding sources and opportunities assessment
- Governance and structural considerations
- Key stakeholder and rightsholder audit
- International and national environmental scan on offshore energy
- Federal and Provincial legislative framework assessment and review

This work will be conducted over the fall of 2022.

- B. The Nova Scotia Department of Public Works (NSDPW) and the Nova Scotia Department of Agriculture (NSDA) are applying for a DFO Fisheries Act Authorization for construction of the Avon River aboiteau and causeway replacement as part of the Highway 101 twinning project. A monitoring plan has been developed by consultants that includes methods to assess the effectiveness and efficiency of a proposed fish passage design, as well as changes to fish habitat. Some of the proposed monitoring methods include acoustic tagging of migratory fishes that will leave Minas Basin through the Minas Passage and could be detected on FORCE's line of acoustic receivers. Detections of these fish would serve to i) further validate species distribution model (SDM) predictions, ii) provide new detections for data deficient species to advance SDM development, and iii) refine encounter rate model (ERM) predictions for detected species. FORCE is engaged in monthly meetings led by NSDPW with consultants, regulators, Mi'kmaw organizations, universities, and fishers, to discuss various components of the monitoring plan and study designs, and to identify areas where it can assist in providing strategic scientific oversight in support of project delivery. FORCE was asked to support this project – it supports our overall monitoring efforts in the Fundy ecosystem and could provide a source of revenue to our science program. FORCE believes any involvement should be contingent on ensuring equitable and inclusive partnerships with other organizations related to this project and region.
- C. FORCE has entered into contracts to provide hydroacoustics support to two groups in 2022: the Eastern Shore Fishermen's Protective Association and Little Hope Herring Group (Port Mouton, NS). Both conduct hydroacoustic surveys for Atlantic herring spawning stock biomass estimation and required training on the use of a Kongsberg EK80 echosounder and analysis procedures to conduct biomass estimation. This expertise is resident at FORCE (Dr. Louise McGarry); we're providing this support to help build regional capacity for use and application of hydroacoustics. The combined value of both contracts is \$101,000 which helps offset operating and other FORCE costs.

CONCLUSION

In 2021/22, FORCE was active in all five of its strategic initiatives, namely, to:

- Facilitate the demonstration of the technology
- Become a leading centre for research and development
- Demonstrate environmental management
- Build awareness, understanding and support
- Pursue business opportunities

