

VOICEPIPE

Issue 93

September 2023

The Newsletter of the BIO-Oceans Association

A Celebratory Beluga Award Ceremony held



From the left: Don Gordon, Kelly Bentham and Monica Bravo. Photo credit: Andy Sherin

As highlighted in the last issue of the *Voicepipe*, three Beluga Awards were presented on 24 May 2023 in the William Ford Auditorium at BIO. The auditorium had a large crowd of BIO OA members, staff and friends and family members of the award recipients. The Beluga Award Committee was represented by Monica Bravo. Belugas were presented to Shawn Roach (2020), Dale Buckley (posthumously) 2021 and Kelly Bentham (2022).

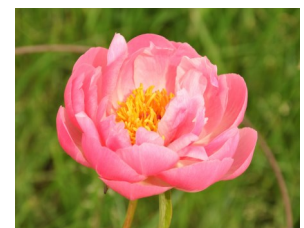
Kelly, the 2022 recipient, has always been very approachable and somehow has been able to find time and energy for unscheduled tasks that folks wander in with. Professional, focussed (pun intended) and trustworthy, Kelly's testimonial was given by Don Gordon.

Shawn's contributions are paramount for the success of many BIO projects and programs. He has always taken a team-work approach in his multi-

**Be a guest editor
for the *Voicepipe*
(see page 7)**

Contents

Beluga Award ceremony	1
President's Message	3
Halifax Harbour: Staging Area for Offshore Wind	4
Offshore Wind Closer to Home	6
Environmental Impacts of Wind Energy	6
A personal tribute to Dave Heffler	7
Be a guest editor	7
The Fate of the OceanGate Submersible <i>Titan</i>	8
Canada's National Merchant Navy Memorial	10
The 2023 Coastal Zone Canada Conference Participation and Insights	11
Interim Editor's Keyboard	12
About the Association	12





disciplinary work at BIO. Shawn's testimonial was given by Tammy Blair, Section Head of Habitat Ecology.

Dale was a founder of the BIO Oceans Association and led the development of BIO-OA's coveted Beluga Award. An award that has recognized 22 persons for their contributions to the BIO community since 2001 including the latest recipients Shawn Roach and Kelly Bentham. Dale passed away in early April 2020 during the pandemic. Betty Buckley accepted Dale's Beluga on his behalf. Dale's testimonial was given by Andy Sherin.



Photos clockwise from the top left: Patrick Potter, President of the BIO Oceans welcomes the audience to the Beluga Award ceremony; Tammy Blair delivers the testimonial for Shawn Roach; and from the left Tammy Blair, Shawn Roach and Monica Bravo. Photo credits: Kelly Bentham



From the left: Patrick Potter, Michael Parsons, family friend and research colleague of Dale's, Betty Buckley and Andy Sherin. Photo credit: Kelly Bentham



PRESIDENT'S MESSAGE

I want to thank Andy Sherin for once again stepping into the role of *Voicepipe* interim-editor and putting this issue together.

On 24 May 2023, we held an AGM in the recently refurbished Ford Auditorium at BIO. Our first in-person annual general meeting since 2019 saw us welcome a few new faces on the executive. Many thanks to the long-standing members of the executive who renewed their commitment to the Association: Secretary David McKewon, Treasurer Lori Collins, Membership coordinator Jennifer Mudge and, of course, past president Andy Sherin. Thank you also to the members-at-large on the executive committee who chose to remain: Pierre Clement, Steve Blasco, Tim Lambert, Don Gordon, Claudia Currie, and Clive Mason. New members include Vice-president Chris Jauer and members-at-large Michel Therrien and Alice Gilson.

There was good discussion at the meeting about the challenges we face as an organization, some of which I've mentioned in previous president's reports: building OA membership, post-COVID engagement with members, financial pressures, and vacancies in key roles on the executive committee (*Voicepipe* editor, Beluga Award chair). These challenges will take time to tackle and need fresh ideas from our new members, the expertise of our veterans, and a lot of elbow grease!

During the discussion of financial pressures, one of the costs we face is the printing and distribution of paper copies of the *Voicepipe*. All agreed that the *Voicepipe* is an important and vital means of communication for OA members as well as between the Oceans Association and current BIO staff and therefore must continue to be available in hard copy at BIO. Nevertheless, printing and distributing newsletters represents a significant cost and

Continued on page 12

Halifax Harbour: Staging Area for Offshore Wind

Halifax Harbour has welcomed several unusual ships lately. *Orion* is an offshore heavy lift offshore installation vessel owned by DEME. *Orion* is installing foundations for 62 offshore wind turbines for the Vineyard 1 offshore wind farm off the coast of Martha's Vineyard. Piles and transition pieces (6 at a time) are delivered to Halifax from Spain aboard GPO heavy lift vessels and transferred to the *Orion*.

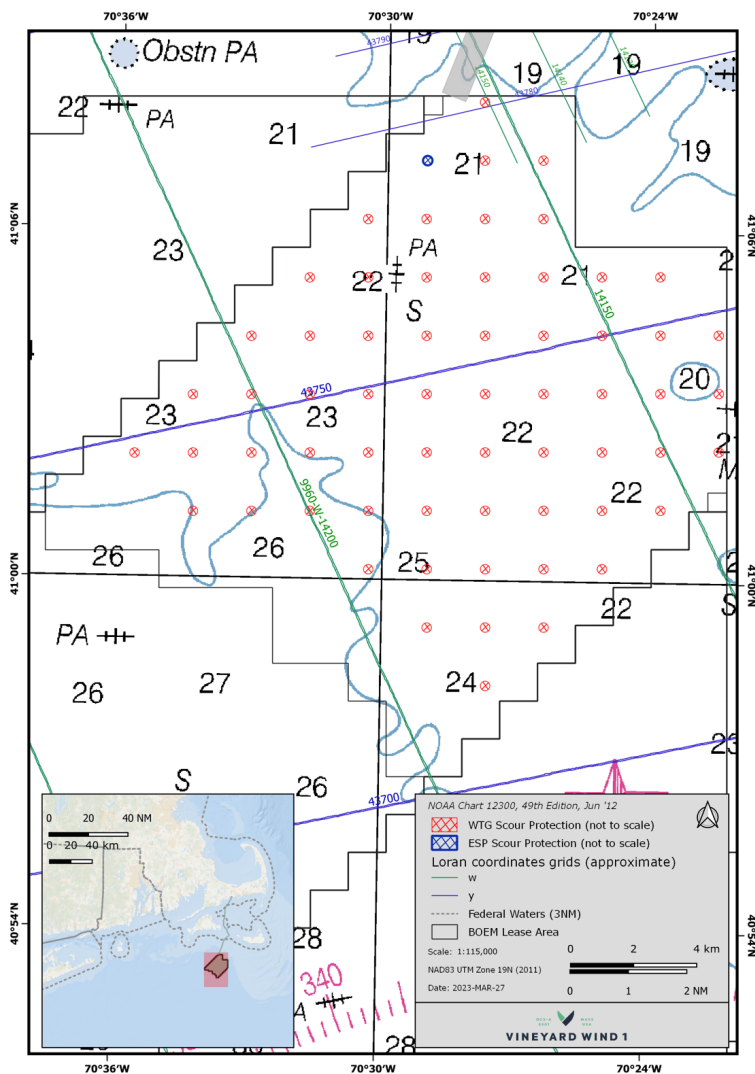


Photo Captions: Above A GPO heavy lift vessel anchored in Halifax Harbour waiting for its turn to offload wind turbine foundation parts to the *Orion* seen in the background tied up in Woodside. Below: *GPO Grace* waits for the return of *Orion* from Martha's Vineyard. Photo credits: Andy Sherin





Captions: clockwise from the top left: Map showing the location of the Vineyard Wind 1 offshore wind farm; *Orion*'s crane loading foundation parts from a GPO heavy lift vessel seen in the background, Photo credit: Andy Sherin; Map showing the location of all 62 Vineyard 1 wind turbines.



Vineyard Wind 1

Vineyard Wind is currently building the USA's first utility-scale offshore wind energy project off the coast of Massachusetts. Vineyard Wind 1 is located in federal wind energy area OCS-A-0501, 24 kilometres south of Martha's Vineyard and Nantucket, and 56 kilometres from mainland Massachusetts. The location was determined through a multi-year, inter-governmental task force process, which carefully considered scientific data and public input. The 800-megawatt project will generate electricity for more than 400,000 homes and businesses and is expected to reduce carbon emissions by more than 1.6 million metric tons per year, the equivalent of taking 325,000 cars off the road annually. The project will begin delivering energy later this year.

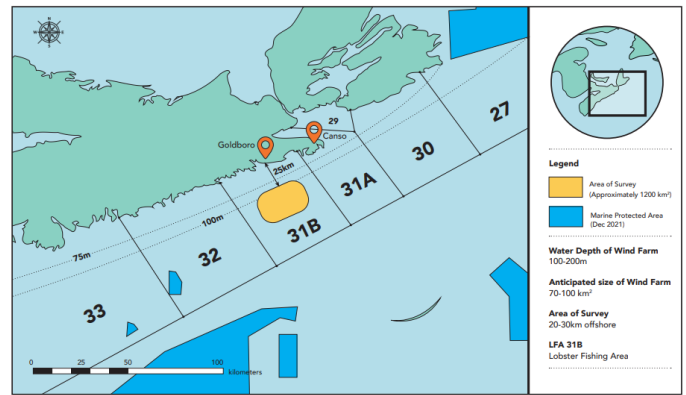
Offshore Wind Closer to Home

The Province of Nova Scotia has issued Module 1 of a Nova Scotia Offshore Wind Roadmap in May 2023. The Roadmap claims that Nova Scotia's offshore winds exceed those of the North Sea which has seen large investments in offshore wind in countries like Denmark. Module 1 of the Roadmap is focussed on the provincial and federal regulatory framework.

In April 2022, the mandate of the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) expanded its mandate to include the regulation of offshore renewable energy development in the Canada-Nova Scotia offshore areas. In March 2023, the Governments of Canada and Nova Scotia launched the start of the Regional Assessment of Offshore Wind Development in Nova Scotia.

The Nova Scotia Roadmap defines two approaches to regulation, one for areas of the offshore under solely provincial jurisdiction and one for areas under joint federal and provincial jurisdiction.

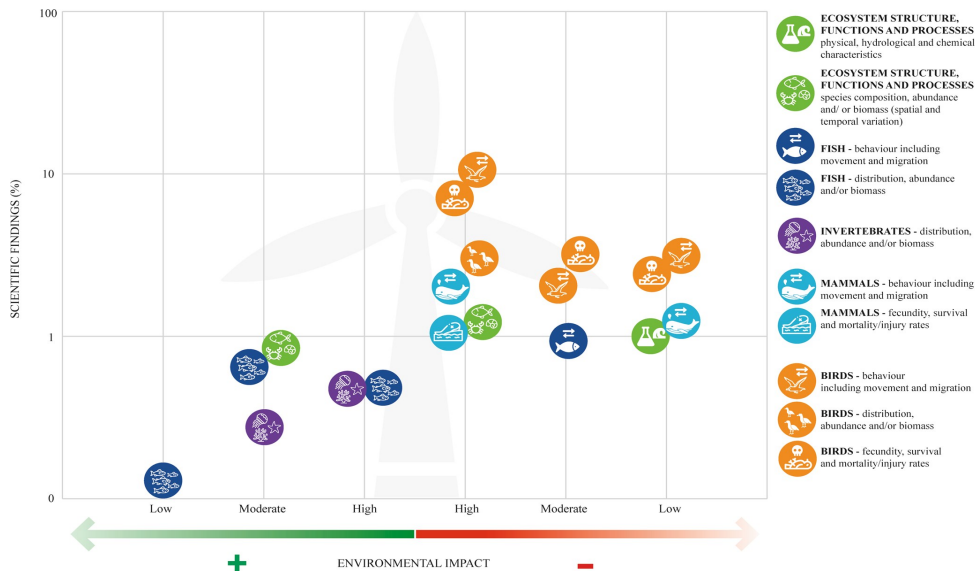
The CBC reported in June 2023 that "the province will issue a "request for information" from developers this year followed by a call for bids in 2024 for seabed leases in waters under exclusive provincial jurisdiction. ...



Location of the proposed Nova East Wind project. Source: Nova East Wind factsheet.

those waters are identified as Bras d'Or Lake in Cape Breton, St. Georges Bay in Antigonish, Chedabucto Bay, St. Margarets Bay, Mahone Bay and St. Marys Bay."

In August 2023 Nova East Wind announced the development of a floating offshore wind farm off Goldboro Nova Scotia. The project has initiated surveys and consultations in the area with the objective of delivering a proposed 300-400MW of electricity by 2029.



Most frequently reported environmental impacts of wind energy devices on the most representative indicators of ecosystem elements, by type (positive/negative) and magnitude (high to low). After Galparsoro, I., Menchaca, I., Garmendia, J.M. *et al.* Reviewing the ecological impacts of offshore wind farms. *npj Ocean Sustain* 1, 1 (2022). <https://doi.org/10.1038/s44183-022-00003-5>

Environmental Impacts of Wind Energy

Galparsoro et al 2022 in a review paper (see full citation in the caption for the figure above) recognize the development globally of regulatory frame-

works and strategic environmental assessments for ocean wind energy (OWE) "to avoid adverse effects and adopt mitigation and compensation measures." These are underway in Nova Scotia. The authors "acknowledge that there are significant scientific discrepancies regarding the magnitude of OWE impacts, as highlighted by the lack of evidence on the assessment of ecological risks associated to OWE projects." The authors suggest "the acquisition of new data through dedicated monitoring activities around OWE developments is, therefore, highly relevant to overcome scientific knowledge gaps—being, in turn, of high value to policymakers, managers, decision-makers, and industry." The authors recognize that OWE projects will increase the demand for ocean space with other traditional and other new marine sectors.

A personal tribute to Dave Heffler

Submitted by Borden Chapman

In 1974 I was well into my first year course in electronic engineering technology at NSIT, attending the Leeds Street Campus in Halifax. At that time, NSIT had a Manpower representative on Campus who distributed application forms for a summer job program called COSEP, (Career Oriented Summer Employment Program). Many of my classmates filled out the application form.

I was living in residence at Pine Hill Hall on Franklyn Street in the south end of Halifax, along with 100 other students, mostly studying at Dal or St. Mary's Universities. The residence was operated by the United Church of Canada as part of the theology school close by, but that school's small student numbers dictated the need to rent out rooms to other students studying off campus.

One afternoon, after returning from class, there was a note on my dorm room door that I was to call a guy named "Dave" regarding the COSEP summer job program. I made that call and it went something like this:

Borden: "Hello, I'm returning your call from earlier today about a summer job."

Dave: "Hi, this is Dave Heffler. Are you the guy who ran a TV and radio business in Amherst?"

Borden: "Yes, that's me"

Dave: "Do you have a summer job lined up?"

Borden: "Nothing yet."

Dave: "Do you want to work at BIO for the summer?"

Borden: "Sure, thanks! But I can't start till mid June as classes don't end till June 15."

Dave: "No problem, come in when you can."

End of interview.

I hung up the phone having absolutely no idea where or what BIO was. I had to ask around the campus about BIO. It's under the "new bridge" on the Dartmouth side was all I learned.

On my first day I took busses from Tower Road to Scotia Square, then across the MacDonald Bridge and final-



Credit: The Heffler family

ly from there to Shannon Park. Then a walk up to BIO. It was June, it was hot, and I wore a black suit, white shirt and tie to impress my new boss. I was directed to the Depot area and met Dave Heffler for the first time. He had a long reddish beard, wore a T shirt, shorts and saddles. Boy was I over dressed!

That summer I learned more about electronics from David than I did in my two years of studying at NSIT. The following year, after graduation, I was rehired by Dave. Both summers I had the wonderful opportunity to sail on the venerable ship CSS *Hudson*, learning about surveying the ocean floor and what's under it.

Dave hired me twice more as I changed jobs several other times in my early working career. He reminded me on many occasions that he had hired me a total of four times and there wouldn't be a fifth! There never was a need for a fifth time.

David Heffler passed away yesterday [9 June 2023]. He was my mentor and friend. He was a brilliant man, always there to offer advice when asked. He was, without doubt, the greatest influence on my life and my career.

My deepest sympathies go out to his wife Theresa and his three sons. He will be missed by so many. Thank-you for everything my friend.

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"the *Voicepipe* is an important and vital means of communication" Patrick Potter

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The Fate of the OceanGate Submersible *Titan*

by Steve Blasco



Figure 1. OceanGate Expeditions 6.7m long, 10,500 kg *Titan* manned submersible descending below sea surface. Source: OceanGate Expeditions

Investigating the geological history of the seafloor as a marine engineering geophysicist with Natural Resources Canada included the use of several manned submersibles. These subs included the Canadian ISE Pisces IV (Beaufort Sea), Russian MRI -1 (Titanic wreck site), Woods Hole Oceanographic Institute Alvin (US Virgin Islands) and the Royal Canadian Navy SDL-1 (Great Lakes, Bermuda). This collective experience has led to an ongoing interest in submersible technology. As a result, the development and diving activities of the OceanGate Expedition's *Titan* manned submersible have been followed since 2018. This discussion is based on these diving experiences, interaction with OceanGate Expeditions and assessment of the myriad of information available online. Information presented here is focused on the loss of the submersible.

Stockton Rush, CEO, OceanGate Expeditions was totally fixated on developing an innovative, cost-effective deep sea 5-person manned submersible promoted as capable of diving to 4,000m water depth. The hull was a cylindrical tube 4m long and 1.7m in diameter with a wall thickness of 0.13m and internal diameter of 1.4m. A 1.9cm thick titanium hemisphere was bolted to each end of the long composite carbon-fibre tube. The forward hemisphere (see Figure 1) has a 0.5m diameter acrylic viewport 0.18m thick and certified for only 1,300m water depth. When the 5 personnel were onboard, the viewport was sealed to the forward hemisphere with 19 bolts. This hemisphere was home to the pilot. *Titan* was propelled by 2 horizontal and 2 vertical electric thrusters run by a gaming controller. In total, with cowlings, the submersible was 6.7m long, 2.8m high

(including the base frame) and weighed 10,450kg in air. Two glass spheres filled with air were located in the stern section to provide additional buoyancy so *Titan* would be neutrally buoyant when floating at sea surface. This new design was only tested by lowering it several times from 1,000 to less than 4,000m water depth in the Bahamas. The sub was registered in Barbados. *Titan* was never subjected to certification although it was repeatedly recommended by several agencies. This was an unacceptable breach of safety protocol. For example, the regulatory authorities could require for such prototypes survivability for 10 times the projected lifespan. In 2019 the carbon-fiber hull showed signs of fatigue (from repeated lowering to depth) and was subsequently rebuilt in 2019-2020 with the same design. Rush had acoustic strain gauges installed in the hull to monitor the effect of changing pressure on the hull as *Titan* descended/ascended. Rush called it an RTM (Real Time Monitor). Such a setup was new technology and not well tested. Rush chose to believe the RTM would give him 3 to 4 hours notice of fatigue failure of the carbon-fibre, for him, enough time to surface the submersible. However, the monitoring system only gave warning just before failure.

The submersible was mounted on a floating platform that was towed by the tending vessel (Figure 2) to the drop zone. Once on location the platform ballast tanks were flooded and both sub (with crew bolted inside) and platform sank to 9m before *Titan* was released to dive. The process was reversed for recovery operations. Both launch and recovery were difficult in rough seas and caused many deployment delays in the North Atlantic.

In 2021 there were 7 *Titan* dives to the *Titanic* wreck site at 3,800m water depth. In 2022 an additional 6 dives were made to the site. The fateful sub deployment was the first of the planned diving program for 2023.

The five personnel in *Titan* at this time included Stockton Rush, pilot 61, and 4 passengers – Paul- Henri Nargeolet 77, Hamish Harding 58, Shahzada Dawood 48 and his son Suleman Dawood 19.

Approximately one hour and 45 minutes after the tending vessel, *Polar Prince*, launched *Titan* from the platform the morning of 18 June 2023, communications from the submersible ceased. Cryptic messages from *Titan* in the 20 minutes before contact was lost informed *Polar Prince* that the power supply was switched from source A to B, the RTM warning lights turned red, crackling sounds were heard in the stern section behind the crew cabin, ballast weights and then base frame were activated and emergency ascent was initiated. However, questionable release was followed by only 8m of lift.

At that moment the submersible was at a water depth of



Figure 2: OceanGate Expeditions *Titan* onboard platform in tow by tender vessel for deployment/recovery at the *RMS Titanic* wreck site in the North Atlantic 650km southeast St John's, Newfoundland. Source: OceanGate Expeditions

3,500m, about 400m above the *Titanic*. At this water depth the pressure on the submersible's hull would be about 350 atmospheres (the weight of the Eiffel Tower). *Titan* imploded in 1 msec (at a rate of 40km/min.) Communications from the submersible would indicate the submariners were aware they were in a dangerous situation. However, they had no awareness of the implosion. It takes 170 msec for the brain to register a sound from your ear – long after the implosion occurred.

When *Titan* did not surface at the designated time on the afternoon of 18 June 2023, OceanGate personnel on the *Polar Prince* contacted Pelagic Research Services in Massachusetts to mobilize the company's ROV (Remotely Operated Vehicle), *Odysseus 6K* to launch a search for the missing submersible. The equipment was flown to St. John's and mobilized on the supply vessel *Horizon Arctic*. On 22 June 22 *Odysseus* was launched at the wreck site. The outer cowling that covered the tail section was the first piece of *Titan* to be located followed by the debris field. *Odysseus* recovered substantial debris. The wreckage fell 400m to the seafloor about 200m from the bow of *Titanic*. Recovered debris from the *Titan* was returned to St. John's and transferred to the US Coast Guard for analysis.

Experts speculated that the implosion could have been triggered by the failure of the viewport, the glass floatation spheres, the composite carbon-fibre hull or a combination of these - possibly triggering one another. The US Navy reported detecting an implosion at the time communications from *Titan* ceased.

Composite carbon-fibre is not strong in compression and weakens with repeated (cyclic) pressure changes (loading) over time. After the major repair followed by 13 previous dives in 2021 and 2022, the residual strength of the carbon-fibre may no longer have been

able to resist the 350 atmospheres of water pressure at 3,500m. This diminishing strength of composite carbon-fibre under compression was well known in the submersible industry and experts lean towards this fact as triggering the implosion. The cause of diminishing strength results from the differing coefficients of expansion and contraction for different materials in contact with each other under cyclic pressure loading. In this case the different coefficients between titanium and carbon-fibre or within the composite carbon-fibre between the filaments and the enveloping epoxy led to cumulative fracturing at material contacts over time and ultimately the catastrophic failure.

It has also been argued that the instantaneous collapse of the hull led to rapid compression of the air in the cabin which would lead to an instantaneous rise to extreme temperatures. True enough, but at the same time the enormous volume of cold seawater instantly flooding the shattering sub would drop the temperature. Human remains could be preserved.

The US Coast Guard is leading the investigation of recovered debris, including the possibility that human remains were preserved. The Canadian Transportation Safety Board is also participating in the investigation along with other agencies from the US, France, Pakistan and the UK.

Only when the results of the investigation are released will the nature of the implosion and its affects be better understood. Even then there may still be lingering questions. Perhaps the remaining debris on the seabed will need to be recovered to resolve remaining issues.

The loss of the *Titan* and 5 personnel totally occupied media and public attention. It eclipsed the far more tragic loss of over 600 lives from the capsized trawler *Adriana* off Greece which was barely reported. The loss of *RMS Titanic* 111 years ago somehow still captivates public interest.

It is unsettling to note that history has repeated itself yet again. Arrogance and misplaced confidence in new technology led to the avoidable deaths of 1528 passengers and crew of *RMS Titanic* in 1912 and again in 2023 with the avoidable deaths of 5 passengers and crew of *Titan*. Eva Hart, a survivor of the 1912 sinking, stated in the Stephen Low docudrama 'Titanica' that "it will happen again and this time there will be **no** lifeboats". Eva was so right...

The *RMS Titanic* disaster resulted in new international safety at sea regulations aimed at preventing future vessel tragedies. In a parallel vane hopefully the *Titan* disaster will lead to new international safety regulations aimed at preventing future tragedies for manned submersibles. This is not a trivial task.

CANADA'S NATIONAL MERCHANT NAVY MEMORIAL

Submitted by Captain (retired) Earle Wagner

One of my major accomplishments in retirement was, the management and funding, and providing essential technical and professional services, and erection of Canada's national merchant navy memorial on the Halifax waterfront. I would like to share this project with you.

For nearly one half century successive Canadian governments did not recognize World War II merchant navy veterans equal to army, navy and air force veterans, who had received benefits for training or education or property under the Veterans Act. In 1991 after a hunger strike in Ottawa and the general support for merchant navy veterans we were invited to meet the Minister of Veterans Affairs in Ottawa.

Our demands were for veterans equality, a National merchant navy memorial, a history of the merchant navy and a list of merchant navy seafarers lost in the 20th century wars and to be displayed in the Peace Tower, Ottawa. The minister told us if we wanted a memorial it was our responsibility. In May 1992 I offered my service to our association if they appointed me chairman of the Memorial Fund by next year I would have a memorial placed on the Halifax waterfront. In July 1992 the executive approved my chairmanship.

In 1992 I had a dual role to chair the first merchant navy National reunion in 47 years to be held in Halifax and also chairman for a memorial. I had no previous training or experience to manage a National reunion or a National memorial. In early September 1992 at the Nova Scotian Hotel approximately 500 veterans attended their reunion, which was a great success. Donations for the memorial were initiated then and by late 2013, \$20,000 was collected.

As the sole manager of the memorial project I dealt with government, companies, educators, organizations, engineers and the public for technical advice and to oversee workmanship, the final approval and be on schedule within the budget. Some that come readily to mind are: Wrote correspondence to raise funds, newspaper articles, interviewed on radio, negotiated for the design artist, acquired special consultants, wrote specifications, used engineer for foundation plan, made presentation to HRM

council for placement on waterfront, researched historical data from archives, procured large African granite stone and had it engraved. I designed a time capsule, collected and fitted special historical items for future reference. Used French translation for wording, engraved CANADA and 10,000 DWT Park ship and 2200 Canadian seafarers who lost their lives all on the front of the memorial. On the rear of the stone are the names of 91



vessels lost by enemy action in WWI and WWII. Invitations were sent - out to veterans, government and public for the unveiling ceremony. My wife Ruth was a great help assisting me for one and a half years completing this project.

On 11 November 1993 under cold but sunny skies representatives of government, veterans, public, clergy and others witnessed Admiral Mason and our National president unveil the National merchant navy memorial at Sackville Landing, Halifax. Captain Earle Wagner was master of ceremonies. To view this memorial stand by the wave memorial and look across to Dartmouth and the black stone memorial is visible on the end of the wharf, about 50 to 70 feet distant.

[Editor's note: 2023 marks the 30th anniversary of the dedication of the Canadian Merchant Navy Memorial. Captain Earle Wagner joined the merchant navy at the age of 17 in 1941. He served in World War II as seaman to Chief Officer and Gunnery Officer. He was Marine Superintendent of Fisheries and Oceans, Maritime Region for 24 years and initiated the double crewing concept on DFO vessels i.e. one crew at sea another on leave ashore. This created a profound improvement in life style of seafarers and their families.]

The 2023 Coastal Zone Canada Conference Participation and Insights By Peter Wells

The Coastal Zone Canada (CZC) Conference was held on 11-15 June 2023, in Victoria, BC. The theme of this biennial conference was “connecting with the coast”. I gave a paper¹ on the Bay of Fundy Ecosystem Partnership (BoFEP)’s activity and its plans for ocean literacy (OL), four posters², and chaired one session. The conference had around 500 attendees, had 4 days of concurrent sessions on a wide range of topics pertaining to coastal and ocean management, and a very diverse and information packed exhibit hall for groups across the sectors involved in ocean science, management, monitoring, and public engagement. I attended all plenaries, 12 paper sessions, and the formal poster session. My paper and the posters were well attended and new connections with other practitioners were made.

Some important points, noted while attending this conference’s papers, discussions and displays, were as follows:

- In this UN Ocean Decade, collaboration and networking are critical to effective ocean management.
- Bottom-up engagement of communities, including those of indigenous peoples, is essential for effective ocean management and its component activities, such as marine spatial planning.
- Climate change is clearly here, as shown by ongoing processes such as coastal erosion.
- All forms of knowledge (western, indigenous) must be used to protect coastal species and spaces.
- Nature based solutions can protect coastlines prone to erosion enhanced by climate change.
- Climate change is the biggest environmental issue of our time and it demands that all members of society are knowledgeable about it and are generally ocean literate.
- To be successful, marine spatial planning must be mostly a bottom-up process, involving coastal communities and local municipal planners. Local knowledge, including historical, should be considered.
- It was abundantly clear from this conference (see the website) and earlier CZC conferences (from 1994 onwards) that having an ocean literate and ocean involved population is critically important for effective coastal and ocean management in an era of accelerating ocean change. The topic itself was explicitly discussed in the session where my paper was presented in and generally discussed in other sessions at this meeting. In the OL session, talks focused on the contributions of whale watching, film and photography, and community attitudes and

perspectives about the coast. In addition, many displays and groups (across all sectors) in the exhibits hall focused on public awareness and engagement with coastal and ocean issues. Clearly, at the heart of this conference was the premise that an ocean literate public is required to support effective coastal and ocean management (including policy and decision-making), protection of marine biodiversity, and enlightened response to climate change. The three big take-home messages for successful advancement of OL and coastal management were: 1) network across interested coastal groups; 2) involve coastal communities directly with projects; and 3) involve indigenous peoples and respect their histories of deep connections with the coast. Further discussion of ocean literacy should be continued in next years BoFEP Workshop and in CZC 2025 in Charlottetown, Prince Edward Island.

¹ Paper: Promoting ocean and climate literacy to communities around the Bay of Fundy and its watersheds. L.Lowther, M.J.A. Butler, and P.G. Wells.

² Posters: Understanding information pathways for evidence-based policy and decision-making in coastal and ocean Management. Wells, P.G. and MacDonald, B.H.; Celebrating BoFEP’s 25th anniversary - achievements and future activities. Wells, P.G., Percy, J., Daborn, G.A. *et al.*; The interplay of ocean science research with public policy and management decision-making: seeking solutions. MacDonald, B.H. , Wells, P.G., Stewart, I., *et al.*; CRC Press Book - Science, Information, and Policy Interface for Effective Coastal and Ocean Management. MacDonald , B.H., *et al.* 2016.



Posters with Peter Wells as an author at the Coastal Zone Canada (CZC) Conference. See full citations above.

effort to us, so please consider receiving your copy electronically. Other means of addressing the financial challenges were discussed, including raising dues and various strategies of increasing membership.

Following the AGM, it was gratifying to see a large BIO audience on hand to witness the presentation of Beluga Awards to three deserving recipients: Shawn Roach (2020), Dale Buckley (2021), and Kelly Bentham (2022). While Shawn is still employed at BIO and Kelly is recently retired, Dale's widow Betty accepted his posthumous award, earned in no small part for his efforts in creating the Beluga Award to recognize the contributions of the often unsung heroes of BIO teamwork

and community. Dale's family was well-represented, attending both the award ceremony and celebratory luncheon for award recipients and family at the Wooden Monkey.

Finally, I want to remember Dr. Charles Schafer who recently passed away. Charles had a long and distinguished career at AGC and was a longtime active member of the BIO Oceans Association executive committee. Never a follower, Charles was one-of-a-kind: intelligent, curious, and thoughtful, with a wonderful dry wit. I will miss him.

Patrick

Interim Editor's Keyboard: Thank you to all of the authors in this issue. I have been watching the activities of the *Orion* and GPO vessels in the harbour was motivated to put together an article on offshore wind. I had been peripherally involved in the information gathering conducted around the Martha's Vineyard site that is now under construction. As a starting point in the search for a new editor of the *Voicepipe*, please consider taking on one issue. I will help with layout and printing. Andy



ABOUT THE BIO-OCEANS ASSOCIATION

The Bedford Institute of Oceanography Oceans Association (BIO-OA) was established in 1998 to foster the continued fellowship of its members; to help preserve, in cooperation with the Institute's managers and staff, BIO's history and spirit; and to support

efforts to increase public understanding of the oceans and ocean science. Membership is open to all those who share our objectives. Most current members are present or past employees of BIO or of the federal departments of Environment, Fisheries and Oceans,

and Natural Resources (or their predecessors) located in the Halifax Regional Municipality. Membership is \$10.00 per year, \$40.00 for five years, or \$150.00 for a lifetime membership.

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Association Mailing address: Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, NS B2Y 4A2.

VoicePipe mailing address: c/o Andy Sherin, 9 Rose Street, Dartmouth, NS B3A 2T4.

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