VOICEPIPE

Issue 94 February 2024

The Newsletter of the BIO-Oceans Association

OA marks 25th Anniversary

Members and guests assembled on 21 November in the William Ford Auditorium at BIO to mark the 25th Anniversary of the BIO Oceans Association. Patrick Potter, President, opened the festivities by welcoming everyone. He and Alistair MacDonald provided entertainment. A cake was cut and distributed. Seveeral potential new members from BIO staff were present as guests.

Photo captions clockwise from the top left: Patrick Potter welcomes members and guests; Alistair MacDonald entertained with song; Patrick converses with guests from BIO staff; and David McKeown, Clive Mason, Don Gordon, and Stu Smith in conversation.

Nominations are open for the Beluga Award

Send your nomination to
Jenna Higgins
Chair, Beluga Award
Jenna.Higgins@nrcan-rncan.gc.ca

Pick up a free copy of **Voyage of Discovery** at the BIO Library

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Remembering Alan Longhurst

By Richard Addison

I first met Alan when I went to the Institute for Marine Environmental Research (IMER) in Plymouth, UK, in the fall of 1974 for a year's professional development leave. IMER (now part of the Plymouth Marine Lab.) had been set up a few years before by the UK government, partly in response to the impact of the *Torrey Canyon* oil spill on the Scilly Isles in spring 1967. IMER's director at the time was Roland Glover, who was an established figure in government marine science and who "knew his way around Whitehall"; Alan had been recruited as deputy director from a senior position in the NOAA Southwest Fisheries Lab in San Diego. I gathered that Alan's role at IMER was to develop the main scientific programmes at IMER and I believe that he also was involved in recruiting IMER's senior scientific staff.

During the following year I got to know Alan both socially and professionally. He and his family lived in an old stone house (which must have cost a fortune to heat) outside Plymouth on Dartmoor; his children were about the same age as ours, and when we went out to dinner in Plymouth his kids would spend the evening in sleeping bags in his station wagon. (We lived in town and could find baby-sitters easily.) As a science manager, he had a wide knowledge of marine ecological issues, and a lot of hands-on experience of dealing with them. He was highly respected in the marine science community; when some US scientists were visiting IMER, one of them, assuming I was an IMER employee, said "I hope you people realise how lucky you are to have Alan running your programmes". Most of the IMER staff would have agreed. But as well as seeing "the big picture" he could focus on scientific detail: during a seminar at IMER I showed some data which Dan Ware and I later published in Nature about PCB concentrations varying with particle size in Gulf of St. Lawrence phytoplankton. Alan, who didn't know much about PCBs specifically, immediately latched on to the slide and proceeded to discuss at considerable length the implications of the data. My IMER colleagues told me this was not unusual: unlike some science managers, Alan would routinely attend scientific meetings and participate actively in them.

Alan was appointed director of the Marine Ecology Lab. at BIO in 1977. He already knew many of the MEL biologists personally through scientific meeting or other connections. He and I worked together a lot during the next decade or so, and we both participated in a memorable DFO visit to Chinese marine science institutes in November 1979. I think that it was one of the earlier technical visits by Canadians to China, taking place just after Mao's Cultural Revolution ended. Our group was led by Gerry Ewing (ADM at the time) and included Ced Mann and Mike Keen from BIO and Ken Denman and Lyn Lewis from IOS. We travelled around coastal China, often in sleepers pulled by coal-fired steam-driven railway engines; we emerged from the carriages covered with a fine patina of soot and dilute sulphuric acid, badly in need of showers. During the day Mike would lecture Alan on the local geology, and Alan would simultaneously lecture Mike on the local bird life. I doubt that either learned much from the other. But all the memories of the trip --- the welcoming "tea ceremonies", the daily paeans of praise for Dr. Norman Bethune (we had arrived on the 40th anniversary of his death), the cold, the ubiquitous Mao suits, our being the first westerners to enter Xiamen for 30 years and therefore attracting large crowds which followed us everywhere (including toilets), and of course the sheer novelty of it all --- have stayed with me.

I lost touch with Alan after we moved to the west coast, but I will remember him as a knowledgeable, stimulating and enjoyable friend and colleague.

Hiking England's Norfolk Coast Path
An Exploration of Coastal Change
By Peter Wells

In mid-April 2023, I once again flew over the North Atlantic to England, home of my ancestors and many cousins and friends. On this trip, one objective was to hike and explore the Norfolk Coast Path **(Fig. 1).** The path is one of the UK's 20 national trails, all noted for relatively easy access, walkability, history, and exposure to some of the country's best unspoiled and biologically diverse landscapes. Numerous guide books assist the walker with maps and relevant information to make the walks enjoyable and safe (see References below).

Fig. 1. The Peddars Way and Norfolk Coast Path, England. (Stewart 2018. The numbers link to map locations in the field guide.)

The path is in the county of Norfolk, located north-east of London and adjacent to the North Sea. It runs from the towns of Hopton-on-Sea and Greater Yarmouth, located east of Norwich and just north of Lowestoft (well known to fisheries scientists for its world famous research laboratory), all the way to Hunstanton on The Wash, a large coastal embayment. The path ambles along a coastal landscape of sandy and rocky beaches, extensive sand dunes, high cliffs, farm fields, salt marshes, and dykes, and the waterfronts of historic Victorian towns and ancient villages. Near the end, it meets another national path, Peddars Way (**Fig. 1**), a long, straight and ancient inland walk that follows an old Roman Road through the inner heart of Norfolk. Together, the two paths are 216 km of fairly easy walking, a combination of flat and undulating terrain through a range of wildness and settled lands.

After a harrowing night at Heathrow Airport where I discovered my booked hotel had been transferred into a refugee center, I travelled to and through London and took the train to Norwich, the capital city of Norfolk. I was met at the train station by friends Graham and Jenny, who live nearby in the village of Brundall. I had met them years earlier on the SW Coast Path, and have hiked with them since (Wells 2023). They treated me to a whirlwind tour of the historic city, after which we went to their lovely home for the night. The following day, we had a break-in jaunt in the adjacent county of Suffolk - the Dunwich Nature Reserve of heathlands, woods, open fields and extensive salt marshes. That evening, we decided to hike the Norfolk coastal path in seven sections, each day coming back to the house for the night. Their hospitality was very generous, and their son drove us back and forth most days. Better guides to Norfolk and the path could not be found anywhere. Their kindness to this wayward hiker is so much appreciated.

The Norfolk coastal path is ancient and well trodden, clearly sign posted ("waymarked") and hence easy to follow. For the seven days of steady but unhurried walking, we were lucky with fine weather, fresh ocean breezes, and terrific views up and down the coast and out to sea. We started in Greater Yarmouth, after exploring the ruins of the ancient Burgh castle built by the Romans during their occupation of Britain.

The first two days were along the top of enormous sand dunes and on beaches, both sandy and stone. Many grey seals (*Halichoerus grypus*) were seen resting at the waters' edge **(Fig. 2)** and at various locations, they have become a popular tourist attraction. Seal pups quite often wander into the dunes and are best left undis-

Fig. 2. A harem of seals resting beside a beach groyne, on the Norfolk coast.

Fig. 3. Signs of coastal erosion along the coastal path. The village is Hemsby is especially threatened.

turbed. Common or harbor seals (*Phoca vitulina*) also thrive along the coast. We soon reached an area of high cliffs at Hemsby that had suffered much erosion from storms and wave action and passed by one house that had just been rescued from toppling over the edge **(Fig. 3).** This area continues to suffer extreme erosion, and parts of the coastal path were diverted inland. Further along, the beautiful village of Happisburgh is suffering similarly, often losing meters of land per year, and more houses and other infrastructure may have to be moved soon. This perhaps is a reminder for Nova Scotians!

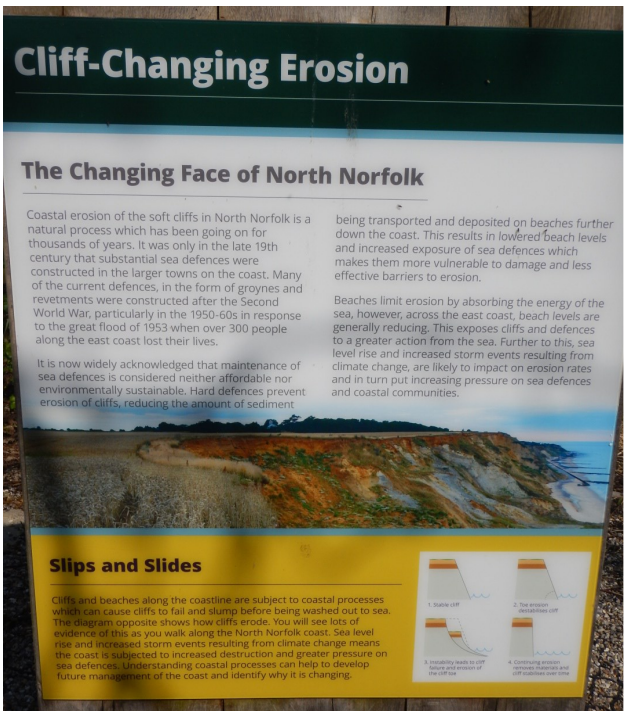

Fig. 4. An interpretative panel at a welcomed rest stop.

Fig. 5. A WWII look-off station, one of many signs of WWII defenses.

Several locations along the Norfolk coast are well known for their glacial and sedimentary geology, and important fossil finds. The skeleton of a steppe mammoth (*Mammuthus trogontherii*) was found in 1990 in the cliffs of the Cromer Forest Bed at West Runton, south-east of the Victorian town of Cromer. Evidence of early flint tools and imprints of hominid footprints were recently discovered on the beach at Happisburgh, the latter being over 850,000 years old. The various fossils (e.g., belemnites, sponges, urchins, fish, rhinos) and the history of early humans are described in excellent interpretive displays **(Fig. 4)** along the path. One section is named the "Deep History Coast", reflecting the spectacular fossil finds. The rest stops at the displays include comfortable benches for resting weary feet. Needless to say, we did not come across ancient animals or prehistoric humans on our walk. But a longer visit could have included more geological examination of the cliff faces along the way; as at the Joggins fossil site in NS, continual coastal erosion uncovers secrets of the past.

Along the path are many remnants of defensive structures **(Fig. 5)** dating from WWII; these include gun emplacements (some with guns, long dis-functional), concrete walls, round pillboxes, and many beach groynes designed to prevent boat landings and reduce wave action. Norfolk was well fortified in that period due to the expectation of an invasion. Some old airfields still remain inland, as the county was home to numerous squadrons of allied bombers and fighters during that time.

Upon reaching the large town of Sheringham after 4 days walking the path, I met and stayed with two cousins, a truly memorable occasion. We had much catching up to do on family history, on both sides of the

Fig. 6. My hiking friends, Graham and Jenny, standing on one of the many dykes and viewing the wildlife of the Norfolk coastal marshes.

Atlantic, with their photo albums guiding the discussion.

After that restful interlude, the three of us (Graham, Jenny and I) rejoined and continued walking westward into the coastal landscape of NW Norfolk, a much transformed land very similar to the Annapolis Valley. This part of the coast has numerous nature reserves, Sites of Specific Scientific Interest, and Special Protected Areas **(Fig. 6).** The many marshes are rich in biodiversity. Birds of all kinds were numerous – geese, ducks, song birds, egrets, herons, and other long-legged coastal birds. It is a bird watchers wonderland. In season, many species of butterflies are seen; we spied a sizeable cocoon of their pupae attached to a plant beside the path.

Numerous dykes separate the many small town harbors and marshes from the farm fields. The harbors are filled with all kinds of boats, commercial, fishing and pleasure. The villages are beautiful and quaint, with much architecture reflecting the connection to the Netherlands; the Dutch had built the dykes many centuries ago. A famous windmill at Cley overlooks enormous stretches of marshes and is a well-known landmark, visible for miles. Again, we could have spent much longer exploring such sites of interest.

At the end of day six spent hiking the long dykes, we arrived at the prosperous fishing village of Wells-next-the-Sea. We met the sister and niece of my Dalhousie colleague, Mike, in a lovely old pub and conveyed messages from Canada over well-earned pints of local beer. Pubs were often the stopping place at day's end, my friends seemingly knowing the location of each of them. Alas, I have no known relatives in Wells, despite the namesake!

Beyond Wells-next-the-Sea lay a life boat station, one of many along the coast **(Fig. 7),** sandy beaches lined with colorful huts popular with visitors, woods full of pine trees, another huge dune system, and a long stretch of dykes. Our walk ended in the village of Burnham Deepdale, in the shadow of an ancient church (**Fig. 8**). We were only one day from our planned destination of Hunstanton, but time intervened; this stretch of the path awaits another visit. We bussed and drove back to Brundall, happy with what we had accomplished over a week of walking (approx.110 km.) and exploring, and

Fig 7. Life boat drill on the beach at Wells-next-the-Sea, on the Norfolk coast.

Fig. 8. St. Mary's, a noted 11th century Anglo-Saxon round tower church, at Burnham Deepdale, on the Norfolk coast.

full of good memories.

This coastal walk has amazing variety, from quite wild stretches of coastline to historic churches, windmills, ancient villages, modern towns, and built-up waterfronts. Just off the coast are many wind farms, visible in the distance. The whole walk leaves one with a sense of

both historic and contemporary England, in a county that has endless stories to tell.

Of great current interest is how people living along the Norfolk coastline now have to adapt rapidly to the greater impact of climate change and the powerful North Sea. As mentioned, so much of this coastline is prone to erosion, especially after massive storms that these days frequently sweep the county and the entire country. Hopefully, the coastal towns and villages of Norfolk will be able to adapt and mitigate the effects of such severe and damaging storms, and preserve their communities and this wonderful coastal path for the future.

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Mary Anning, Famous Fossil Finder

Mary Anning of Lyme Regis, England Anning (1799-1847) lived in the village of Lyme Regis, on the Dorset coast of the English Channel. She was an amateur but very observant and skilled fossil finder along the highly erosional local cliffs. She became well known for making significant discoveries of Plesiosaurs, Ichthyosaurs, coprolites, ammonites, cephalopods and fossil fish, amongst other marine fossils. These were provided to the early paleontologists at various English museums and universities. As an self-educated woman and amateur scientist, she was given little credit by academics for her important skills and discoveries in her lifetime. However, the town has long recognized her significant contributions to science, hence a popular natural history museum and now the new statue of Anning that proudly stands on the waterfront.

Photo caption: Statue of the famous fossil finder, Mary Anning of Lyme Regis. The town in western Dorset, England, has recently erected this lovely statue. Credit Peter Wells.

Announcement
An upcoming coastal and ocean conference

The Huntsman Marine Science Centre (HMSC) is hosting a joint conference on estuarine and coastal science, co-sponsored by the HMSC, the Bay of Fundy Ecosystem Partnership (BoFEP), and the Atlantic Canada Coastal and Estuarine Science Society (ACCESS). It will be held on June 4-7th, 2024, at Saint Andrews, NB, at the fabulous HMSC aquarium.

The conference is entitled "*Tides of Change: Accelerating Conservation and Protection Efforts in Atlantic Canada's Estuaries and Coastal Waters*". It follows 13 previous BoFEP workshops and conferences, the Proceedings from which are all published and available on the BoFEP website (www.bofep.org). Combining the meeting with ACCESS began in 2022, encouraging more university students to attend and present their research findings as they progress through graduate school. The focus of the meeting is both on science pertaining to the Bay of Fundy and more broadly, the estuaries and coastal waters throughout Atlantic Canada.

Abstracts for talks, posters or panel sessions are due on March 31st and should be sent to Dr. Benjamin (Ben) de Jourdan at the HMSC, email: Benjamin.deJourdan@huntsmanmarine.ca. Everyone is welcome to attend. Further information will be available on the various websites.

Mid-Atlantic Ridge - A Personal Recollection – Part One

By D.L.McKeown

Recently, Andy Sherin, the *Voicepipe* editor, asked me to write an article on the extensive research program carried out by BIO on the Mid-Atlantic Ridge (MAR). With some reluctance I agreed as my area of expertise is engineering, not geoscience. With that limitation in mind, I decided to try to produce a three part description of BIO's contributions. This, the first part, will be a personal account of how I became involved in the program. In next part, I'll describe the various expeditions BIO conducted to the MAR. In the final part, I plan to focus on some of the ground breaking engineering achievements of that research program. So, now to the autobiographical part.

At the completion of my Ph. D. studies at the Engineering Laboratory at the University of Cambridge in 1966 I was supposed to move on to a position as a Research Scientist in the Metrology Division at BIO. While we were ultimately looking forward to a return to Halifax, my wife's home town and where we had attended university, we had so thoroughly enjoyed our years in England as carefree students we were reluctant to leave. So, on the pretext that I needed some experience in oceanography before moving to BIO and on the suggestion of our friend Charlotte Keen, I applied for and obtained a position as a Research Assistant in the Department of Geodesy and Geophysics at Cambridge. This academic unit was located at Madingley Rise, once a farm a short distance outside the city. The main office building was a lovely Victorian farmhouse, with further offices located in a converted stable behind it. Across a meadow was a small brick building where I worked and next door, behind Sir Fred Hoyle's astronomical observatory was the mechanical workshop. Beyond that across another field was the geochemistry building.

At that time I knew nothing about continental drift and sea floor spreading. While I might have slept through that lecture during my first year geology course, I suspect it was more the case that it was such new science in the early 60's that it had not yet reached university classrooms. Anyway that ignorance was soon to change as my employer Drum Matthews was one of the lead researchers in this new science. In 1963 he and Fredrick Vine had published a paper in Nature describing how the earth's magnetic field periodically reverses direction and how these changes get permanently recorded in the material bubbling up from mid-ocean ridges as it cools. They went on to note that, if the basalts of the sea floor could be sampled either side of such ridge systems and dated, they would likely be found to be of the same age equidistant from its axis. Furthermore, such dating would delineate the spreading rate of the sea floor in such an area.

MV Theta alongside Karlsen's wharf in Halifax (date unknown)
Source:
Welcome to the Scottish Shipbuilding Database (clydeships.co.uk)

At this point, a short Madingley Rise vignette beckons. In an effort to confirm continental drift by independent means, the geochemists were collecting rock samples from locations in Africa and South America that were thought to have once been adjacent parts of Pangaea before it split apart to form separate continents. To this end, one of their graduate students, Monica Dirac, was sent to South America to collect samples. Upon her return to the UK, she had some trouble with Customs officers who were very concerned that her suitcase was mostly filled with rocks and she had some difficulty providing an explanation they deemed reasonable as to why they were being brought into the country.

Drum soon put me to work developing a buoy mounted autonomous seismic recording system to be used during a planned Cambridge-BIO expedition to the Mid-Atlantic Ridge (MAR) in 1968. The state of electronics at that time was primitive compared to electronics today. Digital systems had to be constructed by assembling individual electronic components such as transistors, resistors and capacitors into logic circuits and solid state miniature digital recording devices were only dreamed of. I ended up putting together a system of amplifiers attached to a very low speed multi-channel Uher cassette tape recorder. This recorder was to be mechanically switched on prior to deployment but not powered up until commanded to do so by an electronic clock. This same clock would then provide a time track on the magnetic tape. The plan was to place these units in several of the BIO radar transponder buoys to record refraction seismic signals.

Carol and I finally returned to Halifax in March, 1968, and I began work at BIO. My first major project there

had nothing to do with the MAR so I'll skip over that. However, because of my work at Cambridge I did participate in that summer's *CSS Hudson* expedition to the Mid-Atlantic Ridge at 45° North. I was to join the ship in Ponta Delgada, Azores along with several BIO scientific staff, ships crew and a mountain of spare parts and equipment. We flew to the island of Santa Maria on a transatlantic flight and landed on a vast airfield which had been built during the WWII as a refuelling stop for allied planes being ferried to Europe. The scientific staff had passports and visas so we were allowed off the plane. However, the ship's crew were travelling on their Seaman Books and were forced to fly on to Lisbon where there was some sort of diplomatic kerfuffle before they were permitted to return to the Azores to join the *Hudson*. Meanwhile, we were to be transferred to our final destination on the island of Sao Miguel aboard a very ancient looking DC-3. After weighing us and all our gear and likely kicking off some other paying passengers to allow for our overweight baggage, we took off. Upon arriving at the island of Sao Miguel, we buzzed the grass field to scare away the cows then landed to the enthusiastic cheers of the native Azoreans on board who were returning home from work terms in the US and Canada.

I was not lucky enough to enjoy the comforts of *CSS Hudson* during my first cruise to the MAR. Instead, I had the interesting experience of working aboard the *MV Theta*. At this point a vaguely relevant historical digression seems appropriate. *Theta* was built as a small cargo vessel in Scotland in 1953 for Christensen Canadian Enterprises Ltd. of Halifax. In addition to supplying the out-ports of Newfoundland and acting as a sealing vessel each spring, it was also frequently charted by BIO and Dalhousie University to do ocean current, hydrography and geophysical surveys. It eventually sank off Nicaragua in 1981. Our work spaces consisted of a portable lab on deck and an incredibly noisy and uncomfortable area in the after hold smelling strongly of the seal skins that it had been recently filled with. The noise there was due to a large motor-generator set that ran constantly to provide us with AC power on this DC ship, forcing us to move up on deck whenever we needed to have a discussion or a breath of fresh air. To fulfill its role as the shooting ship for the seismic refraction lines, its forward hold was filled with explosives.

Keith Manchester was the Senior Scientist on board with a supporting cast of Mike Hughes and Larry Johnson from BIO, Tim Owen from Cambridge University, a geophysicist from the Nova Scotia Research Foundation, an explosives expert or "Shooter" from DEMR in Ottawa, and myself. In addition to being the shooting ship, our other primary role was to moor and maintain the radar transponder buoys being used for navigation. For those of you brought up in a world of GPS on your cellphone, pinpointing your position to within a meter or two at all times, we were not so fortunate in the '60s. *Hudson* was fitted with the first civilian seagoing Transit satellite navigation system, the predecessor of our modern GPS. While a giant step forward in terms of marine position location offshore at the time, it had severe limitations. Firstly, fixes were only available a few times a day when a satellite was present above the horizon. Secondly, it required a lengthy period of data collection on punched paper tape then processing on a minicomputer before yielding a position, so fixes were not instantaneous. On *Theta,* if I remember correctly, we were using Loran-A, a radio navigation system with an accuracy of miles backed up by celestial navigation whenever the persistent fog and cloud cover at 45° north allowed. In other words we rarely knew where we were.

Because continuous positioning was required while running the seismic refraction lines, the plan was for us to set out a pattern of radar transponder buoys in taut deep moorings which were then surveyed in by *Hudson* to serve as reference points. The buoys would respond to the ship's radar signal, thus providing a range and bearing to their location. My recollection is that we spent most of our time rushing about chasing buoys that had gone adrift, repairing their radar transponders which would be blown if either ship got too close with its radar on, and recharging their battery packs and refurbishing them when they flooded. When time permitted, we also ran sparker seismic lines using the radar transponder buoys for positioning.

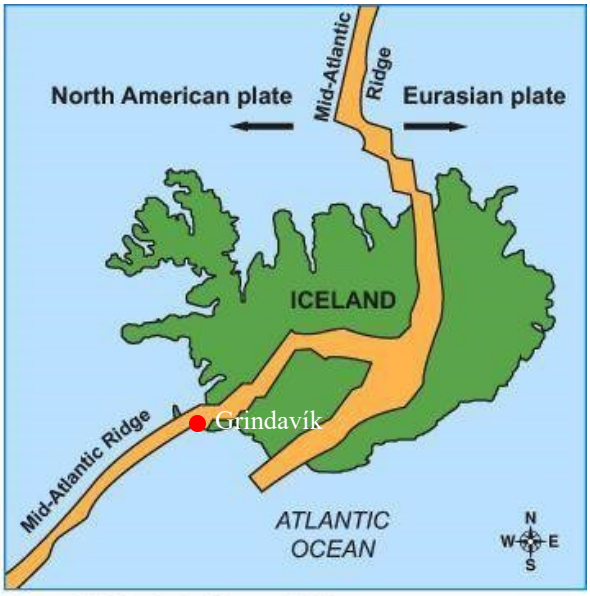
However, in spite of these problems, we did in fact shoot several refraction seismic lines and the recording buoys I helped develop while at Cambridge did in fact mostly work and recorded useful seismic data. Charlotte Keen was subsequently able to use this data set as a basis for her PhD thesis at Cambridge. In addition to her, other BIO luminaries obtained their PhD at Madingley Rise, Cambridge, including Reg Gilbert, Bosko Loncarevic, Clive Mason and Dick Haworth. Also, Mike Keen spent a sabbatical year there while a geology professor at Dalhousie University. Hence, there was a close connection in those days between BIO and the Department of Geodesy and Geophysics.

My intention is to follow up this personal recollection of my first MAR experience with a more objective attempt to document some of the scientific work done during this and several other cruises to the Ridge by BIO and our scientific partners that included the University of Cambridge, Dalhousie University, Memorial University and others. I will try to summarize some of the scientific results achieved, during this major and important oceanographic enterprise.

On the Mid Atlantic Ridge Today

Photo caption: Above: Aerial photo of fissure eruption south of Reykjavik, the capital of Iceland and north of the threatened town of Grindavík. Credit: Iceland Civil Protection.

The night of 24 October 2023 initiated a new period of volcanism on the Reykjanes peninsula with a swarm of over 1000 earthquakes. The earthquakes were followed by uplift at the Blue Lagoon and the Svartsengi geothermal power plant. The uplift was due to accumulating magma. On the evening of 18 December 2023 a volcanic eruption began north of Grindavík. After the eruption ground uplift continued. On 14 January 2024 a second eruption occurred, this time closer to the town of Grindavík. A third eruption started on 8 February 2024. This eruption generated a lave flow that crossed the main road to Grindavík and cut off the pipes that carried hot water to heat the homes in near by communities. The full story can be read at the website of the Iceland Meteorological Service. At https://en.vedur.is/about-imo/news/a-seismic-swarm-started-north-of-grindavik-last-night



Source: U.S. Geological Survey, 2014

The town of Grindavík is threatened by renewed volcanism on the Reykjanes peninsula. The schematic map shows where the Mid-Atlantic ridge meets Iceland.

At Þingvellir National Park, the Almannagjá gorge is part of the rift valley that is the divide between the North-American and Eurasian continental plates. The national park is also the site of the Alþingi, or Iceland's parliament, was founded there as early as 930, making it the oldest operating parliament globally. Photo: Andy Sherin

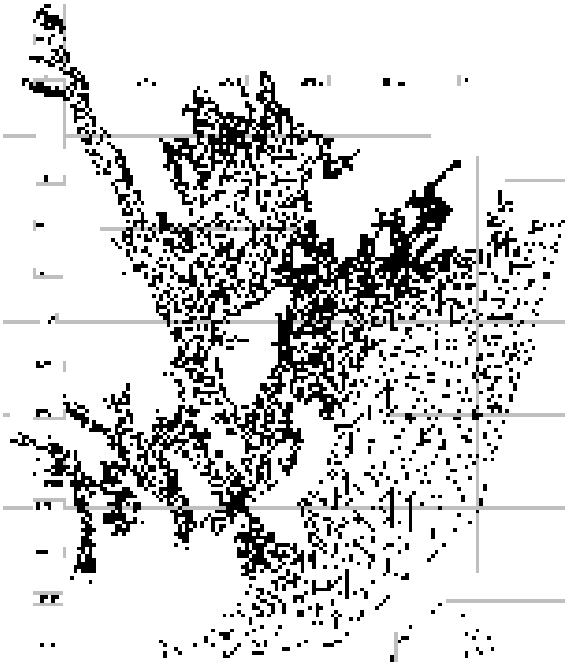
BIO Science Spotlight

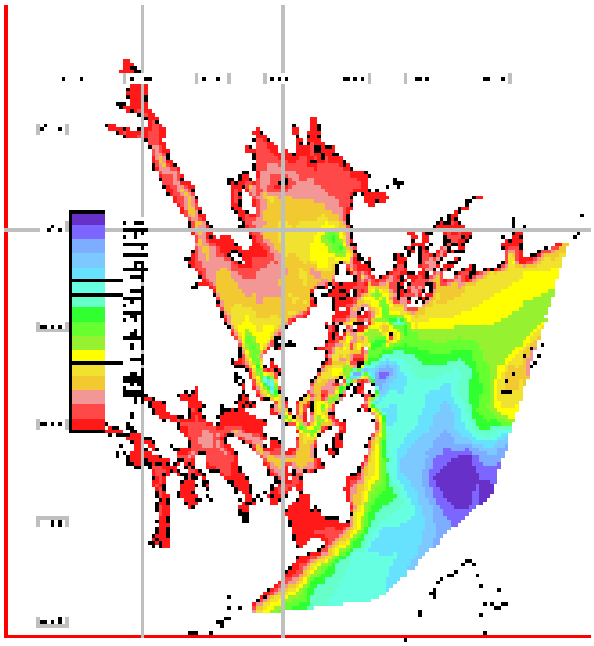
David Greenberg

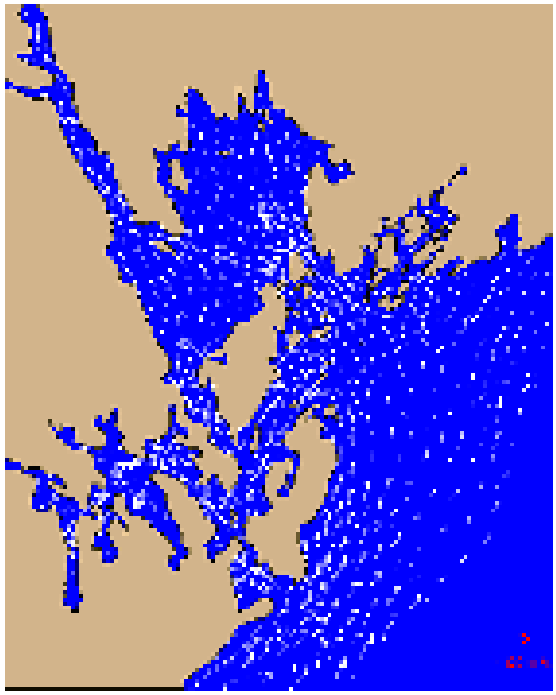
Numerical circulation models are being developed for selected coastal embayments to provide quantitative representations of local currents and sea levels, and to estimate dispersion rates of pollutants and other materials. The finite-element models used in Atlantic Shelf Circulation Modelling are being adapted to the complex geometry and varying shoreline of embayments, providing high local resolution while including portions of the offshore shelf.

Initial applications focussed on Halifax Harbour, examining the sea level response to the 1917 Halifax Explosion and the spatial structure of tidal currents in major shipping channels. Applications to Passamaquoddy Bay are being used in the assessment of aquaculture site suitability and productivity. Similar applications to Tracadie Bay (P.E.I.) are in progress.

https://www.bio.gc.ca/science/research-recherche/ocean/modelling-modelisation/coastalembayments-cotieresdesbaies/index-en.php







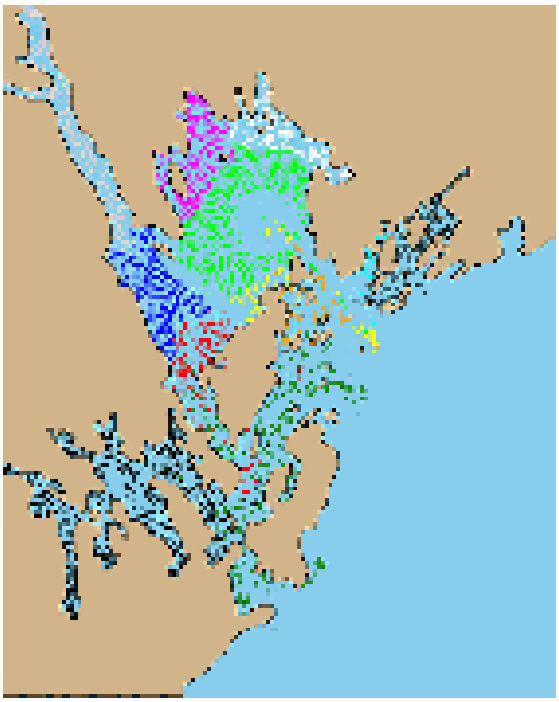


Figure captions: clockwise from top left: Mesh Image for Passamaquoddy Bay, Topographic Image, Static image of the Tidal Currents Animation, and Static image of the Tidal Dispersion Animation.

BIO Science Spotlight
Gavin Manson

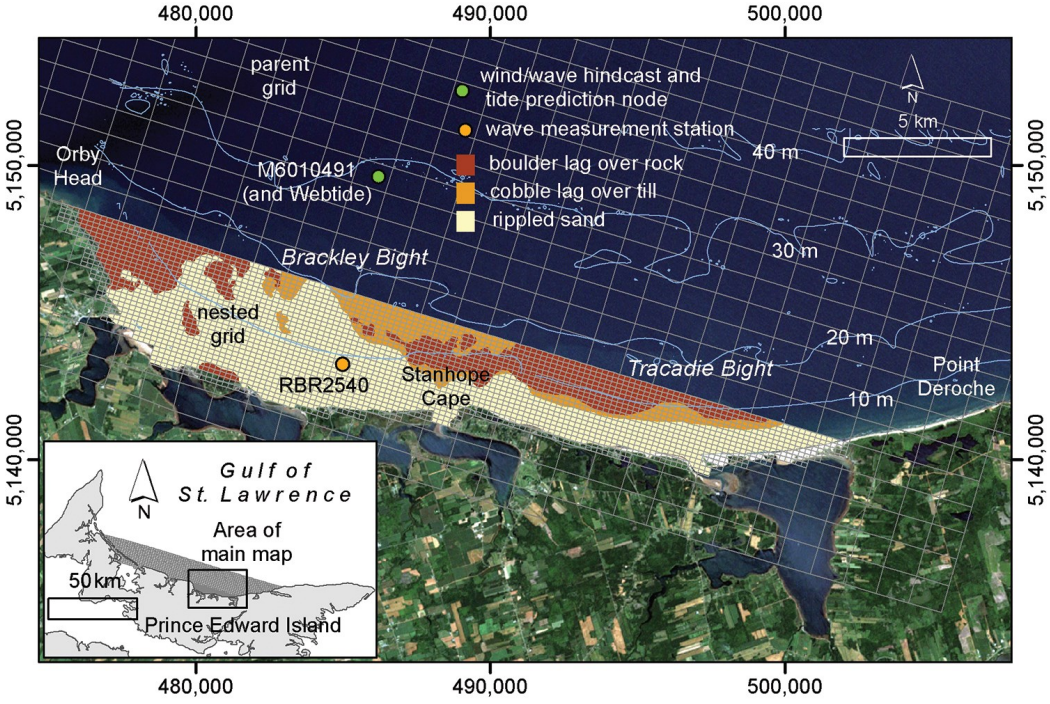
Nearshore sediment transport as influenced by changing sea ice, north shore of Prince Edward Island
https://doi.org/10.1139/cjes-2020-0150

Conclusions:

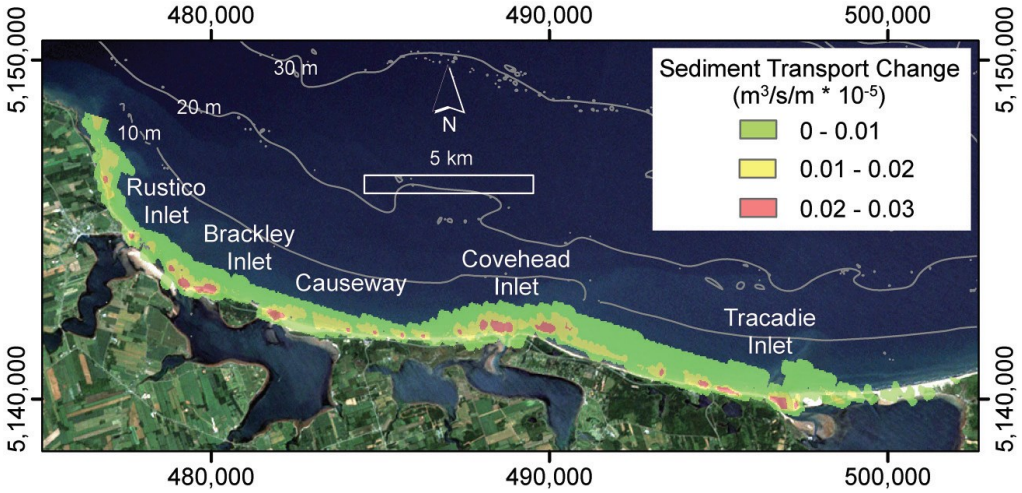
(1) Rates of sediment transport increase significantly as sea ice concentrations decrease from high to moderate, to low, and then to open water. Overall, as sea ice concentration decreases from high to open water conditions, nearshore sediment transport rates increase 180%.

(2) Much of the increase in sediment transport is over shoals adjacent to tidal inlets. These act as anchors for the formation of nearshore ice. When offshore ice concentrations are over a threshold of 30%, these anchors can accrete ice advected onshore in storms. Below this threshold, storm waves can break up nearshore ice and increase sediment transport.

(3)The Southern Gulf of Saint Lawrence is a mid-latitude basin with sea ice and erodible shorelines. Sea ice is decreasing and nearshore sediment transport is increasing, suggesting increasing rates of coastal change. Exactly how rates of nearshore sediment transport relate to coastal change remains uncertain, but a methodology to include sea ice in nearshore sediment transport modelling is developed here, proven, and can be transferred to other sensitive regions for adaptation planning.



The study area with maps of the parent and nested grids, stations, and sediments used in Delft3D modelling.



Difference in temporally averaged total sediment transport rate between high ice and open water concentrations. The greatest differences are near tidal inlets or former tidal inlets.

PRESIDENT'S MESSAGE Clive Mason's unexpected passing reminds us of the importance of getting together and we want to have more informal social events in the future to meet, connect, and socialize. The pandemic drove everyone underground for a long time and stole our momentum. We need to make an effort to re-engage and re-connect. After all, maintaining social connection was one of the main reasons for founding the Oceans Association. The 21 November event (see page1) was a wonderful opportunity for members to meet and catch up. Alistair MacDonald and I sang a few songs while attendees chatted, enjoying a lovely cake and other refreshments. If you have ideas about future social events, please share your ideas and send them to bio.oceans@gmail.com Charles Schafer, another recently departed member of our executive committee, was our outreach coordinator for many years. We will be looking to fill this and other important vacancies at our upcoming Annual General Meeting in May (we've yet to set the date). As we close the book on the first 25 years of the BIO Oceans Association and look forward to the next, I invite you to join the executive committee and contribute your energy and ideas to create a vision for an organization that remains vibrant and relevant to current and former BIO staff. Please consider what the BIO Oceans Association means to you and how you might help to shape its future. Whether you want to assist in planning social events or contribute in other roles on the executive committee, there's a part for you to play. Many hands make light work. And speaking of the AGM, the call for Beluga Award nominations is going out this week. If you have a candidate in mind, please send an email to Beluga Award chair Jenna Higgins (Jenna.Higgins@nrcan-rncan.gc.ca), briefly outlining why you think they deserve the award. The Beluga Award criteria can be found on the BIO OA website. I hope to see you at the AGM in May!

Patrick

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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