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Cobequid Highlands Project

The Cobequid Highlands Project rapidly approaches its conclusion. A public release of data will take place at the Prospectors and Developers of Canada (PDAC) 2018 convention in March. Over several years, this project near Warwick Mountain (see article on p. 6) has dominated the efforts of several DNR geologists, and has resulted in a package of data unlike any other. Included will be a detailed bedrock map, a large suite of bedrock samples with analyses by portable XRF, lab assays and litho-geochemistry, a new surficial geology map, a till geochemical survey with samples taken on a 1 km grid, and a high-density stream sediment (silt) geochemical dataset.

These data are part of a DNR initiative to conduct a geological mapping program across the recently discovered (2011) and underexplored belt of low-sulphidation epithermal gold potential in Carboniferous bimodal volcanic rocks of the Byers Brook and Diamond Brook formations. Following the data release, interested companies and explorationists will be invited to submit exploration proposals on the project area. A Call for Proposals for Exploration will be announced on 3 April 2018. Proposals will be accepted until 31 May 2018, with a review period by Geoscience and Mines Branch staff, concluding with announcement of the successful proposal by 3 July 2018. Proposals will be scored on the basis of the exploration plan and budget, the applicant's history with regulatory compliance, their corporate exploration expertise, and their plans for engagement with the local community.

All geoscience data associated with this project will be released on the DNR website, as well as on data sticks at PDAC at 10 am EST 5 March 2018. A brief presentation on the project will be given by Trevor MacHattie at the Nova Scotia Mining Breakfast on 6 March, and all three principal investigators (Trevor MacHattie, Denise Brushett, and Geoff Baldwin) will be on hand at the Nova Scotia Department of Natural Resources booth at the trade show.

Geoff Baldwin



DNR geologists Trevor MacHattie (group at left), Garth DeMont (group at centre), and Geoff Baldwin (group at right) talk about the Cobequid Highlands Project with community members at the Warwick Mountain Recreation Club (see article on p. 6).

Introducing the Mineral Resources Development Fund

The Government of Nova Scotia plans to create a Mineral Resources Development Fund (MRDF) in spring 2018, replacing the Nova Scotia Mineral Incentive Program (2012-2017). The MRDF will be designed to assist prospectors, exploration companies, and researchers in the search for new discoveries, to advance projects closer to production, and to attract investment into the province.

The new program will tentatively have seven funding streams for the 2018-2019 fiscal year:

1. Prospecting and Exploration Grants (tentative maximum of \$20K);
2. Shared Funding Exploration Grants (two tiers: tentatively \$20K-\$100K and \$20K-\$200K);
3. Marketing Grants;
4. Research Grants (tentative maximum of \$90K);
5. Education, Outreach, and Engagement Grants (tentative maximum of \$30K);
6. Innovation Grants (tentative maximum of \$200K); and
7. Major Project Grants (tentative maximum of \$500K).

An Advisory Council will be constituted by the Minister of Natural Resources in late February or March to include nominees from geoscience, mining industry and prospectors associations; academia; and a Minister's nominee. The Advisory Council will provide strategic advice, guidance, and recommendations to the Executive Director of DNR's Geoscience and Mines Branch regarding the structure, effectiveness, and the continuing and future administration of the MRDF. Applications and proposals for funding will be reviewed by a committee of DNR geoscientists, with support from subject matter experts as required. For more information please contact the author.

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Cliffs of Fundy Aspiring Geopark Gathers Steam

In just two years since the possibility of a Global Geopark for Nova Scotia was broached to the Cumberland Geological Society, the aspiring Cliffs of Fundy Geopark is moving full speed toward its submission to the Canadian National Committee for Geoparks and the Canadian Commission for UNESCO. Funding is provided through support of the municipalities of Cumberland and Colchester, the Nova Scotia Department of Communities, Culture and Heritage, and the Atlantic Canada Opportunities Agency. Project co-ordinator Marlee Leslie, a resident of Bass River, was hired in January to shepherd the process along. Only two candidate geoparks can be submitted by Canada in a given calendar year, and the Cliffs of Fundy hopes to be one of those. If so, official UNESCO Global Geopark status could be bestowed on this spectacular geological region as early as 2020.

Following consultation with communities from Advocate to Bass River, the boundaries of the aspiring geopark have been proposed to extend from the Portapique River in the east to Cape Chignecto in the west, reaching north to Apple River and to the drainage divide of the Cobequid Highlands. In essence a geotourism brand, geopark status carries no land-use restrictions, but has been shown in other countries to have strong potential to grow sustainable rural economic development. For more information on the aspiring geopark, please visit the website <http://fundygeopark.ca>

John Calder



*Project Co-ordinator
Marlee Leslie.*

Mining Consultation Table

Representatives of DNR, Nova Scotia Environment (NSE) and the Office of Aboriginal Affairs (OAA) meet with representatives of the Kwikw'kw Mawklusuagn Negotiation Office (KMKNO) on a regular basis to exchange information and to discuss topics related to mining activity in the province. Pictured here, at a meeting on January 11, 2018, are (L to R) Bernard Matlock, Engineer, NSE; Brian Fisher, Director, Geological Services, DNR; Melissa Nevin, Consultation Researcher, KMKNO; Julie Towers, Deputy Minister, DNR; Donald James, Executive Director, Geoscience and Mines, DNR; Chief Terrance Paul, Mining Lead, Assembly of Nova Scotia Mi'kmaq Chiefs; Twila Gaudet, Consultation Liaison, KMKNO; Beata Dera, Director of Consultation, OAA; David Mitchell, Consultation Advisor, OAA; and (back to the camera) Priscilla Beadle, Working Group Administrator, KMKNO. Also attending the meeting were Lynn Bowen, Director, Policy, Planning and Environmental Assessment, NSE; Helen MacPhail, Supervisor EA Branch, NSE; and Patrick Whiteway, Manager, Mineral Development and Policy, DNR.

Patrick Whiteway



Mining One Window Standing Committee

Responsible authorities from six federal and provincial government departments meet monthly to communicate regulatory activities in their departments related to mineral exploration and mine development in Nova Scotia. The intent is to improve the efficiency and co-ordination of the approvals process, reduce unnecessary overlaps, and to share information. This ensures that relevant issues related to mineral development are addressed by appropriate specialists in a timely matter. The Mining One Window process has been in place since 1996. Pictured below are the members of the Mining One Window Standing Committee.



Front row (L to R): Amy Tizzard, Regional Geologist, DNR; David Mitchell, Consultation Advisor, Office of Aboriginal Affairs; Patrick Whiteway, Chair, Manager of Mineral Development and Policy, DNR. Back row (L to R): George MacPherson, Director of Mineral Management, DNR; John MacNeil, Registrar of Mineral and Petroleum Titles, DNR; Candace Quinn, Environmental Assessment Officer, Nova Scotia Environment; Lachlan MacLean, Canadian Environmental Assessment Agency; and Tom Lamb, Mining Engineer, DNR.

Patrick Whiteway

Gone Fishing

When the chance came to go back to the sea, fishing the waters around his childhood home of East Ironbound Island, Phil Finck didn't take more than a day to make up his mind. We in the Geoscience and Mines Branch were all surprised by Phil's quick exit, but in hindsight, none of us is really shocked. How can you grow up on an island, where fishing and boats were the biggest part of your life, and not want to return? When the offer came to go lobster fishing, Phil did just that.

Phil's work with DNR spanned 33 years, lately nudging him closer to those roots on Ironbound as he provided sage advice to government and to everyday people on how best to cope with the ravages of coastal erosion and rising seas. Even before his work on coastal geology, Phil focused on the practical: industrial minerals and kaolin deposits, surficial geology, till geochemistry, and geohazards. He began his career at DNR working with Ralph Stea to map the surficial geology of the province. With such practical knowledge and witticisms like "Who knows the mind of a squid"? Phil's position may soon be filled, but never his individuality. Fair winds and following seas, Phil, and long may your big jib draw.

John Calder



Phil Finck on his father's boat in New Harbour, at the tip of the Aspotogan Peninsula and close to East Ironbound Island.

Atlantic Geoscience Society Colloquium 2018

The 44th Colloquium and Annual General Meeting of the Atlantic Geoscience Society (AGS) were held at the Holiday Inn, Truro, on February 2 and 3, 2018. Organizers Rob Raeside and Chris White, helped by numerous student volunteers, facilitated an excellent meeting. Over 200 registered participants enjoyed a full and diverse program pushing the boundaries of geoscience in all its branches. As usual, the event was well attended by DNR employees (both former and current) who also contributed to several of the sessions.

The event began on Friday morning with two well attended, day-long workshops: (1) *Your Career and Public Reporting - A QP short course for students (and others)* by Amy Tizzard and sponsored by Geoscientists Nova Scotia and (2) *Subsurface Methods - How to use and interpret drill-hole data and other subsurface data for both industry and academia* by Robin Adair, outgoing president of the AGS. For those not attending a workshop, the afternoon was filled with meetings pertaining to AGS business. Poster displays started late Friday afternoon and remained available to view until late Saturday afternoon. Three concurrent sessions ran Friday evening: (1) Rocks, maps, and tectonic models; (2) advances in assessing arctic geohazards; and (3) a general session on igneous rocks, mineralogy, and mineral deposits.

Saturday's events started with concurrent sessions including *records of environmental change from the Atlantic Provinces and beyond; basin-forming processes during supercontinent assembly: new insights from the Devonian-Permian record of Atlantic Canada; the Meguma Terrane: its place in the Appalachian Orogen and beyond; paleontology and sedimentology in the Maritimes and beyond; AGS outreach innovations: past, present and future; methane emissions from legacy fossil fuel sites in the Maritimes; petroleum geoscience on the Atlantic Margin; and a general session on techniques in earth science.*

Saturday evening featured the Awards Banquet, where several prestigious AGS awards were presented in recognition of worthy student presentations and professional accomplishments.

The **Rob Raeside Award** for best undergraduate student poster went to Taylor Ducharme (University of Ottawa) and his co-authors David Schneider and Mark Coleman.

The **Graham Williams Award** for best graduate student poster went to Steven Rossiter (University of New Brunswick) and his co-author Bruce Broster.

The **Rupert MacNeill Award** for best undergraduate student oral presentation was split between two top talks: Max Chipman (Acadia University) and his co-authors Melissa Grey and Peir Pufahl, and Kate Woods (Dalhousie University) and her co-author James Brenan.

The **Sandra Barr Award** for best graduate student oral presentation went to Matthew Stimson (St. Mary's University) and his co-authors Andrew MacRae, Randy Miller, Steve Hinds, Nicholas Minter, and Zabrina Prescott.

The **Nelly Koziel Award** was launched this year, given to a person who has recently made a significant contribution to geoscience in the Atlantic Provinces, beyond the call of duty. Nelly was treasurer of the AGS, and long-term administrative assistant at the Geological Survey of Canada (Atlantic) and AGS volunteer who staffed the sales table at colloquia, as well as the Nova Scotia Gem and Mineral Show and many other events. The inaugural award was made to Nikole Bingham-Koslowski of the Geological Survey of Canada (Atlantic), who assumed the role of AGS treasurer following Nelly's death last year.

The **Distinguished Scientist Award - Gesner Medal**, given to a person who has developed and promoted the advancement of geoscience in the Atlantic Region in

any field of geology, was awarded to Reginald Wilson (retired from the New Brunswick Geological Surveys Branch).

After the awards, guest speaker Dr. Deanne van Rooyen (Cape Breton University) gave an entertaining talk entitled "Folds, furs, and flies: adventures in northern research" about her exploits in northern Labrador. This was followed by the annual AGS Kitchen Party and open mic, showcasing the instrumental and voice talents of several members of the Mud Creek Boys and other AGS members.

As usual, the AGS Colloquium and Annual General Meeting was a great success in raising the spirit of open communication and the exchange of ideas through both formal and informal discussions. All this could not be possible without the generous contribution from the society's sponsors and partners: Nova Scotia Department of Natural Resources, Nova Scotia Department of Energy, Atlantic Gold Corporation, Nova Scotia Geoscientists, Geological Association of Canada, New Brunswick Department of Energy and Resource Development, and Acadia University. Thanks to the organizers, volunteers and all of the participants for an outstanding weekend.

Chris White and Rob Raeside



Winners of student awards at the 2018 AGS Colloquium (left to right): Matthew Stimson (St. Mary's University); Kate Woods (Dalhousie University); Max Chipman (Acadia University); Taylor Ducharme (University of Ottawa); and Steven Rossiter (University of New Brunswick).

From the Mineral Inventory Files

The Pearl Lake Sn-Zn-Cu-In Prospect and its Magnetic Personality

In 1977, the first year of Nova Scotia's tin (Sn) exploration boom, a consortium of Kerr Addison Mines Ltd., Esso Minerals Canada, and Dome Exploration acquired a large claim holding in southwest Nova Scotia. The consortium contracted an airborne magnetic survey, which turned up dozens of targets. Contractor Geoterrex highlighted one anomaly above all and reported: *"The best prospect in the survey is considered to be S-18, an isolated, fairly deep looking conductor near Pearl Lake. We think this zone has excellent potential and we recommend it on a high priority basis."* Kerr Addison tested the anomaly with trenching and three diamond-drill holes, which revealed many 0.5-3 m thick sulphide-rich zones.

The Pearl Lake property is underlain entirely by metasilstone and metawacke of the Cambro-Ordovician Goldenville Group, the lower unit of the Meguma Supergroup. About 1.5 km to the southeast is the Davis Lake Pluton, a highly evolved, late stage plutonic centre of the Devonian-Carboniferous South Mountain Batholith (SMB). The SMB is host to numerous Sn-W and related element occurrences, as well as the greisen-hosted, East Kemptville Sn-Cu-Zn-Ag deposit and former mine (see *Minerals Update*, v. 29, no. 4).

In 1978, Kerr Addison asked Dr. A. K. Chatterjee of the Department of Mines and Energy to examine the company's Pearl Lake drill core. He reported the widespread presence of cassiterite in the polysulphide veinlets. Esso Minerals soon took over as the joint venture's explorer of the property and continued exploration until 1983. A till geochemical survey was carried out as well as 17 additional diamond-drill holes (Fig. 1). By the end of 1982, an area 750x165 m had been defined, within which numerous zones up to 3 m thick of massive chlorite and/or silica alteration occur. These alteration zones commonly contain veinlets of chlorite-sulphides \pm quartz, with most veinlets 0.1-0.5 cm thick, although some reach up to 5 cm. The most abundant sulphide present is

pyrrhotite with lesser pyrite, chalcopyrite, sphalerite and arsenopyrite. Cassiterite is also common. Typical grades are 0.1-0.5% Sn (up to 2.1%). Fewer samples were analyzed for Zn and Cu, but the limited data collected suggest grades of Zn in the 0.1-0.5% range, up to 5%. Levels of Cu are typically in the 0.1-0.2% range. The widespread presence of pyrrhotite is thought to be the source of the well developed magnetic anomaly at Pearl Lake.

In 1982 Dr. Chatterjee determined that Zn-rich zones within the alteration at Pearl Lake also contained elevated levels of In. This would normally have been a significant finding with important exploration implications for Pearl Lake, and the many other granite- and metasediment-hosted Sn deposits of the Southwest Nova Scotia Tin Domain (*The Geological Record*, v. 3, no. 3). The finding faded into obscurity, however, and by 1984 Esso Minerals Canada decided to abandon all their Sn holdings, including Pearl Lake. Likewise, the 1985 collapse of the global Sn cartel and a

three-fold drop in the global Sn price essentially ended all Sn exploration in the province.

Recent years have seen a rise in the price of strategic commodities like Sn and W, and a more promising outlook. In addition, the 'Green Economy' and its need for commodities like In, Ta and other rare metals is resulting in renewed interest in the deposits of Nova Scotia's Tin Domain. Avalon Advanced Materials Inc. is currently evaluating the feasibility of exploiting the remaining Sn-Zn-Cu-Ag resource at East Kemptville, in part due to its content of In. Alpha Resources Inc., current mineral rights holder of Pearl Lake, has determined Zn-rich zones there contain In up to 68 ppm.

The 1980s Esso exploration only tested the northern flank of the prospect's strong magnetic anomaly (Fig. 1). The deposit remains open along strike to the northeast, southwest and, most importantly, the south. Clearly, there's more to be done.

G. A. O'Reilly

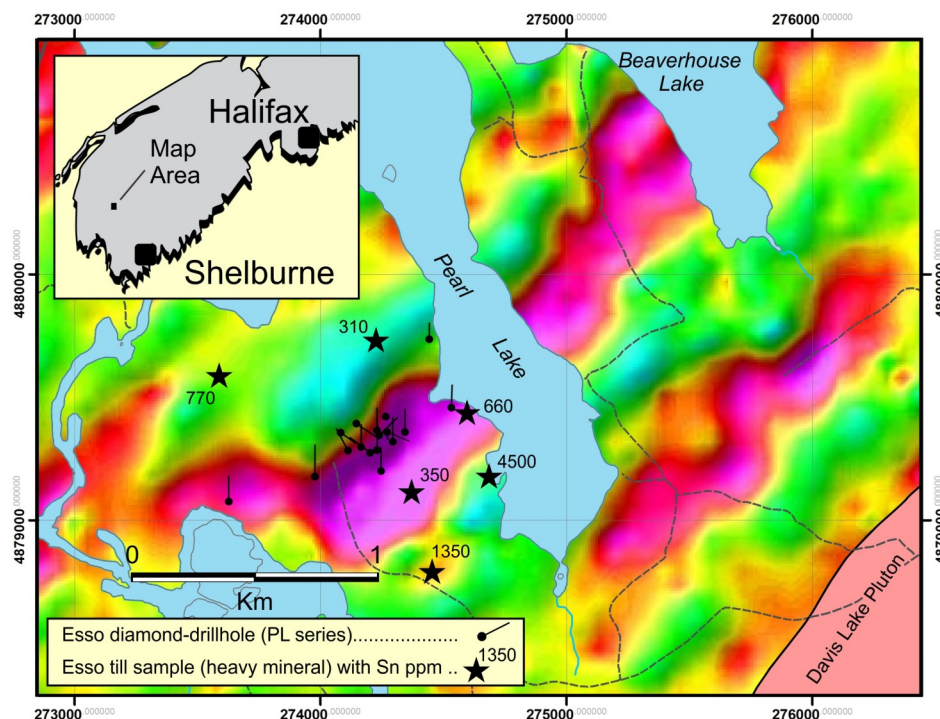


Figure 1. The Pearl Lake Sn-Zn-Cu-In prospect, showing second derivative aeromagnetic anomalies, Esso Minerals Canada diamond-drill holes, and till samples.

Warwick Mountain Community Open House

In 2011, geologists working on the Cobequid Highlands Project identified the potential for epithermal-style gold mineralization in the Warwick Mountain area of the northeast Cobequid Highlands (see article on p. 1). Geochemical surveys showed the area with highest exploration potential is in the headwater streams feeding into French River. This river is the source of fresh water for the Village of Tatamagouche, and its water supply covers the area identified as high potential by the geochemical surveys. The author contacted the Tatamagouche Water Utility in April 2016 and arranged to give a presentation on the project to the Water Supply Committee. The presentation was made in May 2016.

The author has attended all the Water Supply Committee meetings since that date to keep the committee up to date on project activities. The committee suggested that DNR hold a community meeting in the water supply area to provide the residents with information on DNR's investigations in the Warwick Mountain area.

The meeting was advertised in the *Tatamagouche Light* and through posters displayed in the Tatamagouche area by the local councilor, and in the area's DNR offices. The Open House was held in the Warwick Mountain Recreation Club. Four posters discussing various aspects of the project were staffed by the project geologists, and Brian Fisher, newly appointed Director of Geological Services (see *Geological Record*, v. 4, no. 4) also attended to assist staff with answering community questions. The event was well attended. Community residents asked many questions and staff did their best to answer them. The Municipality of Colchester County was well represented at the event by the Mayor, Deputy Mayor and local councilor, who assisted DNR staff in answering resident's questions.

Garth DeMont



Geologist Trevor MacHattie discusses the geology of the Warwick Mountain area with local residents at the Warwick Mountain Recreation Club.

Special Note

E-mail Notification

If you would like to receive an e-mail notice (with hot links) when new maps, digital products and publications are released, or when a new issue of *The Geological Record* is released, please send your e-mail address to DNR.Library.List@novascotia.ca

Dates to Remember

March 4-7, 2018

Prospectors and Developers Association of Canada (PDAC) 2018 Convention, Metro Toronto Convention Centre, Toronto, ON. For more information please visit the web site: <http://pdac.ca/convention>

May 6-9, 2018

Canadian Institute of Mining (CIM) Convention, Vancouver Convention Centre, Vancouver, BC. For more information please visit the web site <https://convention.cim.org/>

June 14-15, 2018

Mining Society of Nova Scotia Annual General Meeting and Conference, Keltic Lodge, Ingonish, Nova Scotia.

June 16-21, 2018

Resources for Future Generations (RFG) 2018, a premier conference on energy, minerals, water and the Earth, Vancouver Convention Centre, Vancouver, BC. For more information, please visit the web site: rfg2018.org

November 4-6, 2018

New Brunswick Exploration, Mining, and Petroleum Conference, Fredericton Convention Centre, Fredericton, NB. For more information please visit the web site http://www2.gnb.ca/content/gnb/en/departments/erd/energy/content/conference/Conf_home.html