

Nova Scotia

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NOVA SCOTIA
Natural Resources

Inverness to Host First Atlantic Stone Carving Symposium

This summer, eight Canadian artists will participate in the first stone carving symposium in Atlantic Canada. Over a two week period from August 28th to September 10th, the public will have a chance to look over the shoulders of artists while they create unique sculptures out of Canadian marble. All artists will carve marble that has been extracted from a new quarry on Cape Breton Island owned by MacLeod Resources. The company markets a variety of intensely coloured and richly veined marble that is being exported as far as Italy, where it competes with the world's finest marble.

Visitors to the event can witness the development of a stone sculpture from start to finish. The carvers will be set up in a beautiful location in Inverness, adjacent to the new building of the Inverness County Centre for the Arts, overlooking the ocean and just an hour's drive from the quarry.

Stone carving symposia originated in 1959 in Austria. Since then they have become important cultural events in Europe and Asia and are established as re-occurring showcases for contemporary art in connection with specific local resources. Symposia in locations like Carrara, Italy, the Mecca of stone sculpture, attract thousands of visitors and are prestigious events for the invited artists.



Photo of the MacLeod Resources quarry near River Denys, Inverness County.

Vanessa Paschakarnis, artist and Professor of Sculpture at Southern Methodist University's Meadows School of the Arts in Dallas, TX, is the organizer of this event. She grew up in Germany and after immigrating to Atlantic Canada she started to spend months at a time in Italy to devote her time to carving stone. After visiting the MacLeod Quarry in River Denys in its beginning stages she convinced Christopher Trider, President and founder, to host a symposium with his beautiful stone right there – in Cape Breton.

For two years a group of dedicated people connected to the Inverness County Centre for the Arts, the Cape Breton Centre for Craft and Design, the Municipality of the County of Inver-



ness, Strait-Highlands Regional Development Agency, Nova Scotia Tourism, Culture and Heritage, the Nova Scotia Department of Natural Resources, the Office of Economic Development and

Enterprise Cape Breton Corporation have been working to realize an event that will help root this long tradition of stone sculpture symposia on Canadian soil. This will be the first event of its kind in Atlantic Canada, and one of very few such events in North America.

The finished sculptures will be exhibited at the new Inverness County Centre for the Arts in Inverness and will then travel for the period of one year to the main sponsors of the event. They will be available for sale afterwards. Make a plan to visit Inverness in the late summer. Don't miss this opportunity to see one of Nova Scotia's mineral resources turned into beautiful works of art!

Mike MacDonald

Fundy Geological Museum Greet 250,000th Visitor

On 2 July 2005, the Fundy Geological Museum in Parrsboro, Cumberland County, welcomed its 250,000th visitor. This is the museum's twelfth year of operation and the 2005 summer season is showing promise to be busier than usual.

After a lull in the Elderhostel "Geological Safari" over the past two summers, the program has thrived this year. Twenty-seven participants attended the June session, starting in Halifax and traveling to a number of local attractions and geological sections throughout northwestern Nova Scotia. A similar trip for early September is fully enrolled already. The Elderhostel program helps the museum develop regional partnerships.

Staff members and volunteers are currently preparing for the 40th Anniversary of the Nova Scotia Gem and Mineral Show, formerly known as the Rockhound Roundup, from August 19-21. This year the event is dedicated to Marilyn Smith, who passed away in November 2004. Marilyn helped coordinate the Gem and Mineral Show during its early years and, as museum Education Officer, fostered its growth over the last twelve years. This year's event will feature demonstrations, ex-

hibits, talks, guided walks and workshops, as well as the commercial exhibits of minerals, gems, fossils and lapidary supplies. This event is fun and educational for the whole family.

The preparation of fossil material collected during "Prosauropod Dinosaur Dig 2004" will continue throughout the summer. Financial assistance for the dig was obtained from Heritage Canada, through the Young Canada Works in Heritage Institutions program. Human Resources and Skills Development Canada provided funding for three students to assist Lab Manager Kathy Goodwin in the paleontology work. For more information on "Project Prosauropod" access the project's web site (<http://www.museum.gov.ns.ca/fgm/lab/lab.html>).

Another popular program this summer is the series of Fundy Geological Museum Curatorial Field Trips. This series of interpretive walks in July and August will help you discover the area's rich geological and natural history. The tours generally depart from the museum and last from three to six hours. The Parrsboro area has an exceptional number of features related to glaciation, Acadian dykes, wetlands and tidal marshes, bedrock exposures

and mineral occurrences. Some of the walks include:

- Five Islands Provincial Park, August 27. Cliffs at the park tell a story of Triassic sand dunes and Jurassic lava flows during the age of the dinosaurs.
- Red Rocks - McGahey Brook, August 28. The Cobequid-Chedabucto Fault Zone, which extends across Nova Scotia (see article on page 3), marks the collision of the ancient North America with an ancient African continent 400 million years ago. The spectacular folds and faults exposed along the shore between Red Rocks and McGahey Brook, in Cape Chignecto Provincial Park, record the birth of the super continent Pangea.

The new *Geological Highway Map of the Province of Nova Scotia* is an invaluable resource, and a "must-buy" for many museum visitors. With 250,000 visitors through the doors, the museum has provided geological information to the public, as well as research and curatorial programs for professionals. For more information on the Fundy Geological Museum and its programs, please access the museum's website (<http://fundygeo.museum.gov.ns.ca>) or call 1-866-865-DINO.

Ken Adams, Museum Director

Scenes of Geological Interest

The Cobequid Fault at Parrsboro, Nova Scotia



The Cobequid Fault, shown above, is a major topographic expression in the western part of northern Nova Scotia as well as an important geological boundary. The image was taken north of Parrsboro at Kirkhill above Highway 209 to Advocate Harbour. Greville Bay, with its excellent exposures of the fault, is visible at the upper left.

A pronounced scarp marks the linear trace of the fault because the rocks on either side have different susceptibilities to weathering. The harder rocks, which are also older, lie to the north of the fault (to the right of the scarp on the image). Rocks to the north are interpreted to belong to the Early Carboniferous Horton Group. Those to the south are younger and are Late Carboniferous in age.

It may be hard to imagine that this fault scarp represents much more than

a local zone of movement, but the Cobequid Fault is an important structure with two branches, which have greatly influenced Nova Scotia's geological history. The east-west branch joins the Chedabucto Fault in the vicinity of Lansdowne (Pictou County). From there the Chedabucto Fault can be traced eastward past Canso to the edge of the continental shelf. The other branch goes northeastward from the Mount Thom area to form the northern boundary of the Stellarton Basin where significant amounts of coal have been mined. The east-west fault system is called the Cobequid-Chedabucto Fault Zone (CCFZ). Movement on the CCFZ is certainly more than 1000 km between 440 and 60 million years ago. There appears to have been little movement after 60 million years ago. During the period of 200 to perhaps 180 million

years ago the CCFZ became one of the rifts that began to widen, splitting up the super-continent Pangea. The rift stopped opening and, therefore, southern Nova Scotia is still attached without an ocean between it and northern Nova Scotia.

Knowing the significance of the Cobequid Fault is a matter of scale. Understanding small areas on either side of the CCFZ did not allow geologists to appreciate the importance of this boundary. Only when large scale differences were defined, such as fossil realms and the mineralogy of granites, did the importance of the fault become known. Now we know that the Cobequid Fault is only a small part of the major east-west boundary between the Avalon Terrane to the north and Meguma Terrane to the south.

Continued on page 6

Prospectors Examine Marble and Skarn in Cape Breton

The Nova Scotia Prospectors Association (NSPA) 2005 Field Trip began on Friday night, June 24. Thirty prospectors gathered for the trip. After meeting at the Skye Lodge in Port Hastings, the group walked to a mineral occurrence close to a contact at the base of the Windsor Group on MacKeen Point, where impressive hydrothermal mineralization in the range of 2 to 3% zinc is displayed in the underlying Horton Group. Coarse calcite and barite occur in tension gashes in the Windsor Group rocks at this site.

The next morning shone bright and began with discussions about industrial minerals, the core of the mining industry in this province. The prospectors began Saturday looking at a building stone candidate (Diogenes Brook Marble) and a bulk lime target on River Denys Mountain, and discussed the exploration taking place around them today. The Diogenes Cave was the last stop in the Glendale area, where members were invited to see the stream disappear into the mountain, then reappear 200 m away. Then it was on to Kennedy Brook and the MacLeod Resources marble operation there. This impressive stop featured a discussion of the Precambrian genesis of the marble, the wire-line cutting operations in the pit, and the cutting and polishing routines at the mill.

The next stop was Eden, where the federal-provincial Targeted Geoscience Initiative (Phase 1 and follow-up work) is credited with the discovery of a new source of pure clay in massive quantity. Our final stop of the day was at Marble Mountain, where members were treated to a short historical lecture in the pit and where, after collecting a few choice samples, several members took the opportunity to swim in the beautiful Bras D'Or Lakes at Marble Mountain Beach to escape the 30°C heat.

Sunday's weather was just as hot as the day before, and the field trip participants began with a brief stop at the Sydney Tar Ponds and a discussion of the remediation plan and the potential use of the clay seen at Eden the day before. Next came a visit to the former steel production site, and an in-depth look at the limy slag deposits formed in Sydney Harbour. Just 'slag' you might think, but Dan Hemming of the Sysco Slag Division pointed out many unique properties of this material. The hardness for building backfill, porosity for the manufacture of high R-factor cement, permeability and alkaline nature of this remarkable material all became apparent at this stop.

In contrast to the stops in Sydney, most of Sunday's stops were more of the hard-rock mineralization variety, consisting mainly of skarns, which are silicate rocks produced through metasomatic replacement of limy carbonates in a contact metamorphic aureole. They are, therefore, usually found in altered limestone close to igneous contacts (volcanic or plutonic rocks), fairly common in the Boisdale Hills. Prospectors learned about skarn mineralogies, how they are usually dominated by garnet and pyroxene, and how mineralogy is the key to recognizing skarns. They were also coached on understanding how the reaction formed within a skarn often produces well developed gossans, which are usually involved in discoveries of skarn-related mineralization at the prospecting stage. After a brief discussion of skarn environments it was off to the Scotch Lake quarry, a spectacular exposure of beautiful altered marble 100 m long by 50 m high.

Gossans once again became the order of the day and were observed at Barachois, where the participants also collected magnetite specimens from a former mine site. Between Barachois and Frenchvale, the Rifle Range and Krumrine base metal quarries held

great interest for mineralization, exploration history and fabulous gossan development in Precambrian skarns. The final stop of the field trip was at Frenchvale, where a new occurrence of corundum has created great interest on the part of many Nova Scotia prospectors. The corundum is easily found in the pit, as long as you know just where to look, and what to look for. Everyone went home happy and with a heavy pack, and all agreed that NSPA Field Trip 2005 was a great success.

Ron Mills



Prospectors scale the falls at River Denys while examining karst features near the Diogenese Brook Cave. Karst topography is found mainly on limestone and gypsum, primarily by dissolution. The topography is characterized by sinkholes, caves and underground drainage.

From the Mineral Inventory Files

The New Ross Manganese Mines: Square Peg in a Round Hole

A few years ago I did some work at the New Ross Manganese Mines, north of New Ross, Lunenburg County (Fig. 1). From a global perspective, manganese (Mn) deposits are almost always confined to sedimentary rocks and formed by near-surface sedimentary processes that are intrinsic to the formation of their host rocks. My attempt to fit what I was finding at New Ross into existing genetic models for Mn deposits was like ramming a square peg into a round hole. You see, the New Ross deposits occur in granites of the South Mountain Batholith, as lenses and pods of the Mn-oxides pyrolusite, manganite and psilomelane in northeast-trending fault zones. They are rare among Mn deposits: New Ross and the Romanèche Mn deposit in the Massif Centrale of France are the only locations in the world where I have been able to find that Mn deposits occur in granite in mineable proportions. In fact, the New Ross deposits are still the deepest and most extensive underground Mn mines in Canada.

Discovered in 1891, manganese was mined at two sites, 3 km apart (Fig. 1). The Cain and Riddle mine opened in the late 1890s and produced from two shafts 60 and 30 m deep. The Dean and Chapter mine opened in 1907 and produced predominantly from three shafts 70, 51 and 51 m deep. Both mines closed in 1921, but the Dean and Chapter mine operated again from 1929 to 1936. A total production figure for both mines of 3,000 tons of 50-60% Mn is considered a minimum given that production figures prior to 1918 were sketchy, at best, as it wasn't until that year that Mn was formally declared a mineral under the *Mines Act*.

Diamond-drilling with some 1940s and 50s exploration programs substantially extended the mineralized zones along strike at both mines. An estimate of 15,000 tons of probable and 41,000 tons of possible high purity Mn-oxide was also made. In 1958, Marpic Explorations Limited sank a 54 m deep shaft

on two pyrolusite veins northeast of the Cain shaft and underground diamond-drilling confirmed Mn-oxide to 104 m depth (Fig. 1).

In 1985 the Department of Mines and Energy drilled three diamond-drill holes of 123, 220 and 452 m depth below the Dean and Chapter workings to examine the 'roots' of the mineralized zone. The drill core showed that intense argillic and hematite alteration typically associated with the Mn mineralization extends to great depth and grades into higher temperature alteration facies such as mica-episyenite, silicification and albitization. In addition, a leucogranite intrusion was encountered at depth which is believed to have played either a direct (fluid and metal input) or indirect (heat for fluid convection) role in formation of the Mn deposits.

The New Ross deposits, being

hosted in fault zones within granite and associated with low- to high-temperature alteration, are clearly not classic 'sedimentary Mn deposits'. The late-stage leucogranites acted as a source of magmatic fluids and heat to run a convective hydrothermal system. Magmatically derived fluids, escaping from the late-stage granites, migrated out through the carapace of previously crystallized granite along fault zones. Alteration of the previously crystallized granite carapace released, among other elements, large amounts of Fe, Mn, Si, P and F. The fluids met and mixed with deep formational waters and, eventually, with highly oxidized, near-surface, meteoric waters. This resulted in massive dumping of Fe and Mn in the form of Fe- and Mn-oxides within the fault zones. Now the peg is rounded and fits quite nicely.

G. A. O'Reilly

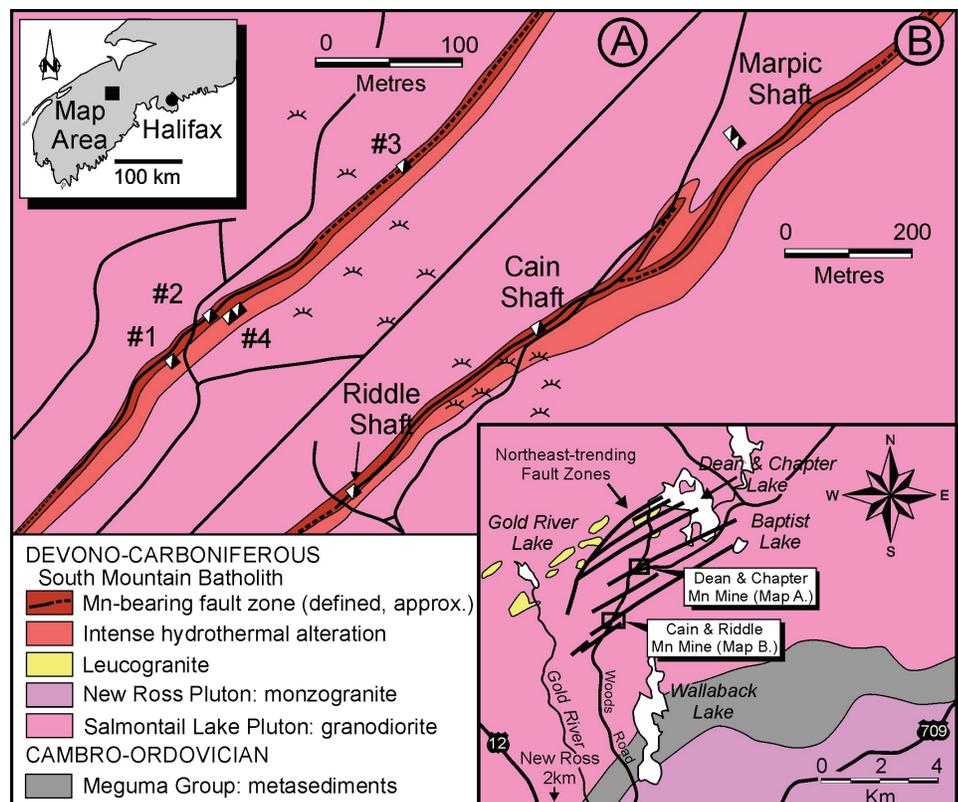


Figure 1. Geology of the former New Ross manganese mines, Lunenburg County. Inset shows the geology of the central region of the South Mountain Batholith.

Cobequid Fault

Continued from page 3

Another matter of scale surfaces as we contemplate the mineral deposits that are scattered along the fault. Immediately off the image to the east is a barite showing that was drilled during the 1970s. Farther eastward is another barite deposit at Bass River that was mined in the 1980s by Dresser Minerals. Magnetite deposits at Bass River with interesting cobalt levels (see *Nova Scotia Minerals Update* v. 19, no. 1 and v. 18, no. 4) are found in the fault zone. Farther east is the former Londonderry Iron District, the Mount Thom Cu-Co-Au deposit, Cu-Fe showings in the Lansdowne region, Copper Lake Cu-Co deposit, and many other showings and deposits. All of these deposits occur next to a fault and, therefore, suggest a connection to the CCFZ. Taken as a group these occurrences strongly suggest an IOCG (iron oxide-copper-gold) association. Looking at one occurrence does not give the scale of mineralization.

Lastly, the image shows a level surface south (left) of the fault. This feature is an outwash plain produced during the last stages of de-glaciation about 12,000 years ago. As the glacier melted, but didn't advance, large amounts of mud, sand and gravel were deposited as a delta into the salt water of the early Minas Basin. As more of the glacier melted, releasing a tremendous weight of ice, the crust of the earth rebounded upward and allowed the ancestral Parrsboro River (not visible in the image) to cut down deeper into the outwash plain delta.

From a relatively simple image comes quite a story. Often our understanding of something does not penetrate to all layers of information. Sometimes this is a matter of scale. As one figuratively 'steps back' to look at a larger view, other 'layers' of information become apparent and the story is more complete.

Howard Donohoe

April - June Open Assessment Reports

Report Number	NTS	Licensee
AR ME 2001-028	21A/16D	True Metallic Explorations Incorporated
AR ME 2003-031	11D/11D	Allen, L J
AR ME 2003-032	20O/16D 20P/13C 21A/04B	Champlain Resources Incorporated Hudgins, A D
AR ME 2003-033	11K/03A 11K/03D	MGI Limited Lynx Minerals Incorporated Atlantic Industrial Minerals Incorporated Mercator Geological Services Limited MacLennan, L Alva Construction Limited
AR ME 2003-034	11F/14C	Hudgins, A D O'Sullivan, J R Roche, M W MacIntyre, A Hudgins, A B Hudgtec Consulting Limited
AR ME 2003-035	21A/04B	
AR ME 2003-038	11E/05A	
AR ME 2003-039	11D/14C	
AR ME 2003-043	11F/04D 11F/05A 11F/05B	

Susan Saunders and Norman Lyttle

A New Policy Governing Marble

Marble is found in parts of Cape Breton Island and is locally found in northern mainland Nova Scotia. We often associate fine architecture or sculpture, such as Michelangelo's *David*, with fine-grained, sugary textured, white marble. Nova Scotia has white varieties and it also has beautifully textured red, grey and buff coloured marble. With the development of marble resources in the province, a natural question was: "Is marble a mineral under the *Mineral Resources Act*?"

After an extensive historical review of legislation it is clear that marble is a mineral under the *Act*. Additionally, Marble Mountain Quarries Limited of Marble Mountain, Inverness County, applied for and received a "Lease of Mineral" under the *Mines Act* in 1966 to operate a mining operation for marble. This Lease established a clear precedent that marble was considered to be a mineral under the mineral resource legislation applicable at the time. The Department of Natural Resources has routinely issued mineral

exploration licenses and accepted assessment work reports for exploration and assessment of marble resources.

Marble is a mineral under the *Mineral Resources Act*. This was formalized with a policy statement on March 31, 2005. For increased clarity, the Department of Natural Resources interprets all pre-Carboniferous carbonate rocks in the province, as shown on the *Geological Map of the Province of Nova Scotia* published in 2000, to be marble.

Howard Donohoe



Photo of red marble from the MacLeod Resources quarry.

Joggins: World Heritage Initiative Gains Steam

Since being named in May 2004 to the all-important Tentative List of future World Heritage nominees for Canada, the UNESCO World Heritage initiative for Joggins has been steadily gaining momentum. The Province of Nova Scotia showed that it would make good on its promise of support for the project with the presentation by Hon. Rodney MacDonald of \$1.1 million at Joggins in February of this year.

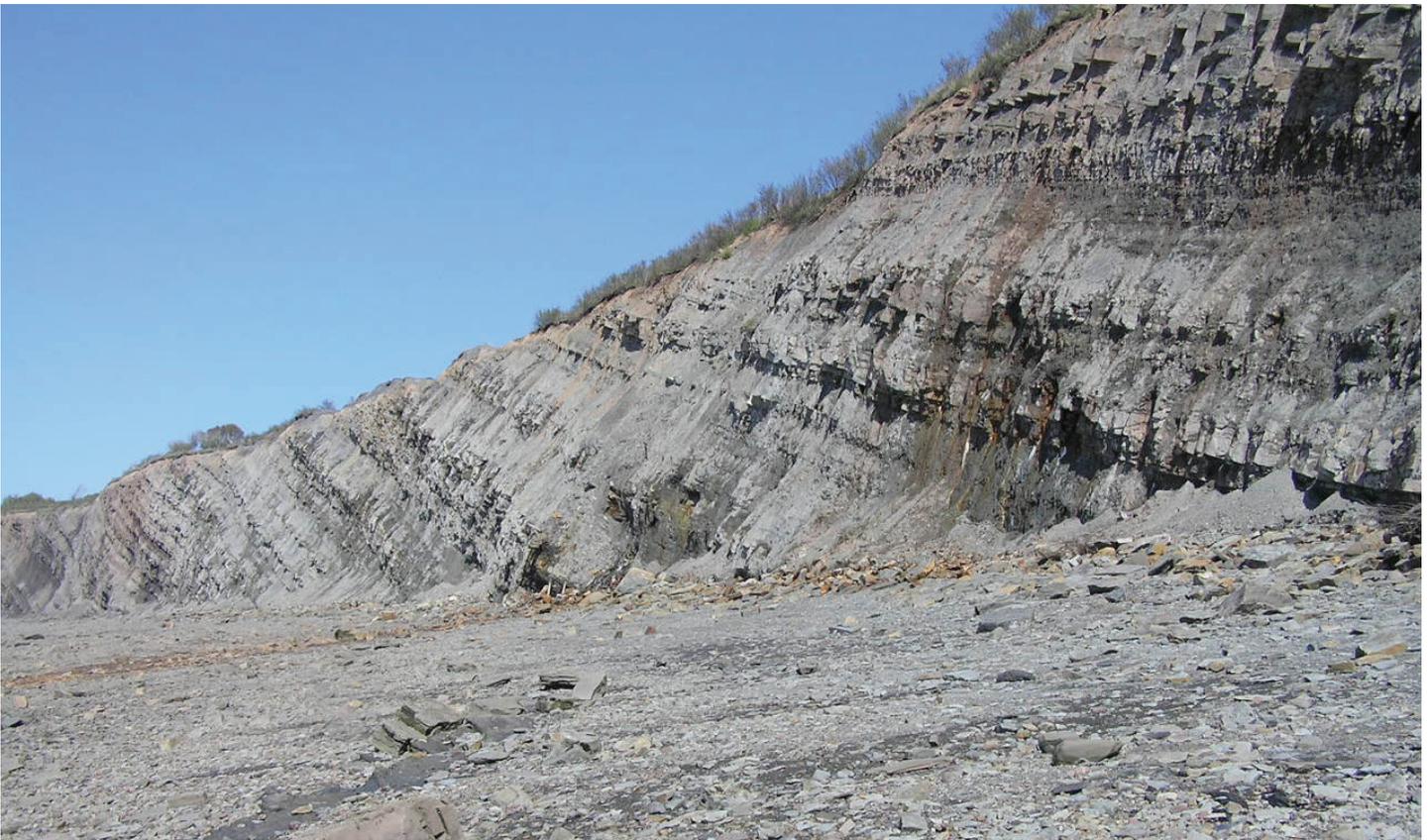
The case for World Heritage status for this famous geological site on the Bay of Fundy has been developed over several years (see v. 21, no. 3), and now an ambitious schedule has been set in motion, with a target submission date of February 2007. A senior level Advisory Board with representatives from the major government departments (Dept. of Natural Resources, Dept. of Tourism, Culture and Heritage, Office of Economic Development) and municipalities has been in

place for the past year and is helping to focus the project and to bring provincial resources to bear as needed. Dr. Scott Swinden represents the Department of Natural Resources on the Advisory Board. A key outcome has been the appointment in June of Ms. Jenna Boon, former Joggins resident, as Senior Project Manager. Her main responsibility will be to ensure that each working group gets their job done in the proper sequence as the nomination and infrastructure are developed for the site. One of these working groups is the nomination group, led by John Calder of DNR, who also serves as scientific advisor to ensure scientific accuracy throughout the project. From the outset, the community is solidly behind this initiative, which is being coordinated by the Cumberland Regional Development Agency under the able direction of Ms. Rhonda Kelly.

February 2007 may seem a long

way off, but a great deal must be achieved before then, in preparation for the crucial visit by World Heritage representatives later that year. Before this, a major interpretive centre must be constructed in which the story of this unique geological site will be told, and a particular challenge, that of an operational plan to manage the site, must be developed and implemented. Proposals for development of the interpretive infrastructure from firms that have demonstrated the depth required to undertake such a challenging project will be received later this month, and work will begin in earnest at the site later this year. If the dream comes to fruition, Joggins will be inscribed on the World Heritage List eighteen months after the nomination is submitted at the annual meeting of the UNESCO World Heritage Bureau. In the meantime, this former coal mining village by the sea will be a very busy place!

John Calder



One small section of the fossil cliffs of Joggins, Cumberland County.

The Prospector's Stake

On the recent telecasts of the Tour de France, one of the sponsors was "Discover Boating." The ads were interesting: "Take me boating....so we will always have something to talk about," and "Take me fishing because my marriage will be here sooner than you think." Maybe now is the time to 'Discover Prospecting.'

I won't claim that prospecting is the cure for 'all that ails you' but I think it has many benefits. The main arguments for prospecting are simple: you are outside, intellectually stimulated, physically active, and spending time doing something you like. Usually it's an area without the noise, confusion and over-stimulation of modern life.

To paraphrase one of the advertisements, "Take me prospecting....and we'll call it a date." Why not? If you choose a non-bug season, going out with a spouse or friend who enjoys the outdoors can be very nice. You may travel in remote areas of the province where nature is in full bloom and few people travel. Using some of the detailed maps from our library, you can find a lot of information on the map and hunt for sites of interest on the ground. You and your partner may also find suitable areas for panning gold. I guess I don't have to tell you about gold fever. As soon as your partner has gold in the pan, I bet they will be hooked. Please remember to get the permission to pan from the mineral rights holder and the land owner.

Of course, when you go into the back woods of the province take the appropriate gear. Some of the items you'll need are knife, compass, matches, GPS unit, first aid kit, map and/or air photos, water, food or snacks, and a back pack. Appropriate clothing, hat, rain gear, sun screen and bug dope are other items that may be needed. Let someone know where you're going and when you plan to return. Your safety preparation shows that you care about your personal safety and know how to travel in the outdoors. It's a good example for your partner and others, especially children. At the same time you can tell your partner about the importance of prospecting. After all you are [usually] the person standing between a relatively unexplored piece of real estate and an option agreement with a larger exploration or mining company. With fewer company geologists because of mergers and downsizing in the exploration industry, prospectors are important.

Howard Donohoe

We Heard From You!

Thank you to the readers of the *Nova Scotia Minerals Update* who responded to our call for comments in the last issue. As expected, the comments ranged widely in respect to the issue of postal delivery of the newsletter. Only a few readers asked to continue to receive the newsletter by postal delivery, but these people agreed that if it didn't arrive by mail they would not or could not read it. Since most comments were sent by e-mail, most readers said that e-mail notification with a link to the full-colour, on-line version of the newsletter would be just great.

Some readers who responded to the article provided thoughtful, practical comments on all the questions asked. These comments will be considered carefully, and implemented in so far as possible; most were very good ideas. Special thanks go to those who included kind remarks about the newsletter, or at least about parts of it.

Any changes to the newsletter will take some time to implement. We have a contract with the Queen's Printer that will run through the Winter 2006 issue. Since the newsletter involves all parts of the Mineral Resources Branch, as well as staff of the DNR Library, there will have to be meetings, proposals, and hopefully consensus.

Doug MacDonald

Special Note

Report of Activities 2004

The Mineral Resources Branch *Report of Activities 2004* (Report ME 2005-1) will be available on August 22 in the DNR Library, 3rd Floor, 1701 Hollis Street, Halifax. The report comprises 156 pages (many in full colour) and costs \$15.

Dates to Remember

August 19-21, 2005

Nova Scotia's Gem and Mineral Show 2005, Lion's Recreation Center, Western Ave., Parrsboro, N.S. Celebrating 40 years...Nova Scotia's Gem and Mineral Show is the only one of its kind in the Maritimes. Formerly the Rockhound Round-up, it was founded in 1966. For more information contact the Fundy Geological Museum (902-254-3814).

October 28-30, 2005

Atlantic Universities Geological Conference (AUGC), Memorial University, St. John's, Newfoundland. For more information e-mail augc2005@mun.ca.

November 3-5, 2005

Review of Activities, Geological Survey of Newfoundland and Labrador, Newfoundland Department of Natural Resources, and Fall Meeting of the Newfoundland Branch CIM, Delta St. John's Hotel, St. John's, Newfoundland. For more information contact Norm Mercer (709-729-6193).

November 7-9, 2005

Exploration and Mining New Brunswick 2005, Delta Hotel, Fredericton, New Brunswick. For more information e-mail: carol.mcneil-dobbelsteyn@gnb.ca

November 9 and 10, 2005

Mining Matters 2005, Westin Nova Scotian Hotel, Hollis Street, Halifax, Nova Scotia. For more information contact Mike MacDonald at 902-424-2523.