NEIGC 2001 TRIP OUTLINES
"Bring ID" for the border

Friday, September 21st, 2001

A1) Geology of the Fredericton-Mactaquac Dam area

Organizer*:* James Whitehead, *Dept. of Geology, University of New Brunswick, Fredericton, NB E3B 5A3;* email: jwhitehe@unb.ca

We will take a trip through time, visiting all the principal lithologies of the Fredericton area to help us reconstruct the regional geological history. This will include some complexly folded Silurian turbidites locally exhibiting some beautiful sedimentary structures, Carboniferous fossiliferous sedimentary rocks, multiple volcanic flows, and glacial deposits. We will briefly consider the geological and engineering factors associated with the location, construction and decay of one of the Maritime's largest hydroelectric power projects: the Mactaquac Dam. We will tour the inside of the structure.

Logistics: This trip leaves from the Mactaquac Holiday Inn (15 min. north of Fredericton) parking lot at 9:00 am Atlantic Standard Time.

A2) Stratigraphy of Neoproterozoic and Devonian - Carboniferous volcanic and epiclastic rocks in the Long Reach and Taylors Island areas, New Brunswick

Organizer: Sue Johnson, *New Brunswick Department of Natural Resources and Energy, P.O. Box 5040, Sussex, NB E4E 5L2*; email: susan.johnson@gnb.ca

On this one day trip to southern New Brunswick participants will first travel to the Long Reach area to view Late Neoproterozoic rhyolite tuff, rhyolite porphyry and felsic and mafic pyroclastic rocks. The emphasis will be on stratigraphy as we look at the relationships with fossiliferous Cambrian marine strata and a basalt - red bed sequence of probable Devonian – Carboniferous age, but we will also see some great examples of volcanic textures. We then drive south to Saint John to examine coastal exposures of basalt and red and grey siltstone on Taylors Island in the Irving Nature Park. These rocks exhibit beautiful peperite structures and examples of soft-sediment deformation. A preliminary Devonian or Carboniferous age for palynomorphs recently recovered from Taylors Island and from the basalt – red bed sequence in the Long Reach area support a previous lithological correlation of these two units.

Logistics: This trip leaves from the Mactaquac Holiday Inn (15 min. north of Fredericton) parking lot at 8:30 am Atlantic Standard Time.

A3) Environmental Geology: Minto Coal Fields

Organizers: *Tom Al and Karl Butler, Dept. of Geology, University of New Brunswick, Fredericton, NB E3B 5A3;* email: tal@unb.ca

The trip will begin with an excursion to the NB Coal Limited Fire Road Mine which was active between 1982 and 1986. During that time a land area approximately 200 x 2500

metres was excavated to between 15 and 20 m depth to remove a coal seam that averages approximately 0.6 m in thickness. The excavation disturbed arkosic sandstone bedrock that contains localized disseminated pyrite associated with reduction zones where organic plant fragments were trapped within the sediments. After four years of mine operation, the mine drainage water had become acidic due to oxidation of the pyrite in the waste piles and a decision was made to close the mine. The Fire Road Mine is now one of the largest producers of acidic drainage in the country, producing on the order of 2 million m^3 of effluent every year. During the field trip we will collect water samples from various locations on the site and measure the pH of the samples to demonstrate the impact of sulfide oxidation on the mine water quality. We will also visit a part of the backfilled pit where geophysical surveys have revealed lateral variations in apparent conductivity that are thought to represent variations in the content or concentration of acid mine water, caused (in part) by an ongoing waste-rock treatment program. We will discuss the effectiveness of the existing low-density lime treatment process that is in operation, as well as the options that have been considered for managing the long-term acid-generation potential of the waste piles at the mine.
We will take the afternoon to visit one of NB Coal's operating mines to look at the overburden stripping operations and search for plant fossil remains.

Logistics: This trip leaves from the Mactaquac Holiday Inn (15 min. north of Fredericton) parking lot at 8:30 am Atlantic Standard Time.

A4) Petroleum Geology in the Carboniferous of Southeastern New Brunswick.

Organizer: Clint St. Peter, *Geological Surveys Branch, New Brunswick Department of Natural Resources and Energy, Box 6000, Fredericton NB E3B 5H1*; email: Clint.St.Peter@gnb.ca

The primary purpose of this trip is to demonstrate two essential elements of a petroleum system: source rocks and reservoir rocks.

At Upper Dorchester oil shales of the Lower Carboniferous Albert Formation are exposed in an abandoned quarry. The oil shales are organic-bearing lacustrine deposits which represent very rich source rocks. In the quarry the oil shales are in contact along the Harvey-Hopewell Fault with limestone, conglomerate and sandstone of the Lime-kiln Brook Formation of the Windsor Group. Vugs, fractures and porosity in the limestone are in part filled with bitumen demonstrating that shore-face stromatolitic limestones and clastics of the Windsor Group may act as reservoirs in the subsurface. The same limestone at this site hosts barite and celestite veins and vugs. The second stop is along the east bank of the tidal Petitcodiac River at Boudreau Village. There, three lithofacies of the Lower Carboniferous Albert Formation are exposed: (1) lacustrine-margin mudstones, (2) fluvial-deltaic sandstones, and (3) fan-delta conglomerates. The sandstones and conglomerates are locally stained by "dead oil" providing evidence that coarse clastics of the Albert Formation are key reservoir beds in the Carboniferous petroleum system of New Brunswick.

There are three regional faults cutting the Albert section at Boudreau Village. The history of movement on those faults is fundamental to understanding the formation of traps hosting the petroleum that is presently driving the oil and gas exploration in southeastern New Brunswick.

Logistics: This trip leaves the Mactaquac Holiday Inn (15 min. north of Fredericton) parking lot at 8 am Atlantic Standard Time.

A5) The Precambrian and Paleozoic Geology of Grand Manan Island

Organizers: Leslie R. Fyffe[1] and Richard H. Grant[2], [1]New Brunswick Department of Natural Resources and Energy, Geological Surveys Branch, P.O. Box 6000, Fredericton, New Brunswick, Canada, E3B 5H1; email: les.fyffe@gnb.ca; [2] 824 George Street, Fredericton**,** New Brunswick, Canada E3B 1K8

Grand Manan Island, located off the coast of southwestern New Brunswick, is the largest island in the Bay of Fundy. The western part of Grand Manan is underlain by Mesozoic volcanic rocks. The eastern part of Grand Manan is underlain by complexly deformed volcanic and sedimentary rocks of Precambrian, and probable Cambrian and Silurian age. A preliminary stratigraphic nomenclature for these pre-Mesozoic sequences has been established and selected sections will be visited on the field trip. A zircon date of 619 ± 6 Ma from a massive rhyolite indicates that some of the volcanic rocks on Grand Manan. are late Neoproterozoic. The pre-Mesozoic accretionary history of Grand Manan Island will be interpreted from inferred relationships to various tectono-stratigraphic belts recognized on the mainland of southwestern New Brunswick.

Logistics: Assembly point is the parking lot of the Surfside Motel in North Head, Grand Manan Island (Bay of Fundy) on Friday, September 21, 2001 at 8:30 am Atlantic Standard Time. If you are coming from the US, Calais, ME – St. Stephen border, then Route 1 east is the most appropriate route. The ferry to Grand Manan leaves daily from Blacks Harbour (southern NB) at 9:30 am, 1:30 pm, 5:30 pm and 9:00 pm and departs from Grand Manan for Blacks Harbour at 7:30 am, 11:30 am, 3:30 pm and 7:00 pm (the 7:00 pm and 9:00 pm trips do not run on the weekend). To take in the full Friday field trip, participants should arrive on Grand Manan Island (Fundy) Thursday afternoon or evening. Arrive at the line-up to the ferry at Blacks Harbour at least two hours before departure time. Extra vehicles can be left overnight in the parking lot at the terminal in Blacks Harbour. There is no charge for the trip to Grand Manan. On arrival in Grand Manan purchase tickets inside the terminal for the 7:00 pm return trip to the mainland on Friday unless staying for the Saturday field trip on the Mesozoic Geology of Grand Manan. Participants may wish to camp Thursday night at Anchorage Provincial Park in Seal Cove. This and other accommodations on Grand Manan are listed on website new-brunswick.net/new-brunswick/grdmanan/links.html.

A6) Geological Setting of Zn-Pb-Cu-Ag VMS Deposits in the Bathurst Mining Camp (BMC), Northern New Brunswick: the Brunswick Belt stratigraphy and structure and associated deposits

Organizers: Steve McCutcheon[1], Jim Walker[1], and David Lentz[2], *[1]Geological Surveys Branch, New Brunswick Department of Natural Resources and Energy, P.O. Box 50, Bathurst, NB E2A 3Z1;* email: Steve.McCutcheon@gnb.ca , *[2] Dept. of Geology, University of New Brunswick, Fredericton, NB E3B 5A3*

Sedimentary and bimodal volcanic rocks of the California Lake, Sheephouse Brook and Tetagouche groups were emplaced in a back-arc basin that opened on the eastern margin of Iapetus in the Early Ordovician; the basin originated by rifting of an ensialic volcanic arc. Back-arc volcanic rocks were initially felsic and erupted on continental crust, namely the passive Gander margin of Gondwana, where deposition of mainly quartzose turbidites (Miramichi Group) occurred during Cambrian and Early Ordovician time. Ultimately, the volcanism became mafic as the back-arc evolved into an ensimatic marginal basin. Back-arc basin rocks were incorporated into an accretionary complex in the Late Ordovician, as the basin closed by northwestward subduction during collision between Laurentia and the extended Gander margin. Massive sulphide deposits occur in the lower felsic volcanic parts of all three groups. This field trip will focus on the eastern part of the BMC, including the Brunswick No.6, and Austin Brook massive sulfide deposits.

Logistics: This trip leaves the parking lot behind Keddies Hotel (Bathurst) at 8:30 am Atlantic Standard Time.

Saturday, September 22nd, 2001

B1) Geological Setting of Zn-Pb-Cu-Ag massive sulfide deposits in the Bathurst Mining Camp (BMC), Northern New Brunswick: the northern belt and it's deposits

Organizers: Steve McCutcheon[1], Cees van Staal[2], and Jim Walker[1], *[1]Geological Surveys Branch, New Brunswick Department of Natural Resources and Energy, P.O. Box 50, Bathurst, NB E2A 3Z1;* email: Steve.McCutcheon@gnb.ca
[2]Geological Survey of Canada, 601 Booth Street, Ottawa, ON K1A 0E8

This field trip is a continuation of trip A6, but will focus on the stratigraphy and structure of the northern part of the BMC, including the Caribou, Murray Brook, and Restigouche massive sulphide deposits.

Logistics: This trip leaves the parking lot behind Keddies Hotel (Bathurst) at 8:30 am Atlantic Standard Time. Afterwards, head to St. Andrews, southern New Brunswick.

B2) Terranes in the Lepreau - Pocologan - Dipper Harbour area, southern NB: A tale of volcanic, high-grade metamorphic, granitoid, and mylonitic rocks

Organizers: Sandra M. Barr[1] and Chris E. White[2], [1]*Department of Geology, Acadia University, Wolfville, NS B0P 1X0;* email: sandra.barr@acadiau.ca; [2]*Department of Natural Resources, P.O. Box 698, Halifax NS B3J 2T9*

The purpose of this trip is to introduce participants to the Kingston and Brookville terranes in the scenic Lepreau - Pocologan - Dipper Harbour area of southern New Brunswick. Participants will meet in Lepreau on Saturday morning where we will look at high-grade metamorphic rocks that separate the Kingston and Brookville terranes. From there we will drive north into the Kingston terrane to see Silurian tuff and hypabyssal granite, intruded by mafic (now amphibolite) sheets. Then we will drive south into the Brookville terrane, looking at mylonitic Early Cambrian granitoid rocks and their undeformed equivalents to the south, and finish the day on flow-banded Late Neoproterozoic volcanic rocks of the enigmatic but beautiful ca. 555 Ma Dipper Harbour Volcanic Unit.

Logistics: Participants should assemble at the Petro-Canada gas station and store on route 795 in Lepreau, New Brunswick (9:00 am Atlantic Standard Time). You can reach this location by Route 1 from St. Stephen (ca. 45-minute drive), or via Route 7 and Route 1 from Fredericton (ca. 80-minute drive). The trip ends in Dipper Harbour, about a 15-minute drive east from Lepreau and a 45-minute drive from St. Andrews. Participants could stay overnight before the trip in the Pocologan area, where several motels and campgrounds, including New River Beach provincial park, are located.

B3) Glacial landforms and deglacial history of southwestern New Brunswick

Organizers: Toon Pronk and Allen Seaman**,** *Geological Surveys Branch, New Brunswick Department of Natural Resources and Energy, Box 6000, Fredericton NB E3B 5H1;* email: **Toon.Pronk@gnb.ca**

This excursion will take the participants on a transect through southwest New Brunswick to the Bay of Fundy coast and back to Fredericton. Glacial landforms and deglacial history will be the focus. Erosional surfaces, moraines, glaciofluvial deltas, mineral exploration trenching, and the scenic Reversing Falls will be on the itinerary. Depending on registration it is possible that more than one trip with different foci will be offered.
Logistics: This trip leaves the Mactaquac Holiday Inn (15 min. north of Fredericton) parking lot at 8:30 am Atlantic Standard Time and ends near St. Andrews, NB.

B4) Bedrock geology of Campobello Island: Remnants of a Silurian arc and back-arc complex in southwestern New Brunswick

Organizer: M. McLeod, N.B. *Department of Natural Resources and Energy, P.O. Box 5040, Sussex, N.B. E4E 5L2*; email: Malcolm.McLeod@gnb.ca

Organizers: M.J. McLeod, *New Brunswick Department of Natural Resources and Energy, Geological Surveys Branch, P.O. Box 5040, Sussex New Brunswick E4E 5L2*; email: Malcolm.McLeod@gnb.ca and R.K. Pickerill, *Department of Geology, University of New Brunswick, P.O. Box 4400, Fredericton, New Brunswick E3B 5A3*; email: rpickeri@UNB.ca

The purpose of this trip is to introduce participants to the Late Ordovician to Early Silurian Kingston Arc and associated Siluro-Devonian back-arc rocks of the Mascarene Basin in southwestern New Brunswick. Contrasts in the stratigraphy and structure in different parts of the arc and the basin will be emphasized. This entails a trip to Campobello Island to view two of the major units in the arc sequence and diabase dyke swarms associated with arc development. Remnants of the back-arc sequence are also present on Campobello Island, which will also be examined.

Logistics: Participants will meet (9:30 am Atlantic time - NB) at the Canadian Customs on the east side of the Franklin Delano Roosevelt (FDR) Memorial Bridge from Lubec, Maine, to Campobello Island, New Brunswick. This is a 1-hour drive south on US Route 1 from Calais, Maine to Whiting, then east on US Route 189 to Lubec. **Remember that you should have the necessary papers for travel across the Canada – United States international border**.

B5) The Late Devonian Mount Pleasant Caldera: geological setting of a W-Mo-Sn-In deposit in southwestern New Brunswick

Organizers: Steve McCutcheon, *Geological Surveys Branch, New Brunswick Department of Natural Resources and Energy, P.O. Box 50, Bathurst, NB E2A 3Z1;* email: Steve.McCutcheon@gnb.ca

Bimodal volcanic and sedimentary rocks of the Late Devonian Piskahegan Group represent the eroded remnants of a large epicontinental caldera complex – the Mount Pleasant Caldera. This complex is divisible into Exocaldera, Intracaldera and Late Caldera-Fill sequences. The Intracaldera Sequence underlies a triangular area (13 x 17 km) and comprises four formations that include thick ash flow tuffs, caldera-margin sedimentary breccias that dip inward, and stocks of intermediate to felsic composition, which intrude the volcanic pile or are localized along caldera-margin faults. The Exocaldera Sequence is east of the triangular area and comprises five formations that include thin ash flow tuffs, mafic lavas, alluvial redbeds and porphyritic felsic lavas. The Late Caldera-Fill Sequence is largely confined to the northern part of the triangular area and comprises two formations containing a similar spectrum of rocks as the Exocaldera Sequence. However, it also includes the Mount Pleasant Porphyry and its associated breccias, which host the mineralization at the Mount Pleasant deposit.

The tungsten-molybdenum and tin-indium deposits are genetically related to granitic rocks that are co-magmatic with the Mount Pleasant Porphyry. Although this igneous activity was focused on the dormant caldera margin, the granite is not restricted to the margin because the associated gravity low extends much farther west. The various phases of granite and the fluids that produced the mineral deposits were probably derived by *in*

situ (i.e. no eruption) cooling of peraluminous anorogenic magma by double-diffusive fractional crystallization. Mass balance calculations show that under the above conditions, small volumes (10-20 km^3) of magma with an initial composition like the Little Mount Pleasant Tuff could yield quantities of metal and fluid capable of producing the Mount Pleasant deposits.
This trip leaves the Mactaquac Holiday Inn (15 min. north of Fredericton) parking lot at 8:30 am Atlantic Standard Time. After the trip head toward St. Andrews, NB.

B6) Mesozoic Geology of Grand Manan

Organizer: J. Gregory McHone, *Graduate Liberal Studies Program, Wesleyan University, Middletown, CT 06459-0519 USA*; email:jmchone@wesleyan.edu

The island of Grand Manan exposes a grand series of Mesozoic features between the Bay of Fundy and the Gulf of Maine, including great cliffs of Jurassic North Mountain basalt, underlying Blomidon siltstone, and the eastern border fault of the Grand Manan basin. The basalts include at least nine lava flows comprising three major units, with several major tectonic contacts and internal unconformities. A spectacular mafic dike at Swallowtail Head may not have been a major feeder to the basalts, but likely source dikes are present nearby on the mainland, including our last stop near Beaver Harbour. Photographs of several Mesozoic Grand Manan stop sites, a bibliography, and related information are posted at http://jmchone.web.wesleyan.edu/CAMP.html.

Logistics: Participants should consider staying on the island Friday night (perhaps after Trip A5 to examine the metamorphic rocks of Grand Manan), or you could join us after the first Saturday morning ferry from Blacks Harbour arrives at 11 am. We assemble at 8:30 am at Southwest Head Light, at the southern end of the island road. Please bring lunch. We will return to the mainland in the afternoon, and participants should purchase their ticket in advance. Information about the ferry and accommodations is available from the Grand Manan website: http://www.grandmanannb.com.

*Saturday Night Banquet & Party at the Kiwanis Point Park, St. Andrews NB – 6 - 11 pm

Sunday, September 23rd, 2001

C1) History of Geological Investigation of Saint John, New Brunswick

Organizer: Randall F. Miller, *Steinhammer Palaeontology Laboratory, New Brunswick Museum, 277 Douglas Avenue, Saint John, NB CANADA E2K 1E5 and Adjunct Professor, Department of Geology, University of New Brunswick*; email: millerrf@nb.aibn.com

Few cities can compare when it comes to the complex geological diversity seen within the city limits of Saint John, New Brunswick. Neither can most cities claim the long history of geoscience investigation that has attracted a fascinating list of scientists to unravel the story. The Late Precambrian limestone of the Green Head Group that forms a high ridge through the center of the city contains the first stromatolite fossil to be

scientifically described. The Cambrian-Ordovician sections that underlie the city center were described in dozens of publications by Canada's Cambrian expert of the 19th century, George Frederic Matthew, and visited by his American colleague Charles Doolittle Walcott. Matthew's young son William, later a world-renowned paleontologist at the American Museum of Natural History, found one of the world's largest trilobites near the harbor. Studies of Cambrian stratigraphy and paleontology are still part of ongoing efforts to define divisions within the Cambrian and have been described in recent years in the Canadian Journal of Earth Sciences, Atlantic Geology, Journal of Paleontology and Paleontology.

Princeton geologist B.F. Howell and Geological Survey of Canada geologists F.J. Alcock and A.O Hayes produced several reports on the geology of Saint John in the early 20th century. Recent mapping by geologists from the provincial survey have provided up to date maps of Saint John. In 1914 British paleobotanist Marie Stopes determined the age of the Upper Carboniferous "Fern Ledges" shales made famous in 1868 by G.F. Matthew and Charles Frederic Hartt in the landmark publication "Acadian Geology" written by Sir William Dawson. Hartt, along with Samuel Scudder of Boston had described some of the world's oldest insects from this site in the 1860's. Hartt later studied with Louis Agassiz at Harvard and went on to become the first professor of geology at Cornell University. Quaternary marine deposits along the coast, first described in the 1860's, continue to yield late-glacial clams, snails, echinoderms and vertebrates, that provide information about the recent climate history of the Maritimes region.

The trip will visit a number of the localities that make Saint John geologically and historically interesting. Many of the fossil specimens described over the past 150 years are now part the collection of New Brunswick Museum located in Saint John.

Logistics: This trip will leave the Kiwanis Point Parking Lot (St. Andrews) at 8:30 am Atlantic Standard Time.

C2) Physical volcanology of the Silurian CVB rocks of Passamaquoddy Bay, southwestern New Brunswick

Organizers: Kelsie A. Dadd, *Department of Earth and Planetary Sciences, Macquarie University, Sydney, NSW 2109, Australia;* email: kdadd@laurel.ocs.mq.edu.au; Nancy A. Van Wagoner, *Department of Geology, Acadia University, Wolfville, N.S., Canada B0P 1X0*

This field trip is a brief look at the volcanic and sedimentary rocks of the Passamaquoddy Bay area in southwestern New Brunswick. The Passamaquoddy Bay sequence is about 4 km thick and comprises 4 cycles of bimodal volcanism. Volcanic rocks are intercalated with littoral facies sedimentary rocks throughout the sequence. The volcanic rocks include felsic lava flows, domes and pyroclastic rocks, and mafic lava flows and pyroclastic rocks. Several of the flows and domes include peperitic breccia indicating that volcanism and sedimentation were contemporaneous. The volcanic facies present indicate both magmatic and phreatomagmatic styles of volcanism. During the field trip,

we will examine a range of volcanic and sedimentary facies through the volcanic cycles and discuss the recognition of volcanic styles and mechanisms.

Logistics: Leave the Kiwanis Point Park Parking (St. Andrews, NB) lot at 9 am (Atlantic Standard Time).

C3) Sedimentological and Ichnological Observations on Tidal Flats: Extapolation to the Rock Record

Organizer: Murray Gingras**,** *Dept. of Geology, University of New Brunswick, Fredericton, NB E3B 5A3;* email: mgingras@unb.ca

The Bay of Fundy, a large tidally-dominated estuary on the coasts of New Brunswick and Nova Scotia, provides excellent examples of estuarine sedimentary facies. This field trip will focus on various aspects of modern estuarine deposition in the area of Saint Andrews. Attention will be given to physical and biologic processes operating within the modern tidal flat and to the resulting sedimentary facies and ichnocoenoses (trace assemblages). Participants will have the opportunity to map upper- and lower-intertidal sedimentary facies and generate predictive models for application to the rock record. Also, the behaviors of several burrowing invertebrates will be documented. Invertebrate burrows will be considered in light of their taphonomic significance and how they might be preserved as fossils in the rock record. Time permitting, a brief survey of New River Beach will also be conducted. Here the focus shall be on foreshore and backshore processes.

Logistics: Leave the Kiwanis Point Parking Lot (St. Andrews, NB) lot at 9 am (Atlantic Standard Time).

C4) Post-Caradocian, Pre-Acadian Stratigraphy In Eastern Maine: Relation Of The Aroostook – Matapedia Belt To The Miramichi Anticlinorium and The Central Maine Belt

Organizer: John Hopeck, *Bureau of Land and Water Quality, Maine Department of Environmental Protection, State House Station 17, Augusta, Maine 04333 USA*; email: JohnHopeck@msn.com

Prior to the Acadian Orogeny, an extensive belt of relatively fine-grained rocks, primarily argillaceous carbonates and thin-bedded siltstones and shales, was deposited in marine basins developed in a basement of Cambro – Ordovician volcanic and clastic rocks. These rocks include those of the Aroostook – Matapedia or Aroostook – Percé Belt. Debris aprons developed adjacent to exposed Cambro – Ordovician rocks include a complex sequence of coarse to medium-grained facies. These rocks in turn have often been associated with their sources in the Miramichi Anticlinorium, and significant faults

have been drawn at the boundary between the relatively fine and relatively coarse facies. This trip will explore outcrops supporting the hypothesis that the formation of these two belts was not separated by significant space or time, but that, instead, they represent a complex interfingering of depositional environments along the fault-controlled margin of the Aroostook – Matapedia and equivalent basins. The trip will also explore the sedimentary evidence for an upward transition from the relatively narrow Aroostook – Matapedia basin to the more open submarine fan facies of the Central Maine Belt.

Logistics: Leave the Algonquin Hotel Parking (St. Andrews, NB) lot at 8:30 am (Atlantic Standard Time).

C5) Regional Geology of the Clarence Stream Gold Deposit, southwestern New Brunswick

Organizers: Kathleen Thorne and David Lentz, *Department of Geology, University of New Brunswick, P.O. Box 4400, Fredericton, NB E3B 5A3*; email: dlentz@unb.ca

Freewest Resources is currently exploring the Clarence Stream gold property that is located on the northwestern fringe of the renowned tin-tungsten-molybdenum-bearing Saint George Batholith in southwestern New Brunswick. A prominent shear zone cuts gabbroic and metasedimentary rocks and is occupied by gold-bearing sheeted quartz veins that lie within the thermal aureole of the Devonian-aged Magaguadavic granitoid phase of the batholith. This deposit bears similarities with the "intrusion-related gold deposits" associated with the tin-tungsten-bearing granites of the Tintina Belt in northwestern Canada and United States.

The trip will include examining the spectacular exposures in numerous stripped zones in addition to outcrops of the local stratigraphy proximal to the property while directly observing the effects of contact metamorphism as a consequence of the local felsic intrusion. Trace amounts of visible gold in conjunction with arsenopyrite, stibnite, sphalerite, and other sulphide minerals will be observed in the various exposed quartz veins, wall rocks, and drill core.

Logistics: Leave the Kiwanis Point Park Parking Lot (St. Andrews, NB) at 9 am (Atlantic Standard Time).

C6) Carboniferous basement-cover relationships around Maces Bay, southern New Brunswick

Organizer: Adrian F. Park, *Department of Geology, University of New Brunswick, P. O. Box 4400, Fredericton, NB, E3B 5A3*; email: apark@unb.ca.

The Avalon composite terrane in the Appalachian orogen of southern New Brunswick contains a number of late Carboniferous nappes (allochthons) intercalating Carboniferous sedimentary and volcanic rocks with their Cambrian-Precambrian basement. The purpose of this excursion is to examine one of these allochthons, the Barnaby Head allochthon, and to elucidate two key relationships: 1. to demonstrate the presence of Acadian (or older) structures, namely shear zone-related mylonites and phyllonites derived from granitoids and metasedimentary formations within the crystalline basement

rocks, and 2. to demonstrate the relationship of the crystalline rocks to the Carboniferous sedimentary cover. Exposure of the Barnaby Head allochthon and the sedimentary succession within the Lepreau River half-graben between the Lepreau River and Pocologan Harbour reveal the relationship between an in situ Carboniferous succession and overthrust crystalline basement. Within the basement rocks a sequence of rocks from low to high strain illustrate the progressive deformation of granitoids and their host rocks from little deformed primary lithologies to mylonitic and phyllonitic rock types. The distribution of these lithologies within the Barnaby Head allochthon also pick out the geometry of an old shear zone transported into its present position by Alleghanian tectonism. **Logistics:** Leave the Kiwanis Point Park Parking lot (St. Andrews, NB) lot at 9 am (Atlantic Standard Time).