

SNAPSHOT OF EXPLORATION IN YUKON

by Mike Burke

Early exploration results in Yukon indicate that 2008 will be another great year, and expenditures are expected to surpass the \$100 million mark for the second year in a row. Development at the successful Minto copper-gold-silver mine for 2008 will include installation of a gravity circuit to capture native gold and connection to the main Yukon hydro grid. Other developments at the Wolverine deposit and Carmacks Copper deposit are pending production decisions.

Several exploration drill programs had an early start in April and results have been very positive. At Sherwood Copper's Minto mine, new drill results from the area to the west of the main resources include 17.1 m grading 0.85% Cu, 0.35 g/t Au, 2.4 g/t Ag. At the Nucleus zone of Northern Freegold Resources early drilling tested a high-grade trend with a 50 m step-out from Hole GRD07-58 which intersected 75 m of 4.26 g/t Au late in the 2008 season. The result was a spectacular intersection of 37.8 m grading 10.41 g/t Au, 0.29% Cu. At Yukon-Nevada Gold's Ketz River property, early results from drilling outside of the resource areas include 7.27 m of 56.0 g/t Au in the QB target of the Shamrock zone and 5.15 m of 13.6 g/t Au in the Peel target of the Manto zone.

MAPS AND PUBLICATIONS 2008

You may view and download many of our publications free of charge from our website at www.geology.gov.yk.ca/publications. You may also purchase a printed copy or CD of any publication by contacting the Geoscience Information and Sales office at Room 102, Elijah Smith Building, 300 Main Street, Whitehorse, phone (867) 667-5200 or e-mail geosales@gov.yk.ca. VISA and MasterCard accepted.

Publications may also be borrowed from the Energy, Mines and Resources library at Room 335, Elijah Smith Building, 300 Main Street, Whitehorse. Phone (867) 667-3111 or e-mail emrlibrary@gov.yk.ca. The website is at www.emr.gov.yk.ca/library.

YGS ANNUAL REPORTS

Yukon Exploration and Geology 2007. D.S. Emond, L.R. Blackburn, R.P. Hill and L.H. Weston (eds.), 2008. Yukon Geological Survey, 272 p., \$10.00

Yukon Mining, Development and Exploration Overview 2007. D.S. Emond, L.R. Blackburn, R.P. Hill and L.H. Weston (eds.), 2008. Yukon Geological Survey, 88 p., free.

YGS OPEN FILES

Allen, T.L., Fraser, T.A. and Osadetz, K.G., 2008. Rock-Eval/TOC data for 18 wells, Peel Plateau and Plain, Yukon Territory (65° 50' to 67° 00' N; 133° 45' to 135° 15' W). Yukon Geological Survey, Open File 2008-1, 14 p. plus spreadsheet(s), online only.

Turner, D., 2008. Surficial geology of Howard's Pass (NTS 105I/12), Yukon and Northwest Territories (1:50 000 scale). Yukon Geological Survey, Open File 2008-19, \$5.00.

Turner, D., 2008. Surficial geology of Howard's Pass (NTS 105I/11), Yukon and Northwest Territories (1:50 000 scale). Yukon Geological Survey, Open File 2008-20, \$5.00.

JOINT YGS AND GSC OPEN FILES

Geophysical Surveys

Kiss, F. and Coyle, M., 2008. Total field magnetic, Wernecke Mountain Aeromagnetic Surveys, Yukon. Scale 1:100 000, \$11.45:

- NTS 106B (NW quadrant); YGS Open File 2008-5; GSC Open File 5411;
- NTS 106B (south half); YGS Open File 2008-6; GSC Open File 5412;
- NTS 106C (north half); YGS Open File 2008-7; GSC Open File 5413;
- NTS 106C (south half); YGS Open File 2008-8; GSC Open File 5414;
- NTS 106D (north half); YGS Open File 2008-9; GSC Open File 5415;
- NTS 106E (south half); YGS Open File 2008-10; GSC Open File 5416;
- NTS 106F (south half); YGS Open File 2008-11; GSC Open File 5417.

Kiss, F. and Coyle, M., 2008. First vertical derivative of the magnetic field, Wernecke Mountain Aeromagnetic Survey, Yukon. Scale 1:100 000, \$11.45:

- NTS 106B (NW quadrant); YGS Open File 2008-12; GSC Open File 5417;
- NTS 106B (south half); YGS Open File 2008-13; GSC Open File 5418;
- NTS 106C (north half); YGS Open File 2008-14; GSC Open File 5419;
- NTS 106C (south half); YGS Open File 2008-15; GSC Open File 5420;
- NTS 106D (north half); YGS Open File 2008-16; GSC Open File 5421;
- NTS 106E (south half); YGS Open File 2008-17; GSC Open File 5421;
- NTS 106F (south half); YGS Open File 2008-18; GSC Open File 5423.

Geochemical Surveys

Friske, P.W.B., McCurdy, M.W., Day, S.J.A., McNeil, R.J. and Grenier, A.G., 2008. Regional stream sediment and water geochemical data, Nahoni Range area, west-central Yukon Territory (parts of NTS 116F, G and K). YGS Open File 2008-2; GSC Open File 5695, \$7.00

Friske, P.W.B., McCurdy, M.W., Day, S.J.A. and McNeil, R.J., 2008. Regional stream sediment and water geochemical data, Finlayson Lake area, southeastern Yukon Territory (NTS 105G). YGS Open File 2008-3; GSC Open File 5696 (re-analysis of GSC Open File 1648), \$7.00

Friske, P.W.B., Hornbrook, E.H.W., McCurdy, M.W., Day, S.J.A., McNeil, R.J., Lynch, J.J., Durham, C.C., Gross, H. and Galletta, A.C., 2008. Day, S., 2008. Regional Stream Sediment and Water Geochemical Data, Sheldon Lake area, east-central Yukon Territory (NTS 105 J). YGS Open File 2008-4; GSC Open File 5694 (re-analysis of GSC Open File 2173), \$7.00.

JOINT YGS AND NORTHWEST TERRITORIES GEOSCIENCE OFFICE (NTGO) OPEN FILES & REPORTS

(read more about the following publications on p. 3)

Pyle, L., Roots, C., Allen, T., Fraser, T., Bond, J., Jones, A. and Gal, L., 2007. Roadside Geology of the Dempster Highway, Northwest Territories and Yukon - A traveler's guide to the Geology of Canada's most northwestern road. YGS Open File 2007-10; NTGO Open Report 2007-05, 92 p., \$20.00.

Jones, A.L. & Pyle, L.J. (compilers), 2007. Roadside Geology of the Dempster Highway, Northwest Territories & Yukon - A geological roadmap for Canada's most northwestern road. YGS Open File 2007-11; NTGO Open Report 2007-009, 1 folded map with notes, free.



SOME CHANGES AT THE YGS

The Yukon Geological Survey (YGS) wishes to extend our thanks to Grant Abbott, who retired late this spring following 28 years of service. He joined the organization in the early 1980's, was appointed Chief Geologist for Yukon Geology Program in 1996, and following devolution, became Director of the Yukon Geological Survey. Grant's commitment to the staff and programs is reflected in the excellent reputation enjoyed by the Survey today. Grant will be missed – but not that badly, because guess what? He's coming back to work as a project geologist! He'll be taking a well deserved vacation this summer, and then rejoining the crew in August.



Carolyn Relf, new Director of YGS

In January, Carolyn Relf joined the YGS as new director. She came from Yellowknife, NWT, where she followed a similar career path to Grant's: mapping geologist; Chief Geologist, then comanager of the joint federal-territorial NWT Geoscience Office. To our colleagues in NWT: your loss – our gain.

In May, Steve Israel successfully defended his PhD thesis from UBC, and thus we're addressing him as doctor - we pass on congratulations.

In early June, Tiffani Fraser delivered two healthy twins – a boy and a girl. Tiffani will be taking the year off to look after the babies, and plans to return to work in September, 2009.



The twins - double the fun!

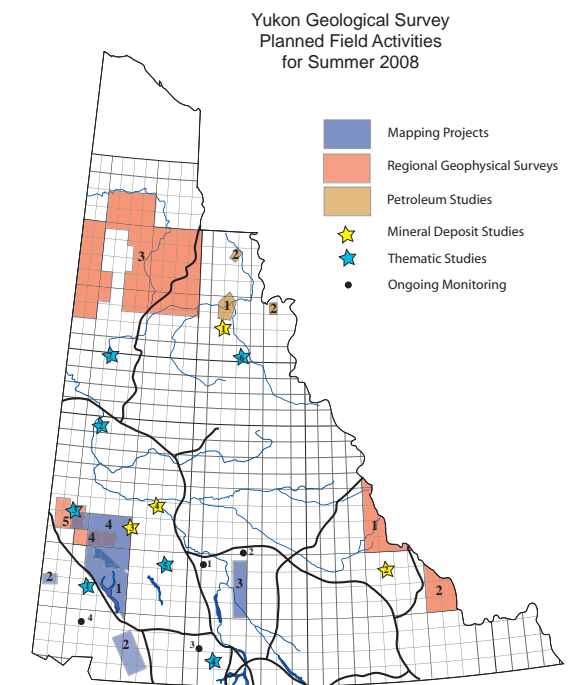
Ken Galambos, our Economic Geologist, has taken a leave of absence from YGS. He'll be moving with his family to Victoria, BC over the summer, where he'll work as a consulting geologist, but the horses will be staying behind on the homestead anticipating their return.

YGS SUMMER ACTIVITIES by Carolyn Relf

The YGS has a busy field season planned for 2008. Project activities include bedrock and surficial mapping, stratigraphic studies, petroleum assessment work, landslide monitoring and a number of thematic studies. In addition, we will be undertaking four airborne



Staff prepare for field season: recertifying Wilderness First Aid.



geophysical surveys in partnership with the Geological Survey of Canada (GSC). Summer activities will also include field visits to active exploration sites (including Yukon Mining Incentive Program (YMIP)-funded projects), and final field work for a Yukon geological highway map.

Twenty-five field projects are planned for this summer (see map above). These field activities are described here briefly.

MAPPING PROJECTS

YGS has four mapping projects underway this summer:

- Don Murphy, with collaborators Cees van Staal (GSC) and Jim Mortensen (UBC), will continue bedrock mapping in Windy McKinley and Yukon-Tanana terranes of the northern Klauane map area, northeast of the Denali fault (1). Work in 2007 identified previously unrecognized potential for volcanogenic massive sulphide (VMS) deposits in Stevenson Ridge area via stratigraphic correlations to prospective successions in the Delta VMS district of Alaska. In addition to the planned mapping, this potential will be further evaluated with an airborne magnetics - EM survey (see p. 3). This work will be in part funded by DIAND's SINED program as well as GSC's new GEM funding (see p. 3).
- Jeff Bond and Panya Lipovsky are leading a four-person crew mapping surficial geology in the Klauane and parts of Stevenson Ridge areas (4). The northern part of the map area lies within easternmost Beringia, whereas the southern part

YGS ACTIVITIES (continued)

contains deposits from three glacial advances. This mapping has implications for placer exploration, and will support feasibility studies of a potential railway route to Alaksa.

- Steve Israel will be mapping rocks of Alexander terrane and Wrangellia from the BC border northward to the boundary of Kluane Park as well as areas near the southern part of Kluane Lake (2).
- Two graduate students (Elizabeth Westberg/Simon Fraser University (SFU) and Mélanie Mercier/Carleton University) will be mapping in the Big Salmon Range (3) under the supervision of Maurice Colpron. The study area straddles the boundary between the Cassiar and Yukon-Tanana terranes, and the research will examine the tectonic history and timing of uplift/cooling.

★ STUDIES RELATED TO MINERAL DEPOSITS

Field-based studies of mineral occurrences will be undertaken in several areas of Yukon:

- Lara Lewis has been examining the characteristics of uranium occurrences in the Wernecke Mountains. Isotopic analysis of uranium-mineralized breccia is ongoing at the University of Western Australia. This summer Lara will collect lead-zinc samples from the Bonnet Plume Range area for Pb-Pb isotopic analysis (1). These data will be incorporated with the results of preliminary work undertaken by Danielle Héon in 2000.
- Kirsten Rasmussen from University of British Columbia (UBC) will be wrapping up field work on her PhD this summer. She is studying the petrogenesis and ages of Cretaceous plutons in southeastern Yukon (2), and contributing to our understanding of the link between gold and tungsten mineralization and plutonism.
- Thierry Binelli Betsi from University of New Brunswick will continue his study of gold and silver-rich veins associated with granitic intrusions in the Dawson Range (3). The project, supported by Northern Freegold Resources, will include stable and radiogenic isotope analysis to determine the ages and sources of the veins.
- Shawn Hood, an MSc. student from UBC, will begin a structural thesis study of the ore body at Minto Copper mine (4). His study will focus on deposit geometry and the role of deformation in how copper and gold are concentrated at the deposit. Maurice Colpron will supervise the field work, and Sherwood Copper Corporation is supporting the project.

PETROLEUM STUDIES

Research in two sedimentary basins in northern Yukon is planned:

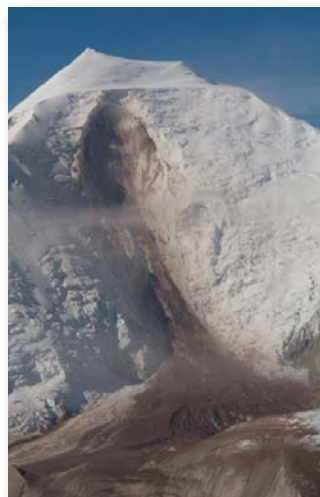
- Grant Lowey is starting a two-year field project in the Bonnet Plume sedimentary basin in northern Yukon (1). This area contains Yukon's most significant coal deposits, and may also contain natural gas. The project will include sedimentology, stratigraphy and palynology components, and will aid in upgrading hydrocarbon resource estimates for the region.
- Tammy Allen will be wrapping up studies in the Peel Plateau (2), a project that was undertaken collaboratively with the NWT Geoscience Office and GSC. She will spend a few weeks

examining stratigraphic sections at two locations in the Peel Plateau to resolve some outstanding questions.

★ THEMATIC STUDIES

- Panya Lipovsky and Steve Israel are collaborating with Peter Haessler of the US Geological Survey in Anchorage and John Clague of SFU to better understand the neotectonics of southwestern Yukon and southeast Alaska. They will be looking at evidence for recent displacement on the Denali fault in the Shakwak Trench and helping supervise Rosie Cobbett's MSc thesis (UBC) on the Duke River fault (1).
- Duane Froese (University of Alberta) is leading a study of permafrost resilience in areas where permafrost has been disturbed - e.g., by forest fires, placer mining operations, etc. (2). Field work in the Dawson region last summer suggested that permafrost has re-established itself in areas of historic disturbance (i.e. Klondike), and the rate of recovery will be documented.
- Derek Turner (SFU) under the direction of Jeff Bond will undertake a study of the last 3 million years of landscape change in the southwestern Yukon (3). He will examine glacial and non-glacial sediment layers along the White River and on Silver Creek in the Kluane Range.
- YGS is providing support to Antoni Lewkowicz (University of Ottawa), who plans to drill a deep borehole on the summit of Mt. Granger, south of Whitehorse (4). The project involves comparing ground temperature data to readings from a local climate station, to determine the influence of warming climate on local permafrost.
- Lesley Dampier (University of Northern British Columbia) will be working under the supervision of Jeff Bond on a study of soils in the Carmacks – Aishihik Lake area (5). She will be measuring the physical and chemical properties of different ages (depths) of soils and comparing these to glacial events in the region.
- Elizabeth Turner, Darrel Long (Laurentian) and Derek Thorkelson (SFU) will examine Neoproterozoic sedimentary rocks of the Mackenzie Mountain Supergroup in the Wernecke Mountains (6). The long term goal of the study is to resolve stratigraphic uncertainties and allow correlations to be made with age-equivalent sections globally.
- A group of researchers from Harvard University led by Paul Hoffman will sample Proterozoic carbonates from Mount Harper and Mount Gibben (7). The field work is part of a global chemostratigraphic correlation study; data will serve as a proxy for tracking major changes in Earth (e.g. break-up of Rodinia; global glacial events).

- **Ongoing Landslide Monitoring**
Panya Lipovsky has been studying geological hazards in southern and central Yukon in collaboration with a number of universities over the past several years. Her work involves



Mount Steele landslide, 2007.

both field measurements and the study of satellite data and aerial photographs to document landscape changes over time. She and her coworkers will be monitoring four areas this summer:

- Near Carmacks (Monitoring Area 1) and Little Salmon Lake (Monitoring Area 2) she will be measuring ground slumping related to melting permafrost.
- She is working with Yukon Parks personnel to develop a landslide warning system for an unstable area at the head of a creek near the Kusawa Lake campground (Monitoring Area 3).
- She is part of an ongoing study of the August 2007 avalanche at Mount Steele in the Icefield Ranges (Monitoring Area 4).

REGIONAL GEOPHYSICAL SURVEYS

YGS is funding geophysical surveys in four areas this fiscal year. The surveys are being managed by the Geological Survey of Canada.

- Regional airborne magnetic surveys (800-m line spacing) are planned in the Little Nahanni River (1) and Eagle Plain/Kandik Basin (2) areas are planned for this summer/fall.
- Two surveys will be flown in the Stevenson Ridge area: a combined radiometric/magnetic survey (3) and a combined electromagnetic/magnetic survey (4). Both surveys will be used to better define the bedrock geology and potential for mineral deposits in this poorly exposed area.

GEO-MAPPING FOR ENERGY AND MINERALS (GEM)

In February 2008, the federal budget included an announcement of \$40 million over two years to undertake geological mapping in

support of economic development of Canada's North. What does this mean for Yukon? Since March, YGS has been working with the Geological Survey of Canada to identify opportunities to collaborate on projects that will stimulate exploration investment in Yukon. A number of project ideas have been generated, and we anticipate undertaking a number of joint projects starting later this summer.

More details will be provided in future newsletters and via the GSC.

MINING & GEOLOGY WEEK by Karen Pelletier

Events for Yukon Mining and Geology Week, May 26-30th, included three locally relevant geology and geomorphology talks by Yukon Geological Survey geologists in both Whitehorse and Haines Junction, where the general public learned about the 2007 mega landslide on Mount Steele (Panya Lipovsky), when Lake Alsek flooded the Haines Junction area around 200 years ago (Jeff Bond), and how the Saint Elias Mountains continue to rise in a modern context (Steve Israel). Children and teens in Haines Junction and Destruction Bay participated in activities such as a rock talk, making rock kits, looking at educational displays, gold panning and soap-stone carving; while both Haines Junction and Whitehorse had educational poster displays on mining, how rocks and minerals are used in our everyday lives and more.



L. Weston making rock kits with children in Destruction Bay.

ROADSIDE GEOLOGY OF THE DEMPSTER HIGHWAY, NORTHWEST TERRITORIES AND YUKON

TWO NEW PUBLICATIONS by Charlie Roots

The Yukon Geological Survey, together with the Northwest Territories Geoscience Office, have jointly published a guidebook and a public education brochure about the landforms and outcrops along the "Road to Resources", now better known as the Dempster Highway, a 717 km gravel road connecting Dawson with Inuvik. These are contributions from a wide-ranging investigation of the hydrocarbon potential of the Peel Plateau, which straddles the Northwest Territories-Yukon border at the latitude of the Arctic Circle. Many geologists involved in the project have traveled this road, and they contributed the pictures, maps and short descriptions for the guidebook.

A 92-page book (YGS Open File 2007-10), subtitled "A traveler's guide to the Geology of Canada's most northwestern road", contains an introduction to the geological provinces, 10 page-size maps and 50 additional colour images, references and a glossary (\$20). It updates a guidebook produced by the Canadian Society of Petroleum Geologists in 1992.

A brochure (YGS Open File 2007-11) resembles a folded road map. When unfolded, a simplified geological map (1:600 000 scale) is surrounded by photographs and short descriptions of 18 spots of geological interest along the route. The brochure is designed for readers without geological training (free).

These publications will enhance your appreciation of the many landscapes and rock formations traversed by the Dempster Highway. They allow you to plan your stops in advance: you can examine a breccia, hunt for fossils and concretions, and generally know what is going on (geologically speaking) as you explore Canada's most northwestern road. To obtain these publications see Maps and Publications on p. 4. Enjoy!

