



ACTIVITIES

by Grant Abbott and staff

The Yukon Geological Survey (YGS) is recovering from the tragic loss of Geoff Bradshaw, our mineral Assessment Geologist, in a helicopter accident over the summer. We thank so many of our colleagues in the geological and mining communities for your tremendous sympathy and support. We are also adjusting to the departure of geologists Craig Hart and Julie Hunt to the sunny climes of Australia. We wish them well, and thank them for their significant contributions to Yukon geology. Until replacements are found, our capacity to undertake mineral deposits studies has been significantly diminished.

The Survey now has a new organizational structure with the creation of four subdivisions. New responsibilities go to Mike Burke as Acting Head of Mineral Services; Diane Emond as Acting Head of Technical Services; Don Murphy as Acting Head of Regional Geology; and Lee Pigage as Acting Head of Resource Assessments and Outreach.

FIELDWORK *Projects are keyed to the map at right.*

1:50 000-SCALE BEDROCK MAPPING ■

1 MAURICE COLPRON teamed up with **STEVE GORDEY** (Geological Survey of Canada [GSC]), **GRANT LOWEY**, **STEVE PIERCEY** (Laurentian University) and **DON MURPHY** to map the northwestern portion of Whitehorse Trough. This map provides ground control of the bedrock geology along the western portion of the seismic survey, acquired in 2004 by GSC/YGS. Compilation and interpretation of the various geoscience datasets is underway and will provide the basis for reassessing the oil and gas potential of northern Whitehorse Trough.

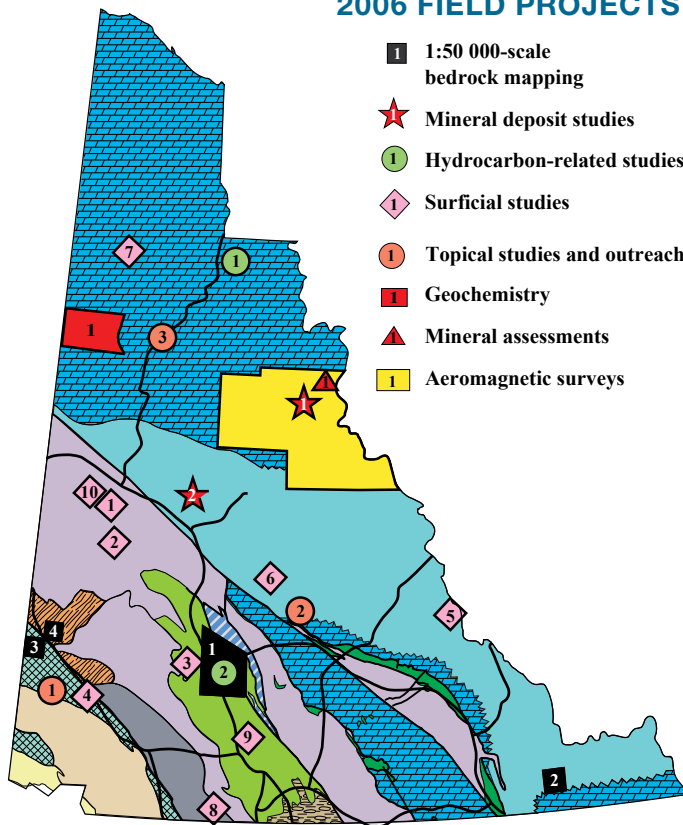
2 LEE PIGAGE began a mapping project in the Otter Creek area (NTS 95D/6) of southeast Yukon (photo at left). This project is a continuation of his earlier work in the Pool Creek and Toobally Lakes areas, and will improve our understanding of structure, stratigraphy and mineral potential of the southeast margin of Selwyn Basin.

3 STEVE ISRAEL continued mapping in the Kluane Ranges, focusing on Late Paleozoic strata of the Skolai Group east of the White River where it is host to Triassic mafic-ultramafic intrusions that host nickel-copper and platinum group element mineralization. In conjunction with



2006 FIELD PROJECTS

- 1:50 000-scale bedrock mapping
- ★ Mineral deposit studies
- Hydrocarbon-related studies
- ◇ Surficial studies
- Topical studies and outreach
- Geochemistry
- ▲ Mineral assessments
- Aeromagnetic surveys



JIM MORTENSEN of the University of British Columbia (UBC), this project is also examining the provenance of Wrangel Terrane through detrital zircon studies of Middle Triassic and Late Paleozoic sedimentary deposits. Studies of the young deformation associated with the Denali Fault are also taking place in collaboration with **DON MURPHY** (YGS) and workers from the USGS in Alaska.

4 DON MURPHY conducted a reconnaissance of the poorly exposed, poorly understood Windy-McKinley Terrane. As originally defined in central Alaska, the Windy and McKinley terranes comprise ophiolitic rocks of unknown age, and melange and flysch of Mesozoic age. Little is known about the original relationships, if any, between these components, and adjacent rocks of Yukon-Tanana Terrane. Don's work will document the nature of these assemblages in Yukon, thereby providing a basis for mineral exploration decisions and land use planning in the area.

MINERAL DEPOSIT STUDIES ★

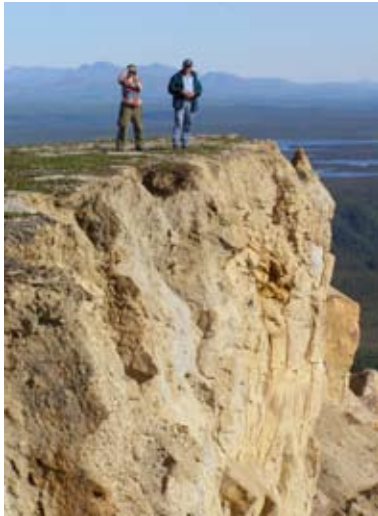
1 LARA LEWIS gathered data on intrusion-related and Wernecke Breccia uranium occurrences for a compilation on uranium exploration in Yukon. She is studying the enigmatic uranium occurrences associated with Wernecke Breccia. New age-dates for uranium mineralization are expected to provide constraints on timing of mineralizing events.

ACTIVITIES (continued)

2 JAKE HANLEY and **ED SPOONER** (University of Toronto) are continuing a post-doctoral study of the evolution and generation of magmatic fluids in mid-Cretaceous granites in Yukon and their relationship to gold mineralization.

HYDROCARBON-RELATED STUDIES ●

1 TAMMY ALLEN and **TIFFANI FRASER** began a four-year project assessing the hydrocarbon potential of the Peel Region in northeastern Yukon (photo below). The study involves collaboration with the GSC, the Northwest Territories Geoscience Office, industry and university affiliates. The focus this year is the Upper Devonian – Lower Carboniferous Tuttle Formation. A major objective of this project is to assess the Tuttle as a potential petroleum reservoir, and to examine neighbouring units as petroleum sources. Another objective was to clarify stratigraphic relationships and sedimentology of Upper Paleozoic strata.



2 GRANT LOWEY continued studies of the sedimentology, stratigraphy and hydrocarbon potential of the Labege Group and Tantalus Formation in the Whitehorse Trough, where studies last year discovered petroleum fluid inclusions and identified two potential petroleum source rocks. He also assisted M. Colpron in 1:50 000-scale bedrock mapping of the northern part of this frontier petroleum basin.

SURFICIAL STUDIES ◆

1 Yukon Geological Survey placer geologist WILLIAM LEBARGE, DR. VLADIMIR NAUMOV (Perm University, Russia) and **DR. ROB CHAPMAN** (University of Leeds, United Kingdom) are studying the sedimentology, stratigraphy and gold characteristics of gravel and conglomerate deposits in the Indian River area. These gravel terraces and the underlying conglomerates are currently the focus of exploration by Boulder Mining Corporation and Klondike Star Ltd. New interpretations of geology and data from this study will further characterize the nature of the placer gold distribution in the Indian River drainage and may help to identify new placer reserves locally and in nearby drainages. This research complements a study by **DR. JIM MORTENSEN** at UBC which focuses on the trace element characteristics of placer gold in the Klondike, which may help to reveal potential undiscovered lode gold sources.

2 JEFF BOND, in partnership with **PAUL SANBORN** and **SCOTT SMITH**, continued their studies of the unglaciated soils in the Klondike. This year, Jeff undertook a geochemical investigation of the soils at the original Boulder Lode mine site on the Lone Star property. In addition, upland cryosols (permafrost-affected soils) were studied on the Lone Star property. Assisting with this investigation is **KATHRYN DENOMMEE** from the University of Waterloo. Her undergraduate thesis involves mapping the surficial materials on a typical north-facing unglaciated slope from the Lone Star property.

3 PANYA LIPOVSKY continued work monitoring permafrost thaw-related landslides in south and central Yukon. In collaboration with

C-CORE and the European Space Agency, InSAR, remote sensing technology and high precision GPS surveys were used to monitor small-scale ground movements at five landslide sites near Beaver Creek, Carmacks and Little Salmon Lake. A reconnaissance inventory of landslides in the Pelly River watershed was also undertaken.

4 ERIN TROCHIM and **PANYA LIPOVSKY** continued their compilation of Yukon Department of Highways borehole data to capture detailed geotechnical and permafrost information. Their work has extended the data set to cover the Alaska Highway from Beaver Creek to east of Haines Junction.

5 DEREK TURNER and **BRENT WARD** (Simon Fraser University), and **JEFF BOND** began a study looking at the glacial history of the Howard's Pass property in the Selwyn Mountains. The work is being completed through Derek Turner's Master's thesis. His project involves reconstructing the late glacial history of the Selwyn Lobe of the Cordilleran ice sheet, mapping the surficial geology of Pacifica Resources property and conducting a mobile metal ion geochemistry case study across the SEDEX deposit.

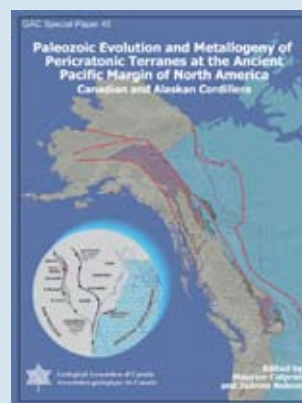
6 BRENT WARD and **JEFF BOND** continued their investigation into the age of Reid glacial deposits in central Yukon. This involved sampling for cosmogenic dating and tephra chronology in the Pelly River area.

7 NICHOLAS UTTING and **IAN CLARK** (University of Ottawa), in cooperation with YGS, conducted a study on the water chemistry and noble gases in perennial springs at Bear Cave Mountain, Fishing Branch River area. This work is to address First Nation concerns about potential disturbance of groundwater during hydrocarbon exploration.

8 MONICA BRUCKNER, MARK SKIDMORE and **JEFF BOND** – Monica conducted her Master's thesis field research (Montana State University) on one of the Wheaton River glaciers this past summer. She is investigating the biogeochemical characteristics of meltwater in a deglaciating basin.

GAC SPECIAL PAPER 45

The long-awaited synthesis of knowledge acquired under the auspices of the Ancient Pacific Margin NATMAP (1999-2003) – a collaborative enterprise of the GSC, YGS, BCGS, USGS



and university partners – has recently been published by the Geological Association of Canada as Special Paper 45. The volume, entitled *Paleozoic Evolution and Metallogeny of Pericratonic Terranes at the Ancient Pacific Margin of North America, Canadian and Alaskan Cordillera* was edited by **MAURICE COLPRON** and **JOANNE NELSON** (British Columbia Geological Survey) and comprises 18 papers detailing the

geological environment of Paleozoic sulphide-hosting strata along the length of the Cordillera, including those of Yukon-Tanana Terrane in Yukon, northern B.C. and Alaska. Special Paper 45 can be purchased from Geoscience Information and Sales in the Elijah Smith Building in Whitehorse, at the GSC Bookstore on Robson Street in Vancouver, or ordered online from the GAC bookstore (www.gac.ca/bookstore).

9 **STEPHEN HORTON** (University of Victoria), **JEFF BOND** and **PETER VON GAZA** (Geomatics Yukon)— Stephen's undergraduate research involves reconstructing the paleogeography of glacial lake Laberge.

10 **DR. ANTONI LEWKOWICZ** and graduate students from the University of Ottawa continued with a number of permafrost studies around the Territory. They have been documenting the effects of the 2004 forest fires near Dawson on slope stability and sedimentation into watercourses, investigating the origin and dynamics of thermokarst lakes and palsas in the Wolf Creek watershed near Whitehorse, and developing regional permafrost modelling/mapping techniques. Geophysical investigations of permafrost landforms and recent landslides were also carried out in collaboration with **BERND ETZELMÜLLER** (University of Oslo) and YGS personnel.

11 **PANYA LIPOVSKY** and **JEFF BOND** are compiling a digital surficial geology map for the entire Yukon, with funding from DIAND under the Strategic Initiatives for Northern Economic Development Program (SINED).

TOPICAL STUDIES AND OUTREACH ●

1 **J. BUNBURY** (University of Ottawa) is studying the effects of the White River Ash event and climate change on aquatic ecosystems in the southwest Yukon.

2 **LUKE BERANEK**, a UBC PhD candidate, with **JIM MORTENSEN**, has been steadily adding to the detrital zircon database for Late Paleozoic and Triassic rocks on both sides of the boundary between the North American continental margin sequence and Slide Mountain and Yukon-Tanana terranes. Luke's 2005 work showed that the terranes were already shedding debris well into North America by the Early Triassic, substantially earlier than previously thought. This season, Luke collected from occurrences of Triassic rocks in the Pelly, Selwyn and Ogilvie mountains.

3 **KAREN PELLETIER** and **CHARLIE ROOTS** (GSC) began the Geological Road Guide this summer by scouting appropriate geological stops of interest along most roadways in Yukon. Charlie, along with **TIFFANI FRASER** and **TAMMY ALLEN**, also contributed to the Dempster Highway Log being prepared jointly with GSC/ NWT. Entitled *Roadside Geology of the Dempster Highway, Northwest Territories and Yukon: a traveler's guide to the Geology of Canada's most northwestern road link*, a draft will be available for use by tourists for spring 2007, along with accompanying road brochures for designated highway segments. The final product is projected to be complete by spring 2008.

GEOCHEMISTRY ■ & MINERAL ASSESSMENTS ▲

1 GSC, in collaboration with **GEOFF BRADSHAW**, completed a stream geochemical survey of an area covering the Kandik Basin in north-central Yukon, south of Fishing Branch Territorial Park. Funding for the survey was provided by DIAND through the SINED. Results will be released in late spring 2007.

AEROMAGNETIC SURVEYS ■■

1 GSC, in collaboration with YGS, began an extensive aeromagnetic survey in the Wernecke and Mackenzie mountains. Funding was provided by DIAND under SINED. Inclement weather during the summer prevented completion of the survey. Completion is now expected in early 2007 with results released in late summer.

GEOFF BRADSHAW MEMORIAL

by Jeff Bond



This summer the Yukon Geological Survey suffered a great loss with the death of Geoff Bradshaw. On July 22, Geoff was tragically killed in a helicopter accident while conducting work toward the Peel River mineral assessment. His passing sent shock waves throughout the mineral industry, government and the community of Whitehorse.

Geoff joined the Yukon Geological Survey in the fall of 2003 after a number of years working in the private sector on both Yukon and international projects. His passion for geology became

clearly evident by the exceptional work he put into his Master's thesis on the geology of the Wolverine deposit. This keenness carried over into his career at the Yukon Geological Survey where it transformed those of us who worked closely with him. He will be well remembered for his enthusiasm, work ethic and his unique ability to bring staff together.

In Geoff's honour, his partner, Zoë Morrison, his brother, Mike, and I constructed a cairn outside of Whitehorse on Tally Ho Mountain. In addition, a scholarship fund has been established in his name to assist future students that wish to pursue research into Yukon geology. Information on both of these memorials can be found on the YGS website (<http://www.geology.gov.yk.ca/bradshaw.html>).

The Yukon Geological Survey would like to thank everyone who has supported us, his partner and his family during this difficult time. Geoff was a valued co-worker and friend, one who made a significant contribution towards making the Yukon a better place.

NEW PUBLICATIONS, DATABASES, MAPS, OPEN FILES

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ANNUAL REPORTS

Emond, D.S., Bradshaw, G.D., Lewis, L.L. and Weston, L.H., 2006. Yukon Exploration and Geology 2005. 339 p., \$10.

Burke, M., LeBarge, W., Traynor, S., Abbott, G., Colpron, M. and St. Amand, J., 2006. Yukon Mining, Development and Exploration Overview 2005. 75 p., free.

Traynor, S. (compiler), 2006. Yukon Mineral Deposits 2006. 14 p., free.

DATABASES

Deklerk, R. and Traynor, S. (compilers), 2005. Yukon MINFILE 2005 – A database of mineral occurrences. CD-ROM, \$30.

LeBarge, W.P. (compilers), 2006. Yukon Placer Database 2006 – Geology and mining activity of placer occurrences. CD-ROM, \$30.

OPEN FILES

Bond, J.D. and Sanborn, P.T., 2006. Morphology and geochemistry of soils formed on colluviated weathered bedrock: Case studies from unglaciated upland slopes in west-central Yukon. YGS Open File 2006-19, \$5.

Bond, J.D. and Church, A., 2006. McConnell Ice-flow and placer activity map, Big Salmon Range, Yukon (1:100 000 scale). YGS Open File 2006-20, \$5.

Colpron, M. (compiler), 2006. Tectonic assemblage map of Yukon-Tanana and related terranes in Yukon and Northern British Columbia (1:1 000 000 scale). YGS Open File 2006-1, \$5.

Friske, P.W.B., McNeil, R.J., McCurdy, M.W., Wilson, R.S. and Day, S.J.A., 2006. Geochemical Data from a National Geochemical Reconnaissance Stream Sediment and Water Survey in the Yukon Portion of the Flat River Map Area, Southeast Yukon Territory (Part of NTS 95E). YGS Open File 2006-18/GSC Open File 5329, CD-ROM, \$7.

Friske, P.W.B., McNeil, R.J., McCurdy, M.W., Wilson, R.S. and Day, S.J.A., 2006. Geochemical Data from a National Geochemical Reconnaissance Stream Sediment and Water Survey in the Area of Old Crow, Northern Yukon Territory (Parts of 116J, 116K, 116N, 116O, 116P, 117A, 117B). YGS Open File 2006-17/GSC Open File 5319, CD-ROM, \$7.

MINERAL ASSESSMENT OPEN FILES

These have been done over the last 10 years and are being released this year. They are not for sale, but can be viewed in the Energy, Mines and Resources library or downloaded from the website.

Fonseca, A., 2006. Mineral Assessment of the Ddhaw Ghro Habitat Protection Area, Yukon. YGS Open File 2006-5.

Fonseca, A., 2006. Mineral Assessment of the proposed Frances Lake Special Management Area, Yukon. YGS Open File 2006-6.

Fonseca, A., 2006. Protected Areas in Canada. YGS Open File 2006-14.

Héon, D., 2006. Mineral Assessment of the Tombstone Study Area, Yukon. YGS Open File 2006-2.

Héon, D., 2006. Mineral Assessment of the Eagle Plain Study Area, Yukon. YGS Open File 2006-3.

Héon, D., 2006. Mineral Assessment of the Northern Klwane Wildlife Sanctuary, Yukon. YGS Open File 2006-4.

Héon, D., 2006. Isotope dating of lead-zinc occurrences in the Bonnet Plume area, Preliminary report. YGS Open File 2006-16.

Héon, D. and Sax, K., 2006. Investigations of 2000 RGS survey, Northern Yukon, Eagle Plains Ecoregion. YGS Open File 2006-15.

Hulstein, R., 2006. Report on the Detailed Mineral Assessment of the Proposed Kusawa Natural Environment Park Special Management Area, Yukon. YGS Open File 2006-7.

Hulstein, R., vanRanden, J., Stroshein, R. and Andersen, F., 2006. Report on 2002 Geochemical Procedures used during Mineral Resource Assessments. YGS Open File 2006-13.

Stroshein, R., 2006. Report on the Detailed Mineral Assessment of the Proposed Lewes Marsh/McClintock Bay and Tagish River Special Management Areas, Yukon. YGS Open File 2006-9.

Stroshein, R., 2006. Report on the Detailed Mineral Assessment of the Proposed Scottie Creek Special Management Area, Yukon. YGS Open File 2006-12.

Stroshein, R. and Hulstein, R., 2006. Report on the Detailed Mineral Assessment of the Proposed Pickhandle Lakes Special Management Area, Yukon. YGS Open File 2006-10.

Stroshein, R. and Hulstein, R., 2006. Report on the Detailed Mineral Assessment of the Proposed Wellesley Lake Special Management Area, Yukon. YGS Open File 2006-11.

vanRanden, J., 2006. Report on the Detailed Mineral Assessment of the Proposed Snafu/Tarfu Natural Environment Park Special Management Area, Yukon. YGS Open File 2006-8.

