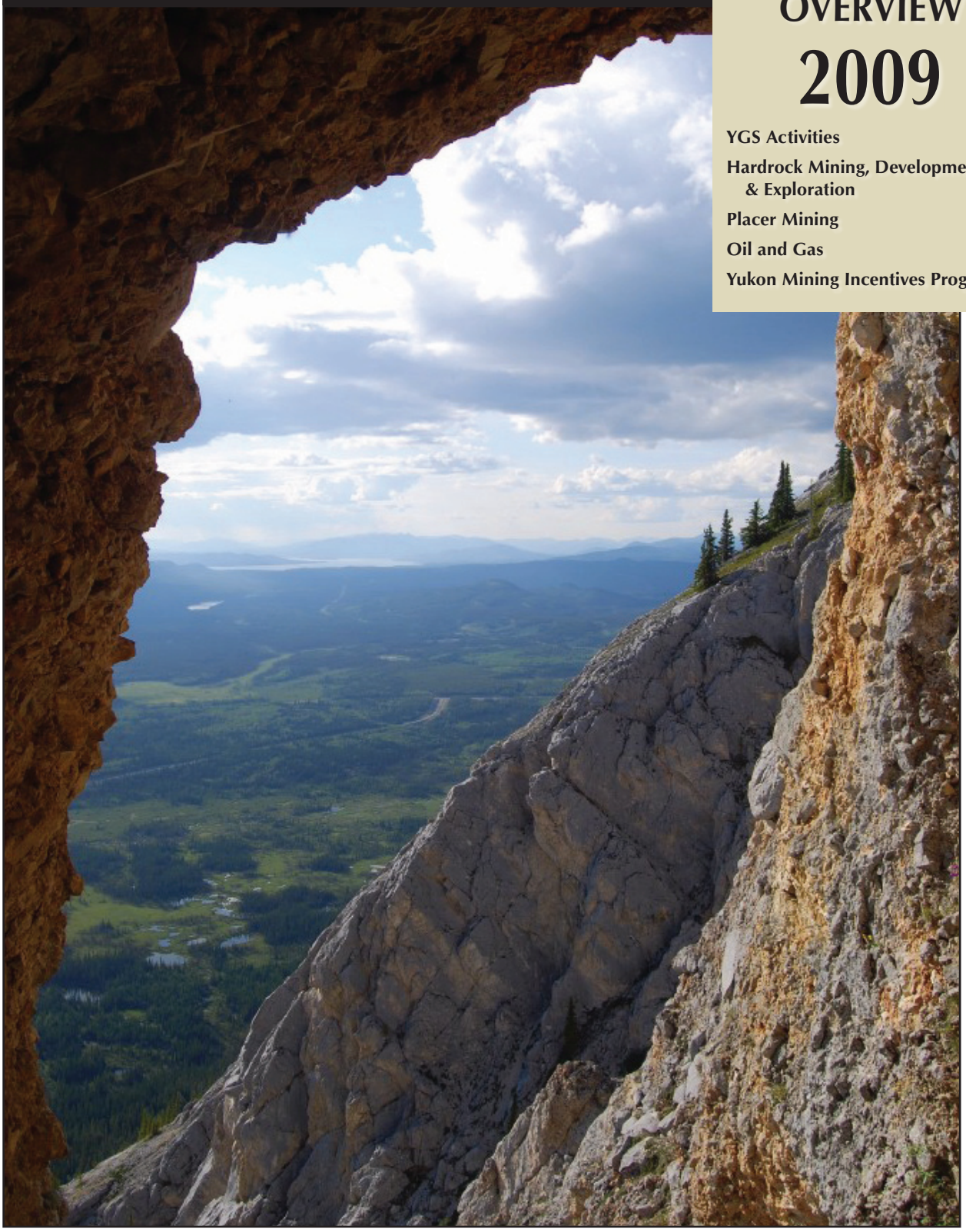
Energy, Mines and Resources • *Yukon Geological Survey*

YUKON
EXPLORATION & GEOLOGY OVERVIEW
2009



YUKON GEOLOGICAL SURVEY

Yukon
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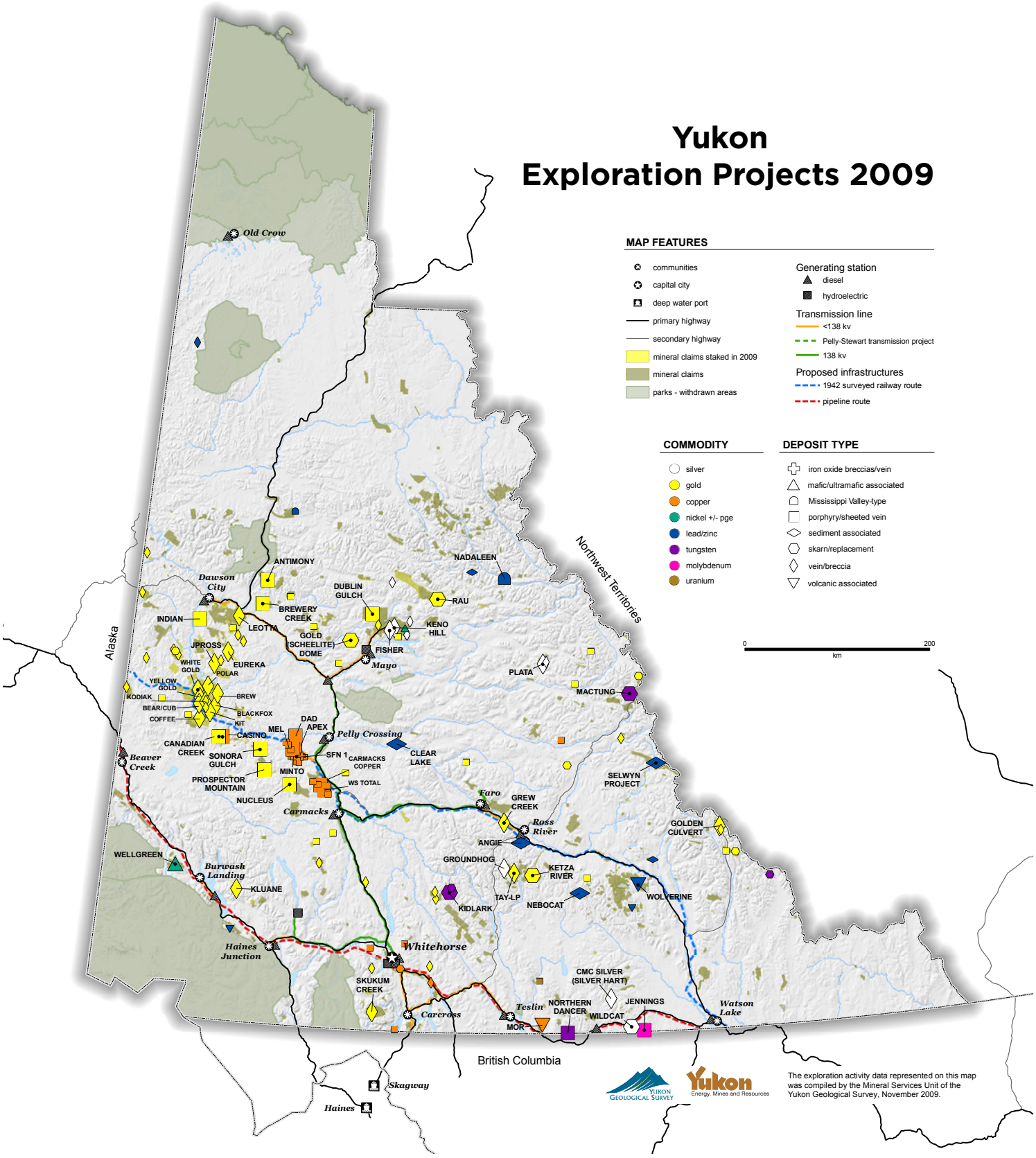

Figure 1. *Yukon exploration projects, 2009. Black dot in symbol indicates project drilled in 2009; advanced projects (>$100,000 in expenditures) have large labelled symbols; early stage projects (<$100,000 in expenditures) have small unlabelled symbols.*

YUKON
EXPLORATION & GEOLOGY OVERVIEW
2009

Edited by
K.E. MacFarlane, L.H. Weston and
L.R. Blackburn

Yukon Geological Survey
Energy, Mines and Resources
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Front cover photograph: Altered limestone. View is to the northwest; Atlin Road in foreground, Marsh Lake in background. Photo by Nicolai Goeppel.

PREFACE

Yukon Exploration and Geology (YEG) continues to be the main publication of the Yukon Geological Survey (Energy, Mines and Resources, Yukon government). This is the 32nd volume of the series and marks the first time that it will only be available digitally. Individual YEG papers, with colour images, can be downloaded from our website. The Yukon Exploration and Geology Overview will continue to be available in print and digital formats. As in previous volumes, YEG 2009 contains up-to-date information on mining and mineral exploration activity, studies by industry, and results of recent geological field studies. Information in this volume comes from prospectors, exploration and government geologists, mining companies and students who are willing to contribute to public geoscience for the benefit of the scientific community, general public, and mineral and petroleum industries of Yukon. Their efforts are appreciated.

Having accepted the position of Head, Technical Services for the Yukon Geological Survey (YGS) in 2009, I also inherited the title of Chief Editor of YEG. It was my first experience with this volume and I must thank Leyla Weston and Lauren Blackburn for their patience and assistance as co-editors. Their commitment and hard work in ensuring that this volume can be delivered to you speaks volumes to their abilities to work gracefully under pressure. Several of our colleagues at the YGS have contributed to this volume, both in preparing and reviewing manuscripts, and deserve a thank you as well.

Wynne Krangle and Peter Long of K-L Services continue to provide excellent service in putting this production together, including editing suggestions, design of diagrams, volume layout, and working under the pressure of a tight deadline. Chera Hunchuk of the Queen's Printer ensured that the printing process went smoothly.

This year's Yukon Exploration and Geology is dedicated to the geologists, prospectors and colleagues who continue to live on in spirit. May they continue to inspire.

We welcome any input or suggestions that you may have to improve future YEG publications. Please contact me at (867) 667-8719, or by e-mail at karen.macfarlane@gov.yk.ca.

Karen MacFarlane

YUKON GEOLOGICAL SURVEY

TABLE OF CONTENTS

Yukon Geological Survey staff: (front row, left to right) Lara Lewis, Carolyn Relf, Tammy Allen, Leyla Weston, Tiffani Fraser and Joyia Chakungal; (middle row, left to right) Laurie Fahr, Bill LeBarge, Sarah Laxton, Kristen Kennedy, Bailey Staffen, Venessa Bennett, Lee Pigage, Karen MacFarlane, Rachelle Dufour; (back row, left to right) Karen Pelletier, Jeff Bond, Charlie Roots, Maurice Colpron, Steve Israel, Panya Lipovsky, Grant Abbott, Aubrey Sicotte and Mike Burke.
Missing from photo: Don Murphy, Grant Lowey, Olwyn Bruce, Robert Deklerk, Steve Traynor, Danièle Héon and Edward Long.

Summary of Yukon Geological Survey's 2009-2010 activities

Carolyn Relf[1]
Director, Yukon Geological Survey

Relf, C., 2010. Summary of Yukon Geological Survey's 2009-2010 activities. *In*: Yukon Exploration and Geology 2009, K.E. MacFarlane, L.H. Weston and L.R. Blackburn (eds.), Yukon Geological Survey, p. 7-16.

INTRODUCTION

Yukon Geological Survey (YGS) had a productive field season in 2009 and continues to be busy generating maps and reports from summer activities. The scope of several of our field projects was expanded this year as a result of collaboration with the Geological Survey of Canada (GSC) under the federal Geo-mapping for Energy and Minerals (GEM) program. In addition to YGS activities, the level of investment in mineral exploration and development exceeded expectations in 2009, resulting in a very busy year for Mineral Services and Technical Services staff.

This report provides a brief snapshot of YGS' activities this fiscal year. Summaries of hard-rock exploration and development and placer activities are described elsewhere in this volume (see Burke, 2010 and LeBarge, 2010 respectively).

FUNDING AND PROGRAM OVERSIGHT

YGS funds its activities from a number of sources (Table 1). A core operating budget funds regional mapping and thematic studies, industry liaison and client information services, while dedicated operating funds exist for carrying out studies related to mineral and petroleum assessments. Funding for the Yukon Mining Incentives Program (YMIP) is dedicated exclusively for grants awarded on a competitive basis to support mineral prospecting and exploration. YGS also administers grants under the Mineral and Petroleum Environmental Research Group (MPERG).

Table 1. *Summary of YGS operating funds for 2009-2010.*

Funding Source	Amount	Description
Core Operating Budget	$868,000	Bedrock and surficial mapping; thematic studies (including university partners); exploration and development property visits; information management and client services
Mineral Assessment	$262,000	Mineral potential assessments and metallogeny
Oil & Gas Assessment	$175,000	Petroleum-related studies: stratigraphy, sedimentology; hydrocarbon analysis
YMIP	$1,700,000	Dedicated funds for YMIP grants ($30K allocated for program administration)
MPERG	$50,000	Studies related to baseline environmental studies and mitigation
SINED	$250,000	Multiple activities: processing of geophysical data; leveling of Regional Geochemical Survey data; development of corporate database; scanning/cataloguing of archived files; seismic monitoring; target studies in Klondike, geothermal workshop
Total	$3,305,000	

[1]*carolyn.relf@gov.yk.ca*

This fiscal year represents year one of a five-year renewal of the Strategic Investments in Northern Economic Development (SINED) program. Previously managed by Indian and Northern Affairs Canada, the program is now administered by the new northern economic development agency CanNor. YGS received a one-year grant in 2009-2010 to undertake a number of projects; most of these were reconnaissance and/or ramp-up activities in advance of a proposed four-year SINED-funded geoscience program. A decision on whether to fund the four-year program is anticipated by spring 2010.

In addition to YGS' investments in Yukon, the Geological Survey of Canada undertook new mapping in collaboration with YGS under the auspices of their GEM Program.

While funding for YGS program activities is allocated on an annual basis, project planning and priority setting is typically done over a longer timeframe. In April 2009, YGS organized its fourth in a series of planning workshops held every five years. In attendance were members of YGS' Technical Liaison Committee as well as a number of clients and research partners. Input was provided on program gaps, criteria for priority setting, and research opportunities. This input will be valuable in planning and implementing our program over the next five years. A report summarizing the discussions will be released early in 2010.

YGS STAFF CHANGES

YGS underwent some changes in staff in 2009. Rod Hill, who worked for Yukon government for 23 years, retired in June, leaving a large gap in YGS' corporate memory and experience. Carrie Labonte, our administrative coordinator, transferred to the Department of Tourism to manage their Finance section. These two positions were re-cast over the summer into a Manager of Finance and Operations, and a GIS Technician, and in September they were filled by Laurie Fahr and Bailey Staffen, respectively. I would like to take this opportunity to thank Rod for his years of dedicated service to YGS and its various pre-devolution incarnations; and for providing me with advice and contextual knowledge in my first year and a half with the organization. I would also like to thank Carrie Labonte, whose efficiency and humour are missed by all survey staff.

In addition to the above, YGS hired two new indeterminate and one term geologist in 2009. Venessa Bennett joined the survey in May as a metallogenist/mineral assessment geologist. Her responsibilities will include provision of mineral deposit studies ranging in scale from regional metallogeny to deposit-scale research, as well as generation of mineral potential assessments in support of Yukon's Land Use Planning process. Joyia Chakungal joined YGS in June as a bedrock mapping geologist. She is ramping up to initiate a new mapping project in the Nash Creek area in 2010. Our third new project geologist is Sarah Laxton, hired on a 1.5-year term to compile ground temperature data as part of a project designed to assess infrastructure vulnerability to permafrost degradation. This project is funded by Indian and Northern Affairs Canada through the federal Climate Change Action fund, and is being delivered jointly with Yukon's departments of Environment and Transportation and Public Works.

In October, Olwyn Bruce started a year's maternity leave following the arrival of Quinn Israel, son of Olwyn and Steve Israel.

Finally, Steve Traynor, YGS' YMIP geologist, is taking a year's leave between October 2009 and 2010. During his absence, his position has been back-filled by Danièle Héon, who will administer the program and liaise with YMIP recipients.

FIELD ACTIVITIES: MAPPING

YGS staff undertook mapping and related studies in six areas in 2009. Most of the field work was carried out in collaboration with colleagues from the Geological Survey of Canada (GSC) and contributed to three projects under GSC's GEM program (Fig. 1). In northern Yukon, targeted mapping and stratigraphic studies were carried out in Bonnet Plume, Peel Plateau and Eagle Plain: work in the latter two areas comprised part of the Yukon GEM Energy project. In southeastern Yukon, a bedrock and surficial mapping project was delivered in the Coal River map sheet (a contribution to the Selwyn Basin GEM project). In southwestern Yukon, activities included bedrock mapping in the Windy-McKinley area, bedrock and surficial mapping in the McQuesten map sheet, and numerous thematic studies targeting specific geologic problems in the Yukon-Tanana and adjacent insular terranes. These activities fall under the umbrella of the GEM Edges project, which covers a portion of southwestern Yukon and northwestern British Columbia.

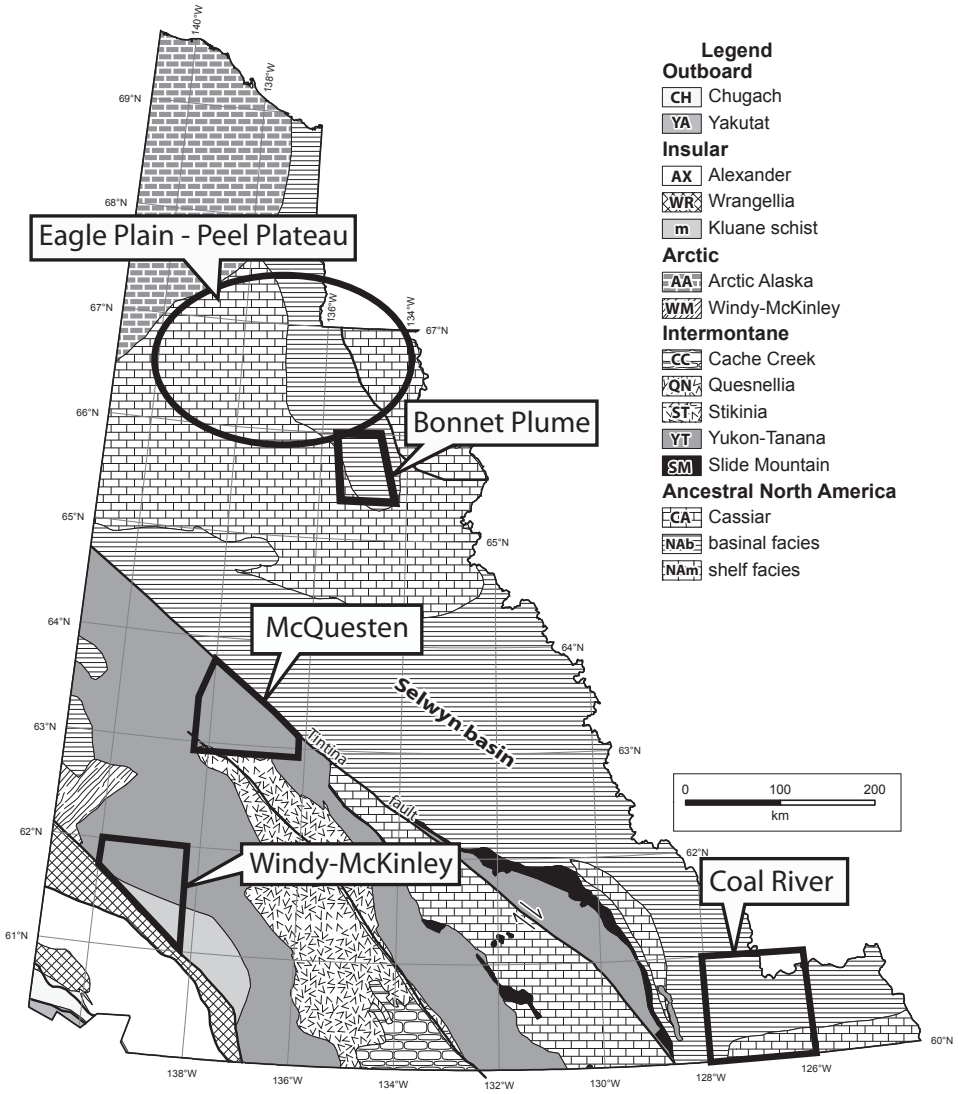

Figure 1. *Location of field mapping projects.*

Table 2. *Summary of mapping and field-based studies carried out by YGS staff in 2009; *indicates activities that were contributions to GSC's GEM program.*

Project	Lead(s)	Highlights
Eagle Plain – Peel Plateau*	Tammy Allen, Grant Lowey (YGS), Larry Lane (GSC) (Allen, 2010)	Focus on source rock and reservoir potential of upper Phanerozoic and Cretaceous rocks
Bonnet Plume	Grant Lowey (YGS)	Basin sedimentology and stratigraphy; examination of coal; evaluation of hydrocarbon potential
Coal River bedrock mapping*	Lee Pigage, Grant Abbott (YGS), Charlie Roots (GSC)	Upgraded stratigraphic correlations and structural interpretation of map area; newly documented Cretaceous plutons (implications for mineral potential)
Coal River surficial mapping	Kristen Kennedy (YGS) (Kennedy, 2010)	New mapping of eastern half of map sheet; documented ice-flow and drainage histories (implications for surficial geochemical exploration)
Windy-McKinley bedrock mapping*	Don Murphy, Steve Israel (YGS), Cees van Staal (GSC)	Completed mapping between Beaver Creek and Kluane Lake; new insights into terrane/sub-terrane assembly for region
McQuesten bedrock mapping*	Maurice Colpron (YGS), Jim Ryan (GSC) (Colpron and Ryan, 2010)	Improved resolution of geology in area with high mineral potential; newly recognized porphyry potential of Reid Lakes batholith
McQuesten surficial mapping	Jeff Bond, Panya Lipovsky (Bond and Lipovsky, 2010)	Refined understanding of glacial limits of pre-Reid events; implications for application of surficial geochemistry tools

Table 2 provides brief descriptions of each of the six field projects. Projects that are contributions to the federal GEM program are indicated, but the information provided here focuses on the contributions made by YGS staff; the reader is referred to GSC's GEM program webpage for more information on GEM projects and publications *(http://gsc.nrcan.gc.ca/gem/)*.

FIELD ACTIVITIES: GEOPHYSICAL SURVEYS

New magnetic data were collected over four areas in 2009, and a fifth area is scheduled to be surveyed before the end of the fiscal year (Fig. 2, Table 3). In addition to new data, YGS undertook a project in collaboration with Aurora Geosciences Ltd. to re-process and integrate recently collected magnetic and MegaTEM data with geology and MINFILE showings in the Windy-McKinley area. The work resulted in an upgrade of the bedrock geology mapped by Murphy in 2008 (Murphy, in prep.), and an interpretive mineral target map planned for release early in 2010.

MINERAL SERVICES ACTIVITIES

Mike Burke, Lara Lewis and Bill LeBarge continued to monitor Yukon hard-rock and placer exploration and development activities, visit active properties, review reports for assessment credit, and provide information and advice to clients. Overviews of industry activities are presented elsewhere in this volume (Burke and Lewis, 2010 and LeBarge, 2010).

YUKON DRILL CORE PROGRAM

In late March, 2009, YGS was awarded a grant under the federal Artic Research Infrastructure Fund (ARIF) to rebuild the H.S. Bostock Core Library. The new building will be located at Mile 918 on the Alaska Highway, beside EMR's Forestry Management Branch. It will house Yukon's collection of diamond drill core, rock and surficial samples collected by YGS, lapidary and sieving facilities, and the teaching collection maintained by the Outreach Program. Currently the project is in the final stages of design, and plans are to award a contract to build early in 2010 with occupancy by April 2011.

The new Core Library represents an exciting opportunity to enhance our drill core program. To that end, YGS acquired a hand-held Niton XRF analyzer over the summer and plans to staff a half-time position to manage the core program and assist clients using the facility. Once staffed (likely early in 2011), priorities will be to update the Yukon drill core database and undertake the scanning and photographing of selected core.

In addition to its hard-rock core program, YGS manages core and cuttings from Yukon oil and gas wells, housed at the Geological Survey of Canada's core facility in Calgary. Core and cuttings can be accessed, with YGS' approval, by industry clients and researchers seeking to sample and analyze material from Yukon wells. Lee Pigage oversees this function and maintains a database of wells that have been sampled. Upgrades to the YGS website include posting of the application form for accessing samples and a template for submitting analytical data.

YGS FUNDING PROGRAMS

YUKON MINING INCENTIVES PROGRAM

The Yukon Mining Incentives Program (YMIP) had a substantial increase in total investment by the Government of Yukon this year. In addition, the upper limits for grants in each of the three program categories were increased to more accurately reflect the current cost of exploration. The rationale for the investment was linked to the global economic crisis, and the intent of the one-year increase was to help sustain industry activity during the recession and to recover more quickly following it. This fiscal year, $1.67M was made available, and the response was an unprecedented number of applications. In total, 173 applications were received, with requests totalling just under $4.75M. Seventy five hard-rock and 28 placer projects were approved, with grants being capped at 75% of the maximum allowable amounts to ensure that as many projects as possible would receive funding. Based on investment commitments made in the successful applications, this year's YMIP funds leveraged a minimum of $6.82M in exploration expenditures, representing a leveraging ratio of >4:1. Information on the 2009-10 YMIP projects is presented in Burke (2010) and can be found at *www.geology.gov.yk.ca/ymip.html*.

MINING AND PETROLEUM ENVIRONMENTAL RESEARCH GROUP

Mining and Petroleum Environmental Research Group (MPERG) continued to provide partial funding for research projects designed to help mitigate the impacts of

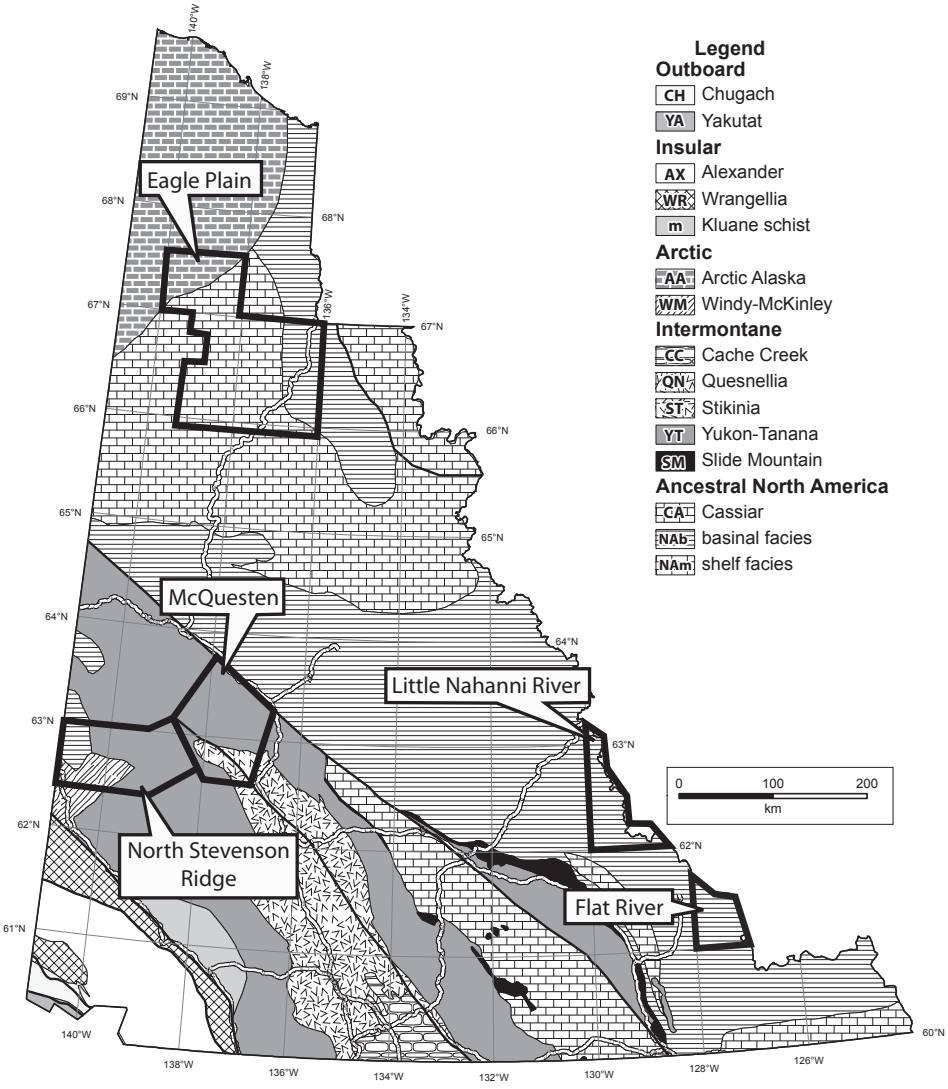

Figure 2. *Location of 2009-2010 magnetic surveys.*

Table 3. *Summary of geophysical surveys flown in 2009.*

Survey area	Details	Release date
McQuesten (NTS 115P)	400 m line spacing aeromagnetic survey funded by GSC (GEM); contribution to Edges project	July 2009
North Stevenson Ridge (NTS 115J/N, 115K/N)	400 m line spacing aeromagnetic survey funded by YGS (SINED); contribution to Edges project	November 2009
Eagle Plain (parts of NTS 116I, 116J, 116O)	800 m line spacing aeromagnetic survey funded by YGS (SINED); contribution to Yukon GEM Energy project	Anticipated release in February 2010
Flat River (NTS 95E)	800 m line spacing aeromagnetic survey funded by YGS	Anticipated release spring 2010
Little Nahanni River (NTS 105I)	800 m line spacing; aeromagnetic survey scheduled to be flown in March 2010	Anticipated release summer – fall 2010

Table 4. *List of MPERG projects funded in 2009.*

Project	Lead Proponent	Funding
Assessment of Low Permeability Cover as Infiltration and Oxygen Barrier to Reduce Acid Generation in Mine Tailings at the Arctic Gold and Silver Mine Site, Carcross, Yukon	EBA Engineering Consultants Ltd.	$9,400
Speciation of Arsenic, Chromium, Mercury and Selenium in the Selwyn Basin	EBA Engineering Consultants Ltd.	$12,000
Assessing Alternative Methods for Reclamation of an Exploration Trail that had Disturbed the Active Permafrost Layer	Laberge Environmental Services	$5,200
Evaluation of the Effectiveness of Mine Water Bioremediation	Laberge Environmental Services	$4,900
Monitoring Experimental Re-vegetation Plots Set up in 2003-2005 at Three Yukon Abandoned Tailings Sites	Tom Hutchinson, Trent University	$9,500
Evaluation of Factors Influencing Spontaneous Vegetation Succession in Northern Latitude Disturbances: Assessment of Natural Recolonization of Historic Decommissioned Borrow Pit and Highway Sections in Yukon	Diane Lister	$9,000

mineral and petroleum exploration and development. MPERG is managed by Karen Pelletier, and the steering committee, made up of representatives from government, industry, Yukon First Nations and non-government organizations, is chaired by Carolyn Relf.

In total, six projects were approved for funding in 2009-10 (see Table 4).

In September 2009, the MPERG steering committee met with a representative of Yukon College's new Research Centre of Excellence to discuss the possibility of merging MPERG with the College's evolving research program in environmental sciences. Given the College's new designation as a degree-granting institution and its potential for leveraging additional funds that align with the goals of MPERG, the committee agreed that in 2010 YGS would transfer the funds to the College to administer, and bring one or more College staff onto the steering committee. It is hoped that this change in program administration will benefit MPERG goals by attracting more researchers with specialties in fields related to remediation in cold environments.

OUTREACH

Karen Pelletier continues to coordinate YGS' outreach and education program. To date this fiscal year, she and her colleagues have participated in 31 outreach events, including school visits, career fairs, open houses, Mining Week activities and field trips. Outreach events comprise hands-on activities and are well received by teachers and communities. In addition to the above, progress continued on a number of educational publications, including the Yukon geological highway map and a series of brochures that describe and illustrate geologic features along the North and South Klondike Highways, Alaska Highway (east and west) and the Robert Campbell Highway.

COMMUNITY ENGAGEMENT

In 2009, Leyla Weston took on a coordinating role for liaising between Yukon First Nations and YGS. Her primary function in this role is to serve as a contact point to ensure information on YGS' program activities is shared in a timely manner with potentially affected First Nations. This is accomplished through face-to-face meetings and phone calls, with the intended outcome being a mutual awareness of, and respect for, each parties' interests, resources and goals. To date, YGS has met and exchanged information with Vuntut Gwich'in, Selkirk, Liard, Kluane and White River first nations, and is committed to continuing with this approach and working with all Yukon First Nations.

LONG-TERM MONITORING AND RESEARCH

YGS is involved in a number of long-term monitoring projects designed to predict geologic hazards and mitigate their impacts on Yukoners. Seismic activity is of significant public interest, particularly in southwestern Yukon along the Alaska Highway and proposed pipeline route. In 2009, YGS funded the deployment of several campaign GPS stations in the St. Elias Mountains as part of an ongoing study to document slip rates along the Denali and Duke River fault systems. This project is being led by Stéphane Mazotti (GSC) in collaboration with

Panya Lipovsky, Don Murphy, Steve Israel (YGS) and Charlie Roots (GSC).

Another area of public interest relates to climate change and its relation to forest fires, glacial retreat and permafrost degradation, particularly where it impacts slope stability and threatens infrastructure. YGS is continuing efforts to characterize these issues in order to support planned development activities, maintain infrastructure and assist land-use planning in the territory. Two long-term initiatives of YGS are the monitoring of permafrost and documenting of landslides. Panya Lipovsky (YGS) and Kenji Yoshakawa (University of Alaska, Fairbanks) installed data loggers in six communities in 2007 to continuously monitor ground and air temperatures. The instruments are part of a circumpolar network of permafrost monitoring stations; Sarah Laxton will take over monitoring during the next year and a half as part of her work compiling Yukon permafrost data. Panya Lipovsky has also been documenting landslides caused by permafrost melting in the Carmacks and Little Salmon Lake areas. Extensive forest fires in 2009 resulted in a number of new slides in this region.

In addition, Panya Lipovsky continued compiling borehole data from along the Alaska Highway (surficial stratigraphy, ice character, etc). This database will be a valuable planning tool for both ongoing maintenance and future development along this corridor.

INFORMATION MANAGEMENT AND INFORMATION SERVICES

CORPORATE DATABASE

A project to merge and integrate YGS' various databases into a single corporate 'enterprise' database was initiated in 2008-09, and continued this year. In year 1, a data model was built and tested for a new Oracle database that will contain our datasets, eliminating duplication between databases and streamlining data entry. This year, YGS awarded a contract to Vandelay Systems to build the new database and develop data entry forms. Their initial focus will be to capture fields covered by the MINFILE, Placer, Igneous and Reference databases, with other data fields (e.g. stream sediment geochemistry) being added in spring, 2010. It is anticipated that the new database will be built by the end of the fiscal year and testing of forms will be completed by late spring 2010. Funding for this work is being provided by CanNor through SINED, and EMR's Corporate Services.

As modules of the new database are completed, data will be migrated into it from existing databases. The next phase of the project (anticipated in 2011-12) will entail the development of web tools to allow end-user access. These will be built using ArcGIS Server, which will support web mapping services, web feature services, and Google Earth searches, among other tools.

MINFILE DATABASE

Robert Deklerk is responsible for the entry and maintenance of data in the MINFILE database. In order to provide information that is as current as possible, a modified approach to data capture was used this year: in addition to pulling data from Assessment Reports, property information was captured from corporate websites and press releases. To date this year, 11 new occurrences have been added to the database (including 5 in the White Gold area), all occurrences in NTS map sheet 106D (Nash Creek) have been updated, and data from over 100 backlogged Assessment Reports have been captured.

ARCHIVED COLLECTIONS

YGS has received donated collections (maps, reports, sections) from a number of companies who have worked in Yukon, including files from Faro and Anvil Range. To date, about 90% of the text documents have been catalogued and transferred to Yukon Archives, where they can be accessed on request from the EMR Library. The remaining documents — about 50 boxes of files and 4000 maps and sections — have not been catalogued and remain inaccessible to clients.

In May, YGS committed to complete the inventory of donated files and scan them to allow on-line access by clients. This fall, Karen MacFarlane documented the number of different types of files and sought an estimate for the cost to scan and index the entire collection (including those housed in Yukon Archives). Scanning of the highest priority documents will be initiated early in 2010 using SINED funds allocated for this purpose. Ongoing funding to continue scanning is currently being pursued, and in the meantime, a priority list will be maintained so that files can be scanned opportunistically as time and resources allow.

WEBSITE UPGRADES

Input from clients at the planning workshop in April identified a number of issues with YGS' website, including

out-of-date information, problems with database searches, and time-outs that did not allow large files to be downloaded. Some of these issues have been exacerbated by corporate replacement of servers, breaking links between web applications and source information and causing frustration for clients.

YGS' Technical Services group has taken a critical look at the website and its on-line information services, and identified a number of priorities for upgrading. Bailey Staffen is YGS' lead on website maintenance, and can be contacted if users experience difficulties. Priority fixes include generating links to EMR's Oil & Gas Branch for easier access to well data, a commitment by staff to update project information, and more regular communication with our central corporate Geomatics staff who manage web servers. A common issue that many clients report relates to MINFILE data: recently entered data are accessible in real time via the on-line MINFILE search application *(http://servlet.gov.yk.ca/ygsmin/index.do)*, but if the database is queried via MapMaker *(http://maps.gov.yk.ca/imf.jsp?site=YGS)* the search tool reads a static extract of MINFILE data and gives the user outdated information. In the past, this extract has not been updated frequently as it requires significant re-formatting of the data to allow MapMaker to read it. Once new web applications are developed for the enterprise database, this issue will be resolved; in the meantime, YGS will work to ensure the MINFILE extract is never more than 2 months old.

EXTERNAL RESEARCH FUNDED BY YGS

In 2009, YGS provided partial funding and/or logistical support for several thematic studies that were led by university researchers. Many of these studies involve graduate theses on different aspects of Yukon geology. The studies are described briefly in Table 5 and their locations are illustrated in Figures 3a and 3b. A number of

Table 5. *Summary of university-based studies being supported by YGS.*

Project	Lead (student/supervisor)	Highlights
Dawson Ranges Au study	Theirry Bineli Betsy/David Lentz, University of New Brunswick (UNB)	Petrogenesis of granite-associated Au-Ag vein systems, southeastern Dawson Ranges
Terrane assembly along North American margin	Luke Beranek/Jim Mortensen, University of British Columbia (UBC)	Detrital age determination of Triassic sedimentary rocks straddling Slide Mountain and Yukon-Tanana terranes and continental North America
Fine gold study	Robert Chapman, Leeds University (Chapman *et al.*, 2010)	Chemical fingerprinting and fine gold from Klondike placers
Cretaceous granites	Witold Ciolkiewicz/Craig Hart, UBC	Metallogeny of Cretaceous intrusions in southwestern Yukon
Duke River fault	Rosie Cobbett/Jim Mortensen, UBC (Cobbett *et al.*, 2010)	Characteristics and evolution of the Duke River fault
Keno Hill study	Simon Craggs/David Lentz, UNB	Integrated structural, geochemical and geochronologic studies of Ag-Pb-Zn veins at Keno Hill
Placer PGE potential study	Yana Fedortchouk, Dalhousie University (Fedortchouk *et al.*, 2010)	Identification of primary sources of placer platinum
Permafrost	Fabrice Calmels/Duane Froese, University of Alberta (U of A)	Testing permafrost resilience using historical disturbances in the Klondike area
Sediment-hosted base metal deposits	Neil Fernandes/Sarah Gleeson, U of A	Barite as a potential exploration vector for SEDEX-style deposits
Wernecke Supergroup study	Francesca Furlanetto/Derek Thorkelson, Simon Fraser University (SFU)	Detrital age determinations of Wernecke Supergroup clastic rocks (thesis write-up)
Mactung study	Andrew Gebru/David Lentz, UNB	Genesis of skarns at Mactung
Exposure dating	John Gosse, Dalhousie University	Application of exposure dating to erosion history and placer development
Keno Hill vein study	Jos Hantelmann/Sarah Gleeson, U of A	Metallogenesis of the Keno Hill Ag-Pb-Zn deposit
Minto deposit study	Shawn Hood/Ken Hickey, UBC	Petrogenesis and structural controls on ore at Minto Mine
Ar-Ar dating	Ellie Knight/David Schneider, University of Ottawa	Thermochronological studies of rocks in the McQuesten area

Table 5. *continued*

Project	Lead (student/supervisor)	Highlights
Mo, W indicator mineral study	Robert Linnen, University of Waterloo (UW) (Linnen and Che, 2010)	Assessment of possible indicator minerals for W, Mo deposits
Neoproterozoic stratigraphy	Francis MacDonald, Harvard University (MacDonald and Roots, 2010)	Global Proterozoic correlations and paleogeographic reconstructions
Study of Pinguicula Group	Kirsti Medig/Derek Thorkelsen, SFU (Medig *et al.*, 2010)	Stratigraphic framework of Proterozoic Pinguicula Group
D'Abbadie fault	Melanie Mercier/Sharon Carr, Carleton University	Structural mapping of the D'Abbadie strike slip fault, Pelly Mountains
Wernecke Breccias	Oscar Neilsen/Derek Thorkelsen, SFU	Provenance of igneous clasts in Wernecke Breccias
Tin Cup Lake study	Steven Scott/Sharon Carr, Carleton University	Structure and metamorphism of Yukon-Tanana and Windy-McKinley terranes, Tin Cup Lake area
Kluane schist	Ben Stanley/Shouffa Lin, UW	Petrology and structure of the Kluane schist
Glacial studies	Derek Turner/Brent Ward, SFU	Glacial stratigraphy and tephrochronology of southwestern Yukon
Neoproterozoic stratigraphy	Elizabeth Turner, Laurentian University	Correlation and origin of Neoproterozoic strata in northeastern Yukon
Big Salmon Range area	Elizabeth Westberg/Dan Gibson, SFU	Structural and thermal histories of the Mendocina Creek area (thesis write-up)

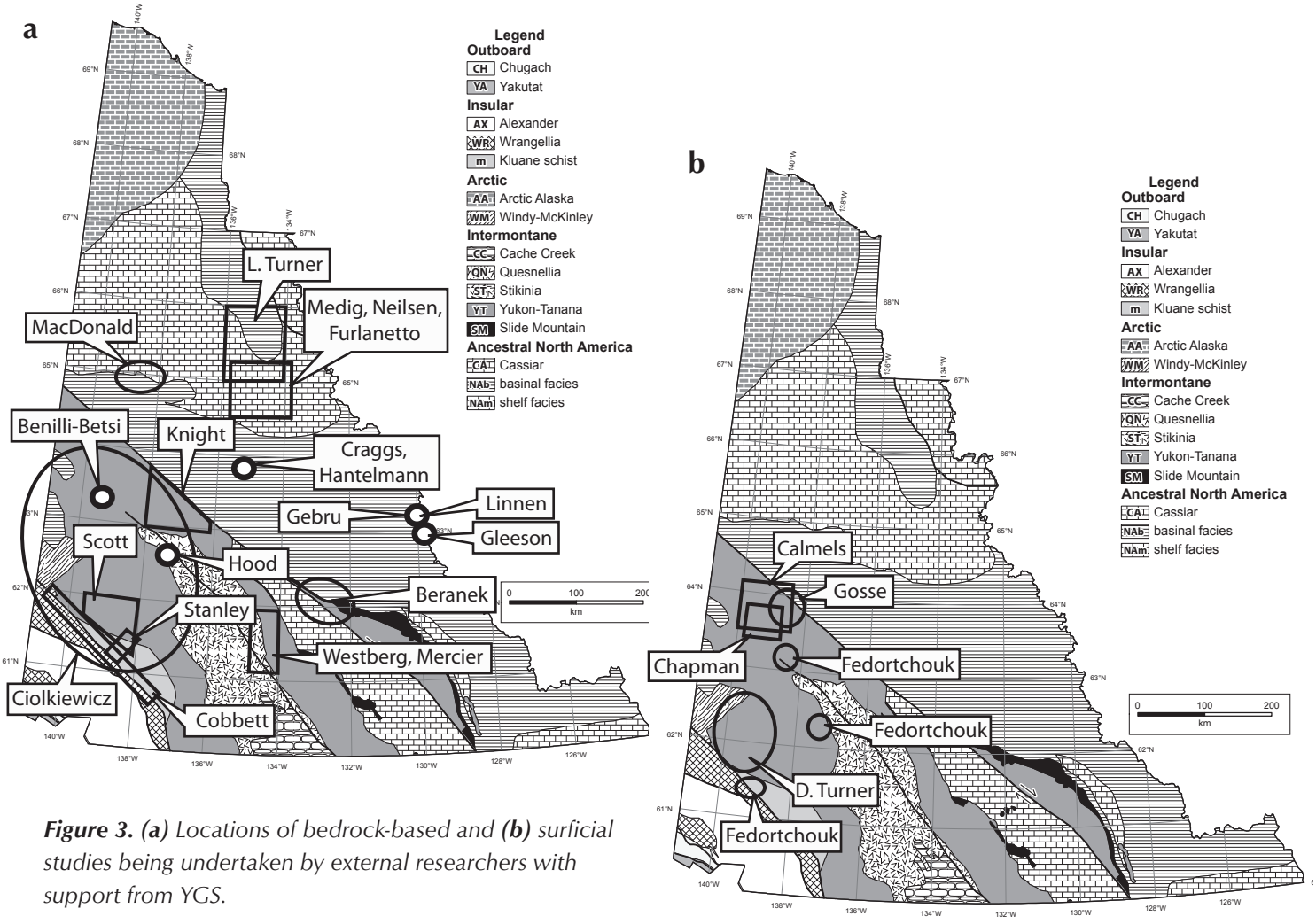

Figure 3. ***(a)*** *Locations of bedrock-based and* ***(b)*** *surficial studies being undertaken by external researchers with support from YGS.*

these external researchers have contributed papers to the Yukon Exploration and Geology 2009 volume.

In addition, several graduate students and post-doctoral fellows collaborated with YGS staff on Yukon-based studies funded by GSC through one or more GEM projects. Details of these studies can be found on NRCan's GEM website at *http://gsc.nrcan.gc.ca/gem/*.

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Yukon Hardrock Mining, Development and Exploration Overview 2009

Mike Burke[1] and Lara L. Lewis
Yukon Geological Survey

Burke, M. and Lewis, L.L., 2010. Yukon Mining, Development and Exploration Overview 2009. *In*: Yukon Exploration and Geology Overview 2009, K.E. MacFarlane, L.H. Weston and L.R. Blackburn (eds.), Yukon Geological Survey, p. 17-58.

INTRODUCTION

With the price of gold breaking the US$1000/oz mark, and the gradual upward trend of gold prices since April this year, the search for new gold targets in Yukon became an increasingly attractive activity during the 2009 exploration season (Fig. 1 on front inside cover). New bedrock discoveries and excellent exploration results at Underworld Resources Inc.'s White Gold property, south of Dawson City, and ATAC Resources Ltd.'s Rau property, 50 km northeast of Keno City, also helped spark interest in the commodity. Additionally, Victoria Gold Corp. commissioned a pre-feasibility study and a comprehensive project proposal to move closer to open pit production of the Eagle Gold project's (Dublin Gulch) 2,690,400 oz. indicated gold resource. Although Yukon exploration activities occurred throughout the classically known 'Tintina Gold Belt', the area of most intense interest was, and continues to be, the greatly under-explored Dawson Range area.

Although base metal exploration expenditures were substantial (approximately $30 million) and significant drill results were obtained at the Minto copper mine, base metals did not capture the same attention as exploration for gold. Many base metal projects in Yukon are conducting environmental, engineering and geotechnical programs in support of scoping or pre-feasibility studies. These projects are advancing these studies, moving towards feasibility and will potentially be making production decisions as base metal prices recover.

Exploration costs for 2009 are estimated at $90 million (Fig. 2) with gold projects capturing 47% of expenditures, silver 23%, copper and copper-molybdenum 15%, zinc-lead 11%, tungsten 3% and other commodities 1%.

Capstone Mining's copper-gold-silver Minto mine continued as Yukon's only operating hard-rock mine; however, that will end in 2010 with the opening of Yukon Zinc's zinc-silver-copper-gold-lead Wolverine mine and Alexco Resources' silver-lead-zinc Bellekeno mine. Combined mine development expenditures in 2009 for the three projects is estimated at $165 million.

There were over 200 active hard-rock exploration projects in Yukon in 2009: 60 projects recorded expenditures of greater than $100,000, and 18 spent more than $1 million. The remaining projects were regional or grassroots generative projects.

Claim staking remained at high levels, with a total of 15 642 claims staked and the number of claims in good standing rising to a total of 79 456 by year end (Figs. 3 and 4, respectively).

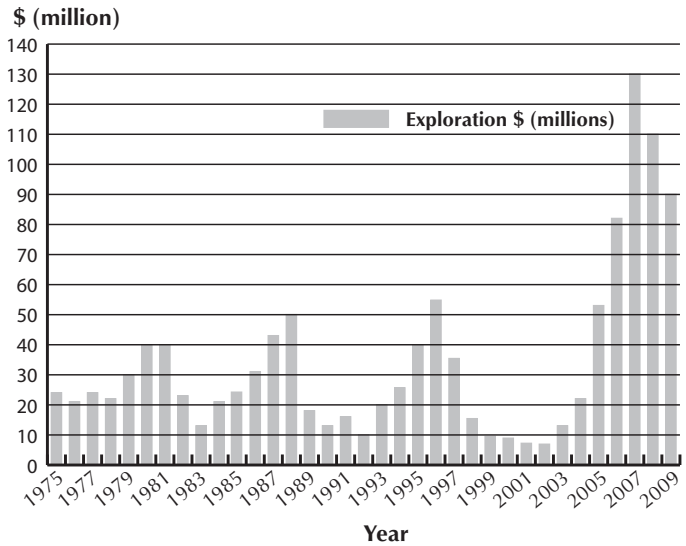

Figure 2. *Exploration expenditures in Yukon, 1975 to 2009.*

[1]*mike.burke@gov.yk.ca*

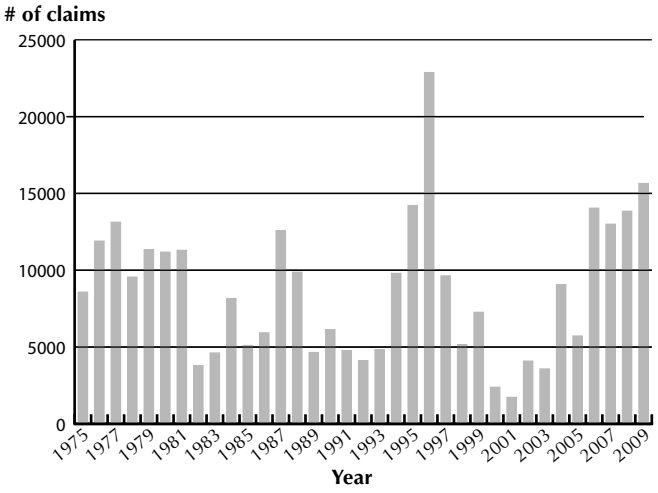

Figure 3. *Mineral claims staked, 1975-2009.*

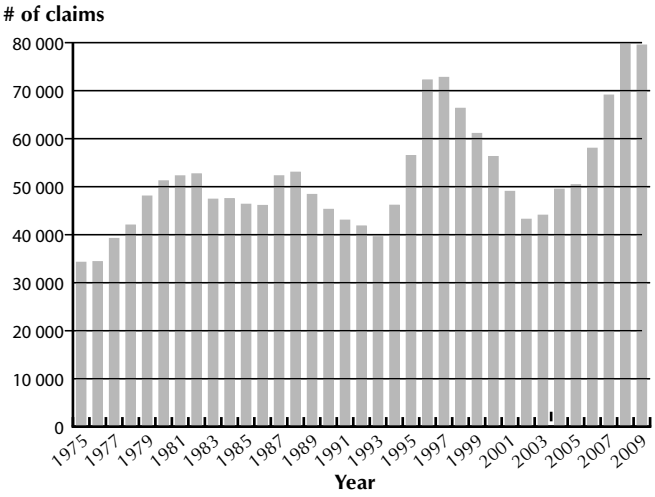

Figure 4. *Mineral claims in good standing, 1975-2009.*

The reader is reminded that this exploration overview is by no means a comprehensive overview of the activity in Yukon. Many results are still pending as of the publication deadline for this volume and thus reports are preliminary in nature.

This publication is available on the Yukon Geological Survey (YGS) website (*www.geology.gov.yk.ca*) as a pdf document with colour photos. Links to company websites are available in this report; these websites contain much more comprehensive information including, in many cases, up-to-date results, plan maps and sections.

MINING AND MINE DEVELOPMENT

The **Minto** mine (Yukon MINFILE 115I 012) is a high-grade copper-gold-silver deposit (Fig. 5) operated by Capstone Mining Corp. (*www.capstonemining.com*). In 2008, production at the mine totalled 47.7 million pounds copper, 30,758 oz gold and 259,824 oz silver at a total cash cost of US$1.15 per pound copper. A total of 809 426 tonnes of ore at a grade of 2.91% Cu was processed in 2008. A phase 3 expansion of the mill to a rate of 3200 tonnes per day was completed and commissioned in the first quarter of 2009. Production to the end of the third quarter 2009 was 38.8 million pounds copper, 19,787 oz gold, 210,549 oz silver at US$1.09 total cash cost per pound of copper. The mill processed 770 194 tonnes at a grade of 2.47% Cu, 1.09 g/t Au and 10.6 g/t Ag. Recoveries for copper were 92.8%, gold was 72.8% and silver was 81.5%, producing a concentrate that averaged 41.6% Cu, 12.7 g/t Au and 162 g/t Ag. A larger scale water treatment plant is being manufactured and a water diversion system is being designed at the site. Exploration at the Minto mine continues to be very successful with two new discoveries made in 2009: Minto North and Minto East in the immediate area of the current mining operations.

Figure 5. *Heavy duty equipment at work at the Minto mine.*

Figure 6. *The Minto mill building.*

A pre-feasibility study into the phase 4 expansion of the Minto mill (Fig. 6) to 4100 t/day was completed in December. This study utilized expanded resources that have been discovered on the property since 2006. The expanded operation has extended mine life to 2018, with targeted production of an average of 45 million pounds of copper per year. The study also discusses the possibility of a further expansion of the mill capacity to 7500 t/day by expansion of the open pit mine or the possibility of developing a 1000 to 2000-t/day underground mine in conjunction with current open-pit mining. The second option would utilize deeper high-grade resources; initial indications are that this would be the preferred option. Details of the pre-feasibility study can be viewed on the Capstone Mining website.

Yukon Zinc Corporation (*www.yukonzinc.com*) advanced the **Wolverine** project (Yukon MINFILE 105G 072) towards production, which is on schedule for the third quarter of 2010. Yukon Zinc Corporation is a private company wholly owned by Jinduicheng Molybdenum Group Ltd. and Northwest Nonferrous International Investment Company Ltd. The mine is being developed as a 1700-t/day underground mine operation with an initial mine life of 9.5 years. The Wolverine volcanogenic massive sulphide deposit contains proven and probable reserves of 5.2 million tonnes at a grade of 9.71% Zn, 284.2 g/t Ag, 0.93% Cu, 1.37 g/t Au and 1.26% Pb. Underground development in 2009 included 585 m of ramp construction and establishment of 5 stope accesses (Fig. 7). Underground mining will utilize a drift and fill mining method. A 200-m ventilation raise that provides a secondary egress to the mine was also completed in 2009. The company completed 18 geotechnical drillholes totalling 730 m and another 30 drillholes totalling 4720 m for further definition of ore zones and upgrading of the resource inventory.

Figure 7. *Advancing the underground workings at the Wolverine property. (Photo credit: Yukon Zinc)*

A 241-person camp was completed at the site with a 70-person overflow camp established. The camp has a waste water treatment system installed, a recycling program established, and a high efficiency incinerator installed. The external frames for the mill building have been erected (Fig. 8) and a selenium and metal water treatment facility has been built on the site. In 2010, mechanical, piping, electrical and instrumentation systems, and commissioning of the mill are planned (Fig. 9), as well as continued development of the underground mine, construction of the paste backfill system, completion of the power distribution system, and maintenance buildings and communications upgrades at the site.

Alexco Resource Corp. (*www.alexcoresource.com*) announced, in November of 2009, a positive development decision for the **Bellekeno** (Keno Hill; Yukon MINFILE 105M 001) Ag-Pb-Zn deposit in the historic Keno Hill District. Extensive underground drilling at Bellekeno during the year (134 holes for 7695 m) successfully upgraded the existing inferred resource to an indicated resource (Table 1, Fig. 10). Alexco completed a positive mine development plan on the Bellekeno deposit in November, received its Quartz Mining License and immediately began construction of the milling facility. The plan estimated that the total construction and capital cost to bring the mine into production would be $41.6 million. The milling facility will have a design capacity of 408 t/day; however, the mining and milling rates are planned at a base rate of 250 t/day. Production is scheduled for the 3rd quarter of 2010. Details of the mine development plan can be viewed on the company website.

Figure 8. *Wolverine mill building under construction. (Photo credit: Yukon Zinc)*

Table 1. *NI 43-101 resource for the Bellekeno property (November 2009).*

Class	Zone	Tonnage	Grade*
Indicated	Southwest, 99 and East	401 000 t	921 g/t Ag, 9.4% Pb, 6.5% Zn, 0.500 g/t Au
Inferred	East	111 100 t	320 g/t Ag, 3.1% Pb, 17.9% Zn, 0.340 g/t Au

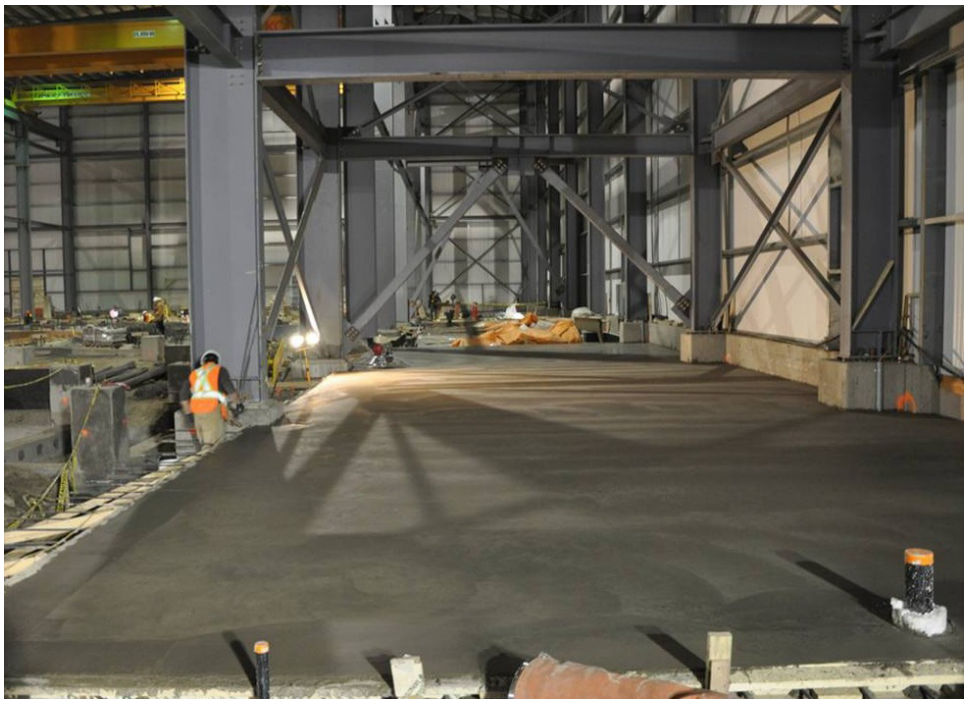

Figure 9. *Construction inside the Wolverine mill building. (Photo credit: Yukon Zinc)*

Figure 10. *N. Goeppel, student geologist, underground at the Bellekeno deposit with high-grade galena-sphalerite-siderite vein.*

EXPLORATION

PRECIOUS METALS - GOLD

SKARN/REPLACEMENT

Atac Resources Ltd. (*www.atacresources.com*) continued drilling its recently discovered **Rau** property (Yukon MINFILE 106D 005), a carbonate replacement sulphide and oxide gold occurrence northeast of Keno Hill in central Yukon. The property was drilled for the first time in 2008 and hit thick gold intersections. Atac staked a substantial number of claims expanding the property to over 600 km^2, covering prospective ground over a 22 km trend. A total of 9578 m (58 holes) of diamond drilling was completed in 2009 (Table 2), mainly on the Tiger zone. The main Tiger zone is within the hinge of a gently east-southeasterly plunging anticline, proximal to a high-level intrusion. Gold mineralization occurs with arsenopyrite, pyrite and pyrrhotite as replacements and disseminations in dolomitized limestone beneath a mafic volcanic bed. Mineralization occurs along an extensive northwest-trending structural corridor that appears to be bounded by a steeply dipping fault along its southwestern side. Drilling in 2009 concentrated on an area of the prospect that is oxidized (Fig. 11), and produced gold intersections substantially higher than those obtained in the sulphides (Fig. 12). Anomalous soil geochemistry occurs along the structural trend and prospecting has resulted in the discovery of mineralization in float assaying from 1 to 18.5 g/t Au. A $12.5 million 15 000-m drill program is planned for 2010.

Figure 11. *High-grade drillcore (Rau09-19) from the Rau property oxide zone.*

Table 2. *Significant diamond drill intercepts from the Rau property.*

Drillhole	Ore Type	Depth of intersection (m)	Intersection*
Rau-09-23	Oxide	60.35	27.43 m @ 9.72 g/t Au
including	Oxide	66.45	6.09 m @ 39.40 g/t Au
Rau-09-19	Oxide	43.6	28.04 m @ 24.07 g/t Au

*True widths are estimated at 50-100% of interval.

Drillhole	Ore Type	Depth of intersection (m)	Intersection*
Rau-09-41	Oxide	71.63	24.47 m @ 19.59 g/t Au, 10.93 g/t Ag
Rau-09-44	Sulphide	183.59	36.78 m @ 3.71 g/t Au
Rau-09-46	Oxide	16.15	56.69 m @ 5.95 g/t Au
including	Oxide	41.44	23.48 m @ 11.01 g/t Au
Rau-09-59	Mixed	19.20	92.01 m @ 2.33 g/t Au
Rau-09-60	Sulphide	6.10	92.96 m @ 2.57 g/t Au

*True widths are estimated at 70-90% of interval. Only silver values of more than 10 g/t Ag are listed.

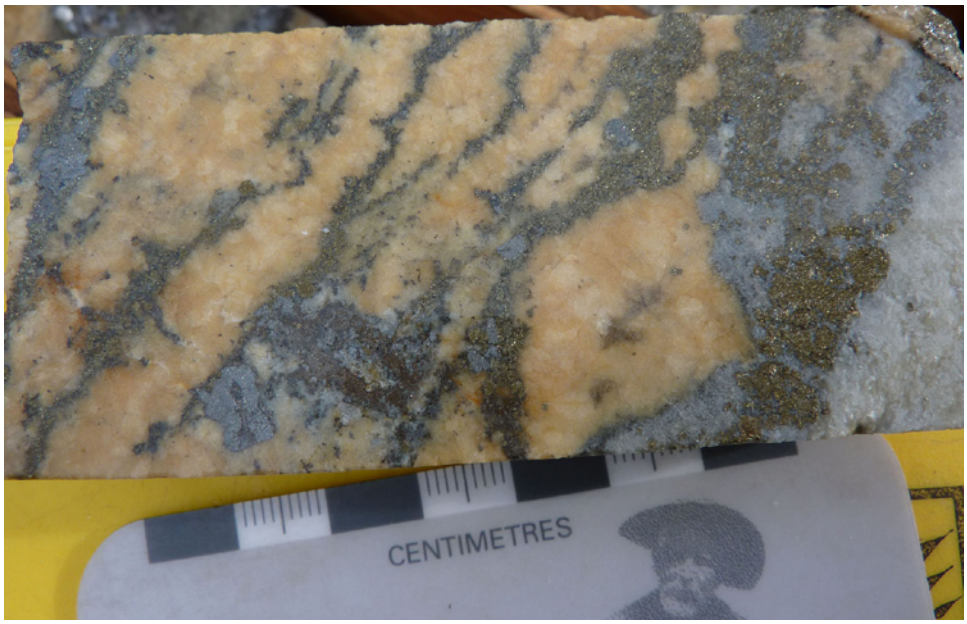

Figure 12. *Sulphide replacement of dolomite from the Rau property.*

Golden Predator Royalty and Development Corp. (*www.goldenpredator.com*) optioned the road-accessible **Gold Dome** (Scheelite Dome; Yukon MINFILE 115P 004) property and explored it with 17 diamond drillholes for a total of 2416 m. The property is an intrusion-related gold system that hosts numerous styles of gold mineralization. The area is covered by a 10 km x 3 km gold-bismuth soil anomaly and is known for active placer gold operations in streams draining the property. Golden Predator drilled three targets: the Hawthorne vein and the Toby and Tom zones (Fig. 13, Table 3). Six holes were drilled in the Tom zone with four holes intersecting semi-massive to massive arsenopyrite-pyrrhotite ± chalcopyrite and locally intense pyroxene-amphibole skarn alteration. Eight holes were drilled in the Hawthorne vein, an arsenopyrite-pyrite ± stibnite vein which was discovered in 1916 but had never been previously drilled. The remaining holes were drilled in the Toby zone which hosts a large Au-As-Bi soil anomaly and coincident IP anomaly. Drilling intersected quartz-sulphide veins and sulphide-altered porphyry at the Toby zone but no results over 1 g/t Au were obtained.

Figure 13. *Diamond drill rig at the Tom zone on the Gold Dome property.*

Table 3. *Significant intercepts from the Gold (Scheelite) Dome property.*

Drillhole	Zone/Area	Depth of intersection (m)	Intersection*
GD09-004	Tom	5.18	1.98 m @ 10.87 g/t Au
GD09-005	Tom	21.34	9.58 m @ 2.56 g/t Au
and	Tom	55.7	1.93 m @ 2.46 g/t Au
and	Tom	161.99	1.16 m @ 1.17 g/t Au
GD09-007	Tom	10.25	25.40 m @ 11.12 g/t Au
including	Tom	13	2.70 m @ 52.35 g/t Au
and	Tom	240.15	3.10 m @ 1.12 g/t Au
GD09-012	Hawthorne	20.00	2.15 m @ 3.79 g/t Au
and	Hawthorne	48.96	1.44 m @ 1.92 g/t Au
GD09-014	Hawthorne	14.20	13.23 m @ 1.40 g/t Au
GD09-015	Hawthorne	24.35	1.46 m @ 2.81 g/t Au
and	Hawthorne	36.35	2.52 m @ 5.17 g/t Au
and	Hawthorne	92.77	1.60 m @ 2.34 g/t Au

*Significant intercepts greater than 1 g/t Au.

VEIN/BRECCIA

Underworld Resources (*www.underworldresources.com*) conducted an extensive exploration program at its recent **White Gold** (Yukon MINFILE 115O 011,012) discovery (Fig. 14), 90 km south of Dawson. Additional claim staking by Underworld increased the White Gold property to over 730 km^2. Underworld also conducted extensive staking in the area for targets similar to the White Gold property; the early 2009 drill results triggered a staking rush to the area involving numerous companies. Diamond-drilling was ramped up after the positive results of 2008 and early 2009 to allow for calculation of an NI 43-101 resource. Ninety holes were drilled, mainly on the Golden Saddle and Arc zones, for a total of 25 670 m (Table 4). Gold mineralization at the Golden Saddle zone is thought to be intrusion-related. It occurs in quartz veins (Fig. 15), stockwork, breccia zones, pyrite veinlets and disseminations (Fig. 16) within meta-igneous host rocks. The geochemical signature of the Golden Saddle consists of elevated Au ± Ag ± Ba ± Mo ± Pb ± W. Alteration in the zone consists of an overprinted assemblage of silica and sericite ± ankerite ± albite ± k-spar (adularia?). Drilling has outlined a tabular northwest-dipping (45° to 70°) zone which varies from 10 to 100 m in thickness with grades that vary between 2.5 and 4.0 g/t Au. The zone remains open along strike and to depth. By contrast, at the Arc zone, 1 km south of the Golden Saddle, mineralization consists of quartz veins and hydrothermal breccia zones with minor pyrite and arsenopyrite hosted in metasedimentary rocks. A NI 43-101 resource is currently being prepared for the Golden Saddle zone and is expected to be complete in early 2010. Exploration on other areas of the property consisted of extensive soil

Figure 14. *Adrian Fleming, CEO of Underworld Resources, at the discovery hole of the Golden Saddle zone, White Gold property.*

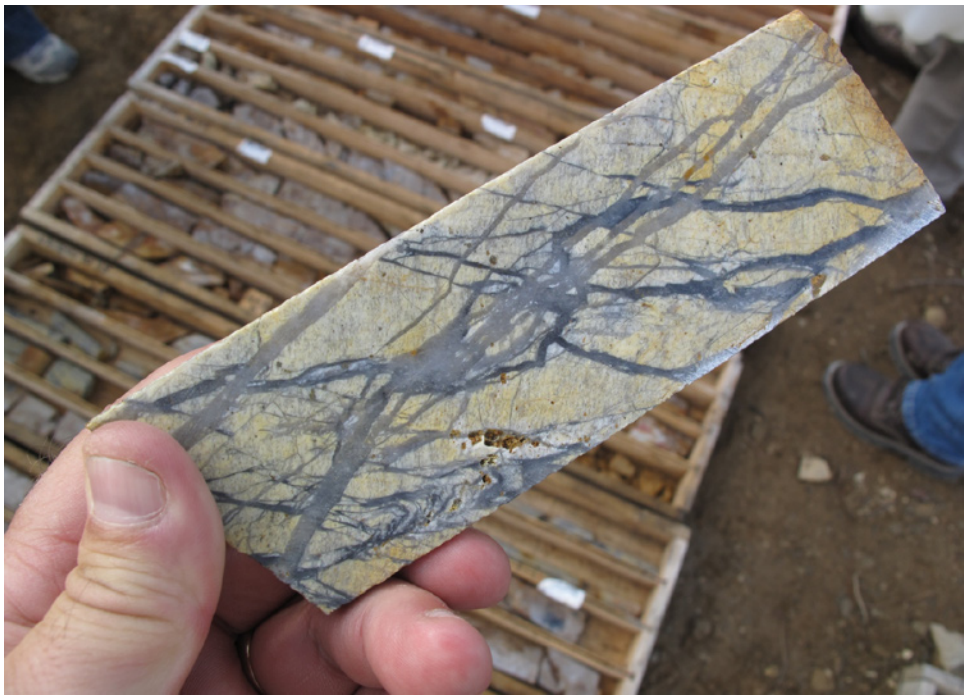

Figure 15. *Multiple pulses of quartz veining in altered intrusive rock at the White Gold property.*

sampling, mechanical trenching, geological and structural mapping and prospecting. Several targets remain to be tested on the property including the MacKinnon zone, where quartz-pyrite mineralization assayed up to 60.2 g/t Au and 354 g/t Ag. Access to the property was improved with the construction of a 20-km access road from the barge landing at Thistle Creek on the Yukon River.

Table 4. *Significant diamond drill intercepts from the White Gold property.*

Drillhole	Zone/Area	Depth of intersection (m)*	Intersection
WD09-47	Golden Saddle	91.88	31.12 m @ 9.2 g/t Au
and	Golden Saddle	221.42	3.58 m @ 1.7 g/t Au
WD09-52	Golden Saddle	223.00	38.0 m @ 3.92 g/t Au
WD09-54	Golden Saddle	261.50	62.97 m @ 2.47 g/t Au
WD09-58	Arc	118.50	34.50 m @ 1.04 g/t Au
and	Arc	190.50	10.50 m @ 1.17 g/t Au
and	Arc	266.00	24.00 m @ 0.76 g/t Au
WD09-64	Golden Saddle	217.50	100.40 m @ 3.13 g/t Au
WD09-69	Golden Saddle	174.65	76.85 m @ 3.40 g/t Au
WD09-74	Golden Saddle	293.00	112.00 m @ 1.94 g/t Au
and	Golden Saddle	310.00	10.85 m @ 8.40 g/t Au
WD09-91	Golden Saddle	70.22	91.28 m @ 3.68 g/t Au
WD09-102	Golden Saddle	368.50	158.5 m @ 1.46 g/t Au

*True widths are estimated to be 70-100% of drilled interval.

Figure 16. *Disseminated pyrite mineralization in felsic rock at the White Gold property.*

Kaminak Resources (*www.kaminak.com*) explored its **Coffee** (Yukon MINFILE 115J 110) property with extensive soil sampling, mapping, magnetic surveys, prospecting and trenching. The property, optioned from RyanWood Exploration, is located approximately 30 km south of the White Gold discovery. Soil sampling has outlined several areas with a similar geochemical signature to the White Gold property with anomalous gold, arsenic and antimony (Fig. 17). Gold mineralization is hosted in both granite and metasedimentary rocks and is associated with heavily bleached rock composed mainly of sericite and quartz. Detailed magnetic surveys, trenching and geological mapping have identified east and northeast trending linears that are associated with the mineralization, demonstrating a structural influence in controlling mineralization. Geochemistry, followed by light-weight backhoe trenching, has proven to be an effective tool in identifying bedrock mineralization on the property which is characterized by poor exposure. The main Supremo zone is a 2 km x 2 km multi-element soil anomaly characterized by strong gold, arsenic and antimony values. Chip sampling of trench material at Supremo yielded values of 11.72 g/t Au over 10 m, 8.56 g/t Au over 15 m, 2.30 g/t Au over 21 m and 1.37 g/t Au over 30 m (Fig. 18). Soil sampling at the Latte zone, located 1.5 km south of Supremo, identified an east-trending anomaly with >50 ppb Au over an area 1000 m by 200 m. Trenching within the trend produced values up to 0.59 g/t Au over

Figure 17. *S. Ryan and V. Bennett (YGS) examine soil grid map at Coffee Creek property.*

35 m and 1.01 g/t Au over 10 m. Trench results from several other areas are pending and soil sampling has identified additional areas that will be trenched in 2010. Kaminak has budgeted for an initial 5000 m drill program in 2010.

Kaminak Resources also conducted exploration consisting of soil sampling and prospecting on its **Kirkman** (Yukon MINFILE 115O 016) and **Cream** (NTS 115J/13) properties.

Strategic Metals Ltd. (*www.strategicmetalsltd.com*) funded a work program consisting of grid soil geochemical sampling and approximately 3500 m of excavator trenching on the **Eureka** property (Yukon MINFILE 115O 057). The program began in mid-June and continued until late August. Soil sampling revealed several clusters of anomalous gold results in an area that is roughly 6000 m long and up to 2500 m across. Only a small portion of the anomalous sample sites have been tested by trenching. The best trench result (0.97 g/t gold across 17.90 m) is within a 1000 m-long zone near the centre of the property that includes areas where previous trenching and reverse circulation drilling returned positive results.

Figure 18. *Silica-altered metasedimentary rock with limonite from the Supremo zone of the Coffee Creek property.*

Numerous other companies were active in the area of the White Gold property conducting mainly preliminary exploration work which included soil sampling, prospecting, mapping and airborne geophysical surveys. Aldrin Resources identified structural trends with coincident geochemical anomalies on its **Brew** and **Ind** projects optioned from RyanWood Exploration. Hinterland Metals (*www.hinterlandmetals.com*) outlined two parallel northeast-trending linear soil geochemical anomalies and discovered four new quartz veins on the **Kit** (Ballarat; Yukon MINFILE 115J 061) property. Historical sampling of quartz has reported values of up to 32 g/t Au on the property, which has undergone extensive placer mining. Arcus Development Group (*www.arcusdevelopmentgroup.com*) optioned the **Green Gulch, Touleary** (Yukon MINFILE 115J 060), **Shamrock** and **Dan Man** properties from Atac Resources in the immediate area of Underworld's White Gold and Black Fox properties. Initial soil sampling identified several anomalies on the properties. At Touleary, limonitic quartz vein float was sampled, assaying 2.8 g/t Au. Pacific Ridge Exploration (*www.pacificridgeexploration.com*) optioned several properties from RyanWood Exploration including the **Goldcap, Polar** and **Stewart** where soil sampling has identified north-trending parallel As-Sb-Au-Ni anomalies. Stina Resources (*www.stinaresources.com*) conducted extensive soil sampling on the **Kodiak** property optioned from RyanWood Exploration. Silver Quest Resources (*www.silverquest.ca*) conducted additional soil sampling on the **Boulevard** property (Yukon MINFILE 115J 052), where drilling in 2008 intersected gold mineralization. Silver Quest also completed soil sampling programs on the **Sizzler** (Yukon MINFILE 115J 098) and **Tak** properties and optioned 11 other Dawson Range projects from Atac Resources, making them one of the largest landholders in the area. Habanero Resources (*www.habaneroresources.com*) conducted soil sampling, mapping and prospecting on its **Yukon Gold** project in the White Gold area. Alix Resources

(*www.alixresources.com*) and Cloudbreak Resources (*www.cloudbreakresources.com*) conducted extensive soil sampling and airborne geophysics on their **Strike** claims. Solomon Resources (*www.solomonresources.ca*) optioned the **Ten Mile** property, from Radius Exploration, which was explored with soil sampling, mapping and prospecting. The Ten Mile property was last worked on by Teck Resources who identified several drill targets that have not been tested. Other companies active in the area include Valley High Ventures, Network Exploration Ltd., Newcastle Minerals Ltd., Weststar Resources Corp., Anglo-Canadian Uranium Corp., First Lithium Resources Inc. and others. The independent website (*www.whitegolddistrict.com*) provides information for companies active in the White Gold district.

The **Leota project** (Leotta; Yukon MINFILE 115O 074) of Leota Goldfields is a large land package east-southeast of Dawson City which encompasses several placer gold-bearing creeks. The land holding, which consists of over 800 quartz claims, has undergone widespread placer mining and there are historical reports of gold-bearing quartz veins. Leota Goldfields is a private company that explored the property with excavator trenching, which uncovered extensive quartz veining in a number of areas (Fig. 19).

Northern Freegold Resources (*www.northernfreegold.com*) completed an extensive drill program at its road-accessible **Nucleus** deposit (Yukon MINFILE 115I 107), the intrusion-related gold deposit on its Freegold Mountain property. A NI 43-101 inferred resource contained 1,082,000 oz of gold (Table 5) and was calculated for the project based on drilling up to, but not including, 2009 field work. The Nucleus zone is characterized by Cretaceous granodiorite sills intruding metasedimentary rocks, with later crosscutting quartz-feldspar porphyry dykes (Fig. 20). Mineralization in the Nucleus zone occurs in all rock types and variably consists of sulphide-bearing hydrothermal breccias; quartz-sulphide and sulphide veins and stockworks; and disseminated sulphides and massive sulphide skarn. A total of

Figure 19. *Quartz vein exposed in trench at the Leota project.*

10 440 m of drilling in 44 holes was completed in 2009 (Table 6). Drilling was re-oriented to account for a new interpretation of the trend of mineralized dykes, sills and massive sulphide skarn zones based on data from oriented core, geophysics and geological mapping. Additional property-scale work included geological and structural mapping, ground-based geophysics (magnetic and radiometric) and stream sediment surveys, which, in combination with historical exploration data, is being used for target generation in areas with sparse data. Although no exploration work was conducted at **Tinta Hill** (Tinta zone; Yukon MINFILE 115I 058) on the Freegold Mountain property, a NI 43-101 resource was released (Table 7). The deposit is an intrusion-hosted polymetallic gold-silver-copper vein occurrence.

Figure 20. *Geologists examine key outcrop at the Nucleus zone where intrusive rocks that demonstrate a protracted mineralization history are exposed.*

Table 5. *NI 43-101 resource for the Nucleus property (2009).*

Class	Tonnage	Grade*
Inferred	67.57 Mt	0.50 g/t Au

*0.3 g/t Au cut-off grade.

Table 6. *Significant intercepts from the Nucleus property, Mt. Freegold Project.*

Drillhole	Zone/Area	Depth of intersection (m)	Intersection
GRD09-125	Nucleus	5.40	7.30 m @ 0.95 g/t Au
and	Nucleus	38.50	2.00 m @ 6.59 g/t Au
and	Nucleus	65.30	4.40 m @ 0.53 g/t Au, 0.10% Cu
and	Nucleus	78.80	2.00 m @ 1.73 g/t Au
and	Nucleus	134.00	3.20 m @ 13.84 g/t Au, 0.13% Cu
and	Nucleus	186.30	4.00 m @ 2.03 g/t Au, 0.31% Cu
GRD09-135	Nucleus	19.81	17.89 m @ 0.71 g/t Au
and	Nucleus	43.61	3.54 m @ 0.96 g/t Au
and	Nucleus	53.27	59.32 m @ 0.81 g/t Au
and	Nucleus	133.60	1.33 m @ 1.62 g/t Au
and	Nucleus	163.43	10.25 m @ 0.44 g/t Au
and	Nucleus	179.22	21.78 m @ 0.74 g/t Au
including	Nucleus	183.60	0.89 m @ 2.13 g/t Au
including	Nucleus	191.76	1.94 m @ 1.91 g/t Au
and	Nucleus	219.36	17.59 m @ 1.89 g/t Au
including	Nucleus	221.33	6.97 m @ 3.96 g/t Au

Table 7. *NI 43-101 resource for the Tinta zone (2009).*

Class	Tonnage	Grade*
Inferred	1.39 Mt	1.62 g/t Au, 44.93 g/t Ag, 0.26% Cu, 0.84% Pb, 1.40% Zn

*0.30 g/t Au cut-off grade.

The **Sonora** gold property (Yukon MINFILE 115J 008) of Northern Tiger Resources (*www.northerntigerresources.com*) conducted 2455 m of diamond drilling in 12 holes (Table 8), all in the Nightmusic zone with the exception of one hole in the Allegro anomaly. No drilling was conducted on the Amadeus zone, a large low-sulphidation epithermal gold-silver target which has had limited drilling during previous exploration. Two styles of mineralization were intersected at the main drill target, the Nightmusic zone, in 2009: 1) copper-lead-zinc + gold-silver quartz carbonate skarn and replacement-style mineralization (Fig. 21); and 2) silver- and gold-bearing arsenopyrite in quartz veins and shears. The company also performed soil and rock sampling, mapping and airborne magnetic and radiometric surveys which resulted in new and better defined targets within a 7-km-priority exploration corridor.

Table 8. *Significant diamond drilling intercepts from the Nightmusic zone, Sonora Gulch property.*

Drillhole	Depth of intersection (m)	Intersection
SG-09-33	91.0	2.9 m @ 3.72 g/t Au, 2.2 g/t Ag
and	127.1	1.4 m @ 5.25 g/t Au, 7.4 g/t Ag
SG-09-34	81.7	0.6 m @ 5.45 g/t Au, 3.5 g/t Ag
and	164.6	0.8 m @ 0.22 g/t Au, 3290 g/t Ag, 0.93% Cu
and	187.3	2.0 m @ 1.20 g/t Au, 10 g/t Ag
SG-09-39	45.2	2.0 m @ 1.05 g/t Au, 0.9 g/t Ag
and	85.4	0.5 m @ 63.8 g/t Au, 46.7 g/t Ag
SG-09-43	59.1	0.7 m @ 3.27 g/t Au, 48.4 g/t Ag, 0.11% Cu
and	97.0	5.1 m @ 0.45 g/t Au, 1.2 g/t Ag
and	106.4	0.4 m @ 7.86 g/t Au, 66.7 g/t Ag, 0.2% Cu
and	130.9	3.7 m @ 1.00 g/t Au, 9.7 g/t Ag, 0.13% Cu, 2.94% Zn

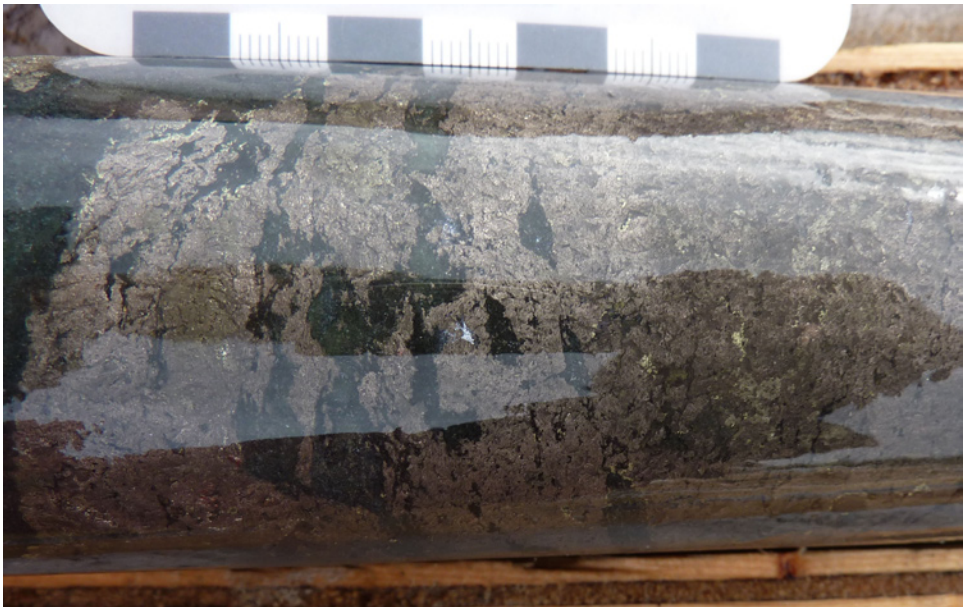

Figure 21. *Sulphide-rich skarn from the Nightmusic zone at the Sonora Gulch property.*

The **Canadian Creek** property (Yukon MINFILE 115J 101) of Alder Resources Ltd. (*www.alderltd.ca*) and Cariboo Rose Resources Ltd. (*www.caribooorose.com*) is located adjacent to the large Casino porphyry deposit. Ten diamond drillholes (1425 m) were completed over IP and gold-arsenic ± antimony-bismuth soil anomalies in the eastern portion of this season's soil grid. All holes returned anomalous gold values from quartz-carbonate veins and clay-altered zones within gneisses and granodiorite to monzonite intrusive rocks (Table 9).

Table 9. *Significant diamond drilling intercepts from the Canadian Creek property.*

Drillhole	Depth of intersection (m)	Intersection*
CC09-05	63.87	7.37 m @ 0.16 g/t Au
including	64.90	0.34 m @ 0.53 g/t Au, 13.5 g/t Ag
CC09-06	5.00	15.00 m @ 0.33 g/t Au
CC09-08	77.80	1.50 m @ 3.50 g/t Au, 3.5 g/t Ag
CC09-10	82.80	7.25 m @ 0.68 g/t Au
including	82.80	3.00 m @ 1.10 g/t Au, 30.4 g/t Ag

*Core lengths may not reflect true intersections.

In June 2009, Victoria Gold Corp. (*www.victoriaresourcecorp.com)* acquired Stratagold and its properties including the road-accessible **Eagle Gold project** (Dublin Gulch; Yukon MINFILE 105D 025) in central Yukon (Fig. 22). An updated resource calculation was calculated in January 2009 (Table 10). The company spent the field season conducting geotechnical, engineering and environmental work in support of an updated pre-feasibility study scheduled for release in early 2010. Geotechnical drilling (1321 m) and drilling for metallurgical samples (505 m) were completed. A

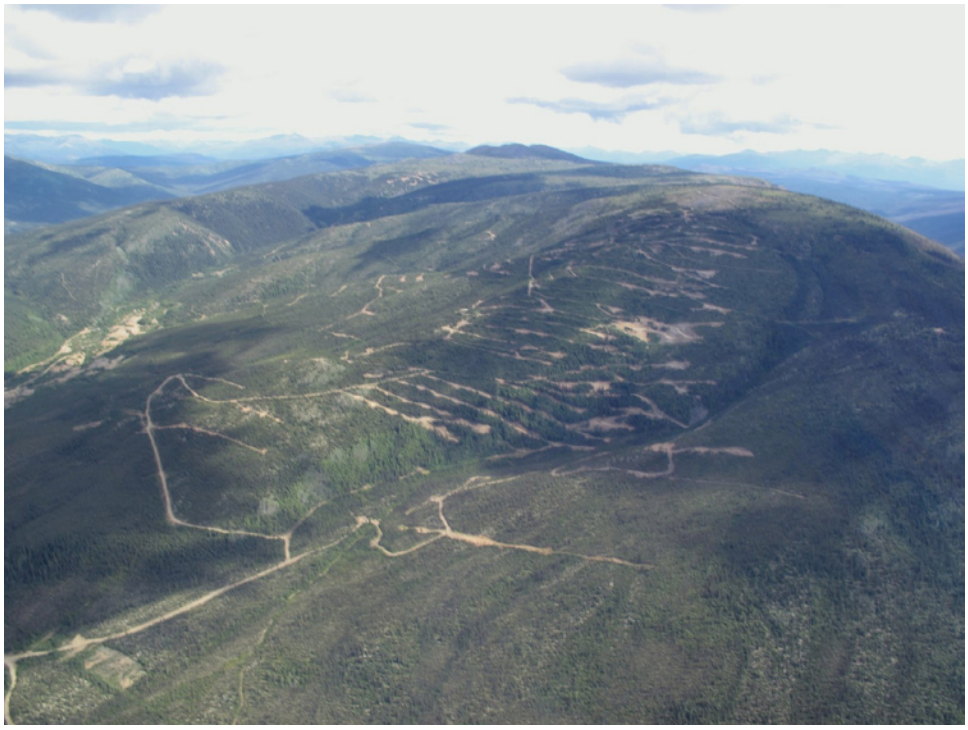

Figure 22. *Aerial view of the Eagle Gold Project (formerly Dublin Gulch).*

previous feasibility study completed in 1997 indicated positive economics at a gold price of US$350/oz. The Eagle zone, an analogue to the Fort Knox deposit in Alaska, is an intrusion-hosted gold deposit consisting of sheeted veins within a Tombstone-age granodiorite stock. Exploration drilling (7 holes for 3296 m) further expanded the limits of the Eagle deposit to the west of the current open-pit design, and to depth, where intersections exceeded the existing resource grade (Table 11). Exploratory trenching was also carried out in two other zones: the Olive zone to the northeast of the Eagle deposit, and the Steiner zone to the northwest. The Olive and Steiner zones contain similar sheeted veining in granodiorite intrusions.

Table 10. *NI 43-101 resource for the Eagle Deposit (Dublin Gulch), January 2009.*

Class	Tonnage	Grade
Indicated	98.58 Mt	0.849 g/t Au
Inferred	2.02 Mt	0.671 g/t Au

Table 11. *Significant diamond drilling intercepts from the Eagle Gold (Dublin Gulch) Project.*

Drillhole	Depth of intersection (m)	Intersection*
DG09-360C	21.34	96.62 m @ 0.95 g/t Au
and	297.79	164.59 m @ 0.96 g/t Au
DG09-361C	299.34	161.80 m @ 1.11 g/t Au
DG09-362C	239.88	51.81 m @ 0.82 g/t Au
and	320.65	166.12 m @ 0.54 g/t Au
DG09-363C	221.59	11.51 m @ 1.16 g/t Au
and	308.46	80.77 m @ 0.52 g/t Au
and	419.71	131.06 m @ 0.68 g/t Au
DG09-364C	209.40	193.55 m @ 0.77 g/t Au
including	209.40	10.67 m @ 2.53 g/t Au
DG09-365C	230.73	123.45 m @ 0.73 g/t Au
including	296.27	56.38 m @ 1.26 g/t Au

*True widths are estimated to be 60-70% of reported value.

The **Prospector Mountain** (Yukon MINFILE 115I 034) property was explored by Tarsis Resources, (*www.tarsis.ca*) for both porphyry and vein mineralization. Prospecting uncovered the Bonanza zone, a 1200-m structural corridor. Eighteen samples of locally weathering vein talus were taken and results ranged from below detection to 82.8 g/t Au, below detection to 1375 g/t Ag and 3 ppm to 11.65 % Cu. Mineralized vein talus ranging from 5 cm to 35 cm in thickness collected from eight sites along the trend, is mostly composed of multiple pulse vuggy quartz and quartz breccia with varying combinations of accessory earthy to specular hematite, black tourmaline, hematized siderite and limonite. A number of samples also contain malachite and azurite either as breccia clasts, matrix filling, or later fracture filling.

The **Antimony Mountain** (Yukon MINFILE 116B 094) intrusion-related gold occurrence was optioned by Golden Predator Royalty and Development Corp. (*www.goldenpredator.com*) . Twelve diamond drillholes were completed (Fig. 23,

Table 12). The main target was the AJ vein, where drilling revealed multiple intersections of gold-bearing vein mineralization, associated with tourmaline, arsenopyrite, pyrite, pyrrhotite and chalcopyrite, hosted in metasedimentary host rocks proximal to the Antimony Mountain stock. Drilling also intersected calc-silicate hornfels and copper-lead-zinc-arsenic-silver-enriched skarn mineralization.

Figure 23. *Inspecting core from the AJ vein at Antimony Mountain.*

Table 12. *Significant diamond drilling intercepts from the AJ vein of the Antimony Mountain gold property.*

Drillhole	Zone/Area	Depth of intersection (m)	Intersection*
AH09-014	AJ	48.85	0.32 m @ 4.5 g/t Au
and	AJ	66.79	2.06 m @ 3.29 g/t Au
AJ09-015	AJ	45.89	2.61 m @ 2.02 g/t Au
and	AJ	52.20	1.10 m @ 1.32 g/t Au
and	AJ	77.49	1.14 m @ 1.86 g/t Au
AJ09-016	AJ	50.41	1.00 m @ 1.83 g/t Au
and	AJ	67.55	1.00 m @ 5.48 g/t Au
AJ09-017	AJ	62.71	0.49 m @ 5.55 g/t Au
and	AJ	70.70	4.88 m @ 12.45 g/t Au
including	AJ	70.70	2.45 m @ 28.81 g/t Au
and	AJ	90.42	0.31 m @ 9.24 g/t Au

*Significant intercepts greater than 1 g/t Au.

Figure 24. *Aerial view of a pit at the past-producing Brewery Creek property.*

Golden Predator Royalty and Development Corp. (*www.goldenpredator.com*) optioned the past-producing **Brewery Creek** property (Yukon MINFILE 116B 160), an intrusion-hosted gold property which produced approximately 280,000 oz of gold from oxide ore processed by cyanide heap-leaching (Fig. 24). The company explored for additional shallow oxide resources and deeper sulphide hosted mineralization in 2009. Diamond drilling was conducted on the Pacific, North Slope, Blue and Lower Fosters zones (Table 13). Drilling at the North Slope targeted deeper sulphide mineralization identified in historical drillholes. Mineralization at the North Slope is hosted in volcanic rocks and calcareous siltstone as opposed to the rest of the property, where mineralization is hosted in Cretaceous-aged quartz-monzonite sills (Fig. 25). Results for drilling of additional oxide resources in the Lower Fosters zone, which has never been mined, were not available at year end.

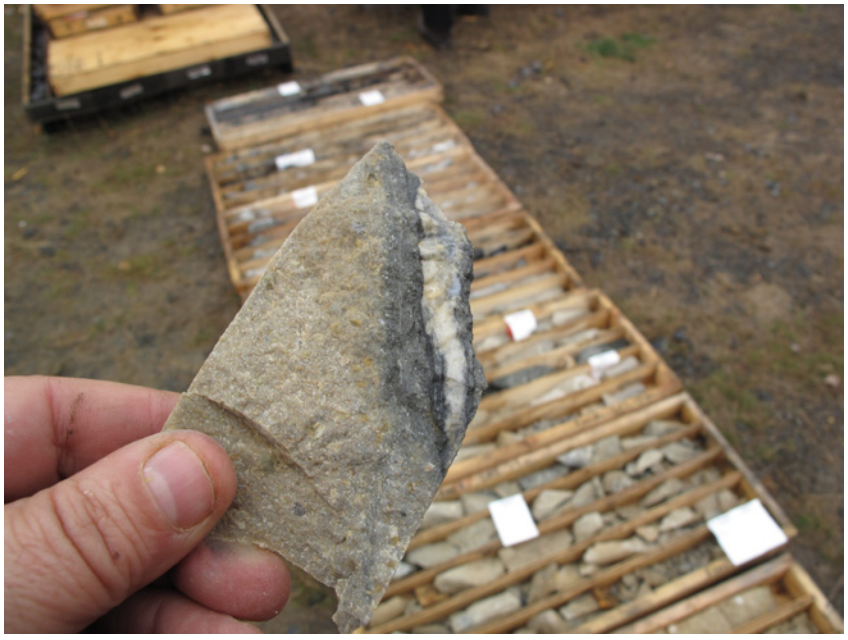

Figure 25. *Altered quartz-monzonite dyke with cross-cutting stibnite vein from Brewery Creek property.*

Table 13. *Significant diamond drill intercepts from the Brewery Creek gold property.*

Drillhole	Zone/Area	Depth of intersection (m)	Intersection*
BC09-132	Pacific area	116.37	6.21 m @ 2.53 g/t Au
including	Pacific area	116.37	1.69 m @ 5.53 g/t Au
BC09-133	Pacific area	110.85	2.00 m @ 3.51 g/t Au
and	Pacific area	155.02	5.06 m @ 2.60 g/t Au
and	Pacific area	162.08	6.00 m @ 1.67 g/t Au
and	Pacific area	172.08	4.70 m @ 3.20 g/t Au
and	Pacific area	227.00	2.00 m @ 0.79 g/t Au
BC09-137	North Slope	142.96	2.00 m @ 1.06 g/t Au
and	North Slope	221.41	1.44 m @ 1.72 g/t Au
and	North Slope	226.00	2.00 m @ 1.45 g/t Au
and	North Slope	243.62	1.90 m @ 20.17 g/t Au
BC09-139	North Slope	263.86	9.71 m @ 4.72 g/t Au
including	North Slope	267.31	4.26 m @ 6.86 g/t Au

*Significant intercepts greater than 0.5 g/t Au.

Monster Mining (*www.monstermining.com*) explored its polymetallic vein property **McKay Hill** (MINFILE 106D 038) in the Keno Hill district. The occurrence is characterized by quartz veins containing galena, tetrahedrite and sphalerite occurring at the margins of greenstone sills that cut Hyland Group siliciclastic rocks. Mineralization also occurs as vein breccias and as replacements. High-level vein material exposed on ridgetops assayed up to 16.8 g/t Au, 3.9% Cu and 668 g/t Ag (Fig. 26). The property was last drilled in 1929.

The road-accessible **Tay-LP** (Yukon MINFLE 105F 121) gold property of Canarc Resource Corp. (*www.canarc.net*) was explored with a 10-hole, 1884-m diamond drill program in 2009 (Table 14). The property is characterized by gold-bearing quartz-pyrrhotite veins and pyrrhotite replacement mineralization hosted by calcareous phyllites and marbles proximal to Cretaceous quartz-monzonite stocks. Drilling targeted an area with historical drill intersections within a 3-km-long MaxMin geophysical anomaly. All holes intersected significant gold mineralization. Samples from hole TLP-09-04 assayed 0.73 g/t Au over 28.2 m (including 1.48 g/t Au over 9.2 m) and 0.81 g/t Au over 10.0 m.

Figure 26. *Surface exposure of polymetallic quartz vein at McKay Hill.*

Table 14. *Significant diamond drill intercepts from the Tay-LP gold property.*

Drillhole	Zone/Area	Depth of intersection (m)	Intersection*
TLP-09-01	Main	91.2	29.2 m @ 0.71 g/t Au
including	Main	93.0	1.0 m @ 9.14 g/t Au
including	Main	109.0	10.0 m @ 0.81 g/t Au
TLP-09-02	Main	90.7	7.3 m @ 0.99 g/t Au
TLP-09-03	Main	158.4	12.6 m @ 0.81 g/t Au
and	Main	174.7	11.0 m @ 0.63 g/t Au
TLP-09-05	Main	32.0	20.0 m @ 0.50 g/t Au
and	Main	86.9	9.0 m @ 1.15 g/t Au
TLP-09-06	Main	84.7	16.3 m @ 0.90 g/t Au
TLP-09-10	Main	105.15	4.85 m @ 3.14 g/t Au
including	Main	105.15	2.00 m @ 6.51 g/t Au
and	Main	123.0	24.0 m @ 0.52 g/t Au

*True widths are greater than 90% of core lengths.

The **Golden Culvert** (Yukon MINFILE number pending) property of Bob Scott and Gary Lee is a recently reported discovery in the Hyland River area (Fig. 27). The property was a historical discovery made by the prospectors following up on fine placer gold discovered within a culvert crossing the Nahanni Range Road. Quartz vein material containing minor arsenopyrite and pyrite has assayed up to 22.8 g/t Au (Fig. 28). Chip sampling across two parallel quartz veins and intervening phyllitic host rock assayed up to 7.70 g/t Au over 3.2 m including 2.44 m of 1.29 g/t Au within the phyllites. The property is characterized by a 2 km anomalous gold-arsenic soil trend which appears to follow a regional northwest-trending structure.

Figure 27. *R. Stack and G. Lee working in the Hyland River area.*

The **3 Ace** (Yukon MINFILE number pending) gold vein is a discovery made by Alex McMillan in the Hyland River area (Fig. 29). The vein discovered by McMillan in early 2000 is up to 2 m thick and is exposed over approximately 5 m along strike. The vein is known to contain localized visible gold. While prospecting in 2009, spectacular visible gold mineralization was discovered in vein float immediately below the vein outcrop. Mineralization in float exposed a relationship that consists of a veinlet of gold at the contact of a brecciated quartz vein and bull quartz vein. Abundant visible gold is disseminated in the bull quartz vein within approximately 30 cm of the contact (Fig. 30). This relationship has not yet been recognized or exposed in the outcropping portion of the vein. A second known occurrence of a quartz vein containing visible gold, arsenopyrite and pyrite is located approximately 500 m from the high-

Figure 28. *Quartz arsenopyrite vein from the Golden Culvert property.*

Figure 29. *Alex McMillan beside the 3 Ace gold-bearing quartz vein.*

Figure 30. *Abundant visible gold in quartz vein from 3 Ace gold discovery.*

grade vein. The nearest historical exploratory work was conducted approximately 2 km away by Hudson Bay Exploration and Development who carried out a minor drill program in 1999 and intersected 4.5 g/t Au over 1.5 m.

The **Skukum project** (NTS 105D/03, 105D/04) hosts numerous low-sulphidation epithermal Au-Ag (± Pb ± Zn ± Sb) mineral occurrences and several resources in southwest Yukon. Significant gold-silver resources have been identified to date by historical mining (~77,796 oz from 1986 to 1988) at the Skukum Creek (Yukon MINFILE 105D 022) and Goddell Gully (Yukon MINFILE 105D 025) properties. Historical gold-silver resources are present in the Cirque, Lake and Brandy zones of the **Mount Skukum** property (Yukon MINFILE 105D 158). The Wheaton River (and Wheaton River valley) crosses the project area and separates the Skukum Creek gold-silver resource and mineralization identified at the Ocean Vein zone on the western side of the valley, from the Goddell Gully gold-silver resource located on the eastern side of the valley. Exploration in 2009 included an I.P. and resistivity geophysical survey in the valley, totalling 26 km in total line length (covering 2.48 km^2), and resulted in several anomalies being discovered. Additional 2009 exploration included surface-rock chip sampling, reconnaissance mapping, and data and map compilations that focused primarily on the Chieftain Hill (Yukon MINFILE 105D 024), Antimony Creek, Becker-Cochran (Yukon MINFILE 105D 027) and Mt. Skukum areas, which will be used for prioritizing targets in the future.

Yukon-Shaanxi Mining Company Inc. conducted exploration work in 2009 at the Skukum project on behalf of the current property owner, Tagish Lake Gold Corp. Yukon-Shaanxi Mining Company Inc. is a private mining and exploration company owned by Yukon-Nevada Gold Corporation (YNGC) and the Northwest Non-Ferrous International Investment Company Ltd. NWI is 100% owned by Northwest

Geological Exploration and Mining Bureau for Non-Ferrous Metals (*www.nwme.com.cn/en*) of the People's Republic of China.

Rockhaven Resources Ltd. (*www.rockhavenresources.com*) was active in the Kluane area of western Yukon exploring its **Ruby Range** project, which consists of the Kluane (Yukon MINFILE 115H 047), Gladstone and JPR properties. Work involved examining several known showings on the properties. Hand trenching on the Kluane property at the Delor zone uncovered a new showing consisting of several large quartz vein boulders up to 40 cm wide; sample grades were from 8.61 to 50.20 g/t gold and averaged 25.44 g/t.

PRECIOUS METALS - SILVER

VEIN/BRECCIA

Alexco Resources Corporation (*www.alexcoresource.com*) continued exploring its property in the historic **Keno Hill** district (Yukon MINFILE 105M 001). The Keno Hill properties encompass numerous silver-lead-zinc vein occurrences, 35 of which have had historical production and are primarily hosted in Mississippian Keno Hill quartzite. Average grades of the veins places the Keno Hill camp in the top 3% of primary silver producers worldwide. Coincident with development of the Bellekeno deposit, the company drilled several targets on the property, including the Lucky Queen, Silver King, Runer, Coral Wigwam, Keno 700 and Bermingham (Table 15) for a total of 7950 m in 40 holes. The company also performed 910 m of sonic drilling in 283 holes on the tailings at Elsa. Drilling at the historic mines in the district continued to produce excellent results, while continued geological mapping, compilation and structural studies are providing new insight into the controls on vein emplacement and grades. Recent work at the Bellekeno Mine has demonstrated that the best location for thick ore shoots is along more northerly fault segments in diverse lithologies (interbedded quartzites and schists), and in particular, at or very near, lithologic contacts. Exploration has identified the Lucky Queen, Silver King and Onek mines as primary targets to add to the resource base in the district. In addition, drilling at the Bermingham area intersected significant mineralization that will be a focus of exploration in 2010. The Bermingham is located along the same structure as the Hector Calumet mine which produced approximately 96 million oz of silver at an average grade of 35 oz/T.

Table 15. *Significant intercepts from drilling at the Keno Hill property.*

Drillhole	Zone/Area	Depth of intersection (m)	Intersection
BKUD09-041	East zone	27.00	3.87 m @ 2584.0 g/t Ag, 1.025 g/t Au, 2.04% Pb, 29.21% Zn
and	East zone	33.90	3.22 m @ 1973.0 g/t Ag, 0.797 g/t Au, 5.52% Pb, 11.81% Zn
BKUD09-071	Upper 99	29.56	6.01 m @ 1863 g/t Ag, 0.526 g/t Au, 8.80% Pb, 6.51% Zn
BKUD09-083	Southwest underground	53.72	0.56 m @ 34.7 g/t Ag, 0.010 g/t Au, 0.03% Pb, 0.44% Zn
and	Southwest underground	56.50	2.89 m @ 668.3 g/t Ag, 0.401 g/t Au, 12.27% Pb, 3.36% Zn
BKUD09-085	Upper 99	29.10	2.29 m @ 2303 g/t Ag, 0.393 g/t Au, 34.95% Pb, 10.44% Zn
K09-0181	Bellekeno hangingwall	117.10	0.72 m @ 226.0 g/t Ag, 0.070 g/t Au, 1.00% Pb, 0.60% Zn
K09-0201	Keno 700	237.20	2.07 m @ 192.3 g/t Ag, 9.634 g/t Au, 2.28% Pb, 3.18% Zn
K09-204	Lucky Queen	227.25	1.35 m @ 6935 g/t Ag, 1.30 g/t Au, 30.4% Pb, 11.4% Zn
K09-218	Silver King No. 5 vein	201.85	2.55 m @ 1932 g/t Ag, 11.3% Pb, 0.4% Zn
K09-0220	Bermingham	241.22	16.01 m @ 174.3 g/t Ag, 0.048 g/t Au, 0.69% Pb, 1.18% Zn
and	Bermingham	261.60	1.21 m @ 35.8 g/t Ag, 0.015 g/t Au, 0.32% Pb, 0.52% Zn

The **Keno-Lightning** property of Monster Mining (*www.monstermining.com*) was explored with soil geochemistry, mapping and prospecting. The property contains several minfile showings, primarily the Homestake (Yukon MINFILE 105M 011).

Mega Precious Metals Inc. (*www.megapmi.com*) explored the **Eagle** and **Fisher** properties (Yukon MINFILE 105M 021 and 22) in the historic Keno Hill silver district (Fig. 31). Mega Precious Metals drill-tested the Eagle silver-lead-zinc vein fault at depth and along strike (Fig. 32). The Eagle vein is up to 4.9 m wide with mineralized lenses of silver-rich galena, sphalerite and tetrahedrite. The Fisher drill targets were compiled from structural analysis, and coincident soil geochemistry and airborne magnetic survey anomalies. The company completed a 16-hole, 4200-m diamond drill program on the Eagle and Fisher veins and 1728 m of rotary air blast drilling. Results are pending.

CMC Metals Ltd., (*www.cmcmetals.ca*) completed logging 1928.7 m of core from 28 holes drilled in 2008 and extracted a bulk sample at its **Silver Hart** (Yukon MINFILE 105B 021) property. The property consists of high-grade polymetallic silver-lead-zinc veins hosted in the mid-Cretaceous Cassiar batholith and Cambrian or older, biotite-quartz schist, limy hornfels and calcareous horizons. Drilling was conducted at the TM zone, which has a historical non-NI 43-101 compliant inferred resource of 45 634 tonnes grading 2088 g/t Ag, and infill drilling was undertaken at the M zone

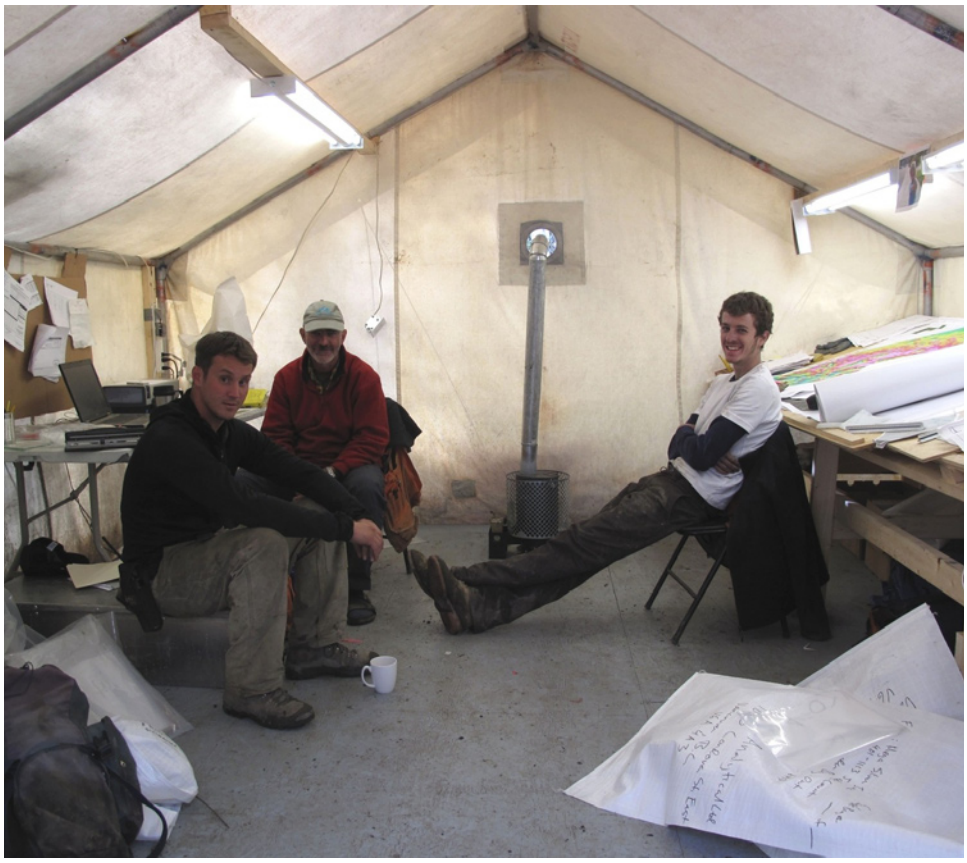

Figure 31. *Mega Precious Metals crew.*

Figure 32. *Drill intersection of the Eagle vein with abundant pyrite and sphalerite.*

(Table 16). The company plans to complete a NI 43-101 resource estimate on the KL, TM and M zones.

Table 16. *Significant intercepts from drilling at the Silver Hart property.*

Drillhole	Zone/Area	Depth of intersection (m)	Intersection
DH09-01	M	12.50	0.40 m @ 5.03% Pb, 20.35% Zn, 290 g/t Ag
and	M	25.20	0.45 m @ 22.52% Pb, 15.08% Zn, 5150 g/t Ag
DH09-02	M	22.80	0.70 m @ 12.64% Pb, 5.79% Zn, 696 g/t Ag
DH09-06	M	40.30	0.50 m @ 0.04% Pb, 15.34% Zn, 571 g/t Ag
and	M	44.00	0.90 m @ 1.01% Pb, 5.60% Zn, 195 g/t Ag
DH09-08	M	30.90	1.40 m @ 0.07% Pb, 40.63% Zn, 472 g/t Ag
DH09-12	TM	40.10	0.50 m @ 3.10% Pb, 21.45% Zn, 2716 g/t Ag
DH09-15	TM	24.10	0.30 m @ 15.55% Pb, 9.54% Zn, 3985 g/t Ag
DH09-16	TM	49.80	2.30 m @ 0.03% Pb, 8.68% Zn, 427 g/t Ag

Rockhaven Resources Ltd. (*www.rockhavenresources.com*) explored the **Plata** property (Yukon MINFILE 105N 003) with excavator trenching and two diamond drillholes (346.6 m; Table 17). The trenching program tested areas with anomalous soil geochemistry to identify potential silver-lead-zinc vein occurrences and silver-gold-lead-zinc bulk-tonnage targets. Disseminated galena, tetrahedrite and sphalerite mineralization was discovered through trenching, 700 m north of the P-2 vein, at the Etzel zone, and similar mineralization was found 1000 m southeast of the Etzel zone at the Ladue zone.

Table 17. *Significant diamond drill intercepts from the Plata property.*

Drillhole	Zone/Area	Depth of intersection (m)	Intersection
PL-09-52	Area between P3 and P4 veins	31.53	1.64 m @ 360.00 g/t Ag, 3.29 g/t Au, 1.98% Pb, 4.17% Zn
PL-09-53	Area between P3 and P4 veins	147.95	1.20 m @ 28.00 g/t Ag, 0.11 g/t Au, 1.81% Pb, 2.96% Zn
and	Area between P3 and P4 veins	188.05	0.82 m @ 201.49 g/t Ag, 2.07 g/t Au, 0.13% Pb, 0.15% Zn
and	Area between P3 and P4 veins	234.95	0.80 m @ 1790.00 g/t Ag, 0.12 g/t Au, 8.28% Pb, 4.97% Zn

Rockhaven Resources Ltd. also explored the **Groundhog** property (Yukon MINFILE 105F 093) with soil sampling, mapping and prospecting. Work outlined a gold-arsenic soil anomaly that lead to the discovery of an area of limonitic quartz rubble which assayed 1.81 g/t Au, 486 g/t Ag, 14.9% Pb and 0.75% Zn.

BASE METALS – COPPER

IRON OXIDE COPPER GOLD

Capstone Mining (*www.capstonemining.com*) continued to conduct extensive exploration work at its copper-gold-silver **Minto** mine property (Yukon MINFILE 115I 012). Early in the year, 600 m north of the existing open pit, Capstone discovered a new shallow zone, Minto North. Drilling at Minto North produced the highest grade intersections to date at the property (Fig. 33). Later in the season, a deep geophysical target identified by a Quantec Titan 24 deep-penetration IP/MT geophysical survey was drilled on the eastern margin of the open pit. Mineralization had been encountered in holes drilled in 2008 and 2009, but the geophysical survey indicated a sizeable target at the margin of the survey. Drilling was successful in intersecting the Minto East zone in four holes. The success of the Titan 24 geophysical survey in identifying known mineralized deposits, and the resulting discovery at Minto East, has demonstrated the excellent potential for continued expansion of resources at the Minto mine. The survey has identified several more targets that will be drill-tested in 2010. Drilling in 2009 totalled 31 476 m in 201 holes. Drilling early in the season included holes on Copper Keel, Area 118 and Ridgetop, but later focused on infill drilling at Minto North (Table 18). An updated resource estimate for the property was released in June 2009 (Table 19), and again as part of the phase 4 expansion study released in December 2009 utilizing subsequent infill drilling at Minto North. The expansion study is examining

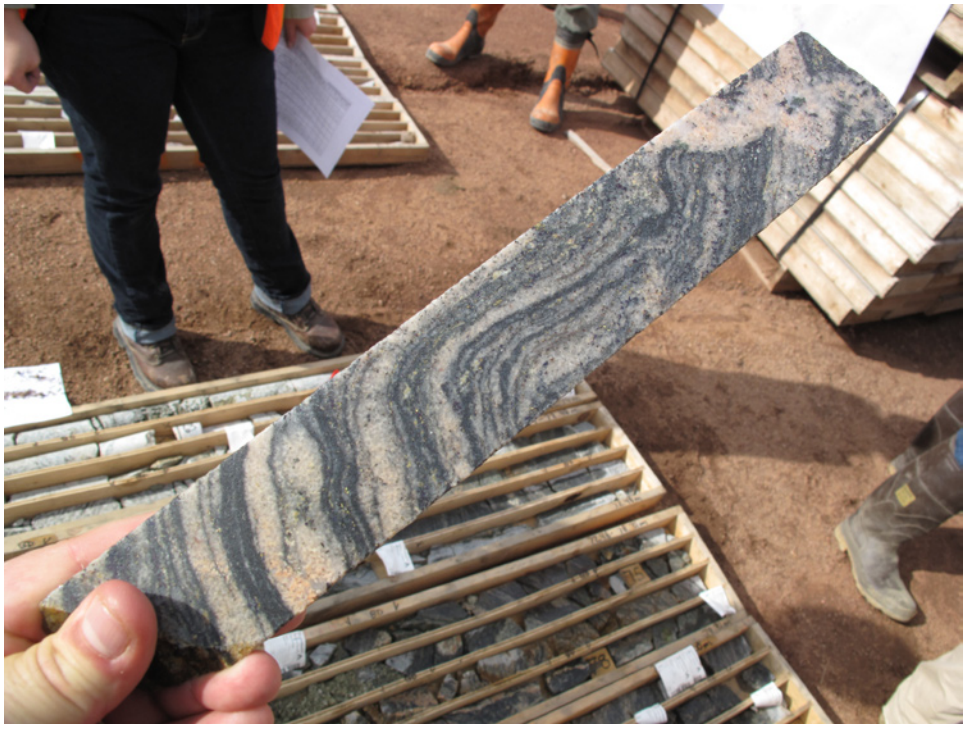

Figure 33. *High-grade core from newly discovered Minto North zone.*

development of open-pit mining centres on the Minto North, Area 2/Area 118 and the Ridgetop deposits, and a further expansion of milling capacity to 4100 t/day.

Table 18. *Significant diamond drill intercepts from the Minto Mine.*

Drillhole	Zone/Area	Depth of intersection (m)	Intersection*
09SWC-395	Copper Keel	241.2	4.3 m @ 3.12% Cu, 2.44 g/t Au, 22.40 g/t Ag
09SWC-417	Ridgetop	34.4	12.2 m @ 2.49% Cu, 1.46 g/t Au, 13.60 g/t Ag
09SWC-480	Minto North	80.6	21.6 m @ 4.64% Cu, 3.59 g/t Au, 18.9 g/t Ag
09SWC-492	Minto North	65.6	18.1 m @ 5.31% Cu, 2.68 g/t Au, 22.3 g/t Ag
including	Minto North	73.1	9.5 m @ 7.32% Cu, 4.50 g/t Au, 32.0 g/t Ag
09SWC-504	Minto North	59.0	40.6 m @ 2.14% Cu, 1.39 g/t Au, 8.4 g/t Ag
09SWC-527	Minto North	61.5	2.00 m @ 19.89% Cu, 4.80 g/t Au, 86.6 g/t Ag
09SWC-584	Minto East	302.0	13.6 m @ 3.45% Cu, 1.18 g/t Au, 8.8 g/t Ag
09SWC-586	Minto East	279.8	27.0 m @ 2.75% Cu, 0.97 g/t Au, 7.2 g/t Ag
09SWC-589	Minto NW	246.5	1.4 m @ 5.14% Cu, 1.27 g/t Au, 17.2 g/t Ag

*Estimated true thickness.

Table 19. *NI 43-101 resource for all Minto deposits (June 2009).*

Class	Tonnage*	Grade
Measured	10 348 Mt	1.37% Cu, 0.55 g/t Au, 4.57 g/t Ag
Indicated	13 920 Mt	0.94% Cu, 0.30 g/t Au, 3.39 g/t Ag
Inferred	5827 Mt	0.91% Cu, 0.25 g/t Au, 2.93 g/t Ag

*Calculation excludes the remaining Minto Main deposit mineral resource.

PORPHYRY/SHEETED VEIN

Western Copper Corp. (*www.westerncoppercorp.com*) received its Quartz Mining license for the **Carmacks Copper** property (Yukon MINFILE 115I 008). The project's Type A water use license application is at the final approval stage, and upon receipt of this final license, Western Copper will be in a position to make a production decision. The deposit bears similarities to the operating copper-gold Minto Mine 40 km to the northwest. The project, if developed, will be an open-pit operation that will use solvent extraction/electrowinning technology to extract copper from the upper oxidized portion of the deposit.

Western Copper Corp. (*www.westerncoppercorp.com*) is advancing its porphyry copper-gold-molybdenum **Casino** property (Yukon MINFILE 115J 028) in west-central Yukon (Fig. 34). Casino is a 900-million tonne deposit hosted in the mid-Cretaceous Casino plutonic suite with mineralization related to an overprinting Late Cretaceous event. Western Copper completed a 37-hole (10 850 m) diamond drillhole program (Table 20), a Quantec Titan 24 deep-penetration IP/MT geophysical survey, and environmental and engineering studies in order to update

Figure 34. *Extensive drilling at the Casino copper-molybdenum porphyry deposit.*

its pre-feasibility study. Diamond drilling successfully intersected mineralization above the deposit cut-off grade in all but one hole along the margin of the deposit within the pit limits and in the 'latite plug', an area previously thought to be barren. The latite plug area produced a number of intersections of significant molybdenum mineralization indicating a previously unrecognized molybdenum zone. Drilling of geophysical targets produced intersections with significant lead-zinc-silver-gold values and also anomalous copper-gold-molybdenum mineralization 500 m outside of the deposit area.

Table 20. *Significant intercepts from drilling at the Casino property.*

Drillhole	Zone/Area	Depth of intersection (m)	Intersection
CAS-025	latite plug	62.50	140.56 m @ 0.21% Cu, 0.073% Mo, 0.09 g/t Au, 1.2 g/t Ag
and	latite plug	88.56	2.66 m @ 1.32% Cu, 0.057% Mo, 0.22 g/t Au, 2.3 g/t Ag
CAS-033	latite plug	11.00	146.90 m @ 0.18% Cu, 0.044% Mo, 0.17 g/t Au, 1.9 g/t Ag
and	latite plug	157.90	24.98 m @ 0.11% Cu, 0.028% Mo, 0.13 g/t Au, 1.4 g/t Ag
CAS-040	latite plug	93.20	99.75 m @ 0.28% Cu, 0.015% Mo, 0.22 g/t Au, 1.5 g/t Ag
CAS-005	Northeast area	54.50	51.10 m @ 0.20% Cu, 0.024% Mo, 0.15 g/t Au, 1.2 g/t Ag
CAS-019	Northwest area	9.05	256.95 m @ 0.14% Cu, 0.025% Mo, 0.21 g/t Au, 1.2 g/t Ag
CAS-018	other areas	72.90	5.60 m @ 0.19% Cu, 0.18 g/t Au, 8.7 g/t Ag

BC Gold Corp. (*www.bcgoldcorp.com*) explored its land holdings in the Minto-Carmacks copper-gold region, including the **Apex, Toe, Pepper, WS, ICE, Peanut** and **Copper** properties (Yukon MINFILE 115 006, 024). BC Gold is the largest landholder in the area with over 17 properties that were initially staked in 2006 based on similar geochemical and geophysical signatures to the Minto and Carmacks Copper deposits. The company holds a block of claims adjacent to the Minto Mine (the Minto Block) and a block of claims adjacent to the Carmacks Copper property (the Carmacks Block). BC Gold conducted mapping, prospecting, MMI geochemical surveys, magnetics and gradient IP (induced polarization) surveys on several properties. The Toe and Pepper properties (Minto Block) meet the requirements of a qualifying transaction and both have coincident geochemical and geophysical anomalies that require drill-testing. The WS property adjacent to the Carmacks Copper deposit was drilled in 2008, intersecting 63.1 m of 0.17% Cu. Subsequent work on the WS has generated a number of additional drill targets.

BASE METALS – ZINC

SEDIMENTARY

Selwyn Resources Ltd. (*www.selwynresources.com*) conducted environmental, engineering and geotechnical work for optimization of its pre-feasibility study that is in progress on the **Selwyn** (Howards Pass; Yukon MINFILE 105I 12, 37, 38) zinc-lead property located on the Yukon/NWT border, 160 km northeast of Ross River. The Selwyn sedimentary exhalative deposit is one of the largest zinc-lead resources in the world. Laminated sphalerite and galena are hosted in black shale of the Ordovician-Silurian Road River Formation (Fig. 35). The pre-feasibility study being prepared is for development of the XY and Don deposits as a high-grade 8000 t/day underground mine. This development could be followed by later expansion with the addition of open-pit operations. A NI 43-101 resource was calculated for the high-grade underground deposit which is a subset of the larger resource (Table 21). Exploration work in recent years has outlined a significant high-grade core. Selwyn also conducted exploration in the XY West high area with the drilling of 10 holes for a total of 4214 m. Results of the program are pending.

On December 14, Selwyn announced a binding framework agreement with Yunnan Chihong Zinc & Germanium Co. Ltd., to form a Joint Venture Operating Company to finance the Selwyn project to bankable feasibility and if warranted, to production. The transaction will create a new Canadian Joint Venture (JV) company that will be 50% owned by each of Selwyn and Chihong. To earn its 50% interest, Chihong will deposit $100 million in cash into an account to be used to fund the JV. Upon completion of the transaction, the JV will undertake underground development and exploration from the existing access in the XY central deposit.

Figure 35. *High-grade, deformed, laminated sphalerite-galena mineralization from the Selwyn SEDEX project.*

This underground development will give access to drilling of the potentially very high-grade core of the syncline that hosts the deposit (but has not been accessible from surface drilling) and allow upgrading of the existing resource.

Table 21. *NI 43-101 resource for Selwyn project (Feb, 2009).*

Deposit	Class	Tonnage	Grade*
XY Central	Indicated	10.738 Mt	10.38% Zn, 4.41% Pb
	Inferred	2.849 Mt	10.86% Zn, 4.41% Pb
XY West	Inferred	1.910 Mt	7.7% Zn, 2.45% Pb
Don East	Inferred	13.607 Mt	8.48% Zn, 2.44% Pb
Don	Indicated	5.325 Mt	9.98% Zn, 3.86% Pb
	Inferred	5.335 Mt	7.94% Zn, 2.95% Pb
HC West	Inferred	2.996 Mt	9.73% Zn, 3% Pb
Total	Indicated	16.063 Mt	10.25% Zn, 4.23% Pb
	Inferred	26.704 Mt	8.81% Zn, 2.81% Pb

*2% Zn cut-off grade.

Copper Ridge Exploration (*www.copper-ridge.com*) explored its **Clear Lake** sedimentary exhalative property (Yukon MINFILE 105L 045) located 110 km northwest of Faro. The zinc-lead-silver-barite massive sulphide deposit is hosted by carbonaceous argillite, siltstone, chert and tuff of the Devonian to Mississippian Earn Group within Selwyn Basin. The pyrite-bearing massive sulphide body is sigmoidal in shape and approximately 1000 m by 120 m in size. Interpretation of a Versatile Time Domain Electromagnetic (VTEM) survey completed over the property in 2008 identified four targets that have similarities to the anomaly over the Clear Lake deposit and warrant follow-up drill testing. The company is currently preparing a NI 43-101 resource for the deposit.

BRECCIA/REPLACEMENT

The **Michelle** property (Yukon MINFILE 116A 016) of Zinccorp Resources Inc. (*www.zinc-corp.com*), located 130 km northeast of Dawson, is a recent base-metal discovery in Yukon. Zinc, lead, silver and gallium occur mainly as secondary carbonate minerals in fractures and breccia zones within Early Proterozoic Gillespie Lake Group dolomite over an area of roughly 6 km by 12 km. The work program consisted of rock and silt sampling to expand zones discovered in 2008 — Civic, Pinpoint and Nanny — and to explore for new targets. The program uncovered a new zone west of the Nanny that extended it 700 m to the west. Grab sampling returned values up to 22 g/t Ag, 3.9% Pb, 41.5% Zn; and 1300 g/t Ag, 30.3% Pb, 27.2% Zn and 1090 g/t Ga.

BASE METALS – NICKEL + PLATINUM GROUP ELEMENTS (PGE)

MAFIC/ULTRAMAFIC

Northern Platinum Ltd. (*www.northernplatinum.com*) continued exploration on its nickel-PGE **Wellgreen** (Yukon MINFILE 115G 024) property in southwest Yukon. Ten diamond drillholes were drilled south of the old mine workings (Table 22, Fig. 36). Drilling intersected disseminated pyrrhotite, pentlandite and chalcopyrite and minor massive sulphide bands within a layered Triassic mafic-ultramafic sill.

Northern Platinum aims to expand the area of known mineralization and search for new targets on the property. Groundwork to follow-up on results of a 2008 airborne survey was undertaken in 2009 to locate and confirm the reported EM and Mag anomalies.

Table 22. *Significant diamond drilling intercepts from the Wellgreen property.*

Drillhole	Depth of intersection (m)	Intersection
WS09-168	42.00	46.00 m @ 0.230% Cu, 0.322% Ni, 48 ppb Au, 248 ppb Pd, 231 ppb Pt, 171 ppm Co
and	101.50	6.00 m @ 0.221% Cu, 0.198% Ni, 94 ppb Au, 199 ppb Pd, 168 ppb Pt, 109 ppm Co
and	111.31	0.79 m @ 1.570% Cu, 1.280% Ni, 121 ppb Au, 413 ppb Pd, 572 ppb Pt, 736 ppm Co
WS09-170	21.15	17.15 m @ 0.129% Cu, 0.303% Ni, 29 ppb Au, 143 ppb Pd, 143 ppb Pt, 141 ppm Co
and	39.52	12.06 m @ 0.103% Cu, 0.267% Ni, 35 ppb Au, 230 ppb Pd, 140 ppb Pt, 132 ppm Co
and	109.50	33.50 m @ 0.405% Cu, 0.319% Ni, 38 ppb Au, 305 ppb Pd, 353 ppb Pt, 159 ppm Co
and	143.00	4.19 m @ 1.282% Cu, 2.549% Ni, 150 ppb Au, 743 ppb Pd, 1095 ppb Pt, 1282 ppm Co
WS09-171	7.70	127.47 m @ 0.097% Cu, 0.233% Ni, 17 ppb Au, 169 ppb Pd, 169 ppb Pt, 128 ppm Co
including	125.12	9.45 m @ 0.279% Cu, 0.449% Ni, 50 ppb Au, 370 ppb Pd, 134 ppb Pt, 189 ppm Co

Figure 36. *Drilling at the Wellgreen platinum-PGE deposit.*

Figure 37. *Underground at the Mactung tungsten skarn deposit.*

BASE METALS – TUNGSTEN + MOLYBDENUM SKARN

North American Tungsten Corporation Ltd. (*www.northamericantungsten.com*) completed its feasibility study on the **Mactung** deposit (Yukon MINFILE 105O 002) in April 2009. The study defined a 2000 t/day underground operation with an 11-year mine life, with potential to extend the life of mine as an open-pit operation (Fig. 37). The Mactung property, which is situated on the NWT/Yukon border in east-central Yukon, is one of the largest tungsten deposits in the world. The tungsten skarn deposit is hosted in Lower Cambrian clastic rocks and limestone at the margin of a Cretaceous intrusion. Drilling of 63 holes (9888 m) in 2009 was mainly for geotechnical purposes. Additional environmental, engineering and geotechnical studies were carried out in support of permitting, and the project proposal has been submitted to the Yukon Environmental and Socio-Economic Assessment Board (YESAB).

Playfair Mining Ltd. (*www.playfairmining.com*) released a NI 43-101 inferred resource for the **Risby** skarn tungsten deposit in May 2009 (Table 23). The skarn deposit, which contains an inferred 89.4 million pounds of tungsten trioxide, is hosted in Lower Paleozoic calcareous rocks that have been intruded by a mid-Cretaceous quartz-monzonite pluton of the Cassiar Plutonic Suite.

Table 23. *NI 43-101 resource for the Risby property (2009).*

Class	Tonnage	Grade*
Inferred	8.537 Mt	0.475% WO_3

*0.2 g/t WO_3 cut-off grade.

PORPHYRY/SHEETED VEIN

Largo Resources Ltd.'s (*www.largoresources.com*) **Northern Dancer** property contains one of the world's largest tungsten-molybdenum porphyry deposits (Logtung; Yukon MINFILE 105B 039). The mineralization is hosted in fractures, veinlets and veins associated with a northeast-trending sheeted vein structure hosted in diorite and metasedimentary rocks that have been skarned and hornfelsed by the diorite intrusion. The deposit has been drill-tested over 1.2 km along strike and remains open to the northeast and southwest along strike, as well as at depth. A NI 43-101 resource estimate compiled in March 2009 includes all of the 2008 drilling (Table 24). Largo has begun a scoping study and metallurgical testwork.

Table 24. *NI 43-101 resource for the Northern Dancer (Logtung) property (March, 2009).*

Class	Tonnage	Grade*
Measured and Indicated	223.4 Mt	0.107% WO_3, 0.029% Mo
Inferred	201.2 Mt	0.089% WO_3, 0.024% Mo

*0.06% WO_3 cut-off grade.

Agnico-Eagle Mines Ltd. (*www.agnico-eagle.com*) drilled 12 diamond drillholes during 2009 for a total of 8400 m on its **Jennings project** (Tootsee River; Yukon MINFILE 105B 089) in south Yukon. The exploration program was directed toward drilling targets identified through previous drilling and soil sampling over the molybdenum-tungsten skarn/porphyry system (Fig. 38). Assay results are pending.

Figure 38. *Drilling at the Jennings molybdenum-tungsten project.*

RARE EARTH ELEMENTS (REE)

True North Gems conducted preliminary exploration on its **True Blue** aquamarine (Yukon MINFILE 105F 081) property to confirm the rare earth potential of the property. Grab samples were collected at three separate locations and have returned assays up to 6.02% total rare earth oxides plus yttrium (TREO) and 2.52% niobium oxide (Nb_2O_5). The REE and niobium mineralization occurs within a skarn and an altered felsic dyke swarm.

ACKNOWLEDGEMENTS

This report is based on public information gathered from a variety of sources. It includes information provided by companies through press releases, personal communication with exploration companies, and property visits conducted during the 2009 field season. The cooperation of companies and individuals in providing information, as well as their hospitality, time and access to properties during field tours, is gratefully acknowledged.

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Yukon MINFILE 2008 - A database of mineral occurrences. Yukon Geological Survey, <*http://www.geology.gov.yk.ca/database_gis.html*>.

APPENDIX 1: 2009 EXPLORATION PROJECTS

Project name	Optioner/Owner	Number	NTS	Work type	Commodity	Deposit
PRECIOUS METALS - GOLD						
3 Ace	Hyland Gold Corporation	105H 036	105H 09	P, G, GC, T	Au	vein/breccia
Antimony	Golden Predator Royalty & Development Corp./RyanWood Exploration Inc.	116B 094	116B 08	G, DD	Au	porphyry/sheeted vein
Bear Creek	16406 Yukon Inc.		116B/03b	GC, T, RC/P	Au	placer/ paleoplacer
Bear/Cub	Underworld Resources Inc./ Morgan, Tom	New	115O/03	P, G, GP, GC	Au	vein/breccia
Black Fox	Underworld Resources Inc./ Ryan, Shawn	115O 014	115O/03	DD	Au	vein/breccia
Brew	Aldrin Resources Corp./ RyanWood Exploration Inc.	New	115O/03	GP, GC	Au	vein/breccia
Brewery Creek	Golden Predator Royalty & Development Corp./Alexco Resource Corp.	116B 160	116B/01	DD	Au	porphyry/sheeted vein
Canadian Creek	Alder Resources Ltd./ Cariboo Rose Resources Ltd.	115J 101	115J/10	DD	Au	porphyry/sheeted vein
Coffee	Kaminak Gold Corporation/ Ryan, Shawn	115J 110	115J/14	G, GP, GC, T	Au	vein/breccia
Cream	Kaminak Gold Corporation/ Ryan, Shawn	115J 110	115J/13	G, GP, GC	Au	porphyry/sheeted vein
Crown Jewel	Ryan, Shawn	115O 139	115O/15	G, GP, GC, T	Au	vein/breccia
Dragon Lake	Eagle Plains Resources Ltd.	105J 007	105J/12	P, G, GC	Au	skarn/ replacement
Dublin Gulch	Victoria Gold Corp.	106D 025	106D/04	G, T, DD	Au	porphyry/sheeted vein
Eiger	Kreft, Bernie	New	115P/14	P, GC, T	Au	porphyry/sheeted vein
Eureka	Strategic Metals Ltd.	115O 057	115O/10	T	Au	vein/breccia
Florence Creek	Brown, Charlie		115H/16	GC, T	Au	placer/ paleoplacer
Flume	Valley High Ventures Ltd.	115N 110	115N/09		Au	skarn/ replacement
Forty Mile	Allan, Grant		116C/07	P, GC, T	Au	placer/ paleoplacer
Gold (Scheelite) Dome	Golden Predator Royalty & Development Corp.	115P 004	115P/09, 16	G, GP, GC, T, DD	Au	skarn/ replacement
Golden Culvert	Lee, Gary/ Scott, Bob	New	105H/16	P, G, GP, GC, T	Au	vein/breccia

Abbreviations

AGP - airborne geophysics
BS - bulk sample
DD - diamond drilling
G - geology
GC - geochemistry
GP - ground geophysics
IOCG - iron-oxide copper-gold
MD - mine development
P - prospecting
PF - prefeasibility
RC/P - reverse circulation/ percussion drilling
T - trenching
U/GD - underground development

Appendix 1 (continued): 2009 EXPLORATION PROJECTS

Project name	Optioner/Owner	Number	NTS	Work type	Commodity	Deposit
Grew Creek	Emerick Resources Corp./Carlos, Al	105K 009	105K/02	DD	Au	vein/breccia
Henderson Dome	Underworld Resources Inc.	115O 168	115O/06	P, G, GC	Au	vein/breccia
Ind	Aldrin Resources Corp./ Ryan, Shawn	New	115O/13	G, T	Au	porphyry/sheeted vein
Indian River - Montana	Schmidt Mining Corp.	Placer	115O/10	GC, RC/P	Au	placer/ paleoplacer
JP Ross	Underworld Resources Inc.	115O 160	115O/03	P, G, GC	Au	vein/breccia
Ketza River	Yukon-Nevada Gold Corp.	105F 019	105F/09	DD	Au	skarn/ replacement
Kirkman	Kaminak Gold Corporation/ Ryan, Shawn	115O 016	115O/03	G, GC, T	Au	vein/breccia
Kit	Hinterland Metals Inc./ Andersen, Farrell	New	115O/03	DD	Au	vein/breccia
Kluane	Rockhaven Resources Ltd.	115H 047	115G/08	P, G, GC, T	Au	vein/breccia
Kodiak	Stina Resources Ltd./ RyanWood Exploration Inc.	New	115O/03	GP, GC, DD	Au	vein/breccia
LB Quartz	Klondike Star Mineral Corporation	New	115O/14	G, GP, T	Au	volcanic associated
Leota	Leota Goldfields	115O 074		P, GC, T	Au	vein/breccia
McFaull Mountain	Monster Mining	New	105M/14	P, G, GC	Au	mafic/ultramafic associated
Moosehorn (Longline)	39231 Yukon Inc.	115N 024	115K/15; 115N/02	P, GP, GC, T	Au	vein/breccia
Nines Creek	Keefe, Ralph		115G/02	P, GP, GC	Au	placer/ paleoplacer
Nucleus	Northern Freegold Resources	115I 107	115I/06	G, GP, GC, DD, RC/P	Au	porphyry/sheeted vein
Oreo	Neugebauer, Henry/ RyanWood Exploration Inc.	116A 027	116A/04	P, G, GC	Au	porphyry/sheeted vein
Polar	Pacific Ridge Exploration/ RyanWood Exploration Inc.	New	115O/03	P, GP, GC	Au	vein/breccia
Prospector Mountain	Tarsis Capital Corp.	115I 034	115I/05	G, GP, GC, T	Au	porphyry/sheeted vein
Rau	ATAC Resources Ltd.	106D 005	106D/01	DD	Au	skarn/ replacement
Rob Roy	Gimlex Enterprises Ltd.	Placer	115O/10	GC, RC/P	Au	placer/ paleoplacer
Shanghai Creek	Ryan, Shawn	105M 028	105M/13	G, GP, GC, T	Au	vein/breccia

Abbreviations

AGP - airborne geophysics
BS - bulk sample
DD - diamond drilling
G - geology
GC - geochemistry
GP - ground geophysics
IOCG - iron-oxide copper-gold
MD - mine development
P - prospecting
PF - prefeasibility
RC/P - reverse circulation/ percussion drilling
T - trenching
U/GD - underground development

Appendix 1 (continued): 2009 EXPLORATION PROJECTS

Project name	Optioner/Owner	Number	NTS	Work type	Commodity	Deposit
Skukum Creek	Yukon-Shaanxi/ Tagish Lake Gold Corp.	105D 022A	105D/03	G, GP	Au	vein/breccia
Sonora Gulch	Northern Tiger Resources Inc.	115J 008	115J/09	P, G, AGP, GC, DD	Au	porphyry/sheeted vein
Sulphur Creek	Klippert, Dan	Placer	115O/15c	GC, T, RC/P	Au	placer/ paleoplacer
Tay-LP	Canarc Resource Corp./ Ross River Minerals Inc.	105F 121	105F/10	DD	Au	vein/breccia
Ten	Solomon Resources Ltd./ Radius Gold Inc./Kreft, Bernie	New	115O/05	P, GC	Au	vein/breccia
Thistle Creek	Underworld Resources Inc./ Morgan, Tom	115O 106	115O/03	P, G, GC	Au	vein/breccia
White Gold	Underworld Resources Inc.	115O 011	115O/04	P, G, GC, DD	Au	vein/breccia
Yellow Gold	ATAC Resources Ltd.	New	115J/14	P, G, GC	Au	vein/breccia
PRECIOUS METALS - SILVER						
Clark-Cameron	Tanana Exploration Inc.	106D 011	106D/02	P, GC, T	Ag	vein/breccia
CMC Silver (Silver Hart)	CMC Metals Ltd.	105B 021	105B/07	DD	Ag	vein/breccia
Fisher	Mega Precious Metals Inc./ Victoria Gold Corp.	105M 022	105M/14	DD, RC/P	Ag	vein/breccia
Groundhog	Rockhaven Resources Ltd.	105F 093	105F/10	P, G, GC, T	Ag	vein/breccia
Jen	Hinton Syndicate & Ewing Transport Ltd.	New	105M/14	P, GC	Ag	vein/breccia
Keno Hill	Alexco Resource Corp.	105M 001	105M/14	DD, RC/P, PF, MD	Ag	vein/breccia
McKay Hill	Monster Mining	106D 038	106D/06	P, G, GC, T	Ag	vein/breccia
Plata	Rockhaven Resources Ltd.	105N 003	105N/09	P, G, GC, T, DD	Ag	vein/breccia
Wildcat	Killdeer Minerals Inc./Lee, Gary	105B 001	105B/01	GC, DD	Ag	skarn/ replacement
BASE METALS - COPPER						
Apex	BC Gold Corp.	New	115I/11	P, G	Cu	porphyry/sheeted vein
BC	BC Gold Corp.	New	115I/07	GC	Cu	porphyry/sheeted vein
Bond	Northern Tiger Resources Inc.	115I 076	115I/13	P, GC	Cu	porphyry/sheeted vein

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Appendix 1 (continued): 2009 EXPLORATION PROJECTS

Project name	Optioner/Owner	Number	NTS	Work type	Commodity	Deposit
Carmacks Copper	Western Copper Corporation	115I 008	115I/07	PF	Cu	porphyry/sheeted vein
Casino	Western Copper Corporation	115J 028	115J/10	PF	Cu	porphyry/sheeted vein
Copper	BC Gold Corp.	New	115I/07	GC, DD	Cu	porphyry/sheeted vein
Dad	Northern Tiger Resources Inc.	115I 026	115I/14	P, G, GP, GC	Cu	porphyry/sheeted vein
Dawg	Copper Canyon Resources Ltd.	116B 111	116B/15	P, G, GC	Cu	Wernecke Breccia
Ice (Cu-Au)	BC Gold Corp.	115I 009	115I/07	GP	Cu	porphyry/sheeted vein
King Lake Copper	39231 Yukon Inc.	105D 104	105D/14	P, GP, GC, T	Cu	porphyry/sheeted vein
Lewes River	Arcturus Ventures Inc.	105D 062	105D/10	P, GC	Cu	skarn/ replacement
Mel (Dawson Range)	Northern Tiger Resources Inc.	New	115I/11	AGP, GP, GC	Cu	porphyry/sheeted vein
Minto	Capstone Mining Corp.	115I 021	115I/11	GP, GC, DD	Cu	IOCG
Mor	Tarsis Capital Corp.	105C 061	105C/01	P, G, GP, GC	Cu	volcanic associated
Peanut	BC Gold Corp.	New	115I/07	GC, DD	Cu	porphyry/sheeted vein
Pepper	BC Gold Corp.	New	115I/11	P, G	Cu	porphyry/sheeted vein
SFN 1	Selkirk First Nation	115I 023	115I/11	P, G, GP, GC	Cu	IOCG
SFN 3 & 4	Selkirk First Nation		115I/11	P, G, GP, GC	Cu	IOCG
Spear	BC Gold Corp.	New	115I/11	P, G	Cu	porphyry/sheeted vein
Toe	BC Gold Corp.	New	115I/11	P, G	Cu	porphyry/sheeted vein
WS Total	BC Gold Corp.	115I 006	115I/07	P, G, GP, GC	Cu	porphyry/sheeted vein
Iron Mike	Eagle Plains Resources Ltd.	New	116K/09	G, GP, GC	Fe	sediment associated
BASE METALS - MOLYBDENUM						
Jennings	Agnico-Eagle Resources	105B 089	105B/01	DD	Mo	porphyry/sheeted vein

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T - trenching
U/GD - underground development

Appendix 1 (continued): 2009 EXPLORATION PROJECTS

Project name	Optioner/Owner	Number	NTS	Work type	Commodity	Deposit
BASE METALS - NICKEL +/-PLATINUM GROUP ELEMENTS (PGE)						
Wellgreen	Northern Platinum Ltd.	115G 024	115G/05	DD	Ni/PGE	mafic/ultramafic associated
RARE EARTH ELEMENTS						
Shark	True North Gems Inc.	105F 081	105F/08	P, G, GC	REE	vein/breccia
BASE METALS - TUNGSTEN						
Kidlark	Yankee Hat Minerals	105F 097	105F/05	DD	W	skarn/ replacement
MacTung	North American Tungsten	105O 002	105O/08	DD, F	W	skarn/ replacement
Northern Dancer	Largo Resources Ltd.	105B 039	105B/04	PF	W	porphyry/sheeted vein
BASE METALS - ZINC-LEAD						
Angie	Full Metal Minerals/ RyanWood Exploration Inc.	105F 091	105F/15	P, G, GC	Zn-Pb	sediment associated
Clear Lake	Copper Ridge Exploration Inc.	105L 045	105L/14	GP	Zn-Pb	sediment associated
Cypress	Full Metal Minerals/ RyanWood Exploration Inc.	106C 022	106C/07	P, G, GP, GC	Zn-Pb	Mississippi Valley Type
Fin	Eagle Plains Resources Ltd.	105H 047	105H/12	G, GC	Zn-Pb	sediment associated
Lower Don Creek	Selwyn Resources Ltd.	New	105I/12	G, GC, T	Zn-Pb	sediment associated
Michelle	Zinccorp Resources Inc./ Strategic Metals Ltd.	116A 016	116A/13	P, G, GC	Zn-Pb	Mississippi Valley Type
Nebocat	Full Metal Minerals/ RyanWood Exploration Inc.	105G 093	105G/06		Zn-Pb	sediment associated
Rusty Springs	Eagle Plains Resources Ltd.	116K 003	116K/09	G	Zn-Pb	vein/breccia
Selwyn project	Selwyn Resources Ltd.	105I 012	105I/06	P, G, DD	Zn-Pb	sediment associated
South Selwyn	Selwyn Resources Ltd.	New	105I/06	G, GC, T	Zn-Pb	sediment associated
Ultra	16406 Yukon Inc.	115B 008	115B/16	P, G, GC, T	Zn-Pb	volcanic associated
Wolverine	Yukon Zinc Corporation	105G 072	105G/08	DD, MD, U/GD	Zn-Ag	volcanic associated

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MD - mine development
P - prospecting
PF - prefeasibility
RC/P - reverse circulation/ percussion drilling
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U/GD - underground development

APPENDIX 2: 2009 DRILLING STATISTICS

Property	Optioner/Owner	# drillholes	metres
	Diamond drilling		
Antimony Mountain	Golden Predatory Royalty and Development Corp.	9	881
Brewery Creek	Golden Predatory Royalty and Development Corp.	30	5011
Canadian Creek	Cariboo Rose Resources Ltd.	10	1425
Casino	Western Copper Corporation	39	10 850
Eagle (Dublin Gulch)	Victoria Gold Corp.	7	3296
Fisher	Mega Precious Metals	16	4200
Gold (Scheelite) Dome	Golden Predatory Royalty and Development Corp.	18	2416
Grew Creek	Emerick Resources Corp.	9	1600
Jennings	Agnico-Eagle Resources	12	8400
Kidlark	JOGMEC/Yankee Hat Minerals	8	575
Keno Hill	Alexco Resource Corp.	174	15 645
Ketza River	Yukon-Nevada Gold	8	1837
MacTung	North American Tungsten	63	9888
Marsh Lake	1356139 Alberta Inc.	2	400
Minto	Capstone Mining Corp.	201	31 479
Nucleus	Northern Freegold Resources	44	10 440
Plata	Rockhaven Resources Ltd.	2	347
Rau	ATAC Resources Ltd.	58	9578
Selwyn Project	Selwyn Resources Ltd.	10	4214
Sonora Gulch	Northern Tiger Resources Inc.	12	2455
Tay-LP	Canarc Resource Corp.	10	1884
Wellgreen	Northern Platinum Ltd.	10	2052
White Gold	Underworld Resources Inc.	90	25 670
Wildcat	Killdeer Minerals Inc.	5	902
Wolverine	Yukon Zinc Corp.	48	5450
		895	160 895
	Percussion/Reverse Circulation		
Eagle/Fisher	Mega Precious Metals		1728
Nucleus	Northern Freegold Resources	21	1241
Keno Hill	Alexco Resource Corp.	283	9100
		304	12069

Yukon Placer Mining Overview 2009

***William LeBarge*[1]**
Yukon Geological Survey

LeBarge, W., 2010. Yukon Placer Mining Overview 2009. *In:* Yukon Exploration and Geology Overview 2009, K.E. MacFarlane, L.H. Weston and L.R. Blackburn (eds.), Yukon Geological Survey, p. 59-62.

PLACER MINING

More than a century after the discovery of gold in the Yukon, placer mining is still an important sector in the Yukon's economy. Royalty records, which represent the minimum amount of gold production, show that over 16.7 million crude ounces (518 tonnes) of placer gold have been produced to date in Yukon — at today's prices that would be worth more than $14 billion.

In 2009, there were approximately 135 active placer mining operations, directly employing approximately 400 people. This was a substantial increase over 2008, which had only 100 operations. As usual, the industry saw a fair amount of transition: some operations moved to new drainages, others closed, several were sold, and a few brand new mines began operating. Although most placer operations are still small and family-run (with an average of three or four employees), there has been a recent trend for small, relatively inactive properties being sold to new owners and re-activated. In addition, several mine owners now own more than one active property, resulting in a shift towards larger mining operations.

The warm, dry summer was helpful to many miners in maintaining settling ponds and thawing frozen ground, however it was less beneficial for operations in the higher gulches where water supply was a problem. A relatively warm fall allowed the mining season to be stretched for those miners able to take advantage of it.

There are ten placer mining areas (Fig. 1) distributed throughout the four Yukon Mining Districts. The majority of active placer mining operations are in the Dawson Mining District, followed by the Whitehorse Mining District and the Mayo Mining District. No placer mines are currently active in the Watson Lake Mining District, although there are a few exploratory properties along the Pelly, Liard and Hyland rivers.

Total placer gold production in Yukon in 2009 was 54,478 crude ounces (1 694 456 g), compared to 52,709 crude ounces (1 639 454 g) in 2008. The value of this 2009 gold production was $48.23 million or US$42.4 million (Fig. 2).

Approximately 86% of Yukon's placer gold was recovered in the Dawson Mining District, which includes the unglaciated drainages of Klondike River, Indian River, part of the west Yukon area (Fortymile and Sixtymile rivers) and lower Stewart River. The remaining gold came from the unglaciated Moosehorn Range (west Yukon area) in the Whitehorse Mining District, in addition to other placer mining areas in the glaciated Mayo and Whitehorse mining districts.

Reported placer gold production from Indian River drainages in 2009 increased slightly from 15,305 crude ounces (476 039 g) in 2008 to 15,336 crude ounces (477 003 g) in 2009. There was a significant decrease in production from Dominion Creek, due in part to the cessation of mining early

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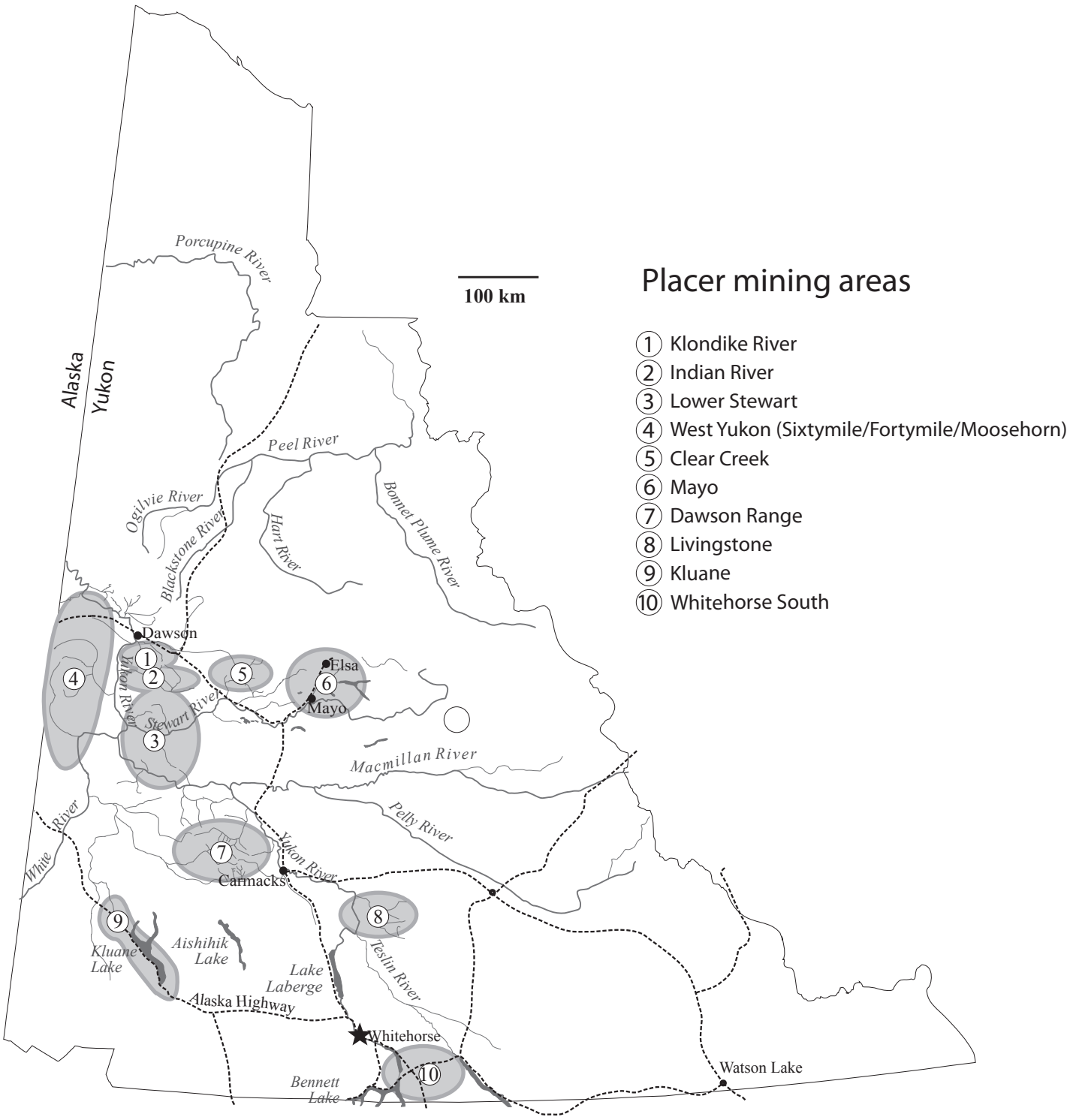

Figure 1. *Yukon placer mining areas.*

in the season by Ross Mining Ltd. New operations on Little Blanche and Canyon creeks and increased production from Indian River nearly compensated for this difference however.

In Klondike area drainages, production increased from 11,223 crude ounces (349 074 g) in 2008 to 13,268 crude ounces (412 681 g) in 2009. Notable increases were reported from Hunker Creek and its tributaries, while royalties from Bear and Bonanza creeks dropped significantly.

West Yukon area (Sixtymile, Fortymile and Moosehorn Range) placer gold production decreased dramatically from 13,416 crude ounces (417 285 g) in 2008 to 8,316 crude ounces (258 657 g) in 2009. The largest decreases were from Sixtymile River and Matson Creek.

Production from operations in the Lower Stewart drainages was up significantly in 2009, to a total of 9,955 crude ounces (309 635 g) from 5,779 crude ounces (179 747 g) in 2008. Production from Black Hills, Barker and Henderson creeks was up substantially, while Scroggie Creek reported royalties were down. Several new operations began on Black Hills Creek and some relatively new operations throughout the region stepped up production.

Clear Creek drainages had a decrease in gold reported over the previous year, down from 487 crude ounces (15 147 g) in 2008 to 443 crude ounces (13 779 g) in 2009.

In the Dawson Range, reported placer gold production more than doubled from 788 crude ounces (24 509 g) in 2008 to 2,014 crude ounces (62 642 g) in 2009. All creeks had increased royalties, and the highest difference was recorded on the Klaza River.

In the Mayo area, gold production decreased substantially from 1396 crude ounces (43 420 g) in 2008 to 1035 crude ounces (32 192 g) in 2009. Duncan and Lightning creeks both had increased production, while Davidson Creek and nearby Mayo Lake tributaries had decreased production.

In the Kluane area, reported placer gold production increased, with 1,648 crude ounces (51 258 g) recorded in 2008 and 1,859 crude ounces (57 821 g) recorded in 2009. Production at Burwash and Gladstone creeks increased, while Frypan Creek recorded no royalties this year.

A small amount of mining took place in the Livingstone area, and 16 crude ounces (497 g) of gold was reported as royalties from Little Violet and Livingstone creeks.

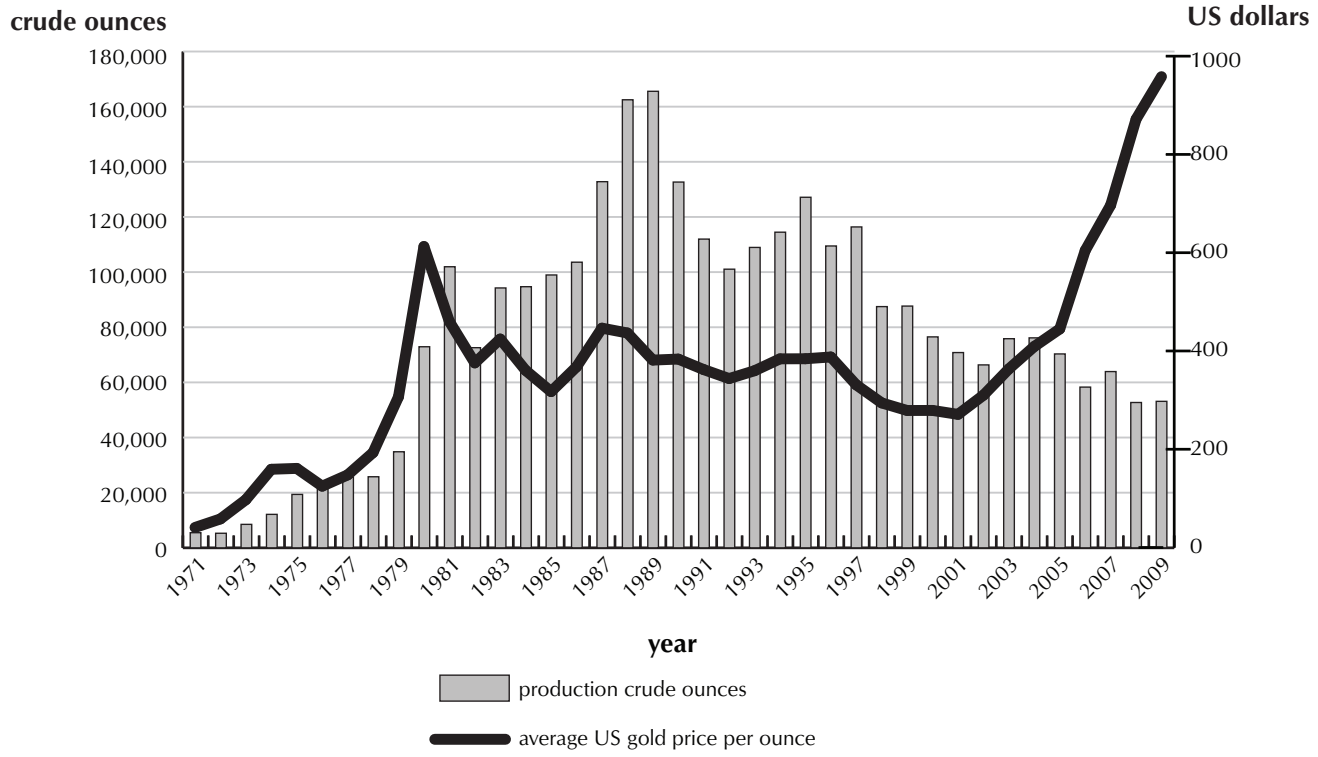

Figure 2. *Yukon placer gold production figures and average US gold price, 1971-2009.*

In the Whitehorse South area, no gold was reported in 2009.

PLACER EXPLORATION

One of the highlights of the 2009 season was the substantial increase in placer staking activity in the Lower Stewart area, fuelled in part by exploration on the nearby White Gold hard rock gold discovery north of Thistle Creek. In addition, several small test operations were established on Maisy May and Black Hills creeks, which have had relatively low levels of activity in recent years.

CONTACT US

The staff at the Yukon Geological Survey and the Client Services and Inspection Division (Department of Energy, Mines and Resources, Government of Yukon) can provide information and advice regarding placer mining in Yukon. Many recent publications and maps can be downloaded for free from our website at www.geology.gov.yk.ca. Information is also available at the Yukon Placer Secretariat, *http://www.yukonplacersecretariat.ca/*. Publications on placer mining in the Yukon are available through the Yukon Geological Survey office at Room 102, Elijah Smith Building, 300 Main Street, Whitehorse, Yukon.

Yukon Oil and Gas Overview 2009

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Adilman, B., 2010. Yukon Oil and Gas Overview 2009. *In:* Yukon Exploration and Geology Overview 2009, K.E. MacFarlane, L.H. Weston and L.R. Blackburn (eds.), Yukon Geological Survey, p. 63-70.

ABSTRACT

In 2009, there was interest shown during Yukon's two oil and gas rights disposition processes. One bid and one permit were issued in the spring 2009 process to Northern Cross Yukon Ltd. Companies continue to show interest in oil and gas resources in Yukon.

Yukon's Oil and Gas Resources (OGR) branch continues to prepare amendments to the Yukon *Oil and Gas Act* in anticipation of tabling in the Legislature in the spring of 2010. OGR also continues preparation of pipeline regulations.

Production of natural gas yielded more than 56 000 x 10^3 m^3 from two wells in southeast Yukon.

Other OGR activities in 2009 included the following: implementating the oil and gas component of the Yukon Energy Strategy; monitoring the progress of the Mackenzie Gas Project; preparing for the proposed Alaska Highway Pipeline Project; participating in several offshore oil and gas initiatives; consultating and cooperating with affected First Nations on a variety of oil and gas issues; ensuring oil and gas interests are taken into account during the Land Use Planning process; and cooperating with the Yukon Geological Survey with field work and associated analytical work in order to discover potential source rocks and petroleum reservoir rocks.

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INTRODUCTION

During 2009, the Oil and Gas Resources (OGR) branch of the Department of Energy, Mines and Resources (EMR) continued its role of promoting Yukon's oil and gas industry. While industry activity was limited over the past year, OGR focused on preparations for future exploration and development in Yukon, specifically pipeline and drilling activities.

Yukon has eight onshore sedimentary basins containing an estimated 17 trillion cubic feet (Tcf) (480 billion m^3) of natural gas and 770 million barrels (120 million m^3) of oil (Government of Yukon, 2009; Fig. 1). Offshore estimates in the Beaufort Sea north of Yukon consist of an additional 40 Tcf (1.5 trillion m^3) of natural gas and 4.5 billion barrels (720 billion m^3) of oil (Government of Yukon, 2009), contributing to Yukon's vast and virtually untapped petroleum resources.

There was one permit issued in the Eagle Plain Basin during OGR's dispositions of oil and gas rights in 2009. Opportunities in southeast Yukon and the proposed construction of the Mackenzie and/or Alaska Highway pipelines continue to hold promise for the Yukon's oil and gas sector.

OGR continues to develop partnerships with other jurisdictions and governments, including First Nations. A unique and competitive oil and gas common regime is in place in preparation for potential expansion of exploration and production. This regime, jointly crafted by Yukon and First Nation governments, applies to all Yukon lands. Although Yukon resources are remote, and pipeline infrastructure is presently lacking, OGR has created an attractive economic and legislative framework that bodes well for future activity.

YUKON'S OIL AND GAS RIGHTS DISPOSITION PROCESS

Pursuant to the Government of Yukon's *Oil and Gas Act* and *Oil and Gas Disposition Regulations*, rights to oil and gas are granted by the Minister through a competitive disposition process. Oil and Gas Resources runs two disposition processes annually, each of which is designed to be completed in approximately five months. Each process consists of the following:

- submission for consideration of Requests for Postings (RFP) for locations of interest to explore for oil and gas;
- review of the RFP, wherein the public, First Nations and government agencies may submit presentations on environmental, socio-economic and surface access concerns related to the requested locations;
- a Call for Bids, where persons or companies are invited to submit bids on posted locations; and
- issuance of oil and gas permits to successful bidders.

A successful bidder is required to submit a work deposit equal to 25% of their bid. The work deposit is returned proportionally as work is completed.

The initial term of the Permit is six years. Permits may be renewed for a further four-year term if a well is drilled during the initial term. Before any activity takes place, companies are required to obtain all regulatory approvals and undergo environmental screening through the *Yukon Environmental and Socio-Economic Assessment Act*. Companies are also encouraged to follow best management practices as outlined by OGR.

Between 2007 and 2009, 15 new permits were issued in northern Yukon totalling $22.8 million in work commitments.

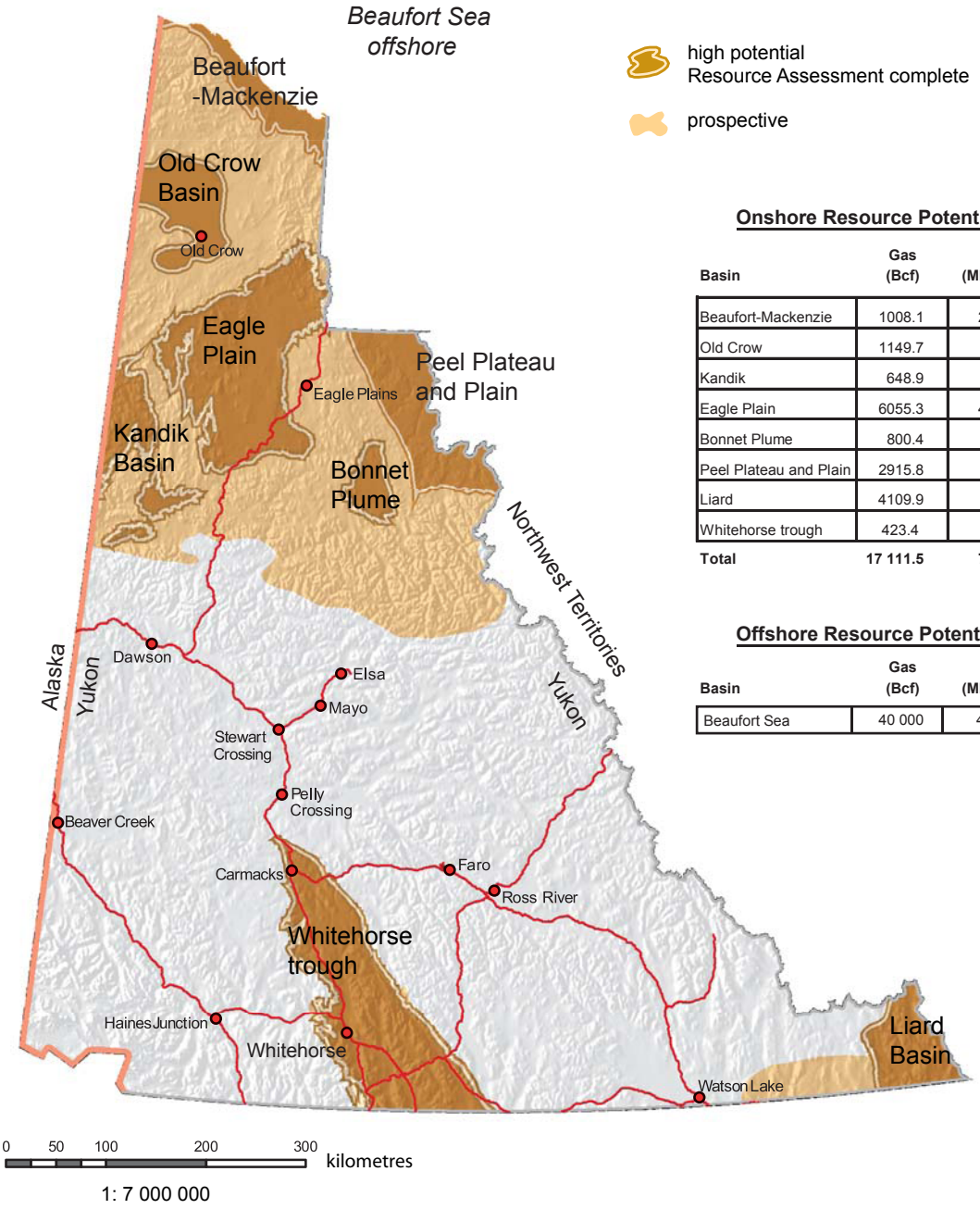
In summary, the Government of Yukon's oil and gas rights disposition process provides:

- an attractive investment climate for future development since it is efficient, streamlined and offers certainty;
- a two-year rolling schedule, providing companies with an opportunity to plan ahead; and
- a minimum work commitment which has been lowered from $1 million to $400 000.

NATURAL GAS PRODUCTION

In southeast Yukon, natural gas is produced from the Kotaneelee Field in the Liard Basin. The two producing wells (B-38 and L-38) yielded 50 393 x 10^3 m^3 of natural gas in the period from January 2009 to October 2009 (Fig. 2) (Oil & Gas Resources Branch, 2009). The field is in the later stages of life and gas production and reservoir pressure are declining slowly, whereas water cuts are increasing. Recovery factor to date is 55% of initial gas-in-place, which is considerably better than similar nearby fields in the basin.

Yukon oil and gas basins



Onshore Resource Potential

Basin	Gas (Bcf)	Oil (MMbbls)
Beaufort-Mackenzie	1008.1	216.7
Old Crow	1149.7	0
Kandik	648.9	99.3
Eagle Plain	6055.3	436.7
Bonnet Plume	800.4	0
Peel Plateau and Plain	2915.8	0
Liard	4109.9	0.1
Whitehorse trough	423.4	19.2
Total	**17 111.5**	**772.0**

Offshore Resource Potential

Basin	Gas (Bcf)	Oil (MMbbls)
Beaufort Sea	40 000	4500

Figure 1. *Yukon's oil and gas exploration regions.*

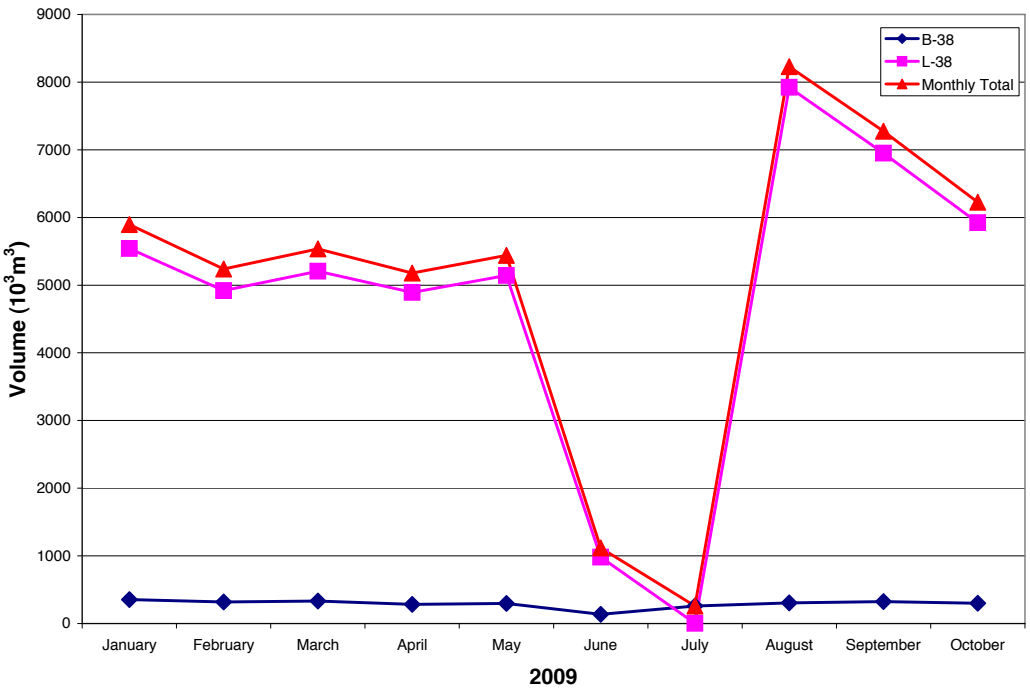


Figure 2. *Yukon natural gas production, from Kotaneelee field, southeast Yukon.*

FIRST NATIONS

The Oil and Gas Resources branch continues to build strong working relationships with First Nations through the ongoing development of a common oil and gas regime and through regular consultation during the disposition and licensing processes. OGR supports the Aboriginal Pipeline Coalition (APC) and believes it has a very important role in ensuring that First Nations remain informed and are prepared for the Alaska Highway Pipeline Project. Canada, Yukon and the APC are working cooperatively toward concluding a more stable long-term funding arrangement: First Nation engagement and participation is essential to the development and implementation of an efficient pipeline regulatory process and in ensuring an outcome whereby First Nations enjoy substantial benefits.

PIPELINES

Both the Mackenzie Gas Project (MGP) and the Alaska Highway Pipeline Project (AHPP) offer enormous economic opportunities for the north (Fig. 3). The Government of Yukon continues to work hard in order to ensure Yukon is pipeline-ready, benefits are maximized, and potential negative impacts are minimized. Work will also continue with our neighbouring jurisdictions — Alaska, British Columbia, Northwest Territories and Alberta — to prepare for both projects.

AHPP will generate an estimated 375 000 person-years of employment over 24 years (McCracken, 2002), while MGP estimates are 181 000 person-years over the same 24-year span (Wright Mansell Research Ltd., 2004). The construction of these two projects will also inject billions of dollars into the North American economy. These projects would provide access for Yukon natural gas to southern markets, which could earn the Government of Yukon more than $40 million annually in royalty revenues from the production of natural gas resources.

ALASKA HIGHWAY PIPELINE PROJECT

Both the TransCanada PipeLines Ltd./Exxon Mobil partnership, and the Denali Project (BP and ConocoPhillips) proponents are focusing on completing cost estimates for an open season in 2010. An 'open season' is a limited window created by a pipeline company to identify gas producers and shippers interested in seeking carrier capacity on the line, if built, and provide a willingness to commit their product at an economically feasible carrier price.

OGR participated in community visits organized by the Aboriginal Pipeline Coalition (APC) to update Yukon First

Nations and municipalities along the proposed pipeline route. The proponents continue to engage First Nations and municipal governments as well.

The Canadian government recently appointed a deputy commissioner of the Northern Pipeline Agency, and is making plans to further staff the Agency.

Should the chosen route follow the Alaska Highway, this will be important to the interests of the Government of Yukon. Yukon has seven well-documented Alaska Highway Pipeline Project interests:

- ensuring a net fiscal benefit to Yukon;
- enhancing positive socio-cultural impacts while mitigating negative socio-cultural impacts;
- promoting environmental stewardship;
- recognizing municipal, community and First Nation interests;
- advancing a clear and efficient regulatory process;
- supporting economic pipeline access for Yukon natural gas; and
- requiring gas take-off points.

Figure 3. *Northern natural gas pipeline options.*

Oil and Gas Resources is also working closely with other jurisdictions that would be affected by an Alaska Highway pipeline. One initiative is the Strategic Action Plan Working Group, which consists of participants from Yukon, British Columbia and Alberta. This group was created in order to manage common issues expected to arise from the various inter-jurisdictional concerns over the Alaska project. Yukon continues to urge the Canadian government to demonstrate that they are prepared with a streamlined, efficient regulatory process for either project.

MACKENZIE GAS PROJECT

Oil and Gas Resources branch involvement with the Mackenzie Gas Project (MGP) hearings is also important. Yukon's interest in the construction of this project is significant, as there are benefits for Yukon to be derived from this pipeline, both during and after construction. During construction, supplies and services will be required of Yukon businesses. Construction will also provide employment opportunities for Yukon residents. The presence of a pipeline would provide a means for Yukon gas to be transported competitively to southern markets, which would mean that potential gas would no longer be cut off from this competitive market.

Oil and Gas Resource's intervention included written submissions and presentations by OGR representatives at both the National Energy Board (NEB) and Joint Review Panel (JRP) hearings.

OGR's intervention in the JRP hearings has resulted in both the proponent (Imperial Oil) and Yukon committing to the enhancement of potential positive effects from construction and operation of the project, and to mitigate potential adverse effects from the proposed project on Yukon's environment, communities and transportation infrastructure.

The JRP was scheduled to release its report to the NEB in December 2009 and the NEB is targeting September 2010 for the release of its final decision document on whether to proceed with a project or not.

OFFSHORE

Although the federal government transferred responsibility for onshore oil and gas to the Government of Yukon, it continues to maintain responsibility for oil and gas management and development in the Beaufort Sea. BP Exploration's $1.2-billion successful bid in 2008 for exploration rights in the Beaufort Sea followed Imperial Oil/ExxonMobil's 2007 bid of $585 million for similar rights. BP followed up with 2-D and 3-D seismic survey work in 2009. These are all clear indicators that industry remains interested in the offshore, and that governments will need to respond to this renewed interest.

Yukon remains committed to finalizing a shared offshore oil and gas management regime and revenue-sharing arrangement with Canada in accordance with the Canada Yukon Oil and Gas Accord. As an interim step, Yukon and Canada have signed a Memorandum of Understanding detailing Yukon's enhanced role in offshore oil and gas management and the collaborative approach undertaken by Canada and Yukon. OGR continues to advance Yukon's offshore interests, including the following: governance, economic benefits, resource revenues, financial considerations, infrastructure, capacity development and sustainable development.

Yukon is actively participating with other governments and industry on a number of existing and proposed Beaufort Sea planning initiatives, including the Integrated Oceans Management Plan, and directly related to oil and gas, the Beaufort Regional Environmental Assessment.

Taking an integrated management approach to all offshore planning is essential to ensuring an efficient and effective planning and decision-making process. OGR continues to work jointly with Indian and Northern Affairs Canada in undertaking a review of the call for nominations for the Beaufort Sea including the possibility of incorporating the area immediately off the Yukon coast in future disposition processes. Yukon is actively involved in the Frontier/ Offshore Regulatory Renewal Initiative which is a process to review and update the offshore oil and gas regulations. This is a federal/provincial/territorial government joint initiative, involving regulators such as the National Energy Board and the East Coast offshore petroleum boards.

Yukon is pleased that the Government of Canada is engaged in improving the northern regulatory system, which has been criticized for being too complicated and costly. This will have implications to Yukon's interests in the Beaufort Sea and northern pipeline development. The goal is to strike a balance between economic development and environmental protection, while making the regulatory system more predictable and efficient.

Yukon is also pleased that the Government of Canada has made northern sovereignty and security a national priority. Given the significant oil and gas resources in the Beaufort

Sea and international interest in the Northwest Passage, Canada's sovereignty in the region must be recognized.

Finally, Yukon continues to work cooperatively and collaboratively with the Government of the Northwest Territories and the Inuvialuit on relevant offshore matters.

OIL AND GAS LEGISLATION

Yukon is planning to introduce amendments to the Yukon *Oil and Gas Act* in 2010.

These amendments will:

- update the Act to reflect Yukon's current oil and gas regulatory regime;
- bring it into line with common law on First Nation consultation;
- provide certainty and growth opportunities for industry; and
- improve opportunities for Yukon and its First Nations to benefit from oil and gas activity.

It is important to continue to improve the legislative framework to support the emerging oil and gas sector within Yukon. A stable framework provides for the needs of industry while maintaining government's ability to responsibly manage resources and provide Yukoners with the benefits of development.

OGR also continues to work on the development of pipeline regulations.

OIL AND GAS CONSENT AND ACCOMMODATION AGREEMENT IN SOUTHEAST YUKON

There continues to be interest in oil and gas prospects in southeast Yukon. This region is of high interest to industry because there is existing pipeline infrastructure and good potential for an economic oil and gas discovery. If the area is further developed, it will also mean a significant economic boost to the residents in the area.

In areas where land claims remain unsettled, Yukon requires consent of the affected Yukon First Nations prior to disposition of oil and gas rights or authorization of oil and gas activities.

Current efforts are focused on obtaining the consent of the Liard First Nation and Ross River Dena Council.

Progress is being made in these efforts. The Government of Yukon has begun consultations regarding potential infringement of aboriginal rights with all affected aboriginal groups who assert aboriginal rights within the southeast Yukon. Throughout the disposition and licensing process, the Government of Yukon consults with affected First Nations about proposed oil and gas activities.

The agreement contains provisions that facilitate economic development, as well as providing the certainty needed by industry. Once concluded, the agreement will be made public.

YUKON GEOLOGICAL SURVEY

In 2009, the Yukon Geological Survey (YGS) conducted oil and gas related research studies in northern Yukon, in three of Yukon's eight oil and gas basins. In addition, new publications were released from two basins in southern Yukon.

In the spring, YGS concluded its research with the Geological Survey of Canada (GSC), the Northwest Territories Geoscience Office, and industry and university affiliates on the 'Regional Geosciences Studies and Petroleum Potential, Peel Plateau and Plain, Northwest Territories and Yukon' multi-year project. A volume and accompanying digital atlas, summarizing research conducted over the previous four years, was released in May (Pyle and Jones, 2009). As part of this partnership, Tammy Allen and Tiffani Fraser of YGS examined the reservoir and source rock potential of Upper Paleozoic and Cretaceous strata. The success of the Peel project was recognized by Indian and Northern Affairs Canada, Northwest Territories region, with the presentation of the Excellence in Science and Technology award.

This year, the YGS began a partnership with the Geological Survey of Canada on a study of the Eagle Plain and Peel Plateau basins, as part of the Geo-Mapping for Energy and Minerals (GEM) 2008-2013 initiative. Tammy Allen conducted three weeks of fieldwork in these basins, focusing on the source rock potential of Upper Paleozoic strata, an extension of her research with the multi-agency Peel Project. Grant Lowey of YGS spent two weeks in Eagle Plain basin, scoping out a new project on the sedimentology, stratigraphy and petroleum potential of the Cretaceous Sharp Mountain Formation. Tiffani Fraser has initiated a study examining the petrophysical properties of reservoir units in the Peel wells.

In addition to fieldwork, a late season core retrieval program from the Eagle Plain and west Richardson Mountains was undertaken in September. Also a GEM-funded program, the core retrieval involved efforts by the GSC, Northern Cross (Yukon) Ltd. and the YGS. Approximately 2250 m of diamond drill core was salvaged from a 2007-2008 mineral sector drilling program. The core penetrated Upper Paleozoic strata and will be examined and studied in Calgary for its shale gas and source rock potential.

Also under the GEM initiative, Grant Lowey spent one week in the Bonnet Plume basin, completing a two-season study of the sedimentology, stratigraphy and petroleum potential of the Cretaceous/Tertiary Bonnet Plume Formation. He is collaborating on this project with researchers from GSC-Calgary and from Laurentian University.

Lee Pigage of YGS has been mapping in southeast Yukon, including Liard Basin, since 2000, originally as part of the Central Foreland NATMAP project. The results of his mapping were released in 2009 as YGS Bulletin 16, "Bedrock geology of NTS 95C/5 (Pool Creek) and NTS 95D/8 map sheets, southeast Yukon" (Pigage, 2009). This compilation includes information on the source rock potential from a variety of units.

For the past six years, Grant Lowey has been studying the sedimentology, stratigraphy and petroleum source rock potential of Whitehorse trough. A paper outlining the source rock potential of this basin was published in the September 2009 volume of the Bulletin of Canadian Petroleum Geology (Lowey *et al.*, 2009).

OTHER ACTIVITIES

Oil and Gas Resources continues to assist in the development of an over-arching Yukon Energy Strategy, designed to provide direction for the sustainable development, management and use of energy in Yukon. The scope of the strategy includes Government of Yukon roles and responsibilities in all aspects of energy development, management and use in the territory. OGR continues to contribute to the development of a Climate Change Action Plan.

OGR has completed an Energy to Mines Report, which examines the possibility of developing Yukon natural gas resources to generate electricity at selected mine and other end-use sites. The study considers using natural gas produced at the Eagle Plain field as a fuel source, and delivering it by pipeline, to the point of use. The study concluded that natural gas is likely an equal economic alternative compared to electricity delivered from the Yukon Energy grid, or from on-site diesel-powered electric generation.

OGR also continues to ensure the Government of Yukon's oil and gas interests are taken into account during the regional land use planning processes.

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Yukon Mining Incentives Program 2009

Mike Burke
Yukon Geological Survey

Burke, M., 2010. Yukon Mining Incentives Program 2009. *In:* Yukon Exploration and Geology Overview 2009, K.E. MacFarlane, L.H. Weston and L.R. Blackburn (eds.), Yukon Geological Survey, p. 71-73.

The Yukon Mining Incentives Program (YMIP) is designed to promote and enhance mineral prospecting and exploration activities in Yukon by providing a portion of the risk capital required to allow prospectors and companies to locate and explore mineral deposits. In anticipation of the decrease in mineral exploration activity that was predicted for 2009, the Government of Yukon approved a significant increase to the YMIP budget (Fig. 1). This budget increase was also accompanied by an increase in the maximum levels of contribution for individual modules: Grassroots Prospecting - $15,000; Focused Regional - $25,000; and Target Evaluation - $50,000. The Target Evaluation module of YMIP was designed to fund early-stage exploration programs to a level where they could support advanced exploration. Government funding available to the YMIP budget, and thus individual programs, is subject to annual assessment and approval.

Since its inception 20 years ago, the YMIP program has provided the stimulus for the bulk of grassroots prospecting and regional exploration in Yukon. Such activities, which were once assumed by major mining companies, have served to highlight new targets and demonstrate the territory's under-explored mineral potential. However, the high level of risk associated with such ventures proved extremely difficult to finance and were often abandoned by the companies during economically challenging times. In response to declining levels of exploration spending in the late 1990s, the Yukon government increased funding to YMIP in 2000. Over the following three years, projects receiving YMIP funding accounted for 40% of all grassroots exploration. The most recent success story resulting from the YMIP strategy is the White Gold project that was funded under the Grassroots Prospecting module, and subsequently the Target Evaluation module, prior to being optioned by Underworld Resources and undergoing advanced exploration activities.

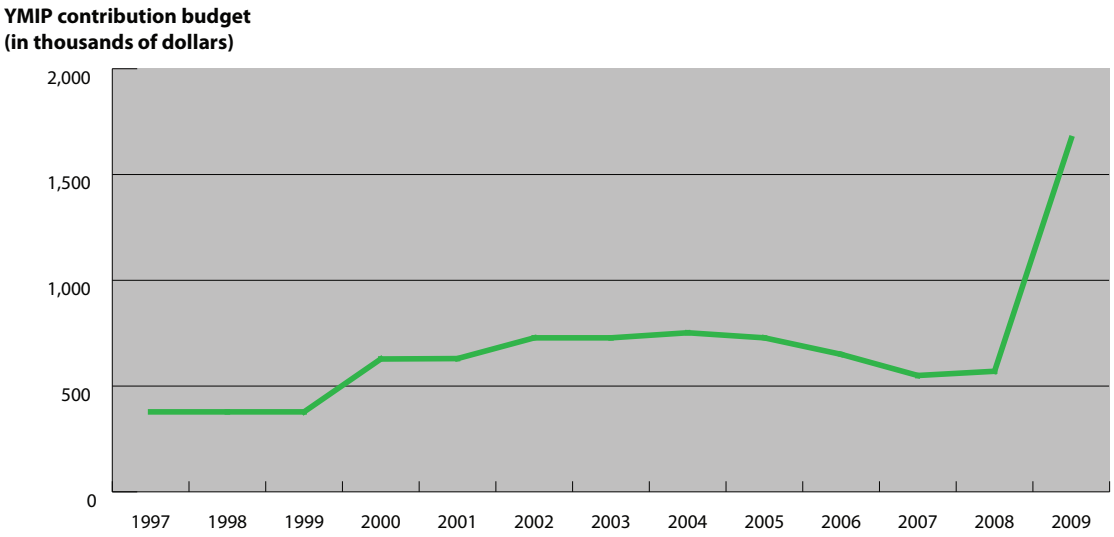

Figure 1. *Yukon Mining Incentives Program funding since program inception.*

In 2009, a total of 174 applications were received by the submission deadline for this season. Of these, 138 applications were for hard rock exploration programs and 38 for placer-related exploration programs. Contribution agreements totaling $1,670,000 were subsequently issued to 102 successful applicants (Fig. 2). In an effort to distribute funds to a greater number of projects, the maximum level of contributions was reduced. Though many of the applications received for 2009 were deemed adequate during the evaluation process, all eligible applications could not be funded.

During periods of prosperity and through those inevitable times of economic challenge, programs, such as YMIP play a fundamentally important role in early-stage project generation, and development of projects entering more advanced stages of exploration. Across Canada, the Government of Yukon is a leader in its commitment to providing economic incentives to mining exploration with its Yukon Mining Incentives Program.

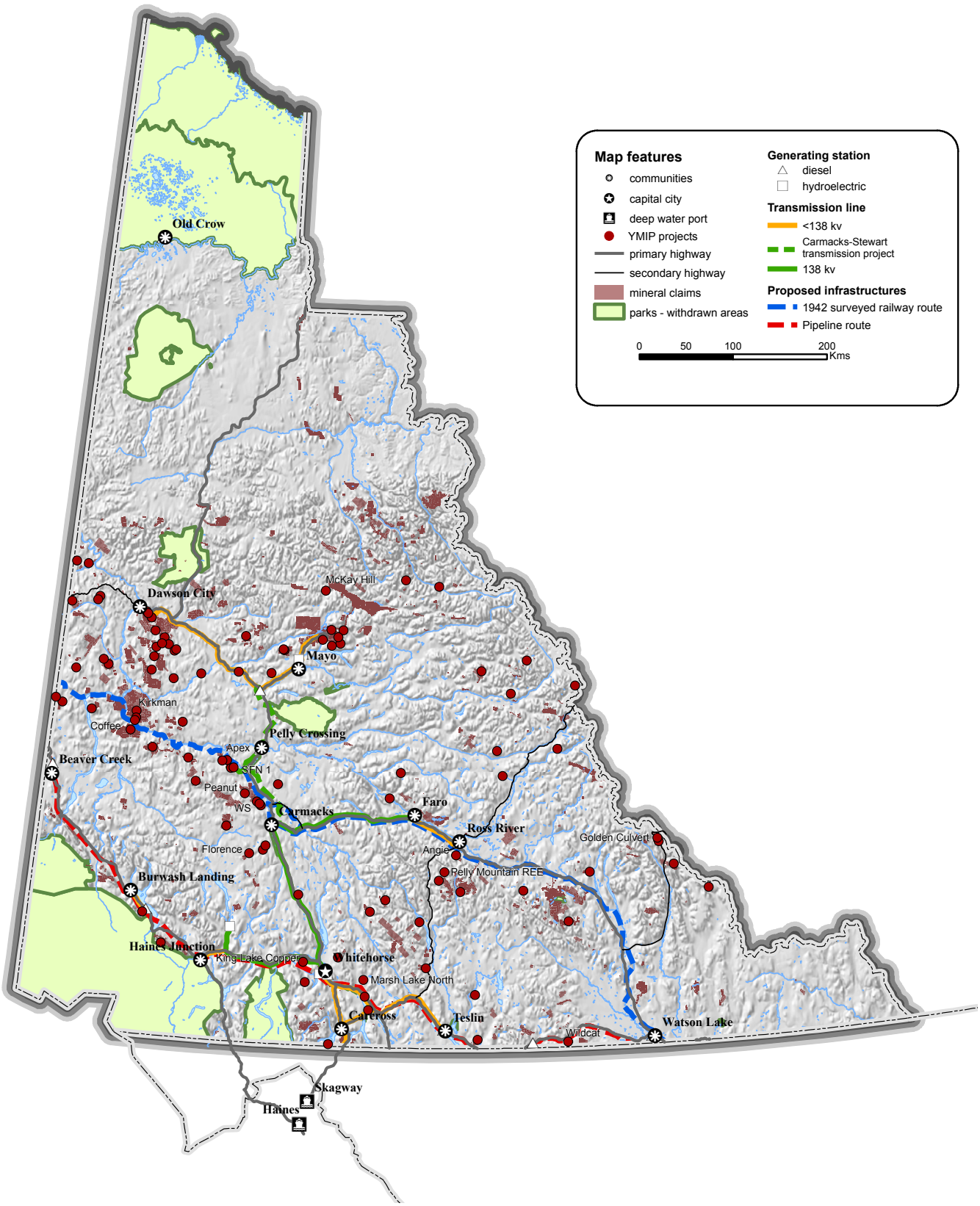

Figure 2. *Yukon exploration projects funded by the Yukon Mining Incentives Program (YMIP) for 2009.*

Robert E. Leckie Awards for Outstanding Reclamation Practices

Erin Dowd[1] *and* ***Judy St. Amand***
Mining Lands, Energy Mines and Resources

Dowd, E. and St. Amand, J., 2010. Robert E. Leckie Awards for Outstanding Reclamation Practices. *In:* Yukon Exploration and Geology Overview 2009, K.E. MacFarlane, L.H. Weston and L.R. Blackburn (eds.), Yukon Geological Survey, p. 75-77.

QUARTZ RECLAMATION

WESTERN COPPER CORPORATION

Western Copper Corporation is the recipient of the 2009 Robert E. Leckie Award for Outstanding Quartz Reclamation Practices. Their exploration project is taking place near Pelly Crossing in the Whitehorse Mining District. The vigorous reclamation of two abandoned camps (Fig. 1) and the clean-up and re-establishment of a well-designed camp and airstrip have earned them the credits they deserve.

Figure 1. *Bomber camp has been reclaimed and the area has been sloped, scarified and fertilized to promote rapid re-growth. Arrows point to abandoned camps.*

[1]*Erin.Dowd@gov.yk.ca*

Restoration efforts have included the clean-up and disposal of empty fuel drums, scrap metal and debris scattered in the area. The company removed 11 damaged buildings, refurbished six trailers for re-use and sealed off a collapsed adit. Two electrical transformers were removed from near the creek and placed in a lined and bermed fuel area, and old fuel drums, piping and scrap metal were removed from the creek bed. All unused trails and roads were scarified, hillsides were re-contoured and the area was fertilized to aid in re-growth.

In addition to the reclamation efforts at the abandoned camps, Western Copper has cleaned up the existing airstrip and established an organized camp. The airstrip was resurfaced and graded, overgrowth was removed, and ditches were established to prevent run-off from eroding the new surface. Lined fuel berms were constructed for diesel and gasoline storage and two large unused propane tanks were removed from the site.

This award recognizes Western Copper Corporation's progressive policies and solid efforts to reclaim this disturbed mine site. This company is truly a leader in environmental stewardship.

HONOURABLE MENTION: STRATEGIC METALS LTD.

Strategic Metals Ltd. has been operating in the Eureka Creek/Black Hills area in the Dawson Mining District. The company has consistently complied with best management practices and has met final decommissioning requirements.

Strategic Metals Ltd. has reclaimed their trenches to closely mimic the surrounding vegetation (Fig. 2). The company dug and reclaimed all trenches within one month and used innovative methods to ensure rapid re-vegetation. Plant life was left in clumps, instead of being mulched, to protect roots for quick and total

Figure 2. *Trees scattered on this reclaimed trench will deter access to off-road vehicles.*

regeneration. Large trees were laid across trenches to prevent access, protect seed stocks, and maintain soil moisture and stability.

This program is a marvelous example of what others should practice.

PLACER MINING RECLAMATION

FAVRON ENTERPRISES LTD.

Favron Enterprises Ltd. is the recipient of the 2009 Robert E. Leckie Award for Outstanding Placer Reclamation Practices. The company has been placer mining in the Last Chance and Hunker Creek areas in the Dawson Mining District since 2004 and has shown exemplary efforts in continual reclamation.

The Favron family has cleaned up and consolidated materials left over from previous operators going back to the gold rush. Reclamation is immediate, whether or not future mining is planned, to protect the land from erosion and to maintain rich organics for later use.

Their property is organized and they have a well-planned operation that focuses on high levels of environmental protection and on ongoing reclamation. Creek beds have been reconstructed to allow for natural flow within the channel (Fig. 3), overburden is contoured immediately and seed stocks are carefully protected. The constructed settling pond system allows for no discharge and an excellent fuel storage system ensures that no fuel spills can occur.

Favron Enterprises Ltd. is considered an exceptional operator and this award recognizes their outstanding efforts in reclamation practices.

Figure 3. *Solid and stable re-constructed stream channel.*

Yukon Exploration and Geology 2009 Abstracts

The following abstracts are from the Yukon Exploration and Geology 2009 volume.
Full versions of the individual papers are available at the Yukon Geological Survey website, *http://www.geology.gov.yk.ca/recent.html.*

Field notes on the Upper Devonian Imperial Formation (NTS map sheet 106L), Tetlit Creek, east Richardson Mountains, Yukon

T.L. Allen

Although the Upper Devonian Imperial Formation is widespread across northern Yukon and Northwest Territories, its geology is poorly understood in northern Yukon. The Imperial Formation is well exposed in outcrop along the eastern flank of the Richardson Mountains, notably on Tetlit Creek and Trail River (NTS map sheet 106L). During the summer of 2008, detailed partial stratigraphic sections were measured on Tetlit Creek to record lithologic variation within the formation. In addition, samples were collected to establish the age of the strata and its source rock potential by means of palynological, geochemical and vitrinite reflectance analyses.

In the east Richardson Mountains, Imperial Formation strata can be informally subdivided into two parts. The lower is predominantly mudstone and siltstone while the upper part consists of sandstone and fine-grained siliciclastic rocks. Palynological analyses for this region have established that the Imperial Formation is late Frasnian to Famennian in age. Accompanying thermal alteration indices (TAI) as well as vitrinite reflectance data suggest that the strata are overmature with respect to hydrocarbon generation. Based on Rock Eval/TOC results from surface, most of the organic matter present within the strata is not favourable for source rock potential.

Deconstructing complex Au-Ag-Cu mineralization, Sonora Gulch project, Dawson Range: A Late Cretaceous evolution to the epithermal environment

V. Bennett, C. Schulze, D. Ouellette and B. Pollries

We present new field and U-Pb analytical data from the Sonora Gulch project that demonstrate a protracted history of polymetallic mineralization (Au-Ag-Cu-Zn ± Mo) associated with several pulses of Cretaceous magmatism. Recent exploration on the Sonora Gulch project has highlighted the presence of two important zones of mineralization: the Nightmusic zone, a mesothermal Au-enriched base-metal skarn; and the Amadeus zone, an epithermal Au-Ag system. Four U-Pb-age dates determined from each of two feldspar porphyry dykes *(ca.* 74 Ma) and a weakly mineralized quartz porphyry stock *(ca.* 75 Ma) within the Nightmusic zone, as well as the Au-Ag mineralized Amadeus stock *(ca.* 75 Ma); these dates demonstrate the widespread occurrence of Late Cretaceous magmatism. The age determinations indicate that mineralization occurring within the Sonora Gulch project area are temporally equivalent to the Casino Cu-Au-Mo deposit, located roughly 40 km to the west-northwest. These new data extend the currently known eastern limit of Late Cretaceous magmatism and associated mineralization.

U-Pb isotopic age dating by LAM ICP-MS, INCO Innovation Centre, Memorial University: Sample preparation methodology and analytical techniques

V. Bennett and M. Tubrett

This contribution reports on sample preparation methods and Laser Ablation Microprobe Inductively Coupled Plasma Mass Spectrometry (LAM ICP-MS) analytical techniques routinely used to acquire U-Pb isotopic age data at the Inco Innovation Centre, Memorial University. Four concordant zircon reference materials that span from Miocene to Archean in age (9.52 Ma, 337.15 Ma, 1066.3 Ma and 2674.3 Ma) were recently analysed during a data collection session in which U-Pb isotopic data for 11 suspected Cretaceous plutonic rocks was being acquired. Final U-Pb age calculations determined for the four zircon reference materials are in excellent agreement with the corresponding known and/or published ID TIMS ages and demonstrate the reproducibility, accuracy and precision of the LAM ICP-MS technique. Furthermore, data collected for sample GP-09-02 demonstrate the applicability of the LAM ICP-MS technique for dating zircon populations as young as Miocene.

New U-Pb age constraints at Northern Freegold Mountain: Evidence for multiple phases of polymetallic mid- to Late Cretaceous mineralization

T. Bineli Betsy and V. Bennett

In this contribution we present new U-Pb age data for ten intrusive units that bracket the timing of polymetallic mineralization occurring within the Northern Freegold Resources Ltd. (NFR), Freegold Mountain project area. Polymetallic mineralization occurring in the Tinta zone predates trachytic dykes (~109 Ma) and represents the earliest phase of mineralization recognized on the Freegold Mountain property to date. Feldspar porphyry dykes that intrude the Revenue zone are correlative to the Nucleus zone feldspar porphyry dykes, and yield ages of ~105-104 Ma, indicating that the structural corridor in which Au mineralization occurred was active from at least this time. Furthermore, monzodiorite was emplaced at ~107 Ma within the Revenue zone. An ~97 Ma aplitic dyke that intrudes porphyritic granite of the Stoddart intrusion predates ~94 Ma Mo-Cu-W mineralization. Andesitic dykes (~77 Ma) that crosscut the Stoddart porphyry and rhyolitic dykes (~ 75 Ma) intruding the Revenue zone, represent Carmacks-age volcanism in the region. These new age data indicate that economically important mineralizing events took place over a period of at least 40 Ma.

High-sulphidation epithermal Au-Ag-Cu mineralization at the McKay Hill property: A revised deposit model

L.R. Blackburn

The past-producing McKay Hill property on NTS map sheet 106D/6 (Nash Creek) has previously been described as having polymetallic Ag-Pb-Zn ± Au-style mineralization. During the 2009 YMIP-funded exploration program, the central claims on the property were mapped and numerous distinct differences from the proposed polymetallic model became apparent. Unlike Keno Hill, veins on the McKay Hill property lack siderite gangue and are not present as vein-faults. Propylitic alteration halos surrounding vertically zoned ore shoots (high-level Au-Cu and deeper level Ag-Cu-Pb) were observed within consistently north-northwest striking, near vertical, siliciclastic and hypabyssal-volcanic rocks. The Ag-Pb-Zn veins in the Keno Hill Camp were emplaced in discrete dilational fault structures within polydeformed clastic metasediments and are not associated with extensive alteration. Host rock competency in both areas is vital in controlling mineralization. Re-evaluating the regional framework could potentially illustrate the area's metallogenic potential for different types of mineral occurrences.

Pre-Reid surficial geology investigations in southwest McQuesten map area (115P)

J.D. Bond and P.S. Lipovsky

Recent field investigations have improved our knowledge of the Quaternary surficial geology, stratigraphy and glacial limits in the McQuesten map area. This information has important applications to surficial geochemical and placer exploration. The Quaternary geology of this area is unique because it encompasses early to middle Pleistocene (pre-Reid) glacial surfaces that are preserved beyond the limit of the Illinoian (Reid) glacial limit. These pre-Reid surfaces have been exposed to long periods of weathering and erosion, which have diminished their original distribution and expression. Stratigraphic exposures examined in the map area provide new evidence for a large glacial lake(s) in the Lake Creek basin ('glacial lake Coldspring'); the lake developed when pre-Reid ice dammed outlets in the Willow Hills and lower Lake Creek. In addition, there is evidence that another large glacial lake ('glacial lake Rosebud') formed on the west side of the White Mountains when a pre-Reid glacier dammed Rosebud Creek. Fieldwork in the White Mountains and on Australia Mountain allowed us to delineate the pre-Reid glacial limit at approximately 1000 m (3300-3400 feet) a.s.l. This elevation is lower than the pre-Reid glacial limit previously mapped for the area by Duk-Rodkin (1999) and is consistent with mapping performed in the adjacent Stewart River map sheet by Bostock (1964), Jackson (2005a,b) and Froese and Jackson (2005).

Preliminary description and slope stability analyses of the 2008 Little Salmon Lake and 2007 Mt. Steele landslides, Yukon

M.-A. Brideau, D. Stead, P.S. Lipovsky, M. Jaboyedoff, C. Hopkinson, M. Demuth, J. Barlow, S. Evans and K. Delaney

In August 2008, reactivation of the Little Salmon Lake landslide occurred. During this event, hundreds of conical mounds of variable size and composition formed in the deposition zone. The characteristics of these landforms are described and a potential mechanism for their formation is proposed. A preliminary slope stability analysis of the 2007 Mount Steele rock and ice avalanche was also undertaken. The orientation of very high persistence (>20 m long) structural planes (*e.g.,* faults, joints and bedding) within bedrock in the source zone was obtained using an airborne-LiDAR digital elevation model and the software COLTOP-3D. Using these discontinuity orientation measurements, kinematic, surface wedge and simple three-dimensional distinct element slope stability analyses were performed.

Particle-size distribution of gold within the Sulphur and Dominion Creek drainages, Klondike District, Yukon, and implications for gold winning and the formation of distal placers containing fine gold.

R.J. Chapman, D.P.G. Bond and W.P. LeBarge

The reducing efficiency of gold recovery with decreasing particle size using a sluicebox, increases the possibility of a very fine gold resource within the Klondike. We have assessed the grade of fine gold within gravel recovered from the southern Klondike, using a combination of screening and bulk leaching by cyanidation. This approach eliminates the nugget effect and size ranges selected correspond to particle sizes exploitable by different metallurgical methods: <53 µm (cyanidation), 53-125 µm (enhanced g concentrators), 125-500 µm (sluice boxes). Colluvium, virgin gravel, and tailings from various mining operations were collected from a relatively long drainage where accumulation of fine gold could feasibly occur. In all samples, gold <125 µm was negligible. Despite this negative result, this approach to resource evaluation is straightforward and could be applied advantageously in other areas where source mineralization contains fine gold. A distinction should be made between placer gold grains of fine but equant nature derived from proximal mineralization, and gold rendered fine and flaky by fluvial transport.

The Duke River fault, southwest Yukon: Preliminary examination of the relationships between Wrangellia and the Alexander terrane

R. Cobbett, S. Israel and J. Mortensen

The Duke River fault is a terrane-bounding structure that separates the Alexander terrane from Wrangellia in southwest Yukon. Detailed geological mapping and sampling of three key areas along the fault was completed in August 2009. In these areas, the fault juxtaposes multiply folded, pervasively foliated, greenschist facies rocks of the Alexander terrane against low-grade Wrangellian rocks that record only one phase of folding. Shear bands, fold orientations, rotated grains, lineations, mica fish and fault plane orientations indicate that the Alexander terrane has been thrust over Wrangellia. Preliminary $^{40}Ar/^{39}Ar$ ages from muscovite grains that may have been reset by motions along the Duke River fault, or grown during faulting, range from 90-104 Ma, suggesting that movement along the fault is at least as old as Cretaceous. Miocene felsic intrusions and Miocene to Pliocene crustal tuffs of the Wrangell lavas have been deformed by the Duke River fault, suggesting movement occurred as recently as the Pliocene.

Bedrock geology of southwest McQuesten (NTS 115P) and part of northern Carmacks (NTS 115I) map area

M. Colpron and J. Ryan

Southwest McQuesten-northern Carmacks area is primarily underlain by rocks of the Yukon-Tanana terrane which is divided in two distinct belts separated by the Willow Creek fault: 1) a central belt of polydeformed, upper greenschist-amphibolite facies metasedimentary and metaplutonic rocks of Permian and older ages; and 2) a northeastern belt of generally undeformed and unmetamorphosed volcano-plutonic rocks of the Early Mississippian Reid Lakes complex. The southern part of the area is underlain mainly by rocks of Quesnellia and Stikinia, including: 1) Paleozoic retrogressed metamorphic rocks of the Boswell assemblage; 2) Upper Triassic augite-phyric volcanic rocks; and 3) Early Jurassic granitoids of the Aishihik plutonic suite. These rocks are dissected by a series of dextral strike-slip faults, probably related to the Teslin fault system. Post-accretion rocks include: 1) mid-Cretaceous biotite monzogranite plutons; 2) dacite and minor basalt of the Upper Cretaceous Carmacks Group; and 3) Quaternary basalt of the Selkirk volcanics. The southwest McQuesten-northern Carmacks area is under-explored, but shares many geological attributes with nearby, highly prospective districts such as the Dawson Range mineral belt, the recently discovered White Gold area, and the producing Minto mine.

Major- and trace-element composition of platinum group minerals and their inclusions from several Yukon placers

Y. Fedortchouk, W. LeBarge, A.Y. Barkov, L. Fedele and R.J. Bodnar

Occurrences of placer platinum-group minerals (PGM) were reported in several gold placer deposits in Yukon. The source rock and the type of platinum mineralization are not known for these localities. We investigated five grains of Pt-Fe alloy from Burwash Creek (map area 115G and F), one grain from Scroggie Creek (map area 115O and N) and one grain from Wolverine Creek (map area 105C and D). Results of multiple electron microprobe analyses display elevated levels of Pd, Rh, Ir and Cu in these Pt-Fe alloy grains. The grains host micro-inclusions of various species of PGM and silicate-melt inclusions with diopside, albite and sodic-calcic amphiboles. Trace element composition of the silicate inclusions determined using laser ablation ICP-MS shows a notable enrichment in large ion lithophile elements. We infer that the reported association of PGM and the trace element composition of silicate-melt inclusions observed in the studied grains were likely derived from a subduction-related Alaskan-type mineralization.

Preliminary Quaternary geology of Coal River (NTS 95D), Yukon

K. Kennedy

Quaternary geology investigations in the Coal River map sheet (NTS 95D) during the 2009 field season focused on characterizing surficial materials and their distributions, with attention to the eastern half of the map sheet which has not been previously mapped. Moraine deposits are relatively thin in valley bottoms (<2 m) and become thinner and more intensely colluviated on upland surfaces. Streamlined glacial landforms and till plains are pronounced in the southern half of the map sheet. Surficial deposits are limited in many east-trending meltwater canyons, and in the northeastern corner of the map sheet.

The map area was glaciated most recently by the Cordilleran Ice Sheet, which advanced from the south and west. Meltwater from montane glaciers and the Laurentide Ice Sheet in adjacent map sheets likely contributed to extensive glaciolacustrine, glaciofluvial and glaciodeltaic deposits in north-trending valleys that were dammed by the Cordilleran Ice Sheet.

Ar-Ar geochronology and Pb isotopic constraints on the origin of the Rau gold-rich carbonate replacement deposit, central Yukon

S. Kingston, J.K. Mortensen, J. Gabites and M. Dumala

The Rau deposit in central Yukon is a gold-rich carbonate replacement deposit hosted in mid-Paleozoic carbonate rocks of the Mackenzie Platform in the footwall of the Dawson thrust. Gold-bearing sulphide mineralization is peripheral to a zone of hornfels and local tungsten-bearing skarn that is associated with several small bodies of granitic aplite and pegmatite that have yielded $^{40}Ar/^{39}Ar$ muscovite ages of 62.3 ± 0.7 Ma, 62.4 ± 1.8 Ma and 59.1 ± 2.0 Ma. These intrusions are geochemically different and slightly younger than the 65.2 ± 2.0 Ma McQuesten plutonic suite farther to the south. Most Pb isotopic analyses of sulphides from the Rau deposit cluster within compositions of igneous feldspars from the associated intrusions; however, some analyses fall on a trend toward more radiogenic compositions that were determined for the host carbonate rocks. The data are consistent with the Rau sulphide mineralization being genetically related to the early Paleocene felsic intrusions and forming peripheral to more proximal zones of hornfelsing and tungsten-bearing skarns.

Evaluation of titanite as an indicator mineral for tungsten-skarn mineralization

R. Linnen and X. Che

One of the challenges in exploring for skarn mineralization is that barren skarn may not give any indication that mineralization is close by. The purpose of the present study is to evaluate titanite as an indicator mineral for tungsten-skarn mineralization. Titanite from samples of scheelite mineralization from the Risby, Ray Gulch and Mactung deposits was analysed by electron microprobe. The titanite is fluorine-rich and some grains contain anomalous tin, but in most grains, metal concentrations are at, or below, the detection limits of the microprobe (~20-50 ppm). Future work is planned to analyse titanite by LAM ICP-MS to determine, in particular, the W-Mo-Sn contents to further evaluate the use of titanite as an indicator mineral for tungsten skarn exploration.

Pressure-depth relationships of the Roop Lakes stock and Keno Hill Ag-Pb-Zn veins

G. Lynch

Key mineral assemblages help determine pressure, temperature and depth of emplacement for mineralized veins of the Keno Hill District, as well as for local Cretaceous pluton emplacement. New electron microprobe analyses are presented on samples collected in the field, enabling further characterization of the hydrothermal and plutonic regimes. Staurolite-garnet-albite-biotite schist along the margins of the Cretaceous Roop Lakes stock, records contact metamorphic conditions averaging 518°C and 3450 bar. To the west, hydrothermal veins of the Keno Hill Mining District containing pyrite-pyrrhotite-sphalerite-arsenopyrite indicate hydrothermal conditions of approximately 400°C and 1500 bar. Lithostatic conditions for the pluton, and likely hydrostatic conditions for the veins, are interpreted to indicate a similar depth of emplacement for the two systems, nearly 10-12 km below the surface.

Upper Fifteenmile Group in the Ogilvie Mountains and correlations of early Neoproterozoic strata in the northern Cordillera

F.A. Macdonald and C.F. Roots

An ~2-km thick stratigraphic section measured through three consecutive shale-carbonate sequences documents the previously undescribed upper Fifteenmile Group in the Coal Creek inlier. These descriptions provide the basis for correlation with Proterozoic strata of adjacent inliers in eastern Alaska, as well as the eastern Ogilvie Mountains.

The lowest unit contains interbedded limestone and mudstone with distinctive maroon-weathering layers. Similar strata are present in unit D of the Pinguicula Group exposed in the Hart River inlier. In that area however, the middle sequence containing massive dolostone, that is the most prominent unit of the upper Fifteenmile Group, is missing beneath an angular unconformity. The Callison Lake dolostone is above this surface and is lithologically indistinguishable from the uppermost, stromatolitic, carbonate of the upper Fifteenmile Group. Both the middle and upper dolostone units are preceded by black shale, indicating abrupt transgressions. In contrast, the carbonate units contain abundant evidence of shallow water and periodic emergence. We interpret the upper Fifteenmile Group to comprise three shallowing-upward cycles in this area.

Structural controls on hydrothermal gold mineralization in the White River area, Yukon

D. MacKenzie and D. Craw

New mapping and drilling associated with gold exploration has elucidated the structural and lithological controls on hydrothermal gold systems in the White River area. The Paleozoic basement consists of a sequence of amphibolite facies clastic metasedimentary and meta-igneous rocks that host lower grade ultramafic rocks, some magmatically and some tectonically emplaced during the Late Triassic to Early Jurassic. Mapped ultramafic bodies show close congruence with published airborne magnetic anomalies. All of these rocks are cut by brittle normal faults and fractures, and dykes correlated with middle Cretaceous to early Tertiary extension-related intrusive rocks. Gold mineralization associated with these fractures was strongly controlled by host rock types. Two main rock types, felsic gneiss and quartzite, were preferentially fractured and hydrothermally altered. Other rock types are only weakly fractured and locally altered. In particular, ultramafic bodies and micaceous lithologies locally impeded fluid flow.

The Proterozoic Pinguicula Group: Stratigraphy, contact relationships and possible correlations

K.P.R. Medig, D.J. Thorkelson and R.L. Dunlop

The Pinguicula Group is a Proterozoic succession of clastic and carbonate rocks exposed in the Wernecke Mountains of northern Yukon. The strata were deposited with angular unconformity on the Wernecke Supergroup following the Racklan orogeny and emplacement of the Hart River sills. Two contact relationships were resolved in the 2009 field season. The first, a 1.38 Ga dyke previously thought to crosscut unit A, has instead been recognized to crosscut the underlying Wernecke Supergroup strata. This relationship is significant because it once again places the lower age limit of the Pinguicula Group into question and may reposition the Pinguicula Group within the history of geologic events. Secondly, the previously undefined contact relationship between units B and C has been identified as a gradational contact, confirming the placement of unit C within the Pinguicula Group. In addition, preliminary data collected from the western Ogilvie Mountains draws similarities between units PR1 and PR2 of the lower Fifteenmile Group, and units A, B and C of the Pinguicula Group. Although preliminary results from the 2009 field season have resolved some of the unknowns surrounding Pinguicula Group stratigraphy, they have also raised more questions.

Preliminary O-S isotopic compositions of Cretaceous granitoids in the Cassiar Platform and Selwyn Basin, Yukon and Northwest Territories

K.L. Rasmussen and G.B. Arehart

A regional stable isotopic study of Cretaceous granitoids (109-90 Ma) emplaced into miogeoclinal Cassiar Platform and Selwyn Basin rocks was undertaken to provide new insights into the origin of several plutonic suites (Cassiar, Hyland, Tay River, Tungsten, Mayo and Tombstone). All of the intrusions have high positive $\delta^{18}O$ compositions (+8.4 to +16.9‰). There is very little systematic variation in $\delta^{18}O$, indicating that the majority of the plutons assimilated significant amounts of, or were entirely derived from, crustal rocks. $\delta^{34}S$ compositions typically range from +2.0 to +11‰ for all of the plutonic suites. This is consistent with derivation of the majority of sulphur from seawater sulphate, with some component of mantle or sedimentary (sulphide) sulphur evident in samples with the lowest $\delta^{34}S$. Future work, including comparison of these data with radiogenic isotopic data, will better define the specific roles that the crust and the mantle played in the petrogenesis of Cretaceous magmatism.

Soil reconnaissance of the Fort Selkirk volcanic field, Yukon (115I/13 and 14)

P. Sanborn

Valley-filling basalts of the Selkirk Volcanics north and west of the Pelly River – Yukon River confluence range in age from early Pleistocene to Holocene. Soils formed on the older surfaces have complex parent materials reflecting early Pleistocene glaciation and significant loess accumulation. A diamicton overlying the early Pleistocene basalt is covered by up to 1 m or more of calcareous loess, and shows no field evidence of weathering or soil formation. Middle Pleistocene basalt has a similar depth of loess cover and appears fresh and unweathered. Lava flows originating on the south side of the Volcano Mountain cinder cone display vegetation ranging from discontinuous lichen and moss cover, to white spruce – aspen forest. Soil profile development varies correspondingly from almost nil, to reddish-brown Brunisolic soils with ~ 30 cm of B horizon, depending on substrate age and/or the presence of lapilli deposits overlying the flows.

Observations of polymetallic Ag-Zn-Pb (± Au ± In) mineralization at the Eagle and Fisher vein-faults, airborne total field magnetics and identification of Tombstone age-equivalent aplite dykes in the Galena Hill area, Keno City, Yukon

D. Tupper and V. Bennett

We present a new dataset from the Eagle Exploration project completed in 2009 on the lesser explored southeast slopes of Galena Hill in the Keno Hill silver camp. The Keno Hill silver camp is hosted in Neoproterozoic and Paleozoic sedimentary rocks of the Selwyn Basin that were subsequently intruded by the Cretaceous Tombstone plutonic suite. Although a genetic association is documented between the Tombstone plutons and Au-As mineralization regionally, the genesis and age of the Keno Ag-Pb-Zn mineralization remains poorly understood.

Mineralization studied from the Eagle project area, while modally dominated by indium-rich sphalerite, was introduced in at least three distinct phases. A low-amplitude aeromagnetic high occurs at the southeast end of Galena Hill and is suggestive of a buried intrusion. Two new U-Pb-age dates of *ca.* 93 Ma have been determined for aplite dykes, indicating the presence of Tombstone suite intrusions within the Eagle Property.

2009 Publications and Maps

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YGS released 52 new publications in 2009: 3 annual reports, 1 bulletin and 48 YGS Open Files.

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