Data for Decision Making

Geological Survey Branch

1995/96 Project Updates

Supplement to Information Circular 1994-16
1994/95 - 1995/96 Business Plan

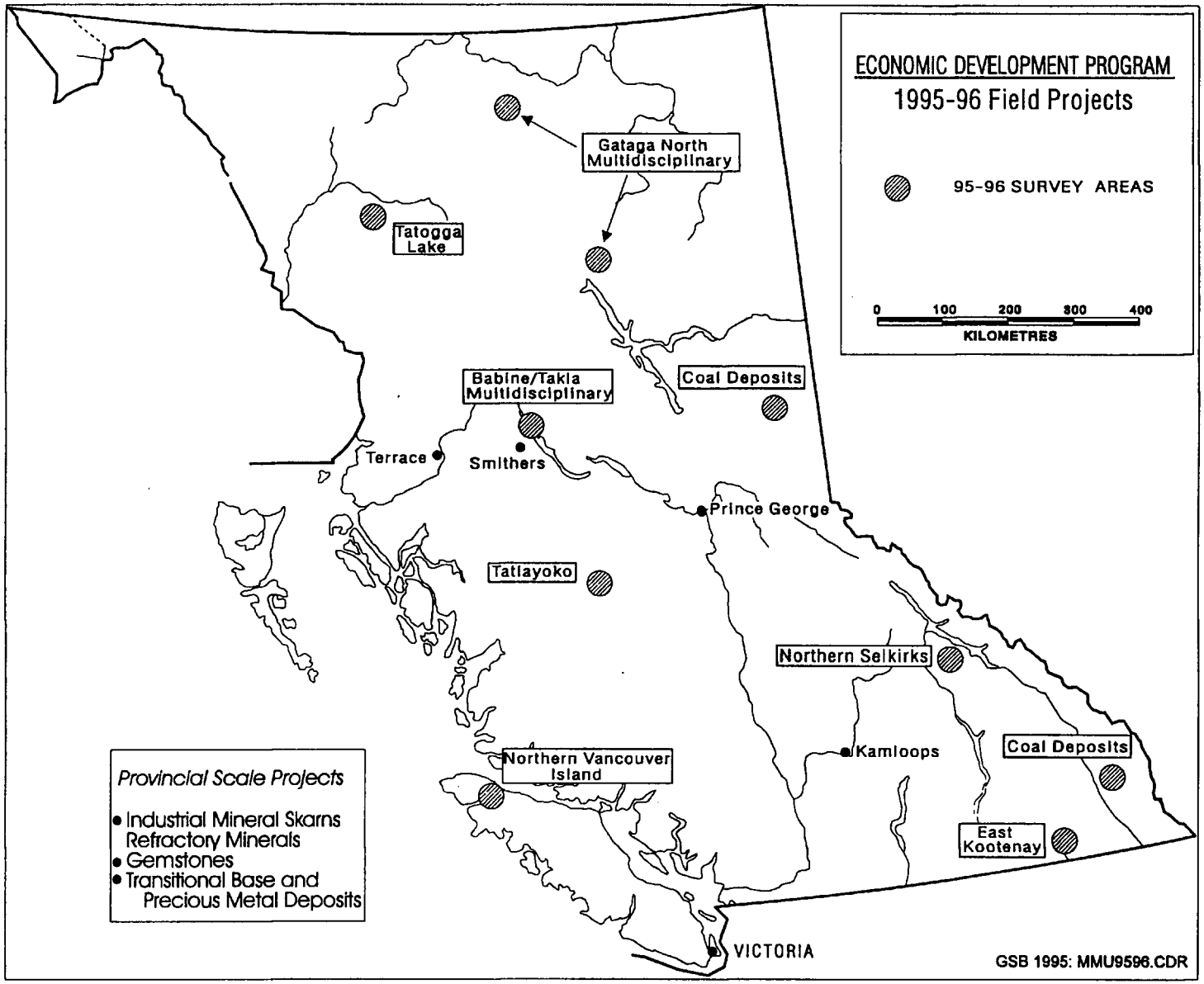
Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources
Mineral Resources Division

Information Circular 1995-8

MEMPR
GEOLOGICAL SURVEY BRANCH

PROJECT UPDATES
1995/96

For a complete review of Branch activities, see the 1994-1996 Branch Plan


ECONOMIC DEVELOPMENT PROGRAM
1995-96 Field Projects
95-96 SURVEY AREAS
0 100 200 300 400
KILOMETRES
Gataga North Multidisciplinary
Tatogga Lake
Babine/Takla Multidisciplinary
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GSB 1995: MMU9596.CDR

INTEGRATED PROJECTS

Northern Vancouver Island Integrated Base Metal and Precious Metal Initiative

Project Leaders: Andre Panteleyev (Mineral Deposits), Graham Nixon (Bedrock Mapping), Peter Bobrowsky (Surficial Mapping), Steve Sibbick (Geochemistry)

Project Budget $122 000 MDA and A-base

Project Statement:

Northern Vancouver Island is richly endowed with mineral resources, but the existing geoscience database badly needed updating. The region also is a high priority land-use planning area. Further, the Island Copper Mine, which has operated continuously for more than 20 years is nearing closure. This multi-disciplinary project, with its base metal and precious metal focus, is updating the geoscience database, assessing the mineral potential of the region, and attempting to identify clues that may lead to discovery of new deposits. Results of the multi-disciplinary studies will be integrated to achieve the objectives of the project.

Actions:

- Field components of two of the four planned survey activities have been completed. We will extend bedrock geological mapping of the Jurassic Bonanza Group southward by covering parts of NTS 92L/6 and 92L/3N. Mapping is at 1:20 000 scale with compilation at 1:50 000 scale. The field component of the mineral deposits study will continue with examination of core from selected drill holes.

- Results of drift prospecting and till geochemistry studies are being compiled and interpreted for release during 1995 as Open Files Maps covering 102I/5 and 12 and parts of 102I/6 and 11.

- Data from all the components of the program will be incorporated into an integrated report to be completed by March 31, 1996. It will include results of bedrock mapping, surficial mapping and complementary geophysical surveys by GSC, data from geochemical studies of drainage from areas underlain largely by Bonanza Group rocks, and interpretations of deposit studies that evaluate alteration processes to distinguish potentially mineralized from barren zones of advanced argillic alteration.

Interior Plateau Integrated Base and Precious Metal Program

Project Team: Larry Diakow, Vic Levson, Steve Cook, Tom Schroeter, Bob Lane, Ian Webster

Project Budget: $102,000 MDA

Project Statement:

This project's objectives are to stimulate exploration in the Interior Plateau region by 1) improving the geological database, 2) collecting new till and lake sediment regional geochemical data, 3) developing and demonstrating new drift-exploration techniques, and 4) describing mineral occurrences. Widespread drift cover, and lack of geological and geochemical information has hindered exploration in this region in the past. In 1993 and 1994 the GSB program discovered several new precious metal occurrences and identified geochemical anomalies that are significant new targets for mineral exploration.

Actions:

Field work in the Interior Plateau program is complete. Activities in 1995/96 will focus mainly on report write-ups as follows:

- Publish highlights of MDA-funded geoscientific work in the Interior Plateau as a series of papers in a joint BCGS-GSC publication
- Publish 1:50 000 scale integrated bedrock and surficial geology maps for two map areas (93F/2 and F/7).
- Compile 1:100 000 scale bedrock and surficial geology maps for the areas surveyed in 1992, 1993 and 1994.
- Release regional till geochemistry data covering four 1:50 000 mapsheets in the Anihim Lake map area (93C/1, 8, 9 and 16) and two in the Nechako River area (93F/2 and 7).
- Publish results of detailed geological and geochemical studies conducted at several case study sites around known mineral occurrences.
- Develop and refine exploration methods for locating buried mineral deposits using lake sediment and till geochemistry.
- Determine optimal methods for design, interpretation and follow-up of regional geochemical surveys.
- Present results of subsurface exploration techniques investigated in conjunction with GSC scientists.
- A compilation report integrating the results of the lake sediment geochemistry, till geochemistry, surficial geology mapping, bedrock geology mapping and mineral deposit studies will be the final product for the project.

East Kootenay Multi-disciplinary Base Metal Initiative

Project Leaders: Derek Brown and Trygve Höy

Project Budget: $ 46 000 A-Base
Geophysieal Survey: $600 000 Mineral Resources Division

Project Statement:

The Purcell Supergroup in southeastern British Columbia hosts the rich Sullivan mine and numerous other deposits. In the last five years, there have been a number of new silver-lead-zinc vein, shear hosted gold, and SEDEX discoveries within the Purcell Supergroup, including the Fors, Star and David prospects. These encouraging discoveries, coupled with renewed interest in SEDEX and redbed stratiform copper deposits, relatively low exploration costs, and established infrastructure, all combine to make this an attractive area for exploration.

This project will contribute to the ongoing GSC-GSB Sullivan-Aldridge research project. Regional mapping and metallogeny are delivered by the Branch, whereas the GSC focuses on the immediate Sullivan Mine area. Geological Survey Branch bedrock mapping, completed in the 1980's around Sullivan and during this project, has been extended to provide a regional geological framework and enable mineral potential evaluation southwest of the Sullivan mine.

A $600 000 airborne geophysical survey will also be undertaken this field season to help locate favourable structures, stratigraphy or evidence of mineralization to promote exploration by industry. The survey will be coordinated by the British Columbia Ministry of Energy, Mines and Petroleum Resources with the Geological Survey of Canada responsible for administering the contract. The objective is to attract exploration for mineral deposits, particularly another Sullivan-type deposit.

Actions:

- Complete bedrock mapping of one 1:50 000 scale map sheet (NTS 82 F/2) and publish map in time for Cordilleran Roundup 1996 (Brown).
- Complete an article for Geological Fieldwork 1995, and a poster display highlighting mapping results to be presented at Cordilleran Roundup 1996 (Brown).
- Supervise the airborne geophysical survey of selected areas of the Purcell Supergroup and publish the results in 1996 (Höy).
- Organize a Special Session on "Continental Rifting and Formation of SEDEX Deposits for the international 1995 GAC/MAC meeting in Victoria. Most researchers from the

Sullivan-Aldridge project will present their data. Act as a co-leader on a field trip and present a regional metallogeny paper (Höy)

- Play an important role in completing a Special Geological Survey of Canada paper to encompass all results from the Sullivan - Aldridge project. Contribute as an author to three articles and act as associate editor of all papers that are of regional extent (Höy).
- Complete a Geological Fieldwork 1995 article on the Fors deposit.

Gataga North Multi-disciplinary Base Metal Initiative

Project Leaders: Fil Ferri (Bedrock Mapping), JoAnne Nelson (Mineral Deposits), Ray Lett , Steve Sibbick, Wayne Jackaman (Geochemistry)

Project Budget $241 500 A-Base and MDA

Project Statement:

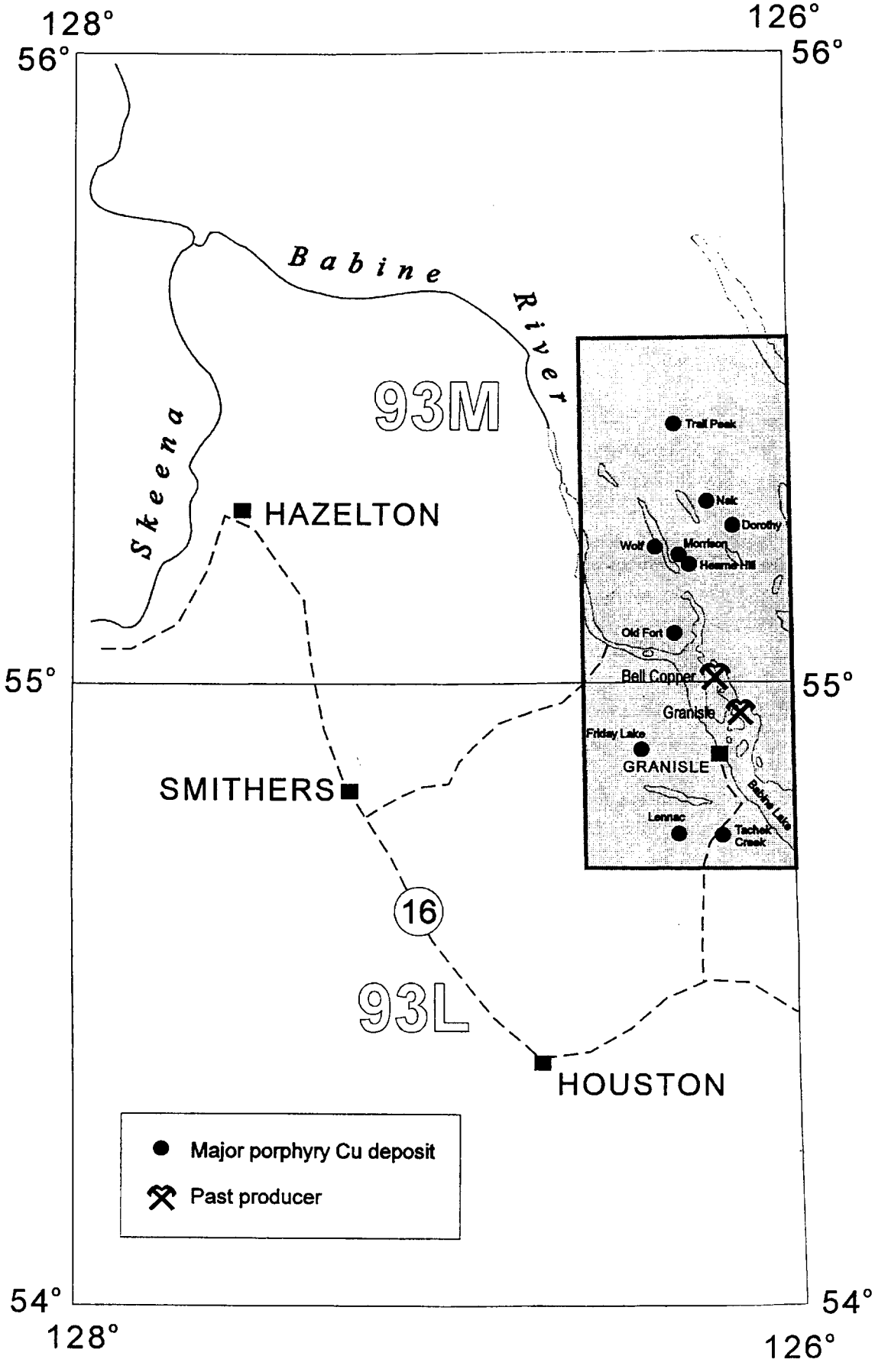
Begun in 1994, this multi-disciplinary, multi-year project features geoscientific studies in the Gataga area, where sedimentary exhalative silver-lead-zinc (SEDEX) deposits are the primary exploration target. We are concentrating on geoscientific surveys to improve bedrock geological maps and interpretations, on refining geochemical exploration tools, and on mineral deposit models. The study includes regional 1:50 000 scale geological mapping northward from the Driftpile Creek SEDEX deposit, studies of SEDEX mineralizing environments in cooperation with the Geological Survey of Canada, geochemical orientation surveys to refine exploration vectors and test methodology to aid exploration in drift-covered areas. Conodont stratigraphy surveys in the Gataga belt are also being conducted by the University of Victoria.

Actions:

- Bedrock mapping will continue to extend existing 1:50 000 scale bedrock map coverage northward through map areas 94L/7, 8 and 10 along the favorable sedimentary belt into areas of lesser exposure. Complementary mineral deposit studies will examine the Driftpile Creek area and the region of the Cirque, Elf and Fluke deposits. Geochemical studies are attempting to provide better exploration tools in areas of low bedrock exposure, and a regional geochemical survey will be undertaken.

- Field studies will be followed by reports in Fieldwork 1995, presentation of results at Cordilleran Roundup 1996, and production of Open File Maps.

Babine Porphyry Belt Project Location



Nechako Plateau - Babine Porphyry Belt

Project Team: Don MacIntyre, Ian Webster (Bedrock Mapping/Mineral Deposits), Vic Levson (Surficial Mapping)
Project Budget: $156 500 A-Base

Project Statement: The 80 kilometre long Babine Porphyry Belt is located in West Central B.C. and centered on the north end of Babine Lake. It includes twelve major porphyry copper deposits of Eocene age including the Bell and Granisle past producers. The value of past production is estimated at $1.13 billion (1986 dollars). The mineral potential of the area was the fourth highest of the 97 tracts evaluated in the Skeena-Nass Mineral Potential project.

In spite of the high mineral potential and obvious economic significance of the area, the most recent geologic mapping in the belt was by Carter in 1973 (B.C. Preliminary Map 12). Subsequently, extensive logging has provided new access and better bedrock exposure, especially in areas of extensive drift cover. This coupled with renewed interest in porphyry copper deposits as an exploration target and the need for economic diversification in the Smithers area economy make this multi-disciplinary project particularly timely. It is hoped that new bedrock and surficial mapping, and mineral deposit studies plus regional geochemical and possibly airborne geophysical surveys will stimulate additional exploration in the belt and lead to new discoveries. Proposed drift prospecting, lake geochemistry and airborne geophysical programs will be especially important in defining new targets in drift covered areas.

Actions:

- The first year of bedrock mapping and mineral deposit studies will be largely reconnaissance in nature. Major deposits and new prospects will be examined and mapped where necessary; regional mapping will focus on areas accessible by logging roads. Carter's 1973 map will be updated and map units placed within a modern stratigraphic framework. Samples will be collected for radiometric dating where necessary. The data collected in the first year of the project will help determine priority areas and mapping strategies for subsequent years.
- Surficial mapping and till geochemistry surveys will be carried out in conjunction with the bedrock mapping program to identify potential mineral and geochemical anomalies in drift-covered areas. Detailed studies will be conducted to model dispersal of mineralized bedrock, determine the ice-flow history of the area, and help design better exploration methods for tracing anomalies to their bedrock sources.
- We will publish reports in Geological Fieldwork and Current Research 1995, publish Open File Maps for Cordilleran Roundup 1996, and present poster displays at Cordilleran Roundup 1996.

OTHER PROJECTS

Tulsequah South Bedrock Mapping Base Metal Initiative

Project Leader: Mitch Mihalynuk
Budget: $0

Status: 1:50 000 scale bedrock geological mapping in the region that hosts both the important Tulsequah Chief volcanogenic massive sulphide deposit, and the nearby Polaris Taku gold deposit has been completed, and a Fieldwork and Current Research 1994 report and an Open File map published. The project final report is on hold for one year due to secondment of the Project Leader to lead the Northwest Mineral Potential map compilation project.

Tatlayoko Bedrock Mapping Project

Project Leader: Paul Schiarizza
Project Budget: $17 000 MDA

Project Statement:

The project area encompasses Mesozoic and Cenozoic volcanic, sedimentary and intrusive rocks along the transition from the Coast Mountains to the Intermontane Belt. It includes the Cretaceous, large-tonnage Fish Lake copper-gold porphyry deposit, and a number of other porphyry-style mineral occurrences, as well as polymetallic and mesothermal precious metal vein deposits. However, the present geologic database is not adequate to provide answers to fundamental questions regarding the controls and potential distribution of mineral occurrences to aid mineral exploration. The area is also one of intense land-use interest; new geological interpretations will allow a more reliable evaluation of mineral potential and provide a basis for informed land-use decisions.

Actions:

- Approximately one month in the field will close the gap between our work and that carried out to the west by the Geological Survey of Canada under the federal-provincial Mineral Development Agreement. It will also resolve problems related to new information, like fossil calls and isotopic dates.
- A poster session will be presented highlighting mapping results at Cordilleran Roundup 1996, and a final report completed for the project by March 31, 1996.

Northern Selkirks: Base and Precious Metal Potential

Project Leader: Jim Logan
Project Budget: $156 000 A-Base

Project Statement:

A structural panel of Lardeau Group and older rocks that underlies a 1500 square kilometre area north of Revelstoke hosts a number of volcanogenic massive sulphide (VMS) deposits, including the operating Goldstream mine. Geological mapping started in 1993 will be extended further to provide information to assist companies and prospectors conduct effective regional exploration. The project includes mineral deposit and litho-geochemical studies designed to develop new geological and geochemical parameters applicable to the exploration for new (VMS) ore bodies in this area and ultimately provide a geological framework that can be applied in other parts of British Columbia. The focus is on establishing the age and chemical characteristics of mineralization and host lithologies, tracing these regionally, and assessing the mineral potential within this structurally complex area.

Actions:

- Extend bedrock mapping at 1:50 000 scale to cover NTS 82M/8 and part of 82M/1. Continue mapping and litho-geochemical sampling of known copper-zinc VMS occurrences in the area and update the deposit database to assess the mineral potential. An Fe-Mn-rich siliceous exhalative is closely associated with massive copper-zinc ore at Goldstream mine. A similar marker horizon occurs on the Rain prospect and will be traced to test its regional exploration potential.
- A progress report will be prepared for Geological Fieldwork 1995, a poster display highlighting mapping results presented at Cordilleran Roundup 1996, and an Open File map at 1:50 000 scale will be published for Cordilleran Roundup 1996.

Tatogga Lake Base and Precious Metal Metallogenic Study

Project Leader: Chris Ash
Project Budget: $146 000 A-Base

Project Statement:

The Tatogga Lake Project involves metallogenic mapping and detailed deposit studies over a 725 square kilometre belt of Mesozoic island-arc rocks situated along the northern margin of the Bowser Basin. These rocks host a variety of arc-related deposits that include porphyry, epithermal, volcanogenic massive sulphide and intrusion-related vein deposits. The deposit studies will focus on the Red Chris, Rose and Groaton porphyry occurrences. The objectives are to describe the geological setting, age and geochemical character of both host rocks and the mineralizing systems. A 1:50 000 scale map of the belt will be completed in 1995.

Actions:

- Continue mapping parts of four 1:50 000 scale map sheets (104H/11, 12; 104G/9,16).
- Examine and document selected mineral deposits within the map area.
- Prepare a progress report for Geological Fieldwork 1995, and a poster display highlighting mapping results Cordilleran Roundup 1996. Complete and publish an Open File map at 1:50 000 scale by Cordilleran Roundup 1996.

Transitional Base and Precious Metal Deposits

Project Leader: Andre Panteleyev

Project Budget: $46 000 A-Base

Project Statement:

Intrusion-related hydro-thermal systems with advanced argillic alteration and acid sulphate/high sulphidation mineralization, with or without enargite, will be examined for their copper, silver and gold potential. The study is provincial in scope, focusing on selected areas with indicated potential. Major deposits of this type are known around the circum-Pacific rim but few have been recognized in B.C. Favourable areas need to be identified and assessed. The geochemical expression in leached cappings, water and silts derived from weathered (oxidized and leached) high sulphidation mineralization will be documented. Descriptions of B.C. deposits and favourable environments will be compiled and an occurrence model developed.

Actions:

- Appropriate deposits will be visited and examined to add to the existing data base that includes occurrences visited in 1991 and 1992. Fieldwork is proposed for northern Vancouver Island, mainly to examine diamond drill core from the Expo property and to do geological mapping in the Monteith Bay "geyserite" deposit, near Kyuquot. Other field visits will include examination, with some possible mapping, of Limonite Creek and Louise Lake deposits, and brief visits to Treaty Glacier and a number of occurrences in south-central B.C with pyrophyllite and/or other minerals of the advanced argillic alteration assemblage.
- Geological Fieldwork 1995 papers on Montieth Bay "Geyserite" occurrence and stable isotope results from North Vancouver Island advanced argillic alteration systems.
- Possible short course presentation at Cordilleran Roundup 1996 in session on New Deposit Models for the Cordillera.
- Chapter contribution to the North Vancouver Island Integrated Project summary report.

B.C. Andalusite Family Minerals

Project Leaders: George Simandl

Project Budget: $21 000 A-Base

Project Statement:
Andalusite, sillimanite and kyanite are aluminum silicate polymorphs. They are applied mainly in the refractories industry. This project contributes to the understanding of, and exploration models for, andalusite family deposits in British Columbia, and their economic potential under current market conditions. The overall focus is on andalusite (± staurolite) minerals in contact metamorphosed and regionally metamorphosed terrains with low pressure, high temperature environments. Reconnaissance of "kyanite/mica/garnet" - type deposits will also be carried out in a coastal area.

Actions:

- Document one or two andalusite showings not covered during the 1994/95 program and selected kyanite /garnet/ ± mica occurrences located near existing infrastructure or close to tidewater.
- Complete a Geological Fieldwork 1995 article summarizing the field results and contribute a poster to the Cordilleran Roundup in January 1996.
- Publish a summary report on six andalusite family minerals in British Columbia incorporating data from the 1994 and 1995 field seasons.

B.C. Gemstones and Ornamental Stone

Project Leaders: George Simandl

Project Budget: $15 000 A-Base

Project Statement:

Deposit models, known occurrences and available geological information suggest that favorable geological environments exists in British Columbia for precious opal, corundum (sapphires and rubies) and beryl family gemstones (including emerald). Jade, rhodonite, agate, peridot and occurrences of other lower-priced gemstones or ornamental stones are also known in B.C. Our province has over 140 known gemstone and ornamental stone occurrences reported.

Gemstones represent a relatively large market, for example, gem imports in the USA for 1992 were estimated at US$ 4,839.4 million. Diamonds represented 86 percent of these gem imports, however emeralds (US$ 164.6 million), sapphires (US$ 75.1 million), rubies (US$ 77.8 million) and other gemstones (US$ 327.7 million) are also important. The economics of gemstone operations are less severely affected than most by lack of infrastructure because only small volumes of the highly-priced product are shipped to the market. Given favorable geological environments, many gemstones represent viable exploration targets even in remote areas of the province.

This new project will provide the first systematic attempt to assess the province's potential for a number of gemstones. It will also update information on selected semi-precious stone occurrences in the province. The information derived will attract the attention of a wide audience, including exploration companies, prospectors, rock-hounds and the general public. The study of rhodonite occurrences may also address the possible link to exhalative massive sulphide deposits.

Actions:

- Present a poster at Cordilleran Roundup 1996.
- Complete an article for "*Exploration in B.C.*".

Cambria: Base and Precious Metal Potential

Project Leader: Dani Alldrick

Project Budget: $50 000 A-Base

Project Statement:

A mineral-rich belt of Mesozoic volcanic rocks flanks the Bowser Basin on the west and north. The BC Geological Survey has completed geological mapping and mineral deposit studies in the northwestern half of this belt between Stewart and Telegraph Creek. The Cambria project will extend these studies to the southeastern half of this belt, from Stewart to Alice Arm, and will also encompass the Anyox pendant.

The project area contains five percent of British Columbia's mineral occurrences, including the Anyox and Kitsault mining camps as well as the Red Mountain and Willoughby Creek discoveries. The area includes the first two producing mines in the Stewart district (Outsider and Red Cliff) and other historic producers (Georgia River mine) which have no published descriptions.

The proposed Geological Survey of Canada 1:250 000 scale regional geological mapping project for the Nass River sheet (103P) would cover one half of the Cambria project area. The Cambria project will be co-ordinated with the Nass Project; Cambria will provide detailed geological information and mineral deposit studies which will be integrated with the regional mapping results.

Actions:

- Produce a 1:100 000 scale geological Open File map showing locations of the more than 450+ mineral occurrences and an associated table of mineral occurrences in hard copy and in digital formats.
- Write short articles on specific deposits for Geological Fieldwork 1995.
- Revise, upgrade and update MINFILE entries for NTS 1030, 103P and 104A.

Industrial Mineral Skarns

Project Leader: Gerry Ray

Project Budget: $53 000 A-Base

Project Statement:

To map, sample and evaluate various skarn deposits or occurrences in B.C. that are a potential source of industrial minerals or substances, such as wollastonite, garnet, tremolite-actinolite, magnetite, beryl, rhodonite, fluorite or marble. In 1994, 29 skarn properties were examined and sampled. In 1995, specific properties that warrant mapping and/or additional sampling include: Mineral Hill-Wormy Lake (wollastonite), Emerald Tungsten (wollastonite and fluorite), Silent Lake (wollastonite) and Zippa Mountain (Crag River - wollastonite).

Actions:

- Publish three articles for Geological Fieldwork 1995 titled "*Wollastonite-bearing skarns in B.C.*", "*Chemistry of the Emerald Tungsten W-Au skarn camp.*" and "*Geology and geochemistry of the Mineral Hill wollastonite skarn deposit.*"
- Produce a final summary paper on Industrial Mineral Skarns in British Columbia.

Coal Deposit Studies

Project Leader: Barry Ryan

Project Budget: $18 500 A-Base

Project Statement:

Studies are currently restricted to active coal mines or properties. Specific studies will focus on aspects of coal quality that affect coal utilization or geological controls on mining. They will add to a general database of coal information for the province.

Coal deposit projects in progress include phosphorous and sulphur studies at the Fording and Greenhills coal mines; washability studies at the Quintette, Line Creek and Elkview mines; and oxidation studies at the Greenhills, Quintette and Elkview mines. In 1995/96 the phosphorous, sulphur and washability studies will be completed. A new project will be started in Northeast BC consisting of a literature survey of public information in assessment reports; visits to accessible properties to collect samples for ash chemistry and other coal quality analyses; and reflectance analyses on samples. The project will include analysis of the coal quality and ash chemistry of Gething Formation coals.

Actions:

- Geological Fieldwork 1995 article on phosphorous and sulphur in coals from the Fording Coal Mine.
- Geological Fieldwork 1995 article on coal quality of the Gething Formation, Northeast British Columbia.

B.C. Aggregate Inventory

Project Team: Peter Bobrowsky, Nick Massey

Project Budget: $25 000 A-Base

Project Statement:

This project will develop a sand and gravel inventory to assist the Ministry manage aggregate resources. The project will provide: 1) a current and comprehensive digital data base of aggregate inventory information, 2) technical expertise as required to assist in provincial land-use issues, and 3) methods of predictive modeling of aggregate reserves.

Actions:

- Complete an inventory of private aggregate pits in the province and integrate this database with the public pit inventory of Ministry of Transportation and highways.
- Generate aggregate potential maps for high priority areas in the province.
- Summarize the proceedings of a workshop on the geology of aggregates held in Vancouver in March, 1995 in a Geological Survey Branch Information Circular.
- Conduct an aggregate potential mapping test case in the Prince George area.

Earthquake Hazard Mapping in Southwest British Columbia

Project Leader: Vic Levson

Project Budget: $50 000 A-Base

Project Statement:

The objective of this program is to produce a series of earthquake hazard maps for seismically active areas in southwest B.C. Critical to the development of seismic hazard mitigation policies and emergency planning procedures is the ability to predict areas that will be most heavily affected during an earthquake. Earthquake hazard maps provide this critical predictive tool. These maps are a cost-effective way to identify the relative vulnerability of public facilities on a regional basis. They are designed for land-use and emergency planning purposes, and to aid in prioritizing seismic upgrading of public and private facilities.

Earthquake hazard maps identify the relative potential for ground disturbance due to earthquake-induced hazards such as liquefaction, amplification and landslides. They are compiled from geologic and geotechnical data that reflect local site conditions. The project is interdisciplinary involving aspects of surficial geology, geotechnical engineering and geophysical studies.

Actions:

- Complete a pilot earthquake hazard mapping program in the Chilliwack region.
- Collect and digitally compile surficial geology, topographic, hydro-geologic and geotechnical data for a second project area in the Lower Mainland
- Conduct field work including cone penetration and geotechnical studies, shear wave velocity investigations, and geophysical surveys in conjunction with collaborating agencies including the Geological Survey of Canada, B.C. Ministry of Transportation and Highways, B.C. Hydro, and geotechnical consultants.
- Produce a new earthquake hazard map of the study area in co-operation with municipal emergency co-ordinators and planners, Emergency Preparedness Canada and the Provincial Emergency Program.
- Provide training for land-use and emergency planners concerning the use and limitations of earthquake hazard maps.

Landslide Hazards in Southwestern British Columbia

Project Leader: Peter Bobrowsky
Project Budget: $20 000 A-Base

Project Statement:
This four year cooperative GSC-BCGS project derives from the Joint Strategic Plan for Surficial Geology studies in BC. Landslide hazard is greatest in Canada in southwestern British Columbia. This region has suffered the greatest number of historically recorded deaths and highest economic losses. This project aims to document the distribution and style of landslides, their relation to geology and material, and their impact on the economic infrastructure, as well as the nature and timing of failures during the Quaternary. A significant aspect of this study relates to the Forest Renewal Plan and the importance of slope stability documentation by Ministry of Forests. During the life of the project the research focus will expand to include both high and moderate magnitude events. Information gained in the project will be used to design mitigative strategies for land-use, economic activity, resource management and public safety. We recognize this work is important to the safety of 1.5 million people in the study area, and important to numerous government ministries (MOF, MOTH, MOH), departments (DFO, DOT, EPC) and local governments. Crown corporations (BC Hydro) and industry (CN-CP) also have a keen interest in this knowledge. The possibility for cooperative funding support from this multi-client base is high. The project reflects key elements of the Resource Inventory Committee guidelines and requirements for BC. Our long-term objective will be to produce 1:50 000 landslide maps for key sheets in the study area. BCGS involvement is anticipated to expand in concert with increased funding from MOF.

Actions:
- Begin an inventory of large magnitude sites and preparation of a data base.
- Evaluate slope deformation features in the Coast Plutonic and Bridge River Complexes, particularly with respect to structural geology and neotectonics.
- Investigate and evaluate block field sites in the Fraser Canyon with respect to possible prehistoric damming of the Fraser River.
- Evaluate engineering geomorphology of complex Quaternary fills in the Thompson River valley.
- Document major landslides in the Mount Meager Volcanic Complex.
- Document and evaluate large to moderate sized mass movements in one map sheet as a test of the viability of generating landslide potential maps.
- Produce papers for GSC Current Research, the 7th International Symposium on Landslides and the Canadian Geotechnical Journal by March 31, 1996.
- Complete an Open File Map for one sheet .
- A poster presentation will be prepared for the 1996 annual Cordilleran Roundup.

Regional Geochemical Surveys

Project Leader: Wayne Jackaman, Steve Sibbick
Project Budget: $300 000 Mineral Resource Division
$37 000 A-Base

Project Statement:

The Regional Geochemical Survey program includes new surveys as well as the release of new data for archived geochemical samples. The release of RGS data stimulates claim staking activity and follow-up mineral exploration. Survey results are also used for resource management, land-use planning and environmental assessments. The RGS Archive program was initiated in 1989 to provide additional analyses for over 25 000 stream sediment samples previously collected from twenty-one 1:250 000 map sheet areas. To date, RGS Archive Open File data packages for ten map sheet areas have been published.

Actions:

- Conduct a new Regional Geochemical Survey in the Cry Lake mapsheet (104I) in 1995. This area is considered to be high priority because of its mineral potential.
- Release survey results for NTS map sheets 103I/J (Terrace), 103O/P (Nass River) in 1995. The Open File data packages include survey details, data listings, summary statistics, data interpretations, sample location maps, geological base maps, plus symbol and value maps for each element. Results are also provided as digital data files.
- In addition, the RGS release includes catchment basins that are delineated and digitized for each RGS sample site, a new feature. This information is included with the Open File data packages.
- Begin preliminary work will begin on future RGS Archive map sheet releases (93N - Manson River, 114O/P Tatshenshini).

Delivery of Analytical and Lapidary Services

Project Leader: Ray Lett

Project Budget: $17 000 A-Base

Program Statement:

The Analytical Sciences Unit provides the Ministry with sample preparation, geochemical analytical, assay, quality control of analytical data, mineral identification, lapidary and photographic services. The Unit also delivers the Assayers Certification Program. In 1994 over 3300 samples were submitted for preparation and analysis and a similar volume of samples is expected from Geological Survey Branch programs in 1995. Rock, soil, sediment and water sample preparation will be carried out in-house and commercially depending on the number of samples submitted for analysis. All analyses will be carried out commercially.

Actions:

The Analytical Sciences Unit will provide the following services in 1995.

- Preparation of roughly 1000 rocks and 2000 soil/sediment samples (jaw crushing, pulverizing sieving)
- Submission of prepared samples after addition of quality control (standards/duplicate samples) for commercial analysis and quality control of returned data.
- Supervlsion of one Assayers Examination.
- Lapidary and photographic services delivered on a user pay basis.
- Advice to the Ministry and the public on mineral analytical and assay problems.
- Mineral identification by X-ray diffraction.

Strategic Priority: Industrial Minerals

Industry Diversification

Strategic Goal: Identify export and development opportunities and new markets for British Columbia's expanding industrial minerals sector.

Background

British Columbia's mineral industry has excellent potential to diversify into industrial minerals to supply provincial and international markets. The province is richly endowed with a variety of industrial minerals, which traditionally have received less attention than either coal or metals. The industrial minerals sector (including construction materials) has grown steadily from a $5 million industry in 1945 to the present size of over $350 million.

British Columbia appears well positioned to experience a marked increase in the value of industrial mineral output in the latter part of this decade. The province is competitive in world markets because it enjoys a rich mineral endowment, a superior geological database, a well developed infrastructure in the south, mining expertise, competitive energy prices and a favourable circum-Pacific location. These advantages can be used to aggressively promote the province's industrial minerals to stimulate economic development.

Sulphur, magnesite, gypsum, silica, barite and limestone are among the most important of the eighteen industrial minerals mined in British Columbia. Companies and prospectors are exploring for granite, marble, white limestone, garnet, white barite, wollastonite, silica, zeolite, kaolin and talc deposits. There is increased interest in the potential for high value gemstones such as diamonds, opals and sapphires.

In 1995, the Ministry of Energy, Mines and Petroleum Resources in partnership with British Columbia Trade and Development Corporation, the Ministry of Employment and Investment, B.C. and Yukon Chamber of Mines, the Mining Association of B.C. and industry have started a new initiative to stimulate the development of industrial minerals.

Objectives

The main strategic objectives of this initiative are to:

- Increase awareness of the potential for industrial mineral products in British Columbia.
- Develop new export markets for British Columbia's industrial minerals and related products.
- Increase the value-added processing component of the sector.
- Foster local industry by replacing imported industrial minerals and related products with materials produced in British Columbia.

Industrial Minerals Initiative 1995-96

Project Team: Dan Hora, George Simandl, Kirk Hancock

Project Budget:	$ 295 000	A-Base
Plus	$ 145 000	contributed by British Columbia Trade

Actions:

- Publish and circulate three issues of a newsletter titled "*Focus on Industrial Minerals*" to an international audience of exploration and mining companies, and investors.
- Produce a directory of companies, consultants and organizations involved in the industrial mineral sector in British Columbia to promote cooperation and to advertise available products and services.
- Attend international trade shows, conferences and technical meetings to promote the province's industrial mineral potential, particularly dimension stone and refractory minerals.
- Promote opportunities for refractory minerals and related value added products through a publication outlining British Columbia's resource potential in these areas.
- Publish an updated catalog of British Columbia dimension stone properties and prepare a document outlining how to start a quarry.
- Complete an evaluation of possible sources of mineral fillers and coaters for paper making in British Columbia. The British Columbia pulp and paper industry is adapting to changing markets and environmental regulations. Such changes could result in a major shift in consumption of minerals and related chemicals, namely kaolin, precipitated and ground calcium carbonate, titanium dioxide and possibly others.

Strategic Priority: Exploration

Industry Revitalization - Exploration Incentives

Strategic Goal: Encourage exploration investment in British Columbia by providing part of the risk capital for prospectors and mining companies.

Background:
The Province's exploration sector is sagging and the competition to attract exploration investment is intense. The 1995/96 financial incentives are targeted to encourage prospectors and mining companies to do the high risk exploration work by providing part of the risk capital.

Objective:
Encourage new exploration investment and activity which has the potential for new mine developments in the province over the next decade.

Explore B.C. and Prospector's Assistance 1995/96

Project Team: Vic Preto, Tom Schroeter, Neil Church, Dorthe Jacobsen, D. Hora
Project Budget: $3 Million Mineral Resources Division

Actions:

- Through Explore B.C., provide financial incentives to mineral exploration companies or individuals for grassroots exploration and for exploration on properties with identified economic potential, and to mining companies for exploration at developed mine sites. Maximum assistance is $150 000 per project. A total of $2.5 million is available in 1995/96.
- Through Prospector's Assistance, provide support grants calculated at 75 percent of eligible expenses to a maximum of $10 000 per grantee. A total of $500 000 is available in 1995/96.