CGKN Workshop Report (Dec. 98)

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Executive Summary

Dramatic advances in data management and communications technology over the past decade have transformed the ways in which geological surveys manage and disseminate their metadata, publications, data and expertise. All of Canada's federal, provincial and territorial geological surveys are currently investing in similar initiatives to develop Internet access to their knowledge assets. Distributed network technology is amenable to the development of a **Canadian Geoscience Knowledge Network** (CGKN), which would link all of the government geological surveys and could potentially include knowledge held within academic institutions and the private sector. The resulting "single window" access will facilitate national and international access to Canadian geoscience knowledge.

To explore the CGKN concept, the National Geological Surveys Committee sponsored a two-day workshop on December 10 and 11, 1998, with representation from all of Canada's government geological surveys. The workshop was hosted by the Geological Survey of Canada in Ottawa. The workshop program comprised an introductory briefing on current Internet initiatives in both the Earth Sciences Sector of Natural Resources Canada and provincial and territorial surveys, focus group and plenary debates of technical and policy issues pertinent to the development of the CGKN, and real-time demonstrations of current Internet initiatives.

The workshop resulted in a strong consensus that the development of the proposed Canadian Geoscience Knowledge Network is essential to maintain Canada's position as a world leader in provision of geoscience information for sustainable resource development and environmental stewardship. In addition to this general consensus, participants agreed that:

1. Each geological survey will fund its own CGKN-related activities, and will determine its rate of participation in the CGKN.
2. Each survey will manage and maintain its information holdings locally, and decide on priorities for incorporating its information into the CGKN.
3. Key data sets, for which the CGKN will provide consistent national coverage, must be identified through a process of consultation with custodians and traditional and potential new users.
4. The CGKN should provide recommendations for standards, data models and methodologies for incorporation of important data layers.
5. The CGKN should be managed by the National Geological Surveys Committee.
6. An initial management structure should be established by May, 1999, with responsibility to refine the concept further, identify and develop standards and methodologies, consult with clients, and investigate sources of the essential core funding required to develop the common elements of the CGKN.
7. The schedule for participation in the CGKN by non-government organizations should be set by the National Geological Surveys Committee.

Workshop Report

A Canadian Geoscience Knowledge Network: Exploring the Concept

Introduction

For the past two years, Canada's National Geological Surveys Committee (NGSC) has been discussing ways to improve access to the information and data holdings of the federal, provincial and territorial geological surveys. Two objectives have dominated these discussions - (1) developing and implementing methods to make the data of different surveys interoperable, and (2) providing access to data and information through the Internet. The first NGSC collaboration toward these objectives is the *Canadian Geoscience Publications Directory* (**http://ntserv.gis.nrcan.gc.ca/**), which provides search capabilities for Canadian government geoscience publications.

The *Canadian Geoscience Publications Directory* initiative resulted from a demonstration to NGSC of a project within the British Columbia Geological Survey to provide Internet access to its information. This provincial project subsequently evolved into *The Map Place* (**http://www.em.gov.bc.ca/geology**), a comprehensive Internet site that illustrates many of the benefits envisaged for a national geoscience knowledge network. The demonstration of the British Columbia initiative showed the NGSC that substantial benefits could accrue from better communication about their individual initiatives in data management and distribution on the Internet. It also stimulated the NGSC to consider collaborating in the development of a national geoscience knowledge network. Development of the *Canadian Geoscience Publications Directory* identified a number of technical and policy issues that had to be resolve to successfully build the larger national network. Accordingly, a two-day workshop was convened in December 1998 to explore the concept of a Canadian Geoscience Knowledge Network (CGKN), and to investigate how the federal, provincial and territorial surveys could cooperate in its development. This report documents the results of that workshop.

Workshop Objectives, Participation and Format

The workshop explored issues related to the following general questions:

1. What information, or "layers", should the CGKN contain?
2. What development steps are a first priority?
3. How should data be structured, formatted, and accessed?
4. What role should standards play?
5. How should the CGKN be managed?, and
6. How will the CGKN be funded?

As the workshop agenda was to include discussions of technical (*e.g.*, hardware and software platforms, standards) and policy (*e.g.*, jurisdictional management, intellectual property) issues, the workshop's organizing committee strove to have both operational

and managerial representatives from every survey participate in the workshop. In the end, this participation was achieved for 7 of the 9 provincial surveys and 1 of the 2 territorial surveys. NRCan's Earth Sciences Sector was represented by each of the GSC's science divisions and the Geoscience Information Division. Observers were present from Geomatics Canada and the National Headquarters of Indian and Northern Affairs Canada. A total of 45 people attended the workshop.

The agenda comprised a mix of plenary sessions and focus group discussions, completed over one and a half days. These are described in more detail in the following section of this report. In addition to these structured discussions, a reception was held in the evening of the first day that featured demonstrations of current survey initiatives relevant to the CGKN. A wide variety of projects was demonstrated, many in real-time *via* the Internet. The interest and discussions generated by the demonstrations strongly reinforced the importance of improved communication among NGSC members, so that each may benefit from the experiences of others.

Summary of Proceedings

Day 1

The agenda of the first day of the workshop focused on discussions of what a national geoscience knowledge network could and should encompass, followed by identification of issues that might emerge in attempts to construct such a network. The day's program comprised an opening plenary, two breakout sessions and a summary plenary. The participants were divided into four groups, comprising a mix of technical and managerial representatives, for each breakout session. The same groups were maintained for both breakout sessions.

Opening Plenary, Day 1

Introductory comments were made to the opening plenary by Marc Denis Everell and Jan Boon, co-chairs of the NGSC. Both speakers commented on the importance of the CGKN initiative as a method of maximizing the use of the Canadian geoscience knowledge base, which is widely acknowledged by both industry and governments as a competitive advantage in attracting and retaining investment to Canada.

A number of brief presentations describing projects involving cooperative management and Internet delivery of diverse geospatial data followed these introductory comments. The projects described were the *Canadian Geospatial Data Initiative* (CGDI, recently renamed *GeoConnections*) being developed by the Inter-Agency Committee on Geomatics; the GSC's *Geoscience Knowledge Network* project and the British Columbia Geological Survey's *The Map Place* initiative. In addition to providing real examples of successes and failures, these presentations identified key technical and policy issues that would require consideration in the workshop discussions.

Breakout Session 1, Day 1

In the first breakout session, each of the four groups was asked to define what a CGKN should be. Five questions were posed to the groups to stimulate their discussions:

1. What should the structure of a CGKN be?
2. What geoscience "layers" are essential, and which should be done first?
3. What should the CGKN's format be?
4. How should the CGKN be managed?, and
5. How should it be funded?

Breakout Session 2, Day 1

In the second breakout session, the same groups were asked to identify critical issues and problems from their earlier discussion that would have to be resolved if a CGKN were to be successful.

Summary Plenary, Day 1

After the breakout group discussions, all participants gathered to share their results in a summary plenary session. Presentations by each group to the plenary (see summaries in Appendix 2) revealed a high degree of consensus on the CGKN vision and on core issues. The principal result was a general agreement on the importance of creating a CGKN. Within that context, a variety of ideas and issues emerged. Overall responses to each of the five questions are presented below.

What should the structure of a CGKN be?: Every group acknowledged that, for a number of reasons, it is essential that each geological survey retain ownership and management of its own data. Thus, a CGKN must be based on the principle of distributed data access through linkage of distributed web sites and data. It was agreed that it will be beneficial to adopt a national approach for some functions, such as searches for data, but individual agencies must retain the ability to provide complementary and individual access to their data through their own window. There should, however, be a consistent view/access to the data, provided by the CGKN structure.

What geoscience "layers" are essential, and which should be done first?: Given the distributed nature of the network and jurisdictional controls, each agency will decide which of their information holdings are essential and set their own priorities for incorporation into the CGKN. At a national level, however, it will be essential to identify key data sets, such as topography, bedrock geology, surficial geology, mineral occurrences, geophysics, and geochemistry. The process to determine these key national data sets should involve consultation with both traditional and possible new users of geoscience data. The issue of resolution and scale is germane here. It was suggested that there be consistent, small scale, country-wide layers to provide a framework for more detailed and localized data sets, that would probably not match from one jurisdiction to another (at least initially). These framework layers could be used in a manner similar to the data alignment layer for topographic data.

What should the CGKN's format be?: Ideally, data layers should be accessible to users from a CGKN in a consistent format and conforming to a common standard. This would facilitate exchange and compilation across jurisdictions. Consistency is most important for the key data sets, where the CGKN will strive to provide national coverage. This would be most simply achieved if all participants used common standards and formats. This is not the case, however, and the resource requirements to convert data to a common set of standards are prohibitive. Consensus developed that either CGKN must diverge from this ideal, or an alternative solution must be found.

Technical experts pointed to recent developments in a class of software called middleware as a partial technical solution to this problem. Middleware products allow delivery of consistently formatted and projected geospatial data from data stored in a range of formats and projections by performing a real-time mapping of data from one format and projection to another. Although translation between different proprietary formats and database designs will probably become more and more routine, there are underlying problems of standards and consistency in data collection methods themselves. The more difficult problem of integrating data with semantic and thematic differences is currently an active research topic. Technical participants warned that standards and methodologies must be carefully selected to ensure that they allow the migration of CGKN to new technologies and standards. There was agreement that the CGKN should support adoption or development of the web tools required to allow integration and exchange of data sets stored in different structures and formats.

How should the CGKN be managed?: Leadership of the CGKN should be provided by NGSC, with committees and/or working groups being established to deal with special issues. NGSC should also set the schedule for involving other participants, such as industry, universities or other government departments, in the CGKN. Client input can be obtained from existing federal, provincial and territorial liaison and advisory committees, and through user workshops.

How should the CGKN be funded?: There was universal agreement that the CGKN cannot proceed without some level of core funding for overall coordination and construction of the common elements. Following from the principle of a distributed network, each participating survey should fund its own activities, particularly the preparation of digital data for inclusion in the network. There was concern about the source of the core funding, and agreement that possible sources should be actively investigated.

Critical issues: As might be anticipated from the points listed above, workshop participants identified issues surrounding intellectual property as being of critical importance. Concern was voiced on questions of protection of intellectual property, recognition of ownership and pricing and sales policies. Questions related to funding sources came up repeatedly. There were concerns about the resources required for participation in the CGKN and the consequences of a survey including only part of their information holdings in the network. It was acknowledged that the surveys differ greatly in capacity and expertise required for participation in the network, which led to

discussion of whether major new funding is essential to allow all of them to participate fully and at the same rate. A number of technical issues were also discussed, chief among them questions of standards and the level of information analysis that should be provided by the CGKN. All of the issues identified by the breakout groups are listed, without relative ranking, in Appendix 2.

Day 2

The program for the second day of the workshop focused on developing a set of recommendations and an action plan for presentation to NGSC. After a short plenary to review the first day's discussions and to outline the process and goal of the second day, participants broke into three smaller groups to separately discuss policies, standards and delivery mechanisms. To facilitate these more focused discussions and allow a different mix of participants, new breakout groups were formed, composed entirely of policy (managerial) or technical (operational) participants. A closing plenary provided an opportunity to report the deliberations of these new breakout groups, summarize the results of the workshop and develop an action plan.

Results, Recommendations and Action Plan

A strong consensus emerged from the workshop on the need for the geological surveys to work together on developments in digital technologies, regardless of the development of a comprehensive CGKN. There was an equally strong expression of a desire to collaborate in the development of a CGKN, with realistic assessments of the technical, policy and funding issues that must be overcome.

A number of overall recommendations were agreed upon at the closing plenary. These include:

1. Each survey will participate in the CGKN at its own rate, using its own resources. Each survey will manage and maintain its information holdings locally, and decide on priorities for incorporation of its information into the CGKN.
2. Key data sets for which the CGKN will provide consistent national coverage must be identified through a process of consultation among the surveys, and with traditional and potential users of geoscience information.
3. The CGKN should develop and document recommendations for standards, data models and methodologies for incorporation of important data layers in CGKN. Wherever possible, the CGKN should adopt existing international standards and protocols to ensure compatibility between CGKN and other international initiatives. Care must be taken to adopt or develop standards, data models and methodologies that will allow the CGKN to evolve to meet future needs and to adapt to technological change. Emphasis should be placed on development of web tools that will allow discovery and integration of distributed data layers stored in different formats.

4. The CGKN should be managed by the NGSC. The schedule for participation in the CGKN by other parts of the Canadian geoscience community (*e.g.*, Canadian Geoscience Council, university departments, industry) should be set by the NGSC. The government geological surveys can use existing consultation and advisory mechanisms (*e.g.*, client liaison committees, user needs workshops) to obtain advice and feedback on the development of the network.
5. It is essential that all clients and potential partners be informed and involved immediately and continuously in all CGKN developments.
6. Each survey will fund its own activities. At the same time, the NGSC, or its designate, should actively investigate sources for the essential core funding required to develop the common elements of the CGKN.
7. By April 1999, the NGSC should establish an initial management structure for CGKN, with responsibility to refine the CGKN concept, identify and develop the standards and methodologies required, and consult further with clients.

Appendix 1. Abbreviated Workshop Program

(The complete program is contained in the workshop handbook, copies of which can be obtained from Mike Cherry at the GSC)

Thursday, December 10

Plenary Session 1 **Alice Wilson Hall, 601 Booth Street**
Co-chairs: Eric Grunsky (Alberta) and Mike Cherry (NRCan)

8:30 - 8:50 **Opening Remarks** **Marc Denis Everell, NRCan and Jan Boon, Alberta Geological Survey**

8:50 - 9:10 **An Introduction to Knowledge Networks** **Jeff Labonte, Geomatics Canada**

The Inter-Agency Committee on Geomatics and the provincial and territorial governments have made significant progress in developing a national Canadian Geospatial Data Initiative (CGDI), now known as GeoConnections. The initiative involves the participation of federal, provincial, territorial and municipal governments, educational groups, industry and public interest groups. This presentation will discuss how CGDI has evolved, identifying problems and successes that may be applicable to the development of a Geoscience Knowledge Network.

9:10 - 9:25 **NGSC's Concept of the CGKN** **Richard Grieve, NRCan**

The National Geological Surveys Committee has discussed aspects of a Canadian Geoscience Knowledge Network at several of its most recent meetings, touching on policy, technical and operational issues. Richard Grieve will summarize these discussions to provide a foundation for the forward-looking discussions that will occur over the course of the workshop.

9:25 - 9:40 **Federal Activity: The GSC's GKN Initiative** **John Broome, GSC**

The GSC started its internal Geoscience Knowledge Network initiative in the spring of 1998, in large part utilizing funding from CGDI to support a wide variety of projects that will demonstrate ways of making geoscience information available through the Internet. John Broome will provide an overview of the GSC's objectives in this initiative.

9:40 - 9:55 **A Provincial Example: British Columbia** **Ward Kilby, BCGSB**

The British Columbia Geological Survey has made remarkable progress in providing access to all of its data through the Internet. Ward Kilby will talk of how this was accomplished, touching on technical aspects (hardware and software platforms) and the resources required.

9:55 - 10:15 **Workshop Objectives and Methodologies** **Session Co-chairs**

This presentation will outline the process to be followed in the workshop, with emphasis on the breakout sessions for the first day.

The intent is to use the four breakout sessions to move from an initial broad canvassing of participants to obtain their ideas about what the CGKN should be (i.e., the "blue sky" exercise of Breakout Session 1) to identification of the issues and problems that will have to be addressed in building and operating the CGKN (Breakout Session 2) and finally to identification of solutions to those issues and problems and setting some broad objectives toward the overall goal (Breakout Sessions 3 and 4).
To accomplish this objective, the Organizing Committee has drawn up a set of questions that all of the breakout groups will be asked to address in the first session. Each breakout group will have a facilitator and a note-taker. The compositions of the first breakout groups will be set by the

Organizing Committee to ensure a good mix of technical - managerial and federal - provincial/ territorial representatives in each.

10:15 - 10:30 **Coffee**

10:30 - 12:00 **Breakout Session 1** **Defining What the CGKN Should Be**

Breakout Session 1 is intended to gather opinions about what the CGKN should be, including such things as its content, distribution, formats and interoperability. The Organizing Committee has also pre-assigned participants to breakout groups, so as to ensure a mix of technical - managerial and federal - provincial/territorial representation in each. The groups should address the following questions:

1. **What should the structure of the CGKN be? Should it be a network of data, documentation and metadata sources, or a metadata centre and network of documented data sources, or something else? Should it be centralized or distributed?**

2. **What geoscience data "layers" are essential? Which layers are optional? Which layers should be completed first?**

   Some layers seem self-evident - bedrock and surficial geology, geophysical data (many types), geochemical data (many types), mineral occurrences and deposits data. Discussion will probably identify more. In addition to the geoscience data layers, there must be consideration of other things, such as a topographic base, metadata, publications directories, claims information, etc.

3. **What should the format of the CGKN be?**

   Should NGSC strive to develop a common set of standards for data distribution to enable compatibility with each other's and clients' GIS systems? Should the CGKN provide data browsing and selection services on a server (data warehousing)? Should the CGKN have full GIS functions on a server? Should it provide simple GIS functions that are downloaded with data?

4. **How should the CGKN be managed?**

   The development of the CGKN will require regular setting and reviews of priorities and progress. Efforts will also be required to secure resources, and to discuss and resolve policy issues (especially inter-jurisdictional questions). Should this be done by the NGSC (either directly or through a sub-committee)? Should it be done through GSC leadership? Are there other potential participants who should be included (e.g., universities, Canadian Geoscience Council, GAC, etc.)?

5. **How should the CGKN be funded?**

   There are probably only a limited number of funding options:
   1) A federally funded program. This could be totally federal funds, or some sort of cost-shared program like the MDAs.
   2) A nationally funded program, in which all jurisdictions contribute to a central fund that is administered by the management group (previous question).
   3) A cooperative program, in which each jurisdiction provides funding for its participation in the network (with the consequence that the pace of each jurisdiction will vary according to availability of resources.
   4) A "modified cooperative" program in which each jurisdiction provides funding for its own participation, with an extra infusion of funding (from the GSC?) to construct and operate a centralized, unified front end to a distributed CGKN.

12:00 - 13:00 **Lunch**

13:00 - 15:30 **Breakout Session 2** **Identifying Issues and Problems**

This session will focus on identifying the pitfalls and problems that may emerge in attempting to construct and operate the CGKN. Discussion can be structured around the questions posed in the first breakout session. The groups will remain unchanged from the morning session.

Groups will be urged to spend most of their time distilling what will probably be a large number of issues and problems into a smaller list of critical problems and a second list of things that will have to be addressed, but not until later. The identification of key issues and problems is more important than discussion of how to resolve them, which will be the focus of the breakout groups on Day 2.

15:30 - 16:00 **Coffee**

Plenary Session 2 **Alice Wilson Hall**
Co-chairs: Peter Davenport (Newfoundland) and Bruce Blair (NRCan)

16:00 - 16:30 **Reports from Breakout Groups**

The facilitators of each of the four breakout groups will present a summary of their discussions. The Organizing Committee will use these summaries to select topics for the Day 2 breakout groups and to assign participants to those groups.

17:00 - 19:00 **Informal Demonstrations (at GSC)**

An informal session will be held Thursday evening from 5 to 7 PM where participants will be given the opportunity to demonstrate examples of CGKN-related data-management initiatives in their organization. Demonstrations need not be Internet–based. A limited number of computers with Internet access will be available. If you are able to provide a demonstration, please contact Bruce Blair (613-996-9502; bblair@nrcan.gc.ca) so we can ensure an adequate number of appropriately-configured computers are available.

Friday, December 11

Plenary Session 3 **Alice Wilson Hall**
Co-chairs: Ward Kilby (British Columbia) and John Broome (NRCan)

8:30 - 9:00 **Synthesis of Day 1 and Setting the Stage for Day 2**

This session will review the results of Day 1, introduce the topics for discussion in the breakout groups, and assign participants to new groups. The intent is to shape the groups for more focused discussions of policy (managerial participants) and technical (software, hardware experts) topics. The objective of both breakout sessions in the second day is to debate solutions and mechanisms, not issues and problems.

9:00 - 10:15 **Breakout Session 3** **Process and Structure for Achieving a CGKN**

10:15 - 10:30 **Coffee**

Plenary Session 4 **Alice Wilson Hall**
Chair: Jan Boon (Alberta)

10:30 - 11:00 **Reports from Breakout Groups**

11:00 - 12:00 **Discussion of Results and Next Steps**

This closing plenary is intended to review the results of the discussion groups, identify areas of consensus and establish timelines and responsibilities for next steps. The session will tentatively be

structured around the five questions from the first breakout, but the final structure will be take into account the discussions and results of the previous breakout and plenary sessions. A short break will be included in the session.

16:15 - 16:30 **Summary and Closing Remarks**

Appendix 2. Summary Notes from Breakout Sessions

(Points made by *rapporteurs* of the breakout groups to the plenary sessions)

Breakout Group 1, Day 1
Facilitators: Ron DiLabio and Ward Kilby

What CGKN should be

- each agency retains ownership of its own data
- manage data locally
- distributed data access
- integrated web sites versus linked set of autonomous web sites
- diverse data elements
- have CGKN managerial body
- ability to deliver data in interoperable format
- must accommodate what participants are able to provide (remain flexible)
- a virtual network providing access to Canadian geoscience data
- agencies are able to maintain their metadata
- CGKN to provide a consistent view/access to Canadian geoscience, dynamically generated from the distributed source
- be linkable to/from other systems/networks (e.g. GeoConnections)

Data Layers

- national base themes/data sets (CGDI) (bedrock, surficial, geochemical, well sites, mineral occurrences, geophysical, etc)
- agencies will define what "layers" of their data are essential

Format of CGKN

- format is layer specific
- there is a need for a standard format for "critical" data layers
- do not set standards today that may stop us from getting our data out
- standards should focus on the national level
- should develop web tools to access data layers

CGKN Management

- NGSC leadership
- committees or working groups may be tasked with specific issues
- other participants could be involved at the discretion of NGSC (univ.; industry; CGC; GAC)
- client feedback through provincial/territorial advisory committees and user-needs workshops

Funding Options

- Provinces/territories to fund their own activities
- GSC attempts to obtain additional funds

Issues

- funding (for those who need it)
- data ownership - crediting data ownership (ours and others)
- data exchange between surveys
- cost recovery vs free distribution
- ensuring continuity; retaining access through use of distributed network
- are there required layers?
- disparity between agencies to deliver data (funding implications; data delivery)
- level of integration

- rights of topographic base
- internal roadblocks (IT; policies)
- data quality
- highlighting missing data
- should it be called "CGKN"
- web site URL (address; language; design)
- ongoing communications (new developments)

Breakout Group 2, Day 1
Facilitators: Phyllis Charlesworth and Peter Davenport

Structure of CGKN

- network (end point), distributed, control coordination and entry
- multiple entry points
- each node links to control site (minimum)
- through each site, access to centre, direct access to others optional
- minimum metadata requirement
- start option: hybrid model - start centralized, move to decentralized
- best interest of client - client-friendly distribution
- what is best model for client access?

Data Layers (multiple scales)

- **H** - topographic data highest priority (include coast line, offshore)
- **H** - bedrock mapping
- **M** - claims Information
- **H** - mineral and coal, oil, surface minerals occurrences
- **H** - geochemistry (mapping)
- **H** - metadata (including references to non-digital information)

Scale?

- multiple scales
- keep information close to source
- mechanism for combining distributed information referenced to a single framework
- **H** - geophysics (aeromag, gravity, seismic, xray)
- **H** - surficial geology
- **M** - assessment data
- **M** - air photos
- **M** - remote sensing
- **H** - drillhole data
- **H** - formation tops

CGKN Format

- deliver data
- provide tools for usage
- ability to integrate data source, for viewing
- browse data and download
- common minimum metadata standard
- standard geospatial frame of reference, or provide means for conversion
- downloads of software only where appropriate (e.g. clients should be able to use info with minimum skills)
- minimum standard geological data model
- tools for clients (range of tools) GIS functionality

- data dictionary, lexicon (geological terms)
- multiple servers, data warehousing
- ability across network to access multiple types of data and combine them into "ad hoc client" products
- adopt a minimum set of standards
- broad range of clients ("everybody")

Management

- NGSC
- industry and universities and NGSC
- Inter Agency Committee on Geomatics model preferred - (NGSC lead with industry, universities, association as major stakeholders on Steering Committee)

Funding

- MDA model
- option #4 is most appropriate now (option #2 second best)
- leveraged funding (applicable to any option)
- leverage with industry
- creative swops
- Geoinnovations fund - model
- Industry Canada

ISSUES

- see ranking
- bedrock geology (essential)
    - scale is also important (most provinces have at 1:1,000,000 or smaller, downloadable)
    - 1:50,000 or larger should be available at provincial level
- mineral occurrences
- classification requirements (some standards needed)
- coordination/cooperation
- surficial geology
- country wide 1:5,000,000 and 1:1,000,000
- larger scales to be included where available
- geophysics
    - 1:1,000,000 downloadable (aeromag, radiometric, gravimetric)
    - larger scales where available
- archiving (digital) data is an issue in all layers!
- geochemistry
    - interpolated raster images at 1:1,000,000 - downloadable
    - more detailed point data available
- cost is an issue! In all layers
- drill hole data
    - location data free (quality indicator needed, accuracy - metadata)
    - point data with attributes should be available (spatially referenced)
- metadata
    - reward system (also for data) to motivate people
    - staff turnover - ensure continuity - ongoing maintenance
    - minimum set of interoperable standards to be defined for CGKN
    - tools to help fill out forms and should present mandatory fields first
    - field dictionary
    - who will develop the specialized data fields?
    - metadata subsets to be defined by specialists cooperatively

ISSUES

- clients may be "misusing" or misinterpreting tools and information
- management
    - copyright issues could be major
    - political level may need to become involved
    - cost recovery policies differ - bad for users
    - intellectual property issues
    - how do you get credit and what for? How about changes?
    - decision making (cumbersome)
    - archiving policy
    - resources needed for management
    - give this a priority in the overall competition for resources
    - needs of some clients more easy to meet than those of others
    - client feedback essential

Breakout Group 3, Day 1
Facilitators: John Broome and Andy Fyon

Data leads to information, which leads to knowledge

Drivers

- improved use/access/exchange to info and knowledge
- technology as vehicle for partnerships
- maximize access to use knowledge (outside traditional clients)
- educate users in use of our data
- science - internal/external (better science)
- synergies/cooperation/economy of scale
- improved competitive advantage in global economy
- marketing data and information (economic/decision making)

CGKN Mission

Cooperative framework to maximize access and use and application of data and information relevant to geoscience applications, to broadest user group quickly, efficiently, and cost-effectively.

Critical Issues/Functions

- incremental and evolutionary
- vectoring to required/requested data
- dynamic vs. passive: two way data exchange/transfer
- search and find
- purpose of data
- conditions of collection (accuracy)
- use of data
- accessible to wide range of users (usability; platform independent)
- meets jurisdictional "rule of engagement" (policy/political) and needs
- meet jurisdictional priorities
- "producers" of data (winners)
- feasibility study (what exist? what format?)
- accommodate existing prov/terr/fed government solutions
- open "architecture"/IT and IM context
- add value (access to data and to analytical tools)
- if we go with GIS online tools, then we must satisfy these concerns:

- lowest common denominator (point to data source)
- highest common denominator (tools, but subject to above conditions)

- where do we want to be (incremental? flexible? evolutionary? open?)

Themes - Data/Information

- based on our existing perspective of our collective client needs

Caution - existing client

- variable needs depending on slice of clients
- cover off what know

All that we have:

- bedrock geology
- Quaternary - surficial
- geophysical (potential, seismic 3D vs 2D)
- mining rights (mineral claim tracts)
- geographical
- etc.

Issue: priorities

- scale
- responsibility to set /define priorities
- themes/scales responsibility of data owner (jurisdiction)

CGKN Management

What is the management function? Management model (governance model)?

- coordinate linkages between partners
- policy issues - identify/resolve
- pricing policy
- measure performance - advice/changes to improve/address performance
- promote Canadian geoscience (external to CGKN)
- facilitate communication between partners (internal to CGKN)
- promote client-approach ("external" clients)
- sponsor/champion "standards" - implies project sponsorship
- guidance to ongoing maintenance
- incremental - caution about control

Implications about Management Structures/Governance

Steering Committee

Pro: collaborative
politically do-able
buy-in because of equal ownership

Con: ability to achieve consensus

What do they do:

- they are the visionaries/guiders/Board of Directors
- provide direction to Secretariate
- global visionaries
- broadest experiences/relevances/perspectives
    - existing clients/uses, or
    - "anticipated" future clients/users
- identify policy issues

Secretariat: the "doers", real body with real $

- Concerns:
    - funding issue

        - if responsible to Steering Committee (accountability)
        - responsibility: coordinating/daily stuff
        - accountable to: something (best is Steering Committee)
    - Identify options and implement decisions
    - Find management solutions and implement to policy issues raised by Steering Committee
    - assumes continuity
    - could add functions

Governance

Now: baby steps (bodies @ workshop in steering committee)
Then: broadest stakeholders

Funding Principle

- very qualified Yes
- needed for Secretariat
- operationalize decisions
- who controls items needing funding (steering committee)
- who benefits - stakeholders (specifically, incremental benefits)
- if control/benefit, therefore, incremental responsibility to fund?
- BUT, need to know what CGKN does
- stability/continuity needed (certainty of funding)
- can't commit to something we don't know/understand
- willing to consider small, meaningful "start"

Levels of "Functionality"

- metadata
    - ownership
    - maximize points of entry
    - retain jurisdictional identity
    - maximize access to data
    - maximize functionality
- search and report on metadata
    - tools reside with data owners
    - tools reside nationally
    - is there a common set of tools we all share?
    - do we want to "anticipate" national tools that access our data?
    - does horizontal search have an implication?
- standards or software fix (techno-fix)
- browse data (need to confirm no policy issue)
- want data (policy threshold pricing)
- real online GIS functionality
- is it beneficial to enable an Australian to search for Precambrian gold in mafic volcanic rocks?

ISSUES

- agency identity to preserve jurisdiction , marketing activity
- impact: affects scope and functionality of CGKN and therefore design must consider political sensitivities
- tradable data policy
- value-added products/ buy data
- mitigate: political none, but time?
    - technical solution to cope with royalty payment
- impact: curtails data delivery outside jurisdictional system

- how are priorities set to portray digitally jurisdictional data (@ what scale)?
- impact: 1) coordinated functionality, 2) unequal client "value-added"
- mitigate: jurisdiction therefore consensus/peer pressure
- data are stored in variety of formats, levels of preparedness
- impact: affects interoperability and Canada-wide look-feel of analytical functions
- mitigate: need to find techno-fix or standards
- scope of CGKN
- framework
- IT solution
- vision
- impact: funding commitment to governance structures
- mitigate: "nationally coordinated projects"
- Issue: need governance princi0les to guide Steering Committee
- Is benefit/value to clients equal to all jurisdictions? [Test: where will I allocate my scarce survey $]
- commitment to the science behind the data and the IT/IM solutions
- garbage in = garbage out
- substance and relevance to clients

Breakout Group 4, Day 1
Facilitators: Mike Cherry and Eric Grunsky

1. Structure
    - distributed network of DATA with governing body overseeing (NGSC)
    - NGSC set standards
    - minimum layer of standards
    - CGKN/NGSC body encourage/help agencies in need (with dollars/tech help?)
    - metadata, publications geology
    - NGSC window to de-centralized network

2. Data Layers
    - base layer (topo; hydro; political boundaries)
    - scale
        - initially: national topo database
        - with time: provincial topo database on a prov. by prov. basis
    - capability to merge layers across prov/terr boundaries, not there yet
    - geology (bedrock -**1**; surficial -**2**)
    - geophysics -**3**
    - mineral occurrences -**4**
    - publications
    - metadata standards
    - interface to what's there, its quality/metadata
    - current client base wants "just the data!"
    - expanded client base may require new tools and methods
    - data inventory

What is the value/purpose of CGKN?
- provide data warehouse/national inventory
- position us in global market
- economies of scale
- not "re-invent the wheel"

- national scale information/data (e.g. broad exploration projects - Labrador Trough; sedimentary basins)

3. Format of CGKN
    - distributed
    - standards/formats for data distribution (dxf, shp)
    - interoperability
    - need business case for FME/OGDI interoperability server, (through NGSC sponsorship/funding?) to allow local native formats to be used by everyone

4. CGKN Management
    - NGSC joint committee (technical people; clients)
    - membership:
    - now: Fed/Prov/Terr
    - other government departments (Environment; Agriculture)
    - private industry; universities

5. Funding
    - through NGSC
    - federal moneys through CGDI
    - NGSC to examine funding methods
    - private sector interface/links for nominal fee?

Pitfalls and Problems
- copyright/ownership; links; partners; products; data; services; metadata; cost recovery
    - Vision: BC example, free data
- Platform independence
    - document formats (archival)
    - html (client accessible)
    - rtf
    - hardcopy
    - geographical formats: solution may lie in FME/ODGI
    - CGKN - build consensus with support from NGSC (moral authority)
- Archiving data (which format) and data maintenance

Goals

1 Year
- CGKN web site, design and implement standard interface with a common look
- develop business case for interoperable component to present to NGSC
- large data server/digitizing requirement (e.g. assessment files/records), present to Mines Ministers through NIDP, National Infrastructure Data Program
- explore metadata implementation

Long Term
- platform independence
- full data access (electronic)
- archive issues
- data models
- client GIS/analysis abilities (BC example)

Breakout Group 1 (Policy), Day 2
Facilitators: Jan Boon and Andy Fyon

CGKN Management Structure

The CGKN should be an NGSC initiative, managed by the following:

- Board (of Directors?) - initially composed of a majority of NGSC members and participants from academia and industry. Members should have a broad experience and perspective. The mandate of this interim board would be to define the vision and specific goals of the CGKN.
- Secretariat - there should be a secretariat to coordinate daily activities and development and to find final solutions to issues.
- Operational Strategy Committee - this committee would be responsible for strategic implementation of CGKN, and would function as a "project office".

Client feedback is essential, and should be accommodated through provincial/territorial advisory committees and user needs workshops. The interface to CGKN for clients would be through the Board of Directors.

Funding

In the longer term, proposals for a funding mechanism should involve both the Board and the Operational Strategy Committee. Possible options for long term funding include GeoConnections, direct invoices to participating agencies, accommodation within existing budgets, and "local" specific project proposals. More than $200,000 in annual funding is required to initiate and sustain GeoConnections, and this money is not available from provincial and territorial budgets. In the short term, only in-kind contributions from the provinces and territories are possible. The GSC indicated that it might be able to partially fund an initial Board meeting.

Name and Acronym

There was general agreement that the acronym CGKN is cryptic and difficult to pronounce. A new name must be found, preferably one that is clear in both official languages.

Breakout Group 2 (Standards), Day 2

Facilitators: Eric Grunsky and Phyllis Charlesworth

- require an effective national metadata system, at the discovery level
- a common set of metadata fields (minimum required to define contents, 20?), a further look is of interest

  Action: NGSC set up committee to come up with minimum common set of fields for data set and publication discovery based on international standards. SHORTEST TERM

  Action: find tools to assist with metadata input and query at CGKN site. SHORT TERM implement above. LONGER TERM and ongoing
- maintain and archive (protect) CGKN knowledge
- local agency responsible
- need agency commitment to data maintenance
- CGKN as forum and advisory group
- account for versioning and dynamic maps/data

  Action: use discussion groups to address issue of archiving should address policy issues
- combining and exchanging knowledge
- dynamic translators rather than standard formats
- queries can occur at common level
- examine other initiatives as guide

  Action: establish working groups to determine parameters to integrate data sets (facilitate search and combination by others of different data; e.g. geochem; min. deposits; geol. maps; versions; etc.)

Breakout Group 3 (Delivery), Day 2

Facilitators: Peter Davenport and Ward Kilby

- BC GKN model: consensus that it has a good "look and feel", and carries out most functions required in an Internet viewer/browser (version 4 will allow platform-independent browsing)
- Mapguide (and possibly other packages) could be used to launch CGKN, together with a web-based data management system such as Cold Fusion

Action Items

1. **Jamie Rupert (GSC)** evaluate alternatives to MapGuide (Grasslands Scenery; Geomedia; ArcView IMS; Mapobjects IMS; Mapinfo)
2. establish criteria for server software functionality
3. **Murray Journeay (GSC)** establish test-bed system for CGKN - linking/overlaying info from 2+ jurisdictions
4. initiate additional test projects
5. **Phil Moir (GSC)** MapGuide server at GSC Atlantic
6. authoring tools for MapGuide by Nfld survey
7. use CGKN web site or list server for communication on current projects

CGKN Functions

- data viewer/browser for spatially-referenced info (MapGuide, etc.)
- metadata discovery and access (MapGuide, CEONet)
- links to supplier of data and source agency site(s) (MapGuide, CEONet, . . .)
- transparently display data from all data formats used by data holding agencies
- alpha-numeric queries (not map-based) (e.g. toponomic, themes, NTS, etc.)
- integration of data sets - vertical and horizontal
- data supplier links
- simple user interface - browsing functions
- on-line documentation and tutorials
- security and safeguards
    - limited queries
    - warning/notification
- languages - for navigation especially
- client feedback mechanism
- tracking - usage and clients
- options for user/client profiles
- a way to highlight important data gaps
- dynamic interactions (addition of data by users)

Appendix 3. Summary Notes from Closing Plenary Session

Plenary Session, Day 2
Facilitator: Jan Boon

Standards

- queries in French? Bilingual metadata?
- archiving policy
- what is being archived? How? Readable in 10 years?
- action items on new structure!

Delivery

- functional mode presented by BC (MapGuide) is acceptable
- do not focus on 1 piece of software (political implications, technical implications)
- local systems important and local decisions too. Flexibility
- meet client needs
- flexibility, scale. Dynamic data bases to feed CGKN. Experimentation
- testing important. Use test beds as available

Policy

- for leverage - provinces to use enabling technology expenditures
- NGSC co-chairs to assemble Board
- "Canada level" reports to "Strategic Committee". Jurisdictional local management
- may need 3 full time staff to design and push CGDI model
- real $$, the sooner the better. Need assigned people
- partners should be included as soon as possible
- involve universities in building (as partners), include in the "doing"
- contributors vs. users vs. builders

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