Making USGS Information Effective in the Electronic Age

Conveners: Thomas Aldrich, Frances Hotchkiss, Deborah Hutchinson

By Debbie R. Hutchinson[1], Rex Sanders[2], and T. Faust[3]

[1]USGS, 384 Woods Hole Road, Woods Hole, Massachusetts
[2]USGS, 345 Middlefield Road, Menlo Park, California 94025
[3]USGS, 600 [4th] Street South, St. Petersburg, Florida 33701

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By Deborah R. Hutchinson, Rex Sanders,and Trent Faust

Executive Summary

The USGS Coastal and Marine Geology Program (CMGP) held a workshop on "Making USGS Information Effective in the Electronic Age" in Woods Hole, MA, on 6-8 February 2001. The workshop was designed to address broad issues of knowledge and communication, and to help develop the mission, vision, and goals of the National Knowledge Bank called for in the 1999 NRC review of the CMGP.

Presentations led by historians and philosophers yield to a wide-ranging review and discussion of the role of USGS science in society: USGS science is important to government to understand certain complicated public policy issues (such as the environment), but we must participate in two-way public dialogs to increase our relevance and usefulness. Presentations led by USGS communications experts reviewed the principles of audience analysis and effective communications: this focused look at audiences, markets, and products provided an introduction to the behaviors, the tools, and the terminology that might be applied to public discourse. Presentations by several information technology experts showed the potential – and pitfalls – of current schemes for Web-based information access. Finally, several brainstorming sessions developed action items, vision, and characteristics of a knowledge bank.

Based on the workshop discussions and results, the authors developed the National Knowledge Bank Mission, Vision, and Goals statements.

Mission

Put CMGP knowledge to work for America

Vision

Scientific Dialog: The National Knowledge Bank is central to public discourse. We help Americans use what we know about coastal and marine natural systems to make better decisions, and we learn from them what knowledge is important.

Knowledge Culture: The National Knowledge Bank results in a seamless CMGP culture. Our knowledge culture promotes scientific dialog with Americans, strengthens our scientific and strategic leadership, promotes knowledge sharing, and encourages individual and organizational learning.

Scientific Excellence: The National Knowledge Bank (NKB) is a living repository of past and current CMGP knowledge. Scientists both within and outside USGS use the NKB to make pioneering and important scientific discoveries.

Introduction

The workshop "Making USGS Information Effective in the Electronic Age" is one part of an on-going process to make USGS Coastal and Marine Geology Program (CMGP) data, information, and knowledge more accessible and more useful to both internal and external stakeholders. We are focused on information for two reasons: (a) As government science comes under greater public scrutiny, we must engage a wider audience in using and valuing our work; and (b) we must respond to the 1999 National Academy of Sciences/National Research Council review of the USGS Coastal and Marine Geology Program, which challenged the program to "create a National Knowledge Bank on the Geologic Framework of the US Coastal and Marine regions" (National Research Council, 1999, p. 48).

The recently released NRC review of the entire USGS (National Research Council, 2001) recognized that the USGS is both a natural science *and information* agency, and highlighted the need to change how we manage information and knowledge resources. Some excerpts from the report demonstrate these points: "The USGS is a vitally important provider and coordinator of information related to critical issues in the natural sciences…information management at the USGS should shift from a more passive role of study and analysis to one that seeks to convey information actively in ways that are responsive to social, political, and economic needs…The USGS is well positioned to provide the framework for a geospatial information depository and portal for the DOI and other federal department, providing access to a range of natural science information and derivative products that can support effective decision making" (NRC, 2001, p. 3, 4, 6). Our interest in knowledge and information management is therefore both timely and consistent with broader USGS goals.

The CMG Program funded a planning year in FY2001 to define the scope, goals, audience, necessary resources and support required for a National Knowledge Bank. "Making USGS Information Effective in the Electronic Age" was the first workshop, held in Woods Hole, MA on 6-8 February, 2001. The workshop included 28 people from the three Coastal and Marine Geology teams, 2 people from Reston, and 8 non-USGS personnel. This report describes the workshop and outcomes.

Goals of the Workshop

The workshop was designed to address broad issues of knowledge and communication, in order to develop the mission, vision, and goals of a knowledge-handling system for the Program. The four goals of the workshop were:

- To understand the purposes of public science in general and USGS in particular;
- To understand whom the USGS serves and how best to effectively communicate with them;
- To develop a vision, a mission statement, and goals for the National Knowledge Bank; and
- To develop action items that would contribute to the goals.

Goals

- Aug. 2001: Develop a strategic plan to implement each of our visions, using elements brainstormed at the workshop and more.

- 2002: At least one group of Americans will make better decisions about coastal and marine natural systems because of our science.

- 2002: At least one of our research projects will modify its goals, based on a dialog with all important stakeholders.

- 2002: At least one research project in each field center will actively participate in our new knowledge culture.

- 2003: At least one important CMGP scientific discovery will be made by using the NKB.
- 2003: Everyone in CMGP will know how to participate in our new knowledge culture.
- 2006: All American decisions about coastal and marine natural systems will use our knowledge and information where appropriate.
- 2006: All of our research projects will set goals based on a dialog with all important stakeholders.
- 2006: Everyone in CMGP will participate in our new knowledge culture.
- 2006: Several scientific discoveries per year will be made using the NKB, by American scientists inside and outside CMGP.

Workshop Overview

The workshop took place during 3 days and was divided into three segments: the challenge of vision, the challenge of skill, and the challenge of strategy. The first two parts were presentation by leaders in their respective fields with audience questions and discussion; the final section was intended to be brainstorming and discussion, but this component was shortened during the meeting in order to accommodate three presentations showcasing information handling systems. Short summaries follow:

Part 1: The Challenge of Vision

In this section two philosophers examined why the nation needs Earth scientists in the federal government by raising awareness on four basic issues: the relationship between citizens and government (J. Porter); the role of public scientists (J. Porter); a philosophical history of USGS (R. Frodeman); and the role of USGS scientific information (R. Frodeman).

Jene Porter (Appendix 2) developed both a political and historical context for understanding the role of science in public policy issues. He pointed out the general dearth of material exploring and defining the history of public science, the philosophy of public service, and the role of public science in western governments. This is in contrast to the abundant literature on the history of specific disciplines of science. In examining the last century, he noted an important shift in how western governments get legitimacy. Whereas much of the first two centuries of American government were based on legitimacy from consensus and education, he noted that the last half of the 20th century has posed complicated public policy issues that now require scientific input (e.g., atomic energy, environmental issues, health issues, and population explosion). The challenges posed by requiring scientific knowledge in addition to consensus to carry out public policy are formidable. A central tenet of his message is not whether science will play a role in government in the 21st century, but which scientists will play a role, and how they will be empowered by the government. Because public discourse is essential to developing public policy, scientists who engage in public discourse must embrace a set of strategies and rules that are very different from their traditional “peer-review” discourse. He challenged the participating USGS scientists to find opportunities to encourage public discourse in order to build credibility and trust in government science.

Bob Frodeman (Appendix 3) built on Porter’s foundation but took a closer philosophical look at both Earth Science and USGS. His examination of the place of Earth sciences in western culture explored the dilemma of mixing science (looking for truth) with politics (looking for priorities). Some of the questions he posed were:

- What are the peculiar roles and responsibilities of a public science agency,?
- How do the roles and responsibilities differ from other scientific institutions and from public agencies?
- To what degree should a public science agency be focused on creating new science versus creating a context for understanding the science we already have?

- What types of skills are needed for creating "contexts for understanding?"
- What is the relevance of Earth science studies to Congress?
- What is unique about public science?
- What is the relationship between knowledge and democracy?

Some of the answers to these questions are complicated and controversial. Frodeman suggested there are two reasons why public science agencies are necessary: (1) some knowledge is too valuable to be in private hands (this becomes more important in a knowledge-driven, high-technology society); and (2) some knowledge will be marginalized or neglected if put in the market domain (which would probably be the case for some of the spatial/temporal scales of Earth science information). In support of this are three claims: that public science needs to be (more) responsive to socio-political-cultural issues, that the USGS (or some agency like it) must become a central organ of government, playing a vital role in societal decisions, and that cultural transformation (to embrace public science) can be accomplished through "wide interdisciplinarity" i.e., bringing the physical sciences into closer connection with the social sciences and humanities while also engaging stakeholders and community groups. He concluded by pointing out how the USGS is well suited to tackle some of the pressing public policy issues of the future, such as access to physical resources, environmental demands from burgeoning population, and the role of technology in solving these issues.

Part 2: The Challenge of Skill

Two communications experts from USGS headquarters, Mike McDermott and Gail Wendt, led this second part of the workshop (Appendix 4), investigating audience analysis and communication tactics.

As part of a transition into this section, Cathy Norton, Chief Librarian of the WHOI/MBL library, facilitated a discussion about "To whom do we communicate, and for what purpose?" The ideas developed in this short brainstorming were:

- To understand limits and scarcity (e.g., metaphor of a life boat)
- To show USGS is a trusted and disinterested source of information
- To advance science and knowledge
- To increase comprehension of complicated issues
- To inform the decision making process (awareness, understanding, action)
- To provide information for responsible resource management
- To advocate for the planet (and the unique relationship between people and Earth)
- To recognize issues that are important for the future
- To plan for future generations

The audience analysis segment, presented by Mike McDermott, took an in-depth look at defining products, identifying audiences, and exploring the relationships between USGS and potential audiences (e.g., public, stakeholder, customer, cooperator, and partner). Part of understanding one's audience is to understand a market (i.e., a group of people, organizations, or both willing to change behavior based on either exchange of value or ability to do so). By thinking of the various audiences in segments or in layers, one can therefore begin to target them more specifically. Discussion points touched upon how one might do this to engender public discourse, i.e., two-way communication, and who the target audience of the CMGP knowledge bank might be. Because of limited time, the matrix analysis of the audience was curtailed, although the use of the matrix as a tool to explore an audience was described.

Using the tools and terminology developed in the audience analysis section, Gail Wendt followed with a communication analysis, and described the building blocks of effective communication. By effective communication, she meant getting the right message to the right audience at the right time. The basic building blocks of effective communication consist of six steps: articulating the objective to achieve, finding the right audience, delivering the right message, using the right format, distributing the message to have the broadest impact,

and finally evaluating the success of the effort. Handouts of summaries of the Bureau strategies and messages were distributed at the workshop (Appendix 4).

Part 3: The Challenge of Strategy

The final day of the workshop was intended to brainstorm issues related to the knowledge bank that would point the participants toward a unified vision and mission. Instead, four speakers started the day by showcasing potential applications of web-based developments to aid in communications (M. Journeay, F. Marincioni, and T. Faust) and updating the workshop participants on the status of the regional synthesis workshop held in Reston in December, 2000 (S, Eittreim).

Murray Journeay (Geological Survey of Canada) described the CordLink project, a prototype digital library for the Canadian Cordillera, focused on the Georgia Basin of British Columbia. His presentation covered many issues that resonated with the CMGP audience (making geoscience knowledge more useful to geologists and more relevant to other parts of society, about governance and civic dialog, the Canadian Geoscience Knowledge Network, and the development of the CORDlink geolibrary project) **(**http://cordlink.gsc.nrcan.gc.ca/, Appendix 5)

This was followed with a presentation from Fausto Marincioni (USGS Woods Hole), on the prototype Marine Realms Information Bank (MRIB, a distributed geolibrary that provides organized access to information about CMGP oceanic and coastal environments. The MRIB project is part of a cooperative project with WHOI and utilizes a centralized metadata management scheme to organize and access widely distributed web pages. The output of the classification and search can be either map view or a table of relevant information resources (http://mrib.usgs.gov, Appendix 6).

In the third presentation, Trent Faust (USGS St Petersburg) gave a short demonstration of the proposed redesign of the CMG Program home page, highlighting new elements, new links, and design considerations. (http://marine.usgs.gov, Appendix 7).

In the final presentation, Steve Eittreim (USGS, Menlo Park) updated the group on the Regional Synthesis project, based on the December, 2000, workshop. He discussed the consensus view of increasing the number of regions from 8 (recommended in the NRC review report) to 13. In doing regional assessments, a matrix of regions versus topics forms the blueprint for building data and interpretive layers in the GIS. The Regional Synthesis steering committee is looking to the knowledge bank project as a repository for the GIS layers and for developing data and map standards for the GIS.

The remainder of the third day was devoted to discussions and brainstorming led by Rex Sanders (USGS Menlo Park), on the strategic directions for the CMG "Knowledge Bank" project. With an eye toward developing a sense of priorities and vision, each participant had the opportunity to submit the single most important item that he/she felt the knowledge bank could achieve. These ideas are summarized in Table 1. Because many of the ideas describe characteristics of the knowledge bank, rather than outcomes or achievements, a second list of characteristics is included in this appendix.

Table 1: Brainstorming – Single Most Important Achievement for the National Knowledge Bank

Trusted information resource
Incremental modularity
WHOLE-PROGRAM FOCUS
On-going, living, never finished
Narratives plus story telling
Framework for interaction
A context of understanding
Shared information for public good
Multimedia
Serve all agencies and academia
Robust structure and ontology
Integrative in nature
Interesting, alluring, useful, relevant content

Connectivity and interoperability
What we know and what we don't know

The final discussions of the day brainstormed on the possible components of the Knowledge Bank. The ideas flowed vigorously, and resulted in nearly 100 subjects suggested for consideration before the discussion was shortened in order to end the meeting (Appendix 9). Subsequent ranking of these ideas forms the basis for both short-term and long-term actions that might be taken to build the National Knowledge Bank. Some of the actions that ranked high are designating a CMGP contact for every big issue or region, doing more metadata, building predictive models, identifying best practices for interacting with the public and with partners, developing feedback surveys for our work, utilizing external advisory groups for guidance, participating in public lecture series, and developing a seminar series to discuss the social context of CMGP science.

Workshop Outcome

Several accomplishments of the workshop are worth noting:

1. There was strong enthusiasm expressed during the discussions about the value of information.
2. The concepts of public science and public good were discussed and contrasted with what the USGS is actually doing, especially with regards to outreach.
3. There was strong enthusiasm for the idea of public discourse, rather than the one-way telling of scientific truths or (the common metaphor of) "throwing our truths over the wall."
4. The idea of the Citizen and public science serving the citizen was discussed enthusiastically, and briefly contrasted with the ideas of customers and audience.
5. At several times, the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO) was noted for how a public science agency has been immensely successful in demonstrating its usefulness and relevance to citizens and society (http://www.csiro.au/).

Because of the lively, engaging, and enthusiastic discussions and question sessions, a number of objectives were not met. These included consensus on how the USGS should serve the citizens, on defining the National Knowledge Bank, on a strategy for achieving the goals of the NKB, and on developing a strategy for continuing to work on what the workshop began, including disseminating workshop concepts to the scientific staff and to other levels of the USGS.

The discussions and directions set at the workshop laid the groundwork for brainstorming fundamental aspects of the National Knowledge Bank. Certain topics related to the NKB have been taken up by the workshop conveners and organizers after the workshop and are included in this workshop report. This includes statements about Mission, Vision, and Goals, as well as the ranked items in the brainstorming list that gives a numerical value to each item based on the scope of its impact, the immediacy of implementing it, and what kind of communication (dialog vs over-the-wall) it supported (Appendix 9).

CMGP National Knowledge Bank

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Goals

- August 2001: Develop a strategic plan to implement each of our visions, using elements brainstormed at the workshop and more.
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Strategic Issues

- The NKB project will promote the use of public discourse, knowledge management, and information technology, in support of each of our visions.
- The NKB must integrate coastal and marine geologic information, especially program priority information such as regional, topical, and national syntheses.
- The NKB project must coordinate efforts with higher-level information projects, including Gateway to Earth and the Digital Atlas, while remaining focused on the needs of CMGP.

- The NKB project must coordinate efforts with other CMGP projects, including the Regional Synthesis project.

- The NKB project will provide guidance to researchers and users about cataloging and archiving coastal and marine geologic data, databases, maps and other derived products. Essentially, the existing Data Management project will become part of the NKB project.

- The NKB will include tools that maximize flexible use of the Knowledge Bank for internal and external science and decision making. When necessary, the NKP project will develop new tools.

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Appendix I

Workshop Announcement, Premeeting Reading Material and Workshop Agenda

Making USGS Information Effective in the Electronic Age

In this workshop, staff of the USGS Coastal and Marine Geology Program will be joined by experts in the fields of political science, philosophy, and communication science, to aid us in considering the role of government and the historical development of the USGS, in defining key communication purposes and audiences, and in understanding effective communication strategies. Building on these fundamental considerations, the workshop will develop strategic plans for program information products that effectively apply our scientific expertise in the service of the nation.

Who should attend:

1. Staff of the Coastal and Marine Geology program who are involved in the management and delivery of information, especially those working with the Knowledge Bank, National and Regional Assessments, and Web Sites.
2. All who wish to have a clearer sense of mission as government scientists in the electronic age.

To Register, contact Joanne Sedlock, (jsedlock@usgs.gov or 508-457-2286). Program questions can be forwarded to Fran Hotchkiss, (fhotchkiss@usgs.gov, or 508-457-2242).

The Workshop will be held in the Swope Center of the Marine Biological Laboratory, in Woods Hole, and housing accommodations have been arranged there.

Presenters' Précis:

Part One: The Challenge of Vision

How is it that our highest ideals, both of scientific truth and of public service, can be served by publications for a non-scientific audience? By taking a fresh look at why our nation needs earth scientists within its government, we will clarify our purpose in communicating scientific knowledge and our standards for successful communication.

Part One: The Challenge of Vision – *Jene M. Porter*

Government and Citizen: The Role of the Public Scientist

Homo Sapiens are curious animals. We are social animals in certain obvious respects: we need a degree of social organization to raise the young, and we provide for food, clothing, and shelter through joint activity. Yet, paradoxically, we have found it extremely difficult to organize ourselves with any degree of stability. Thus, for most of our history we survived in quite small groups. These groups had a kind of balance between themselves, nature, and their enemies. But, they were--and some are still in existence--rather primitive in that they were small and had limited purposes. Still they have been most successful, and some have lasted as long as recorded history. On the other hand, when we humans organized ourselves into empires, these grander structure were always short-lived. Great empires in the past were lucky to last one century. Rome lasted a turbulent four. No one made it into double digits, and the relation between government and citizen were turbulent.

Something quite extraordinary happened at the beginning of modernity (16th to 17th centuries): we developed a new understanding of political systems. To use modern language, we saw the birth of the state, the bureaucracy, the executive branch, and sovereignty. Along with fostering new developments in agriculture, health, communications, and transportation, we humans have been able to organize ourselves into large groups and to

provide for the necessities of life. As far as human population is concerned, there has been an epidemic of our species: it has become a litany to note that in the 18th century humans numbered 300 million and today we are 6 billion or that in the last 50 years we have grown from 2.5 billion to 6 billion.

We have been able to deliver on the material necessities of life--thus the population explosion. Yet, who would, after the experience of the twentieth century, call our political institutions stable or argue that we have solved the task of relating government to citizens? It has become a commonplace among political philosophers of all stripes to question the materialism and the spiritual or moral vacuity of our political societies and to worry about the consequences for the future. Further, the growth of the executive branch and its focus on delivering the material conditions of our existence have combined to blind political and bureaucratic leaders as well as citizens to a host of long-term but pressing problems for humanity. One would be hard-pressed to find a better place to discuss such problems than Woods Hole.

What can be done? How can science--academic, public, and private--and citizens relate? What is the role of the public scientists? How can independence and competence be maintained? Without these two attributes an institution will have little success in persuading the public about long-term issues. Further, the great issues of the day do not come packaged in neat boxes labeled engineering, political science, biology, geology, economics, and so forth. Yet, without a blending of perspectives the problems will be neither seen nor addressed clearly. The experience of commonwealth countries--and some of it is quite dismal--may provide some examples of the interdisciplinary scope of public science and may show us what does not work as well as what may work in persuading citizens and politicians. It is simply indisputable that the institutions of public science will be critical in providing the moral leadership required in the twenty-first century.

Part Two: The Challenge of Skill – *Robert Frodeman*

Philosophies of Government Science, Our Historic and Present Roles

There are two themes to my remarks:

Part 1: A Philosophical History of the USGS
Part 2: The Role of USGS Scientific Information

1. "History is the medium of thinking" (Merleau-Ponty). For the USGS to envision a future where it fulfills its promise within the body politic, it needs a firm grasp of its history, and more generally the history of public science in America. We will therefore review both the history of the USGS (with a particular focus on the USGS's own sense of its role in society), and the history of public science (including the debates over the use, nature, and scope of the public production of knowledge). Developing these themes will involve some conceptual analysis of the terms "politics" and "science." We will find over the history of the Survey a variety of implicit philosophies underlying the survey's relation to the nation.

2. The information that the USGS produces has -- must have - a wide range of uses in a variety of cultural, political, and economic contexts. We will explore these contexts, with a particular focus on the political and cultural dimensions of scientific information within our nation. This will involve an account of the difference between scientific explanation and narrative understanding in the presentation of scientific information. We will also review the effect of recent political developments (e.g., the rise of stakeholders' movements, and more generally of libertarian political philosophies). Finally, we will consider the relationship between government, knowledge, and democracy.

Part Three: The Challenge of Strategy – *Mike McDermott and Gail Wendt*

Analyze This . . . and then Communicate

An interactive session on audience analysis and communication tactics prepared for the USGS Coastal and Marine Geology Program workshop on *"Making Information Effective in the Electronic Age"*

The intent of the audience analysis session is to provide a model and techniques for determining what groups you want to communicate with, particularly in terms of the Knowledge Bank and the National Assessment products of the USGS Coastal and Marine Geology Program. We see the session as a practical exercise where the theories and philosophy discussed in the previous sessions are incorporated into actual use. About half of the session will be exercises and discussion as you work through the audience analysis model, think about appropriate messages, and determine the communication vehicles that will have greatest impact in reaching your audience and achieving your communication goal.

Simple audience typology models will be discussed with a focus on a model that looks at the spectrum of audiences - ranging from the general public to the intentional partner. A sample inventory of various audience types for the Coastal and Marine Geology Program will be developed. Next steps in the group's work will focus on developing messag es and choosing the communication vehicle that best fits the audience.

In preparing for the session, think about existing communication vehicles and information products in the Coastal and Marine Geology Program and then ask yourself these questions (try to come with a rough list of your answers):

<u>About your audience</u>
Who do you think are the audiences for your science?
What are your assumptions about your various audiences?
What do you want to say? To whom? About what?
Who <u>needs</u> to know (what you are communicating)? Why?
Who should know? Why?
Who would like to know? Why?

<u>About your communication vehicle</u>
How do you address audience needs in a communication vehicle?
Is a passive product appropriate? Active? What is your sense of how passive or active products work for an intended audience? Print, online, interaction?
How will you disseminate and maintain your communication? Gather feedback?

<u>About the public audience in communication</u>
As a government science agency, what responsibility do you feel you have - or do you want to take - in communicating with non-scientific audiences?
What communication works best for the general public?
How can you enlist other customers in serving public needs?
Communication can be one of the most effective allies of science, but it requires a commitment of resources and energy to be done right. What you say, how you say it, to whom you say it, and why you say it are all crucial steps in the communications process. Communications needs to be part of the overall Program plan. Whether it is a news release to the public, a fact sheet targeted to the marine community, a one-page briefing sheet for a Congressional staffer, or a listening session with your customers, your communication, if effectively crafted and targeted to an appropriate audience, will help to promote the interests of your program and support the mission of the USGS. We look forward to seeing you.

Workshop Agenda

Part One: The Challenge of Vision

How is it that our highest ideals, both of scientific truth and of public service, can be served by publications for a non-scientific audience? By taking a fresh look at why our nation needs earth scientists within its government, we will clarify our purpose in communicating scientific knowledge and our standards for successful communication.

Tuesday, February 6

8:45a.m. Registration with coffee and pastries
9:00 Introductions and announcements
9:15 "Government and Citizen" led by Jene Porter

11:45 lunch

1:15 p.m. "The Role of Public Scientist " led by Jene Porter
2:45 "A Philosophical History of the USGS" led by Bob Frodeman
4:45 Adjourn for the day

Wednesday, February 7

9:00 a.m. "The Role of USGS Scientific Information" led by Bob Frodeman
10:45 Summarizing: To whom do we communicate, and for what purposes?
Result: List of critical communication purposes

11:30 lunch

Part Two: The Challenge of Skill

How can we match our publications and online services to the abilities and interests of their audiences? By learning basic skills of marketing and communication, we can use these tools in presenting and delivering knowledge so that it achieves its purpose.

1:00 p.m. "Audience Analysis" led by Gail Wendt and Mike McDermott
4:30 Summarizing: What audience characteristics affect our key communication purposes?
Result: a white paper describing critical CMGP communication purposes and, for each, an audience analysis.
5:00 Adjourn for the day

Part Three: The Challenge of Strategy – Building a CMGP Knowledge Bank

As the world enters the 21st century in a transition from an "industrial" economy to a "knowledge" economy, one of the biggest ironies for USGS researchers is that USGS is not universally viewed or valued as a knowledge-generating organization . Perhaps the most painful signs that we, as government scientists, have not been using our knowledge effectively is the goal of the original Contract with America to abolish the USGS. How often have we (scientists) also asked "why don't others appreciate the importance of my work?" With the background of the workshop in examining the role of a federal scientist (day 1) and the critical audiences (day 2), the focus of day 3 will be to apply this understanding to develop the principal goals and objectives of a long-range plan for Knowledge Management (KM) in CMGP. The development of a robust KM strategic plan should serve to improve the quality, delivery, and impact of CMGP science.

Day 3 will comprise a mixture of the entire group discussing issues, and smaller break-out brainstorming sessions. The break-out groups will be tasked with developing goals, objectives, and actions required for CMGP to handle and communicate its knowledge more effectively. The main focus of the break-out sessions will be on the principal knowledge products of the Program (projects and assessments) and on identifying the critical components

of a Knowledge Bank. These categories may change depending on the discussions of days 1 and 2 of the workshop and the consensus of participants.

Thursday, February 8

08:30 a.m. Introduction, Charge, Discussion - Debbie Hutchinson and Rex Sanders
08:50 The Georgia Basin Digital Library Example - Murray Journeay
09:20 The Marine Realms Digital Geolibrary Example - Fausto Marinicioni
10:10 Three Break-out Groups to look at how we manage our most critical resource - Knowledge. Each group is to brainstorm on the three topics (projects, assessments, components of a Knowledge Bank).
This first session is to identify key goals and key objectives.
(a) Discussion Leader - Brad Butman
(b) Discussion Leader - Rex Sanders
(c) Discussion Leader - Jeff Williams

12:00 Lunch

1:30 p.m. Panel Discussion of Break Out Group Results
Projects
Assessments
Components of a Knowledge Bank
3:00 pm Summary and Next Steps
3:30 pm Adjournment

Appendix II

Presentation: Jene M. Porter – Challenge of Vision

Challenge of Vision

MOTIVATION: - LOVE OF SCIENCE
- Love of Earth
- Love of Public Service

OBJECTIVE NEED: Role of Science in Public Policy
Expansion in the last half of the twentieth century
Examples: - Atomic Energy
- Environmental Issues
- Health Issues of all kinds – tobacco to thalydomide

VALUE OF WORKSHOP:
History of Public Science
Philosophy of Public Science

TWENTY-FIRST CENTURY: PLANETARY NEEDS
Who must help address the formation of public policies?

Public Policy → **- Government**
- Society
- Citizens
- Science

Government and Citizens

POWER - The Ability of Make and Enforce Decisions.
FORCE – The Ability to Cause Physical Changes.
AUTHORITY – The right to rule and claim obedience.
VIOLENCE – The unauthorized use of force.

AUTHORITY SOURCES
- **God**
- **Tradition**
- **Consent**
- **History**
- **Expertise**
- **Etc.**

CITIZENS – ACCREDIT

Public Policy and Planetary Needs

Power to Enact Public Policy ← Authorized ← Knowledge

How to connect with citizens so that scientific knowledge is accredited?

A. Responsive to:
- **Citizen's Needs**
- **Society's Needs**
- **National Interest**
- **Public Good**

B. Sound Science

C. Multidisciplinary

Role of Public Scientist

Independence and Competence Required:

Commercial

University

Public

THREATS:

Funding – Source and amount

Political Purposes

Special Interest Group – e.g., genetics

Public Scientists in Other Countries:

U.K.

CSIRO

CANADA

RESPONSIBILITY AND CALLING

Accreditation

ACCREDITATION ← PUBLIC DISCOURSE ← CONTRIBUTING FACTORS

Law
Morality
Scientific Discourse
Religious convictions
Economic Processes
Ideology
Education
Etc.

Appendix III

Presentation: Robert Frodeman – Challenge of Skill

History is the medium of thinking

Maurice Merleau-Ponty
(1904-1961)

Science in the Public Interest:
The USGS in the 21st Century

A Philosophy Of the Earth Sciences:

Two Modalities, Internal and External

1. "Epistemology": questions internal to the discipline itself

- The peculiar methodology of science in the field
- The decline of fieldwork & the rise of "cybergeology"
- The shift from geology to Earth Sciences

2. "Politics": questions concerning the place of the Earth Sciences in culture

- As handmaiden to industrial development
- The cultural implications of fossils and deep time
- The narrative nature of the science
- As paradigmatic example of public science

Congressional Questions to Public Science:

1. What is the *relevance* of studies in paleontology, hydrology, or oceanography?

2. What is *unique* about public science? Why have a public science agency, when private companies could more efficiently handle those aspects of research that were relevant? If the information is truly useful, there will be a market for the information.

3. *Objectivity:* Are scientists promoting their own values under the guise of disinterested science?

Toward a Political Theory/Philosophy of Public Science

- What are the peculiar roles and responsibilities of a public science agency?
- How do these roles and responsibilities differ from other scientific institutions, and from public agencies?
- To what degree should a public science agency be focused on creating new science, versus creating the context for understanding for the science we already have?
- What types of skills are needed for creating "contexts for understanding"?

Claims:

1. To do "public science" requires that we think epistemology and politics equi-primordially.

2. The USGS - or another agency like it - can become a central organ of government, playing central role in society - if it can adapt to a changing cultural environment.

3. "Wide interdisciplinarity" as the means for this cultural transformation: a horizontal and vertical interdisciplinarity involving a) the humanities and social sciences with physical sciences; *and* b) stakeholders and community groups.

Appendix IV - Audience/Communication

Presentation: Mike McDermott/Gail Wendt – The Challenge of Strategy

Analyze This . . . and then Communicate

An interactive session on audience analysis and communication tactics prepared for the USGS Coastal and Marine Geology Program workshop on *"Making Information Effective in the Electronic Age"*

Audience Analysis > Communications Analysis > Exercise

The intent of the audience analysis session is to provide a model and techniques for determining what groups you want to communicate with, particularly in terms of the Knowledge Bank and the National Assessment products of the USGS Coastal and Marine Geology Program. We see the session as a practical exercise where the theories and philosophy discussed in the previous sessions are incorporated into actual use. About half of the session will be exercises and discussion as you work through the audience analysis model, think about appropriate messages, and determine the communication vehicles that will have greatest impact in reaching your audience and achieving your communication goal.

Simple audience typology models will be discussed with a focus on a model that looks at the spectrum of audiences – ranging from the general public to the intentional partner. A sample inventory of various audience types for the Coastal and Marine Geology Program will be developed. Next steps in the group's work will focus on developing messages and choosing the communication vehicle that best fits the audience.

In preparing for the session, think about existing communication vehicles and information products in the Coastal and Marine Geology Program and then ask yourself these questions (try to come with a rough list of your answers):

About your audience

Who do you think are the audiences for your science?

What are your assumptions about your various audiences?

What do you want to say? To whom? About what?

Who <u>needs</u> to know (what you are communicating)? Why?

Who should know? Why?

Who would like to know? Why?

About your communication vehicle

How do you address audience needs in a communication vehicle?

Is a passive product appropriate? Active? What is your sense of how passive or active products work for an intended audience? Print, online, interaction?

How will you disseminate and maintain your communication? Gather feedback?

About the public audience in communication

- As a government science agency, what responsibility do you feel you have – or do you want to take – in communicating with non-scientific audiences?
- What communication works best for the general public?

- How can you enlist other customers in serving public needs?

Communication can be one of the most effective allies of science, but it requires a commitment of resources and energy to be done right. What you say, how you say it, to whom you say it, and why you say it are all crucial steps in the communications process. Communications needs to be part of the overall Program plan. Whether it is a news release to the public, a fact sheet targeted to the marine community, a one-page briefing sheet for a Congressional staffer, or a listening session with your customers, your communication, if effectively crafted and targeted to an appropriate audience, will help to promote the interests of your program and support the mission of the USGS. We look forward to seeing you.

Looking for a Few Good . . . Communication Basics?

A handout for the Woods Hole Workshop
USGS Coastal and Marine Geology Program

Launch strategy tools – If you have a product, information, or news to communicate, plan your strategy for reaching the widest audience in the most effective manner.

USGS Tools and Resources

***Bureau Communications Strategy, 2001-2006* –** A framework for achieving USGS communications long-term goals, now available on the web.

Check out currently available *toolkits* to make your communication job easier. More toolkits are in the works, so visit the site often.

Mainstream and Technical Media

Use USGS Office of Communication resources for tools of the trade – they are your professionals; ***"Staff and Contact Information."*** They can provide guidance on clearance, release, and effective promotion of your news.

- News release
  - Newsworthy information, timely, topical, targeted
  - Target to current issues
  - Leverage – is there an event/anniversary/allied news story to use as the "hook"?
    – Is this Coastal Awareness Week?
- Media relations
  - Contact reporters – introduce new reporters on science or environmental. beat to USGS; compliment on a story; provide additional material. Don't over-react if something isn't reported correctly – provide correct information in a timely manner. Letters to the Editor should be used sparingly and need appropriate approval.
  - New project? News to announce? Hold briefing for media and/or public.
  - Leverage – joint announcement/photo opportunity with cooperator/partner.
- Radio/TV/interview
  - Available video footage? – needs to be broadcast quality; B-roll (background footage for media to have on file for future stories or as backdrop).
  - Photo caption or graphic from report – to Photo Desk
  - Interviews – have sound bites ready (state your point in 10-30 seconds).
  - Be proactive – local talk shows, contact news/assignment editors with story.
  - Media advisory – location shot/camera crew opportunity – scientists at work in field settings are also good.
- Technical announcement
  - Announce availability of report, software, model.
  - Information rather than news – aimed at trade, technical press, not NYT.
- Review/testimonial
  - Trade publications; chapter publications of professional societies.
  - Columns in local newspapers.
- Cover letter/note
  - Traditional and non-traditional audiences – make benefits of the information evident to them. Can be formal letter or short, more personal note that is generic *"Dear Coastal Colleague."*
  - Target your message – what do they need to hear about what you are sending, communicating – relate the information to them.
  - Leverage – accomplish more than one goal; send new report as approach to potential cooperator; broaden understanding of USGS and Program in State or community with newly elected officials.
  - Part of Hill strategy – send to local offices of House and Senate members.
- Event
  - Target planned or recurring event, meeting, or media opportunity – "Awareness Week."
  - Give cooperator/partner opportunity to share the stage.
  - Presentation to cooperator or official – leveraging message.

Consider non-traditional audiences

Trade associations and professional societies – look at those who are in allied areas, such as the recreation community, public health, insurance and risk management, intergovernmental – who are others in your sphere of influence? Use them to:

Leverage the USGS message
Broaden impact
Let them disseminate the information to their members/constituents – will be heard through the authority of the organization
Enable them to carry the message for you

Consider non-traditional venues/opportunities for outreach

Roadside/public display – streamgaging signs
Museums, visitor centers (parks, highways, chambers of commerce)
Non-traditional audience opportunities – exhibits, displays in their worlds.
Web is good for posting, but it's passive, think of ways to make it active; fax is still a viable tool – use it to tell what new on web pages; email works, too.
Combine tactics – news release, cover letter, web visual, fax broadcast, etc

Bureau Communications Strategy 2001-2006: A Framework for Achieving the USGS Communications Long-term Goals

Appendix B: Expressions of Bureau Messages

FY 2001 Bureau Message: Safer Communities

Expression	Example
National	The USGS provides science for safer communities.
Regional	USGS data hels East Coast water managers plan for drought.
Discipline	USGS streamgage data help predict floods and droughts.
State	USGS data are being used to create disaster-resilient communities in California.
Local	USGS maps are used by Albuquerque developers to avoid subsidence areas.
Center	The USGS National Wildlife Health Center helps New England communities determine risk of West Nile virus outbreak.

FY 2001 Bureau Message: Sustainable Resources

Expression	Example
National	USGS energy and mineral assessments data help guide public policy and national defense strategies.
Regional	USGS bird banding helps wildlife managers determine population trends in the North American flyway.
Discipline	USGS ground-water data help America plan for the future.
State	Illinois uses sand and gravel data from the USGS to analyze resource potential.
Local	Western Pennsylvania coal mines use USGS data on coal contaminants to reduce acid mine drainage.
Center	The USGS Center for Coastal Geology measures declines in coral reef health.

FY 2001 Bureau Message: Livable Communities

Expression	Example
National	USGS science is helping ensure that America's landscape continues to support people and wildlife.
Regional	The Great Lakes States rely on USGS data and information to help guide future growth and plan for sustainability of natural resources.
Discipline	USGS research is helping America's communities limit or prevent the extensive ecosystem destruction and economic losses caused by invasive species.
State	Tools provided by the USGS have allowed Alaska's resource managers to understand and predict the effects of decisions about the State's wetlands.
Local	Loudoun County planners use USGS historical growth data to plan for future growth.
Center	The USGS EROS Data Center archives and distributes the largest collection of satellite imagery of the Earth.

FY 2001 Bureau Message: America's Natural Heritage

Expression	Example
National	The National Park Service uses USGS science to help maintain park lands for the enjoyment of all visitors.
Regional	USGS streamflow data are used by recreationists to enjoy the natural beauty and wonder of the Colorado River.
Discipline	USGS biological resource studies help America preserve its natural heritage for future generations.
State	USGS data were critical in the development of the Wilson State Wildlife Refuge habitat conservation plan.
Local	Effects of mining practices on water quality in the Bluefield area will be evaluated by USGS scientists.
Center	The USGS Center for Coastal Geology focuses on the science needed to preserve America's fragile coral reefs.

Audience Matrix (Version 4; 6/22/01, Mike McDermott)

The following matrix attempts to describe levels of relationship with external groups from the most general level of the public to the most engaged with a specific partner in terms of key elements defined below. Within the matrix, there are two basic types of relationships, a "public" relationship in which a government agency by definition is obliged to interact (generally by providing information for free), and an "exchange" relationship in which something of value, often funds, is exchanged for some form of products. It's important to note that one person or group can maintain different levels of relationship simultaneously, e.g., a State Geologist can be in a "customer" relationship buying a report as well as a signer of a cooperative agreement.

Audience Level/ Element of Relationship	**Public**	**Interested Public**	**Stakeholder**	**Congress**	**Customer**	**Cooperator**	**Partner**
Public or Exchange	Public	Public	Public	Public	Exchange	Exchange	Exchange
Interest	Potential	Expressed	Expressed	Expressed	Expressed	Expressed	Expressed
Value		Indirect	$ Indirect/ Direct	Direct	$ Direct	$ Direct	$ Direct
Time		Information	Policy/ Information	Policy/ Information	Product	Product	Product/ Policy
GOALS			Support	Support		Support	Shared
Communication Vehicle	Passive: Website	Pass&Act: Web/email	Pass&Act : +Factsheet	Pass&Act : +Factsheet	Active: +Product	Active: +Data,info.	Active: +Knowledge

Audience: Level of Relationship		**Elements of Relationship**		**Communication Vehicle**
Public	Must be served	Interest	Potential or expressed	While communications is not an element of relationship, it is often how relationships are manifested. The range here is additive from passive websites to active exchange and engagement.
Interested Public	Request specific service	Value	Received directly or indirectly	
Stakeholder	Influencer	Time	How spent time on/with USGS	
Congress	Appropriations & law	Goals	Support/Oppose or Share	
Customer	Product purchaser			
Cooperator	Shares time and material			
Partner	Shares time, material, and goals			

USGS
science for a changing world

Analyze This . . . And Then Communicate

Mike McDermott and Gail Wendt

Making Information Effective in the Electronic Age
USGS Coastal and Marine Geology Workshop
Woods Hole, MA
February 7, 2001

U.S. Department of the Interior
U.S. Geological Survey

Overview

- Audience Analysis
- Communications Analysis
- Exercises

USGS

Audience Analysis

- What is a Product?
- What is an Audience?

USGS

What is a product?

- Product: A bundle of features and benefits
- Features: Facts about product
- Benefits: Values of the product
- So What?

USGS

Products and Audiences

- Product = The point of communication.
- Communicate in terms of product values that interest the audience.
- Convert points you want communicated into terms that interest the audience.
- If you don't know what the audience is interested in . . . find out.

USGS

What is an Audience?

- A group of listeners
- A group of message receivers

USGS

Basic Communication Model

- Sender
- Encode Message
- Transmit Message (Media)
- Decode Message
- Receiver
- Feedback

USGS

Three Ways to Look at an Audience

- Based on level of knowledge
- Based on market segments
- Based on level of relationship

USGS

Level of Knowledge

- Core Professional
- Non-core Professional
- Publics

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What is a Public?

A group of people, organizations, or both, whose actual or potential need must be served in some way.

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What is a Market

A group of people, organizations, or both willing to change behavior based on:

1) exchange of value and

2) able to do so.

USGS

Market Segmentation

- Market universe
- Market segments
  - --Geography
  - --Demography
  - --Product Benefits
- Target markets

USGS

Level of Relationship: From Public to Partners

- Public: Must be served
- Stakeholder: Influencer
- Customer: Product purchaser
- Cooperator: Shares time
- Partner: Shares goal

USGS

Elements of Relationship

- Interest: potential or expressed
- Value: received direct or indirect
- Time: spent on product or policy
- Goals: supported or shared

USGS

Audience Matrix

	Public	Stakeholder	Customer	Cooperator	Partner
Interest	Potential	Expressed	Expressed	Expressed	Expressed
Value		$ Indirect	$ Direct Product	$ Direct Prod&Exp	$ Direct Prod&Exp
Time		Policy	Product	Product	Plcy&Prod
Goals		Support		Support	Shared
Communc. Vehicle	Passive: Website	Pass&Act: +Factsheet	Active: +Products	Active: +Data,info	Active: +Knowlge
	Public	Public	|--------	Exchange of Value	---------|

USGS

"There is one final problem that is in itself not primarily of a scientific character, but is as difficult and important as the others – namely, the problem of communicating the results of our work to the public in a way that they can be understood and used. Taking a hard look at the work of the U.S. Geological Survey several months ago, I suddenly realized that the maps and reports of which we have been so proud – and justly I think – have been released in a form in which they are understandable only by other earth scientists. Little wonder that insufficient use has been made of our results by land-users and land-use planners, and little wonder that the general public lacks understanding of fundamental resource and environmental problems."

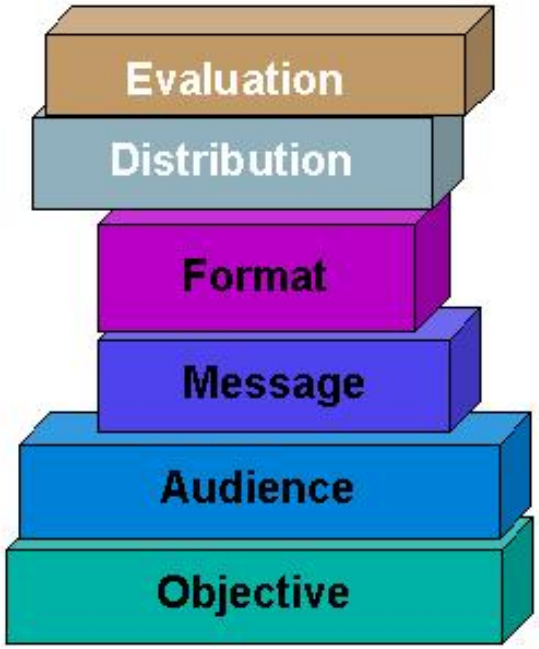
V.E. McKelvey, USGS Director
AAPG meeting, Denver, Colo., April 17, 1972

USGS

Right Audience +
Right Message +
Right Timing =
Effective Communication

USGS

What are the building blocks of effective communication?



USGS

Building Blocks of Communication

What is the objective you are trying to achieve?

Inform
Influence
Communicate
Engage

USGS

Building Blocks of Communication

- Who are you trying to reach?
- Why that audience?
- Use the Audience Analysis
- Keep audience in mind

USGS

Building Blocks of Communication

- What do you want to say to your audience?
- What do you need to say to reach objective?
- Is it the same message to all audiences?

USGS

Building Blocks of Communication

- Choose a format that "works" for your audience
- Think about their needs; their world

USGS

Building Blocks of Communication

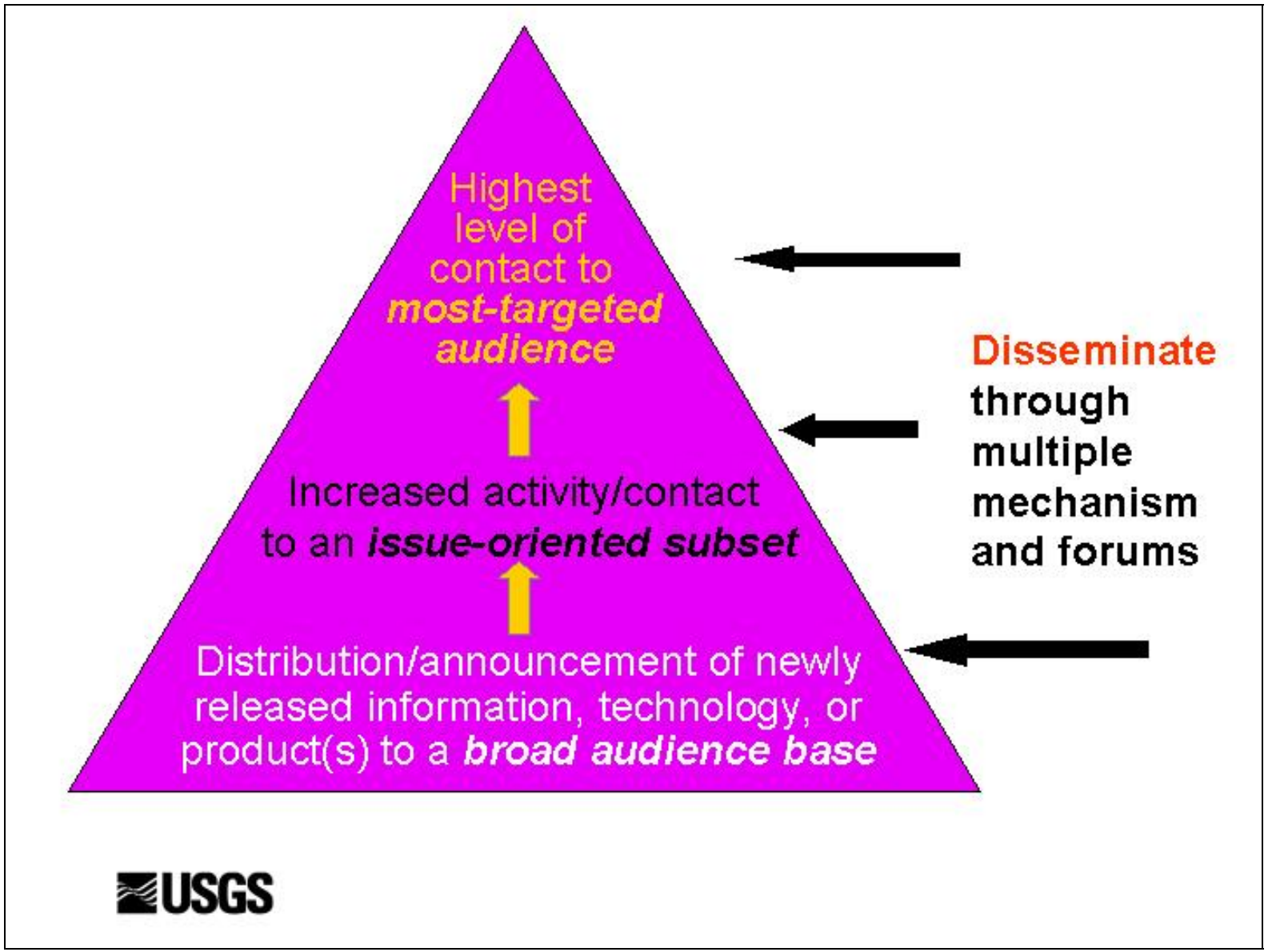
- How can you make the broadest impact?
- How can you multiply the effect of your message?
- How do you effectively deliver your message?

USGS

Building Blocks of Communication

- What worked?
- What didn't?
- What could you change?
- What would improve future products?

USGS

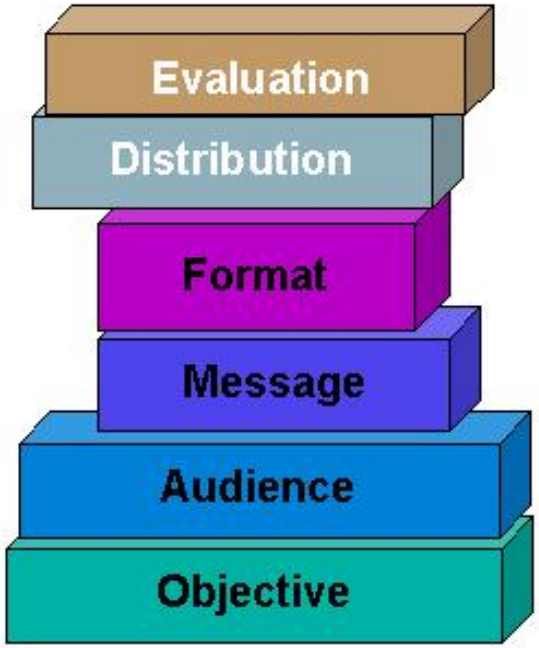

Highest level of contact to most-targeted audience
Increased activity/contact to an issue-oriented subset
Distribution/announcement of newly released information, technology, or product(s) to a broad audience base
Disseminate through multiple mechanism and forums
USGS

Bureau Communication Strategy 2001-2006

- Who We Are
- What We Say
- To Whom We Say It
- How We Get It Done
- Why We Do It
- How We Sustain It
- How We Pay for It
- How We Know It's Working

USGS

If you build it right . . .
They will come



USGS

What's in it for the USGS?

- USGS research and information used by customers.
- Customers know and support USGS science.
- USGS fulfills role as "civic scientists."
- Internal buy-in for communication efforts.
- Informed citizenry.
- It's the right thing to do.

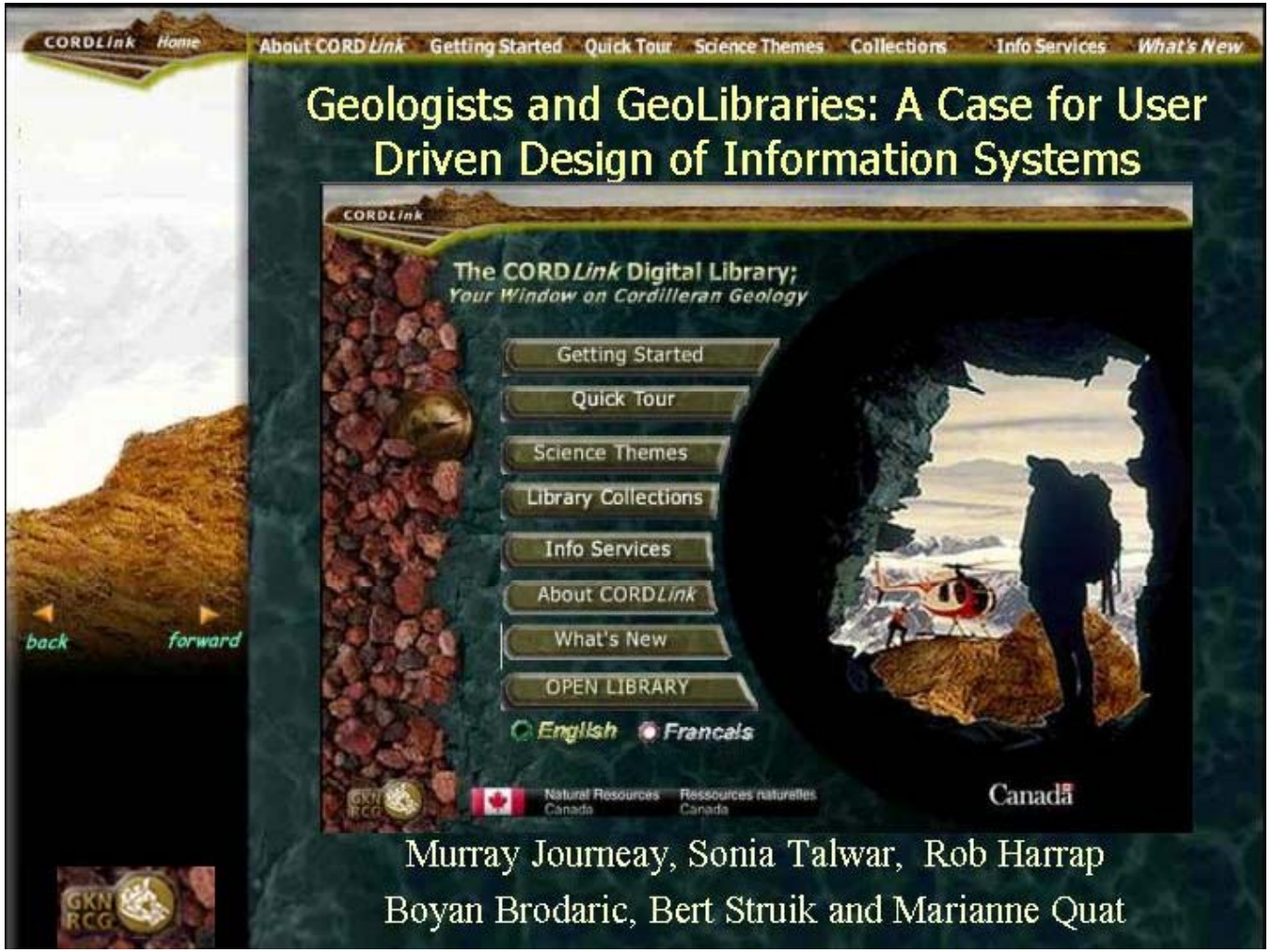
USGS

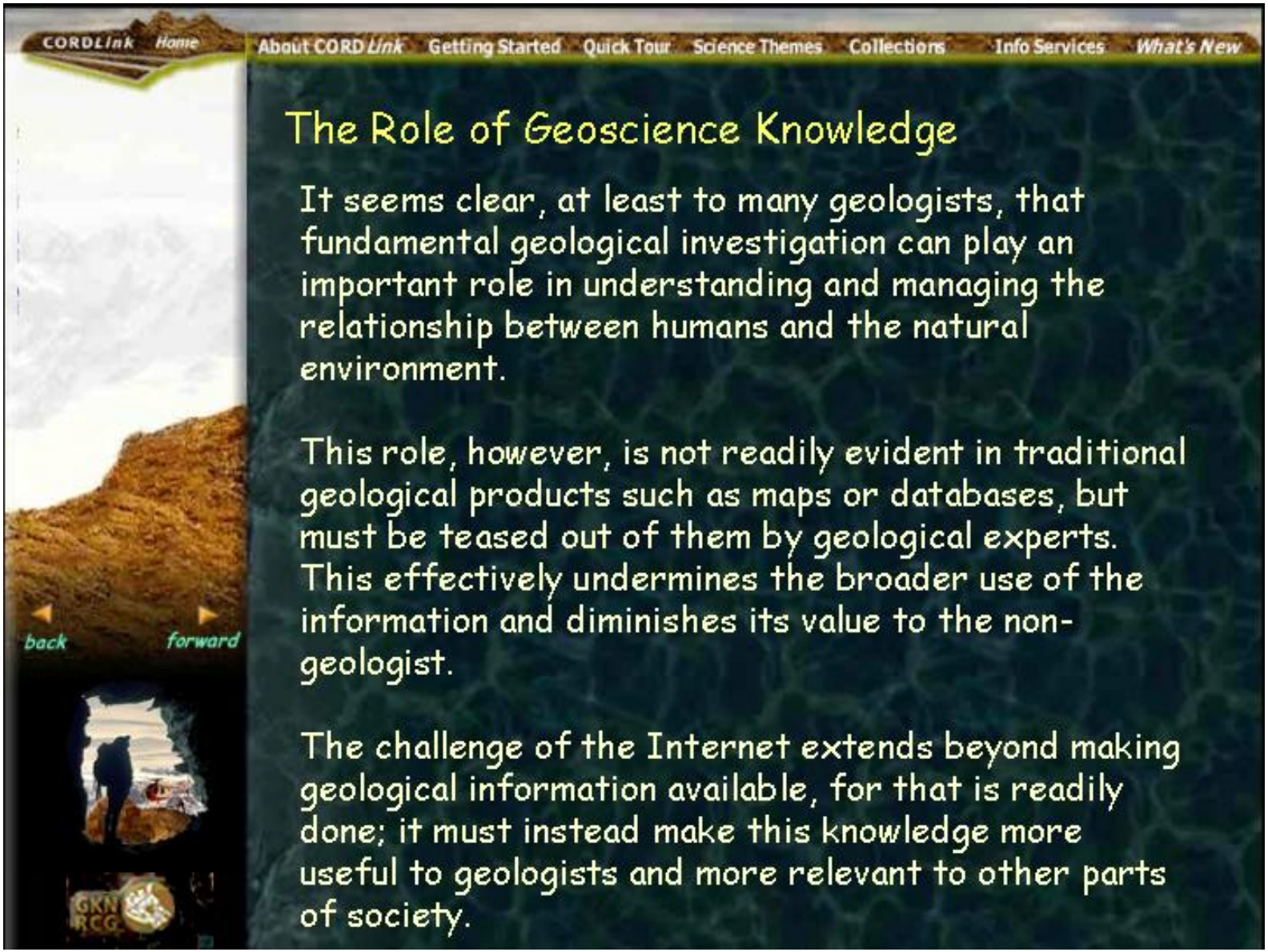

Communicating
the science
of coastal
and marine geology...
it's about
making a better world!

USGS

Appendix V

Overheads:Presentation: Murray Journeay: CORDlink

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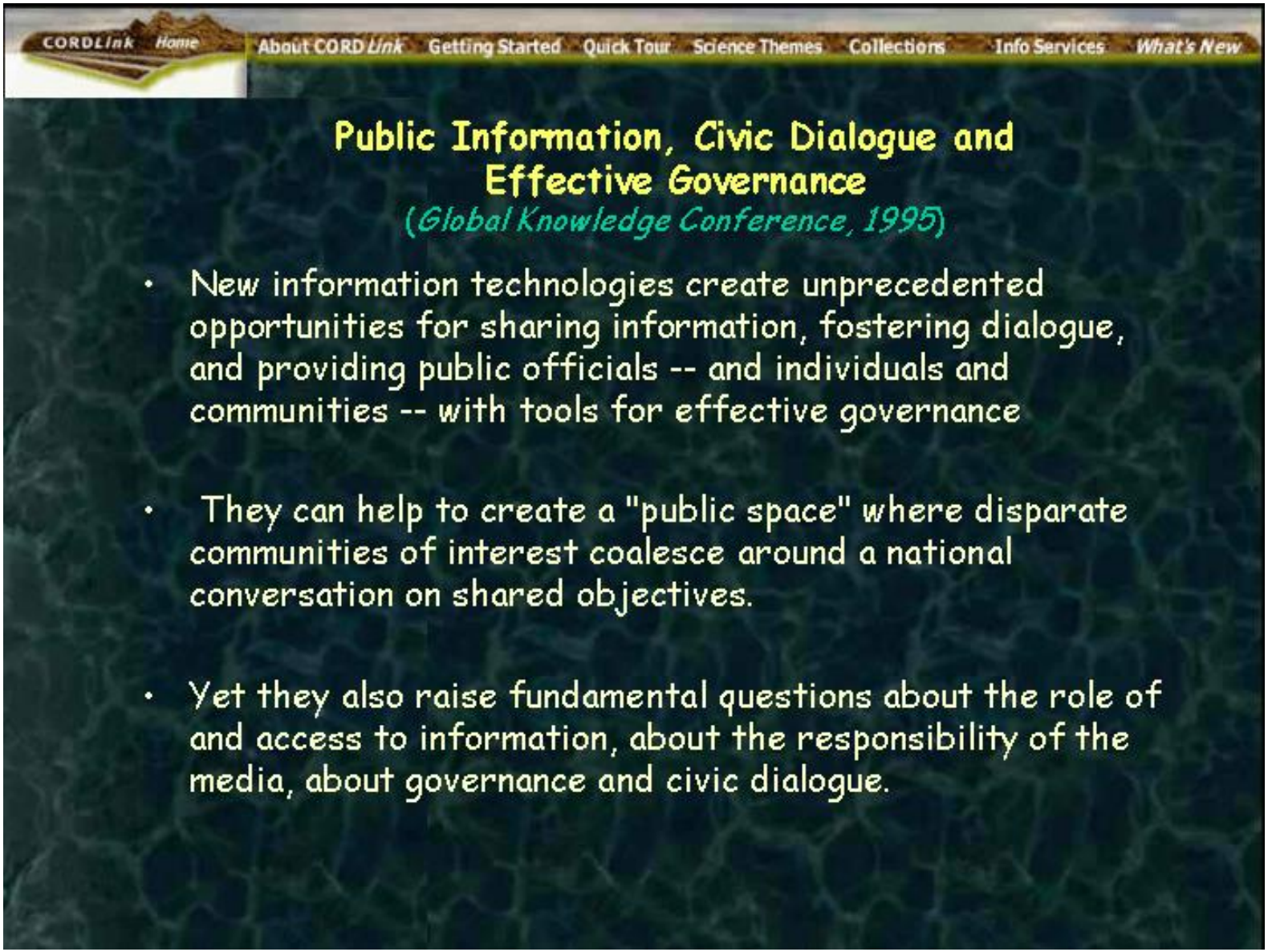
Quick Tour
Science Themes
Collections
Info Services
What's New
The Role of Geoscience Knowledge
It seems clear, at least to many geologists, that fundamental geological investigation can play an important role in understanding and managing the relationship between humans and the natural environment.
This role, however, is not readily evident in traditional geological products such as maps or databases, but must be teased out of them by geological experts. This effectively undermines the broader use of the information and diminishes its value to the non-geologist.
The challenge of the Internet extends beyond making geological information available, for that is readily done; it must instead make this knowledge more useful to geologists and more relevant to other parts of society.
back
forward
GKN RCG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What's New
Public Information, Civic Dialogue and Effective Governance
(Global Knowledge Conference, 1995)
• New information technologies create unprecedented opportunities for sharing information, fostering dialogue, and providing public officials -- and individuals and communities -- with tools for effective governance
• They can help to create a "public space" where disparate communities of interest coalesce around a national conversation on shared objectives.
• Yet they also raise fundamental questions about the role of and access to information, about the responsibility of the media, about governance and civic dialogue.

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Government Online: The "Push" Model

Objectives

- Canadians online (internet access through schools and libraries, (Schoolnet)
- Promote e-commerce
- Increase availability of Canadian-produced content (i.e. online courses, cultural collections, and health information, etc.)
- Put government information & services on internet 24/7 (Gov't online)
- Smart communities – to connect municipal government to local residents and businesses.
- Connect Canada to rest of world – attract investment to Canada

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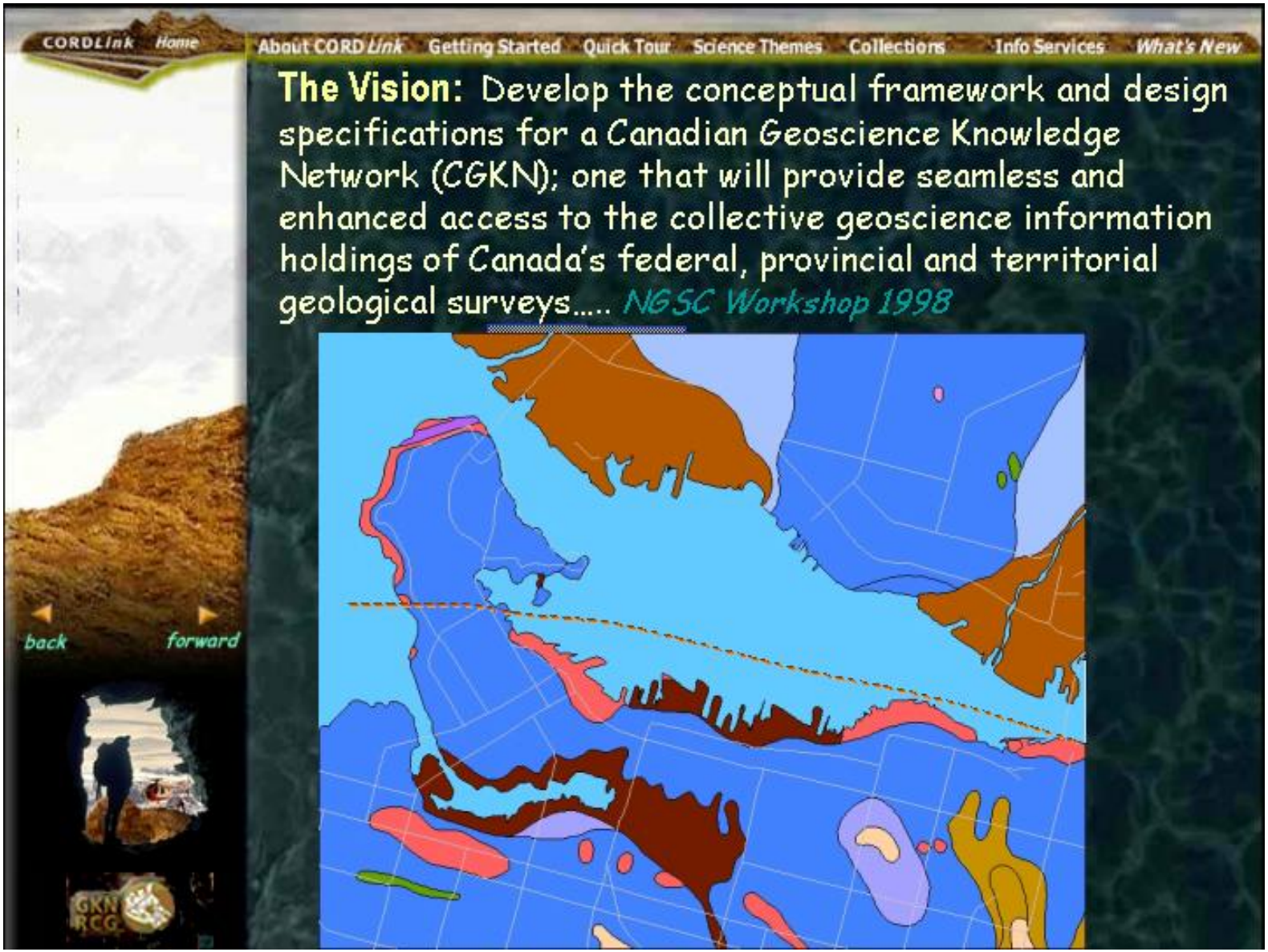
Community Networks: The "Pull" Model

Objective

Build the capacity of Canada's Aboriginal, rural, coastal and northern communities who wish to use Computer-based geospatial information, and the Internet to improve their ability to plan and make decisions towards a sustainable future.

Principles

- Control by the communities
- Mentoring (support)
- Partnerships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What's New
The Vision: Develop the conceptual framework and design specifications for a Canadian Geoscience Knowledge Network (CGKN); one that will provide seamless and enhanced access to the collective geoscience information holdings of Canada's federal, provincial and territorial geological surveys..... NGSC Workshop 1998
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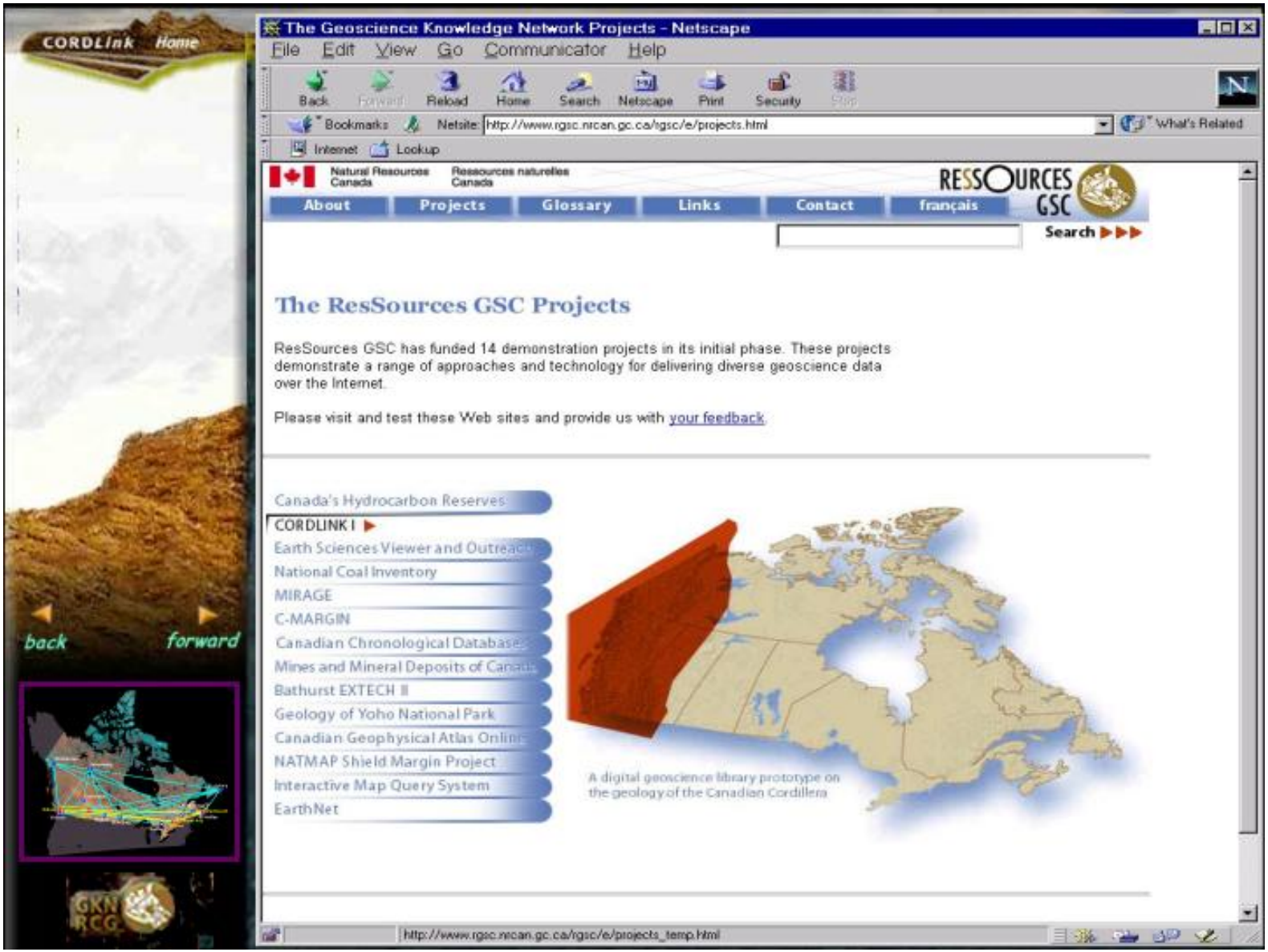
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The Geoscience Knowledge Network Projects - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Stop
Bookmarks Netsite: http://www.rgsc.nrcan.gc.ca/rgsc/e/projects.html What's Related
Internet Lookup
Natural Resources Canada
Ressources naturelles Canada
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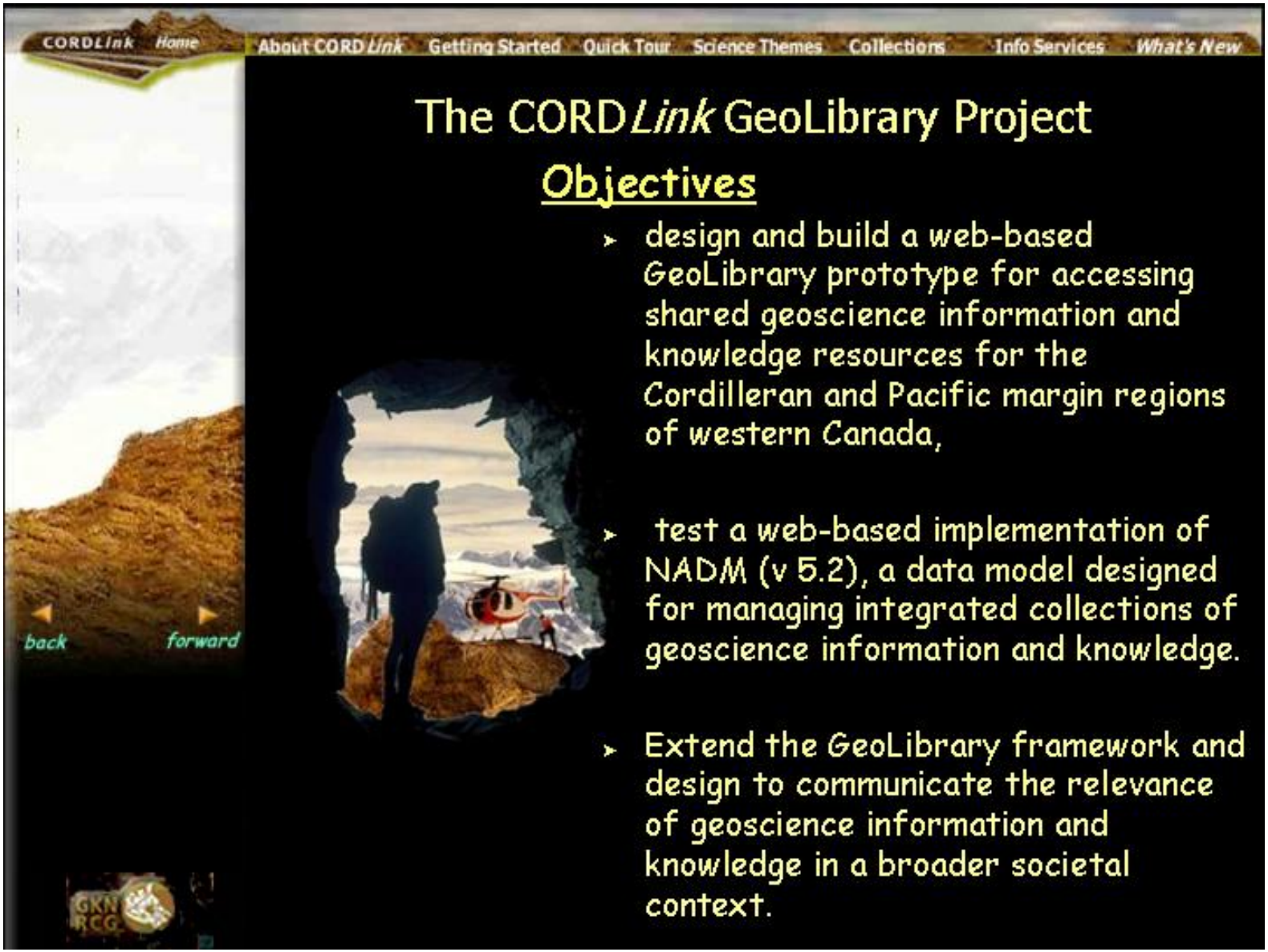
Search
The ResSources GSC Projects
ResSources GSC has funded 14 demonstration projects in its initial phase. These projects demonstrate a range of approaches and technology for delivering diverse geoscience data over the Internet.
Please visit and test these Web sites and provide us with your feedback.
Canada's Hydrocarbon Reserves
CORDLINK I
Earth Sciences Viewer and Outreach
National Coal Inventory
MIRAGE
C-MARGIN
Canadian Chronological Database
Mines and Mineral Deposits of Canada
Bathurst EXTECH II
Geology of Yoho National Park
Canadian Geophysical Atlas Online
NATMAP Shield Margin Project
Interactive Map Query System
EarthNet
A digital geoscience library prototype on the geology of the Canadian Cordillera
http://www.rgsc.nrcan.gc.ca/rgsc/e/projects_temp.html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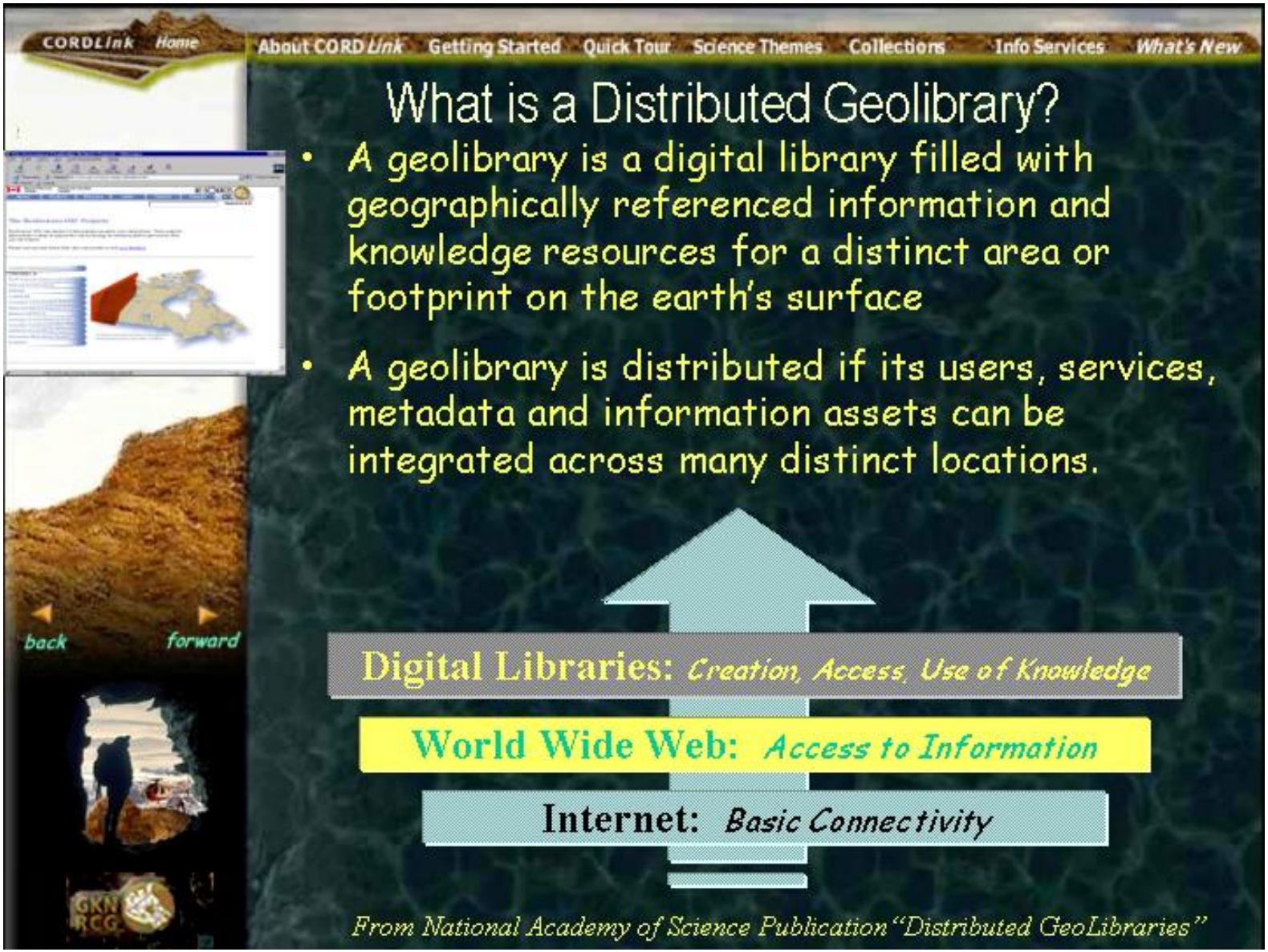
What's New
The CORDLink GeoLibrary Project
Objectives
design and build a web-based GeoLibrary prototype for accessing shared geoscience information and knowledge resources for the Cordilleran and Pacific margin regions of western Canada,
test a web-based implementation of NADM (v 5.2), a data model designed for managing integrated collections of geoscience information and knowledge.
Extend the GeoLibrary framework and design to communicate the relevance of geoscience information and knowledge in a broader societal context.
back
forward
GKN RCG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What's New
What is a Distributed Geolibrary?
• A geolibrary is a digital library filled with geographically referenced information and knowledge resources for a distinct area or footprint on the earth's surface
• A geolibrary is distributed if its users, services, metadata and information assets can be integrated across many distinct locations.
back
forward
Digital Libraries: Creation, Access, Use of Knowledge
World Wide Web: Access to Information
Internet: Basic Connectivity
From National Academy of Science Publication "Distributed GeoLibraries"

CORDLink Home | About CORDLink | Getting Started | Quick Tour | Science Themes | Collections | Info Services | What's New

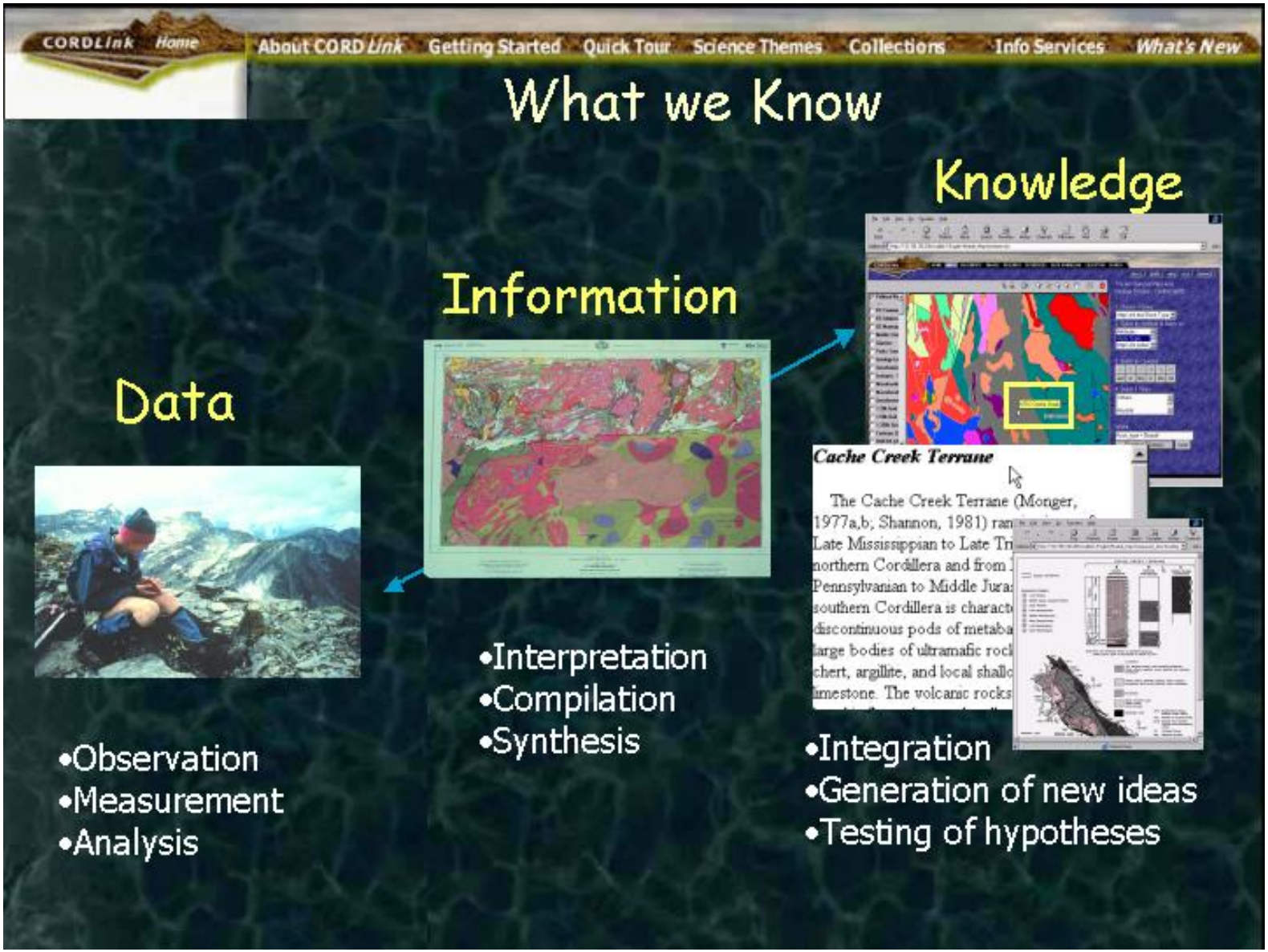
back forward

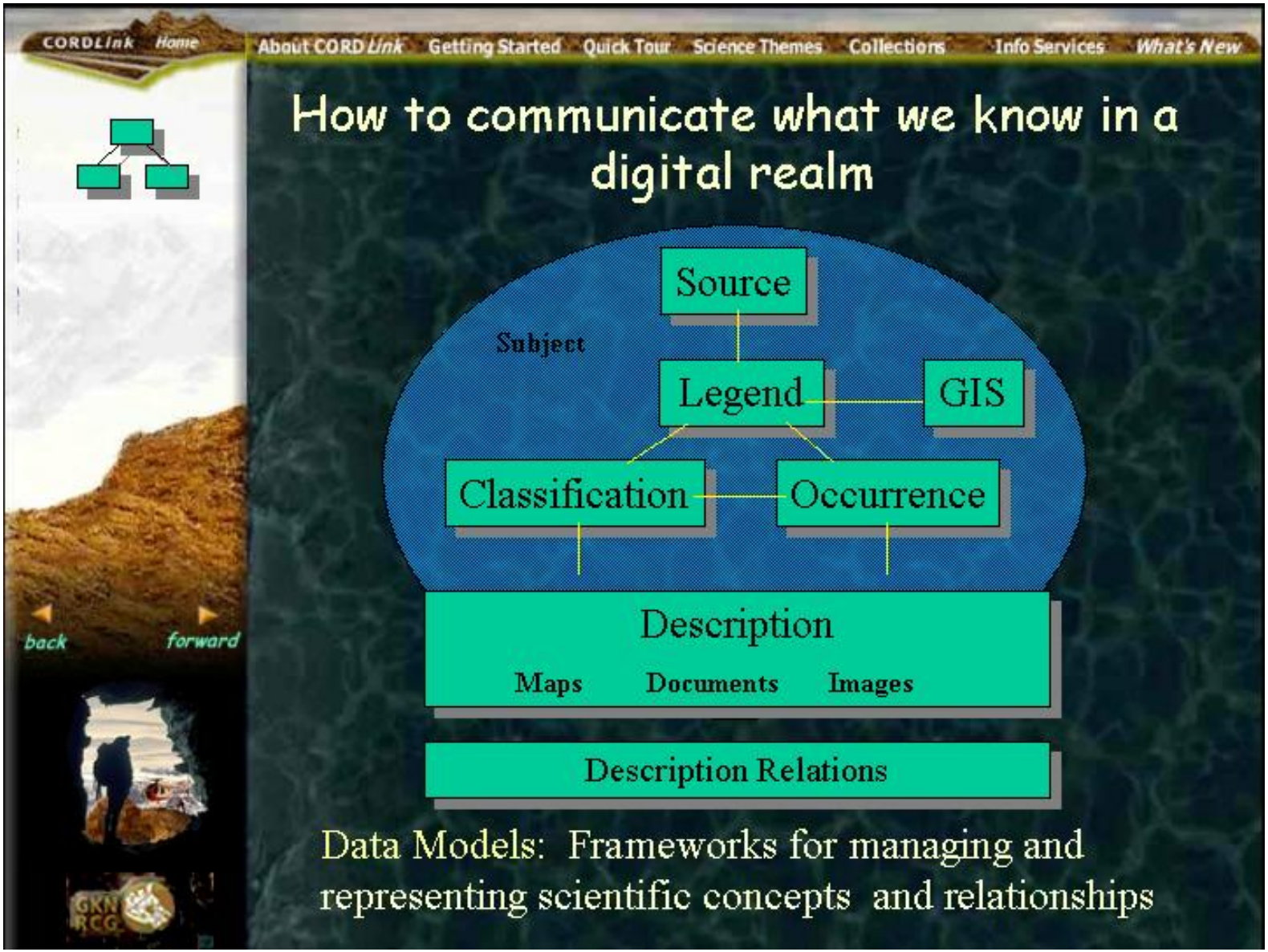
The Library Concept: Stewardship of shared information resources to promote both pure and applied research has traditionally been one of the principle roles of our library systems.

Libraries are based on the premise of sharing information for mutual benefit. They exist to acquire, give access to and safeguard carriers of knowledge and information in all forms, and to provide instruction and assistance in the use of the collections to which the users have access.

GeoLibraries: are built upon these same principles. They represent shared collections of geographically referenced information (maps, documents, multi-media) that are stored in a relational database and accessed through a suite of Web-based applications in a distributed network environment using standard (open) protocols.

From National Academy of Science Publication "Distributed GeoLibraries"


CORDLink Home
About CORDLink
Getting Started
Quick Tour
Science Themes
Collections
Info Services
What's New
What we Know
Knowledge
Information
Data
Cache Creek Terrane
The Cache Creek Terrane (Monger,
•Interpretation
•Compilation
•Synthesis
•Observation
•Measurement
•Analysis
•Integration
•Generation of new ideas
•Testing of hypotheses


CORDLink Home
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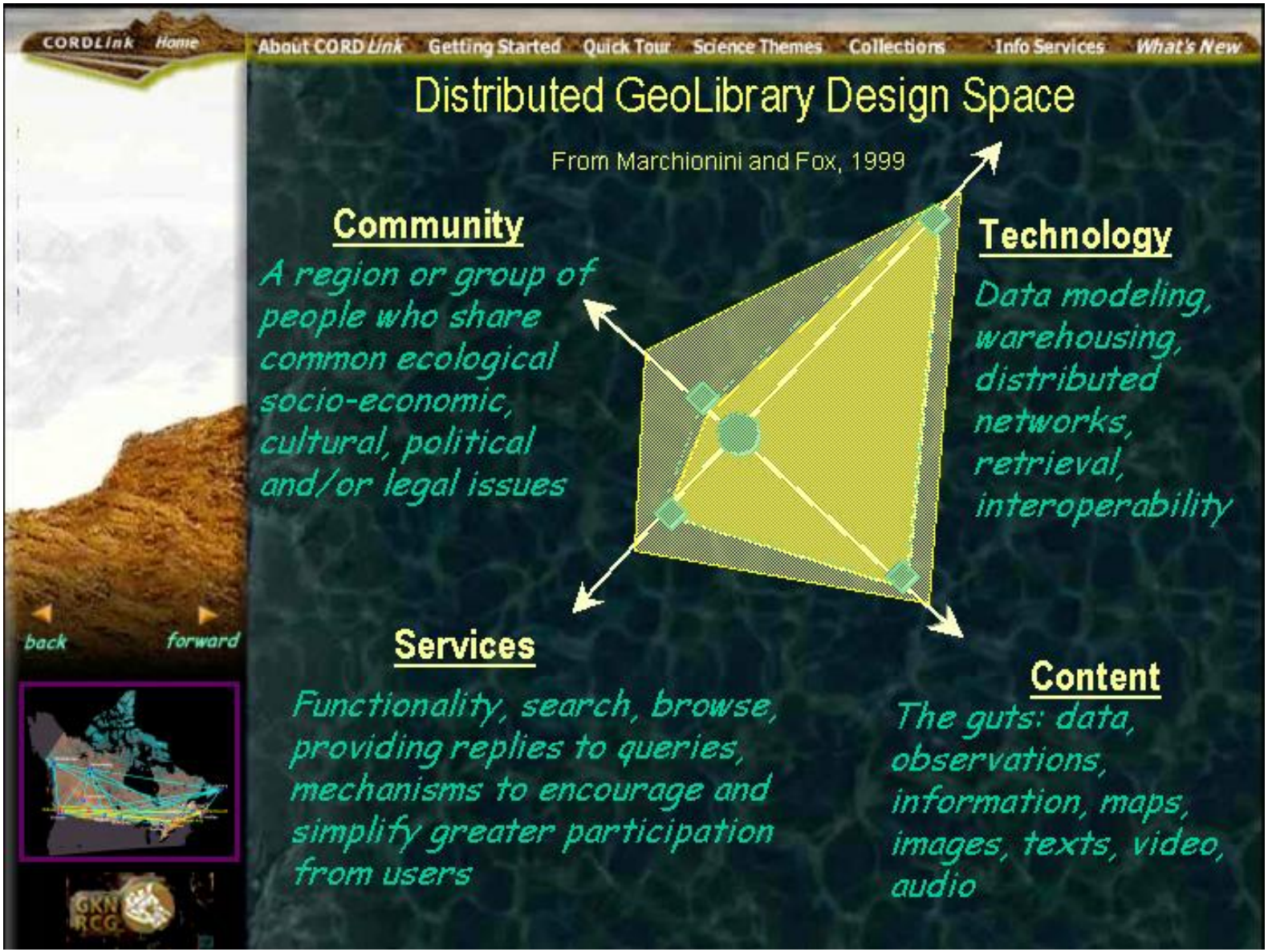
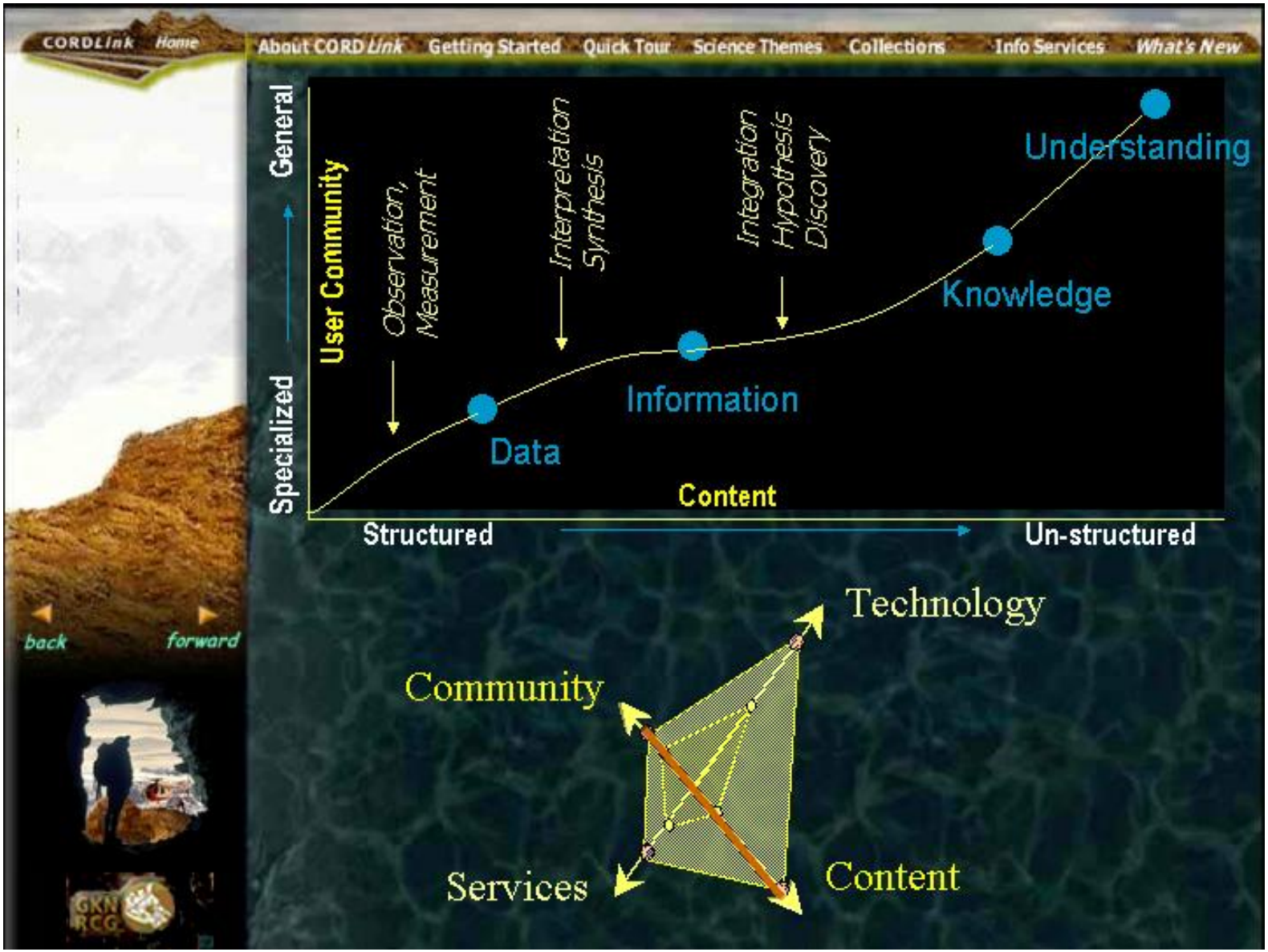
Collections
Info Services
What's New
How to communicate what we know in a digital realm
Source
Subject
Legend
GIS
Classification
Occurrence
Description
Maps
Documents
Images
Description Relations
back
forward
Data Models: Frameworks for managing and representing scientific concepts and relationships


CORDLink Home
About CORDLink
Getting Started
Quick Tour
Science Themes
Collections
Info Services
What's New
Distributed GeoLibrary Design Space
From Marchionini and Fox, 1999
Community
A region or group of people who share common ecological socio-economic, cultural, political and/or legal issues
Technology
Data modeling, warehousing, distributed networks, retrieval, interoperability
Services
Functionality, search, browse, providing replies to queries, mechanisms to encourage and simplify greater participation from users
Content
The guts: data, observations, information, maps, images, texts, video, audio
back
forward
GKN
RCG


CORDLink Home
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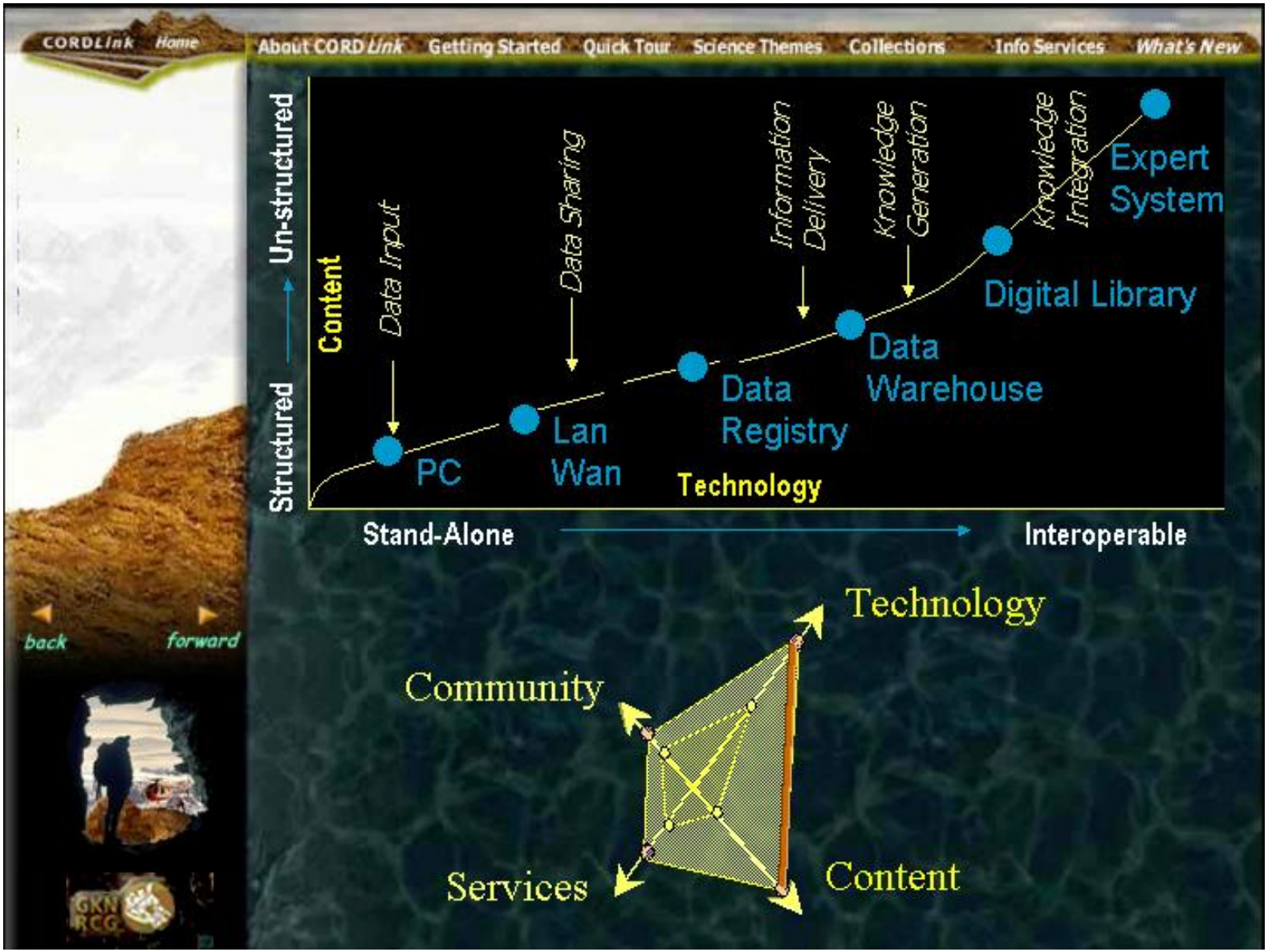
Science Themes
Collections
Info Services
What's New
General
User Community
Specialized
Observation, Measurement
Interpretation Synthesis
Integration Hypothesis Discovery
Understanding
Knowledge
Information
Data
Content
Structured
Un-structured
back
forward
Technology
Community
Services
Content


CORDLink Home
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Science Themes
Collections
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What's New
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Content
Un-structured
Structured
Data Input
Data Sharing
Information Delivery
Knowledge Generation
Knowledge Integration
Expert System
Digital Library
Data Warehouse
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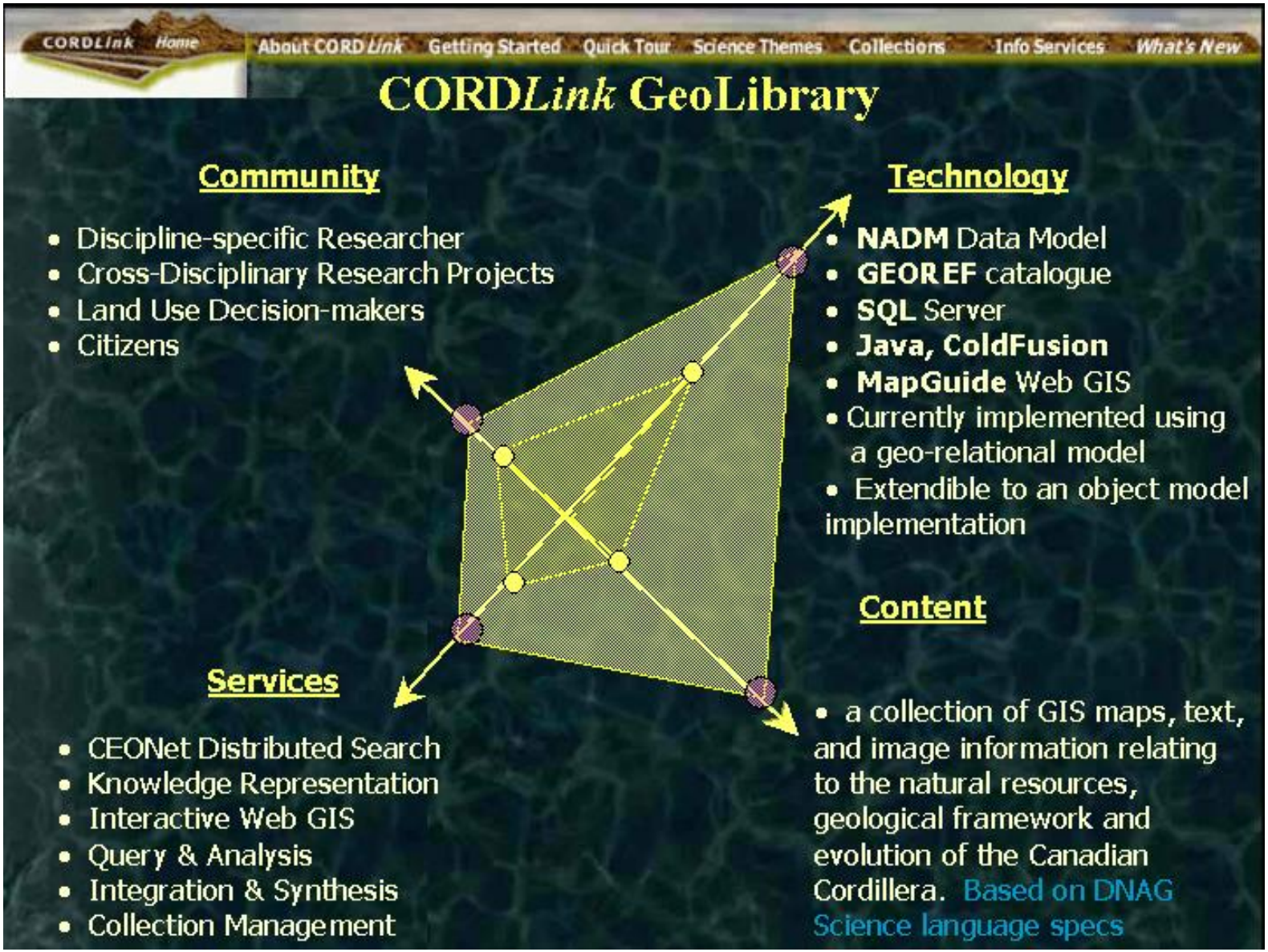
PC
Technology
Stand-Alone
Interoperable
Technology
Community
Services
Content


CORDLink Home
About CORDLink
Getting Started
Quick Tour
Science Themes
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Info Services
What's New
CORDLink GeoLibrary
Community
Discipline-specific Researcher
Cross-Disciplinary Research Projects
Land Use Decision-makers
Citizens
Technology
NADM Data Model
GEOREF catalogue
SQL Server
Java, ColdFusion
MapGuide Web GIS
Currently implemented using a geo-relational model
Extendible to an object model implementation
Content
a collection of GIS maps, text, and image information relating to the natural resources, geological framework and evolution of the Canadian Cordillera. Based on DNAG Science language specs
Services
CEONet Distributed Search
Knowledge Representation
Interactive Web GIS
Query & Analysis
Integration & Synthesis
Collection Management


CORDLink
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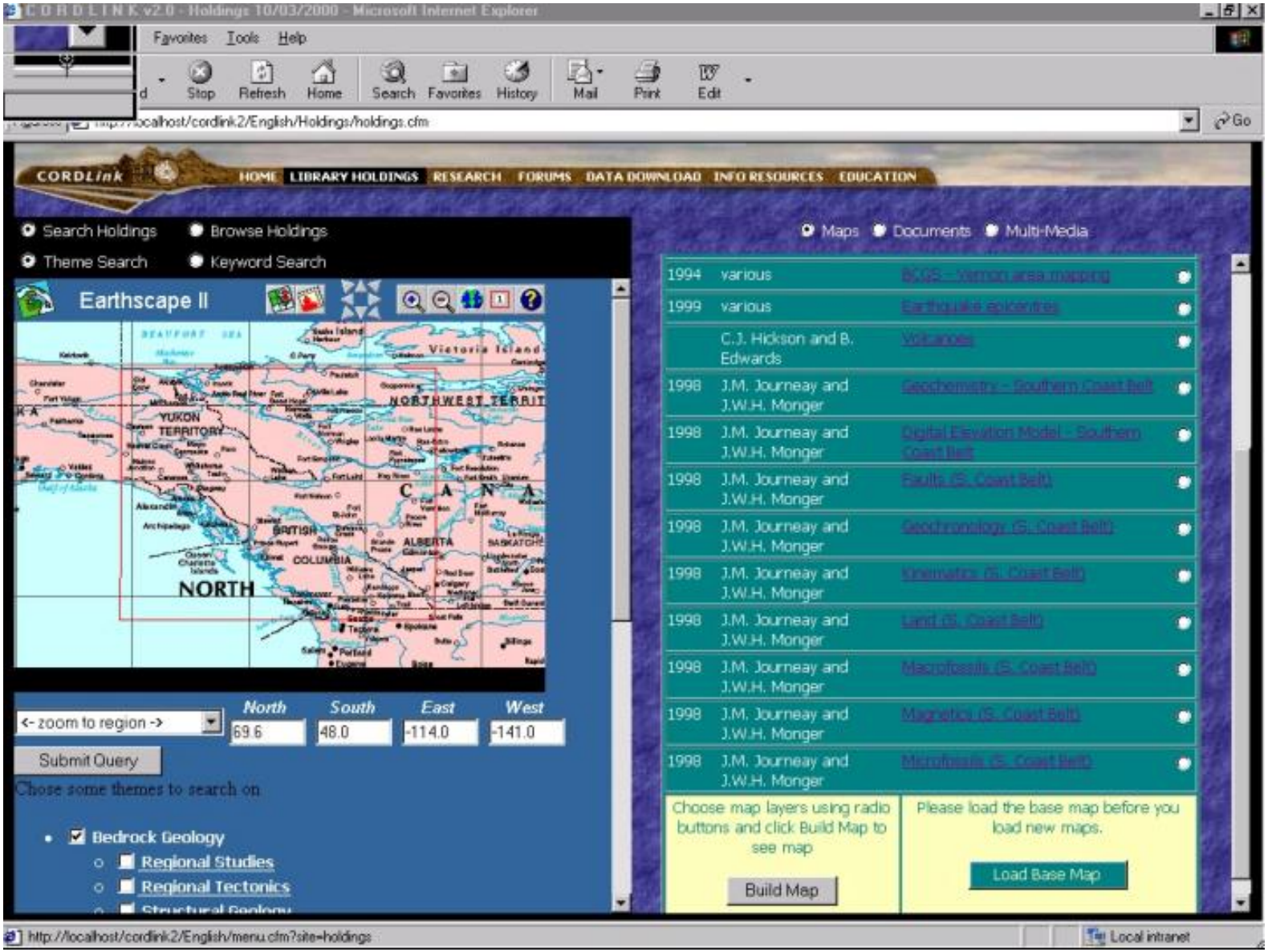
DOCUMENTS
IMAGES
RESEARCH
REFERENCES
DATA DOWNLOAD
EDUCATION
SEARCH
Quick Tour
Science Themes
Library Holdings
About CORDLink
Partners
Feedback
Open Library
PROTOTYPE V1.0
Aperçu sommaire
Sujets scientifiques
Ressources de la bibliothèque
A propos de CORDLink
Partenaires
Rétroactions
Ouvrir la bibliothèque
GKN RCG
A window on Cordilleran geology
Un aperçu de la géologie de la Cordillère
http://cordlink.gsc.nrcan.gc.ca/CORDLink


C O R D L I N K v2.0 - Holdings 10/03/2000 - Microsoft Internet Explorer
Favorites Tools Help
Stop Refresh Home Search Favorites History Mail Print Edit
http://localhost/cordlink2/English/Holdings/holdings.cfm
Go
CORDLink
HOME
LIBRARY HOLDINGS
RESEARCH
FORUMS
DATA DOWNLOAD
INFO RESOURCES
EDUCATION
Search Holdings
Browse Holdings
Theme Search
Keyword Search
Earthscape II
Maps
Documents
Multi-Media
1994 various
1999 various
C.J. Hickson and B. Edwards
1998 J.M. Journeay and J.W.H. Monger
North
South
East
West
<- zoom to region ->
69.6
48.0
-114.0
-141.0
Submit Query
Chose some themes to search on
Bedrock Geology
Regional Studies
Regional Tectonics
Choose map layers using radio buttons and click Build Map to see map
Build Map
Please load the base map before you load new maps.
Load Base Map
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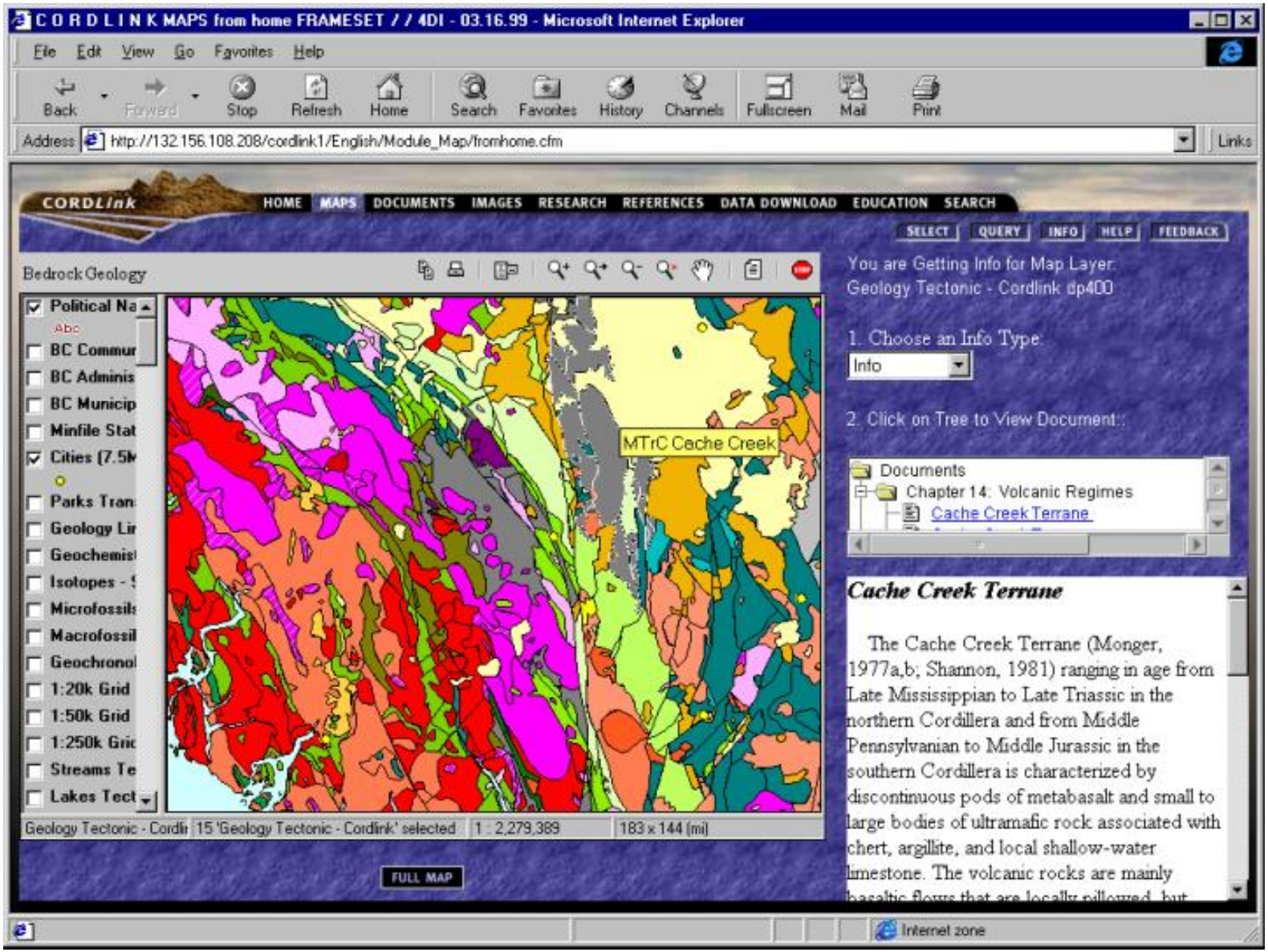
Local intranet


CORDLINK MAPS from home FRAMESET / / 4DI - 03.16.99 - Microsoft Internet Explorer
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Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail Print
Address http://132.156.108.208/cordlink1/English/Module_Map/fromhome.cfm
Links
CORDLink
HOME MAPS DOCUMENTS IMAGES RESEARCH REFERENCES DATA DOWNLOAD EDUCATION SEARCH
SELECT QUERY INFO HELP FEEDBACK
Bedrock Geology
Political Na
BC Commur
BC Adminis
BC Municip
Minfile Stat
Cities (7.5k
Parks Tran
Geology Lir
Geochemis
Isotopes - S
Microfossils
Macrofossil
Geochronol
1:20k Grid
1:50k Grid
1:250k Gric
Streams Te
Lakes Tect
MTrC Cache Creek
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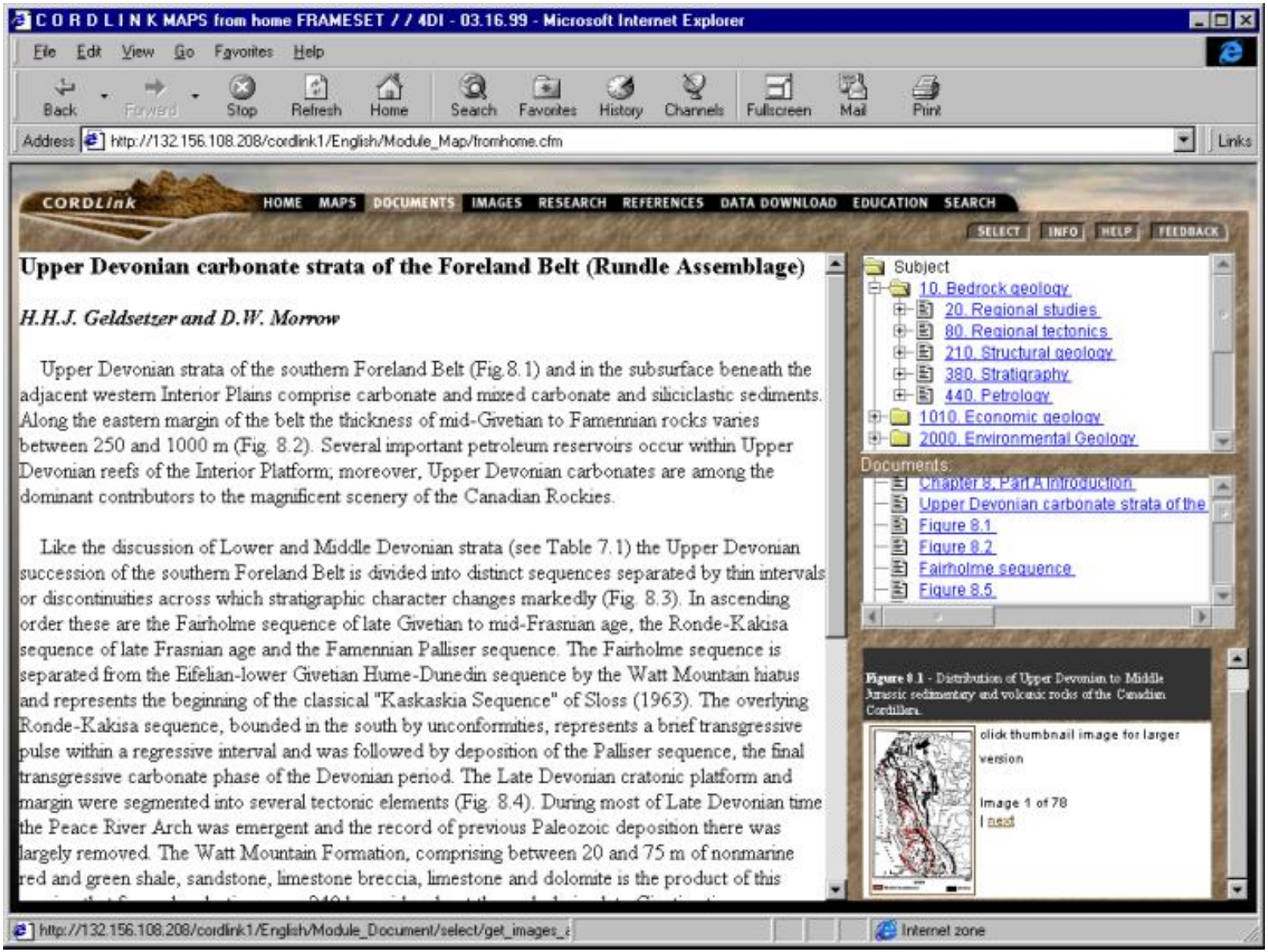
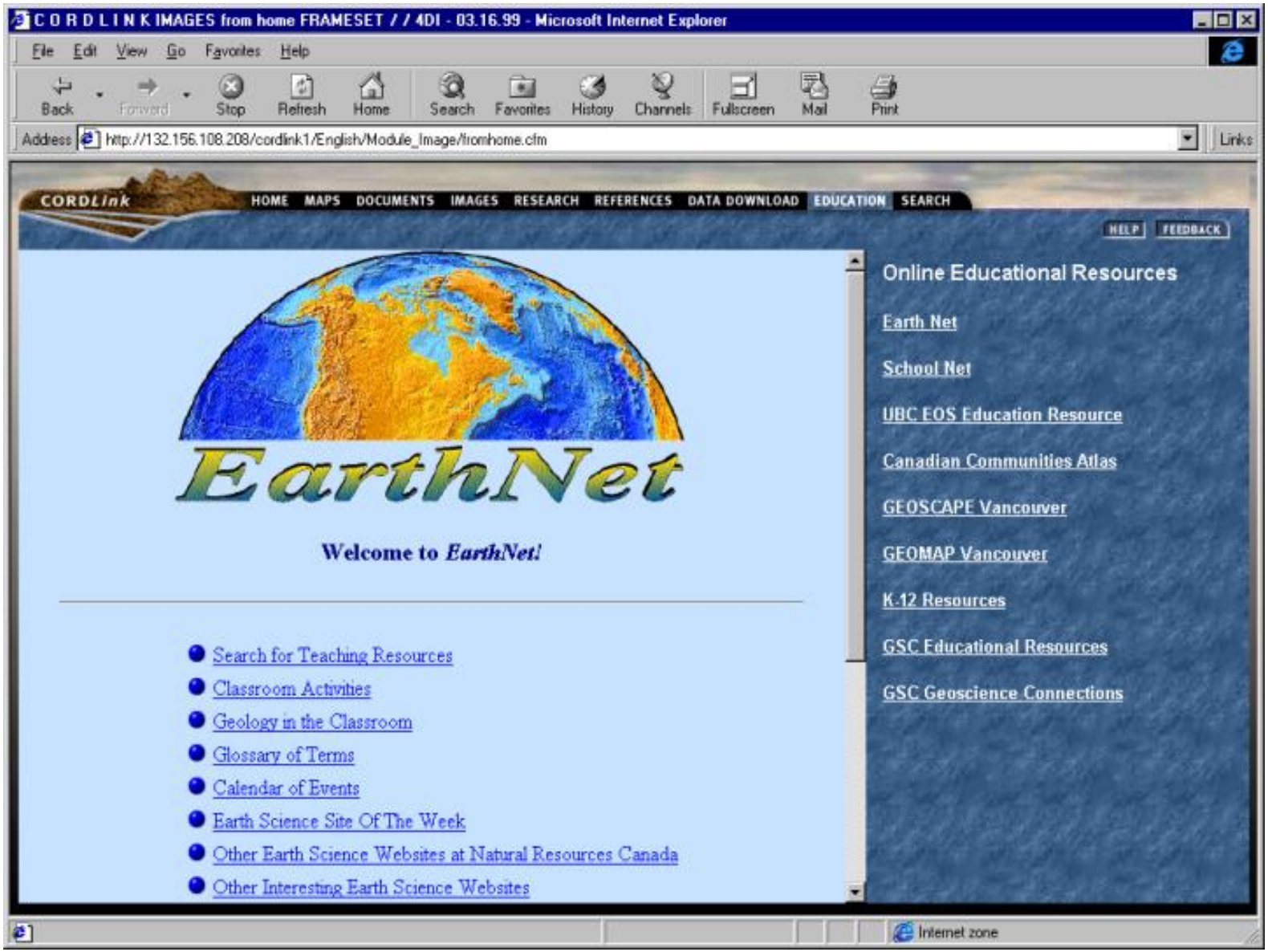
15 'Geology Tectonic - Cordlink' selected
1 : 2,279,389
183 x 144 (mi)
FULL MAP
You are Getting Info for Map Layer:
Geology Tectonic - Cordlink dp400
1. Choose an Info Type:
Info
2. Click on Tree to View Document::
Documents
Chapter 14: Volcanic Regimes
Cache Creek Terrane
Cache Creek Terrane
The Cache Creek Terrane (Monger, 1977a,b; Shannon, 1981) ranging in age from Late Mississippian to Late Triassic in the northern Cordillera and from Middle Pennsylvanian to Middle Jurassic in the southern Cordillera is characterized by discontinuous pods of metabasalt and small to large bodies of ultramafic rock associated with chert, argillite, and local shallow-water limestone. The volcanic rocks are mainly
Internet zone


CORDLINK MAPS from home FRAMESET / / 4DI - 03.16.99 - Microsoft Internet Explorer
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail Print
Address http://132.156.108.208/cordlink1/English/Module_Map/fromhome.cfm
Links
CORDLink
HOME MAPS DOCUMENTS IMAGES RESEARCH REFERENCES DATA DOWNLOAD EDUCATION SEARCH
SELECT INFO HELP FEEDBACK
Upper Devonian carbonate strata of the Foreland Belt (Rundle Assemblage)
H.H.J. Geldsetzer and D.W. Morrow
Upper Devonian strata of the southern Foreland Belt (Fig.8.1) and in the subsurface beneath the adjacent western Interior Plains comprise carbonate and mixed carbonate and siliciclastic sediments. Along the eastern margin of the belt the thickness of mid-Givetian to Famennian rocks varies between 250 and 1000 m (Fig. 8.2). Several important petroleum reservoirs occur within Upper Devonian reefs of the Interior Platform; moreover, Upper Devonian carbonates are among the dominant contributors to the magnificent scenery of the Canadian Rockies.
Like the discussion of Lower and Middle Devonian strata (see Table 7.1) the Upper Devonian succession of the southern Foreland Belt is divided into distinct sequences separated by thin intervals or discontinuities across which stratigraphic character changes markedly (Fig. 8.3). In ascending order these are the Fairholme sequence of late Givetian to mid-Frasnian age, the Ronde-Kakisa sequence of late Frasnian age and the Famennian Palliser sequence. The Fairholme sequence is separated from the Eifelian-lower Givetian Hume-Dunedin sequence by the Watt Mountain hiatus and represents the beginning of the classical "Kaskaskia Sequence" of Sloss (1963). The overlying Ronde-Kakisa sequence, bounded in the south by unconformities, represents a brief transgressive pulse within a regressive interval and was followed by deposition of the Palliser sequence, the final transgressive carbonate phase of the Devonian period. The Late Devonian cratonic platform and margin were segmented into several tectonic elements (Fig. 8.4). During most of Late Devonian time the Peace River Arch was emergent and the record of previous Paleozoic deposition there was largely removed. The Watt Mountain Formation, comprising between 20 and 75 m of nonmarine red and green shale, sandstone, limestone breccia, limestone and dolomite is the product of this
Subject
10. Bedrock geology
20. Regional studies
80. Regional tectonics
210. Structural geology
380. Stratigraphy
440. Petrology
1010. Economic geology
2000. Environmental Geology
Documents:
Chapter 8, Part A Introduction
Upper Devonian carbonate strata of the
Figure 8.1
Figure 8.2
Fairholme sequence
Figure 8.5
Figure 8.1 - Distribution of Upper Devonian to Middle Jurassic sedimentary and volcanic rocks of the Canadian Cordillera.
click thumbnail image for larger version
Image 1 of 78
next
http://132.156.108.208/cordlink1/English/Module_Document/select/get_images_
Internet zone


CORDLINK IMAGES from home FRAMESET / / 4DI - 03.16.99 - Microsoft Internet Explorer
File Edit View Go Favorites Help
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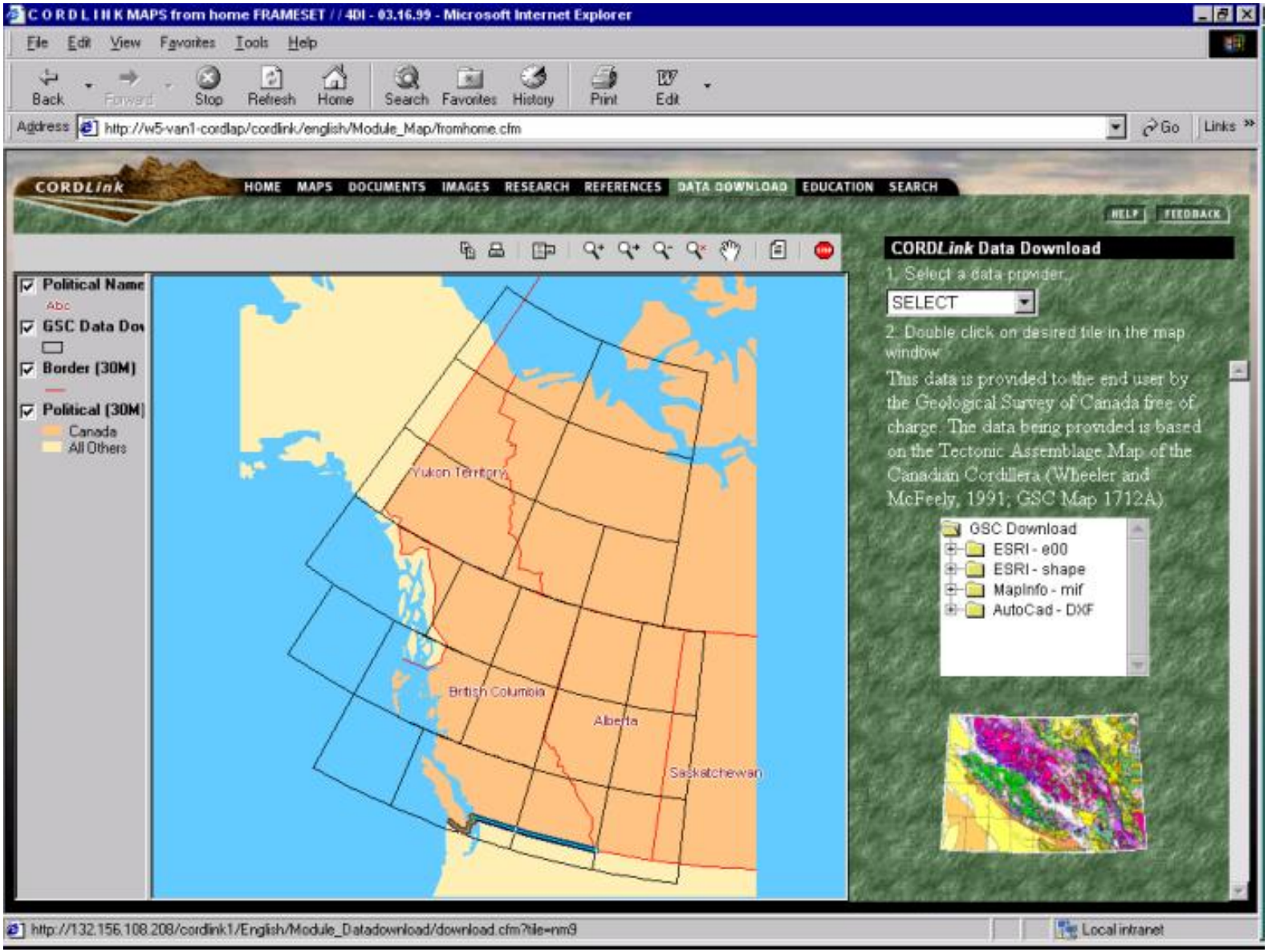
Links
CORDLink
HOME MAPS DOCUMENTS IMAGES RESEARCH REFERENCES DATA DOWNLOAD EDUCATION SEARCH
HELP FEEDBACK
EarthNet
Welcome to EarthNet!
Search for Teaching Resources
Classroom Activities
Geology in the Classroom
Glossary of Terms
Calendar of Events
Earth Science Site Of The Week
Other Earth Science Websites at Natural Resources Canada
Other Interesting Earth Science Websites
Online Educational Resources
Earth Net
School Net
UBC EOS Education Resource
Canadian Communities Atlas
GEOSCAPE Vancouver
GEOMAP Vancouver
K-12 Resources
GSC Educational Resources
GSC Geoscience Connections
Internet zone


C O R D L I N K MAPS from home FRAMESET / / 401 - 03.16.99 - Microsoft Internet Explorer
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HELP FEEDBACK
Political Name
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Border (30M)
Political (30M)
Canada
All Others
Yukon Territory
British Columbia
Alberta
Saskatchewan
CORDLink Data Download
1. Select a data provider.
SELECT
2. Double click on desired file in the map window
This data is provided to the end user by the Geological Survey of Canada free of charge. The data being provided is based on the Tectonic Assemblage Map of the Canadian Cordillera (Wheeler and McFeely, 1991; GSC Map 1712A).
GSC Download
ESRI - e00
ESRI - shape
MapInfo - mif
AutoCad - DXF
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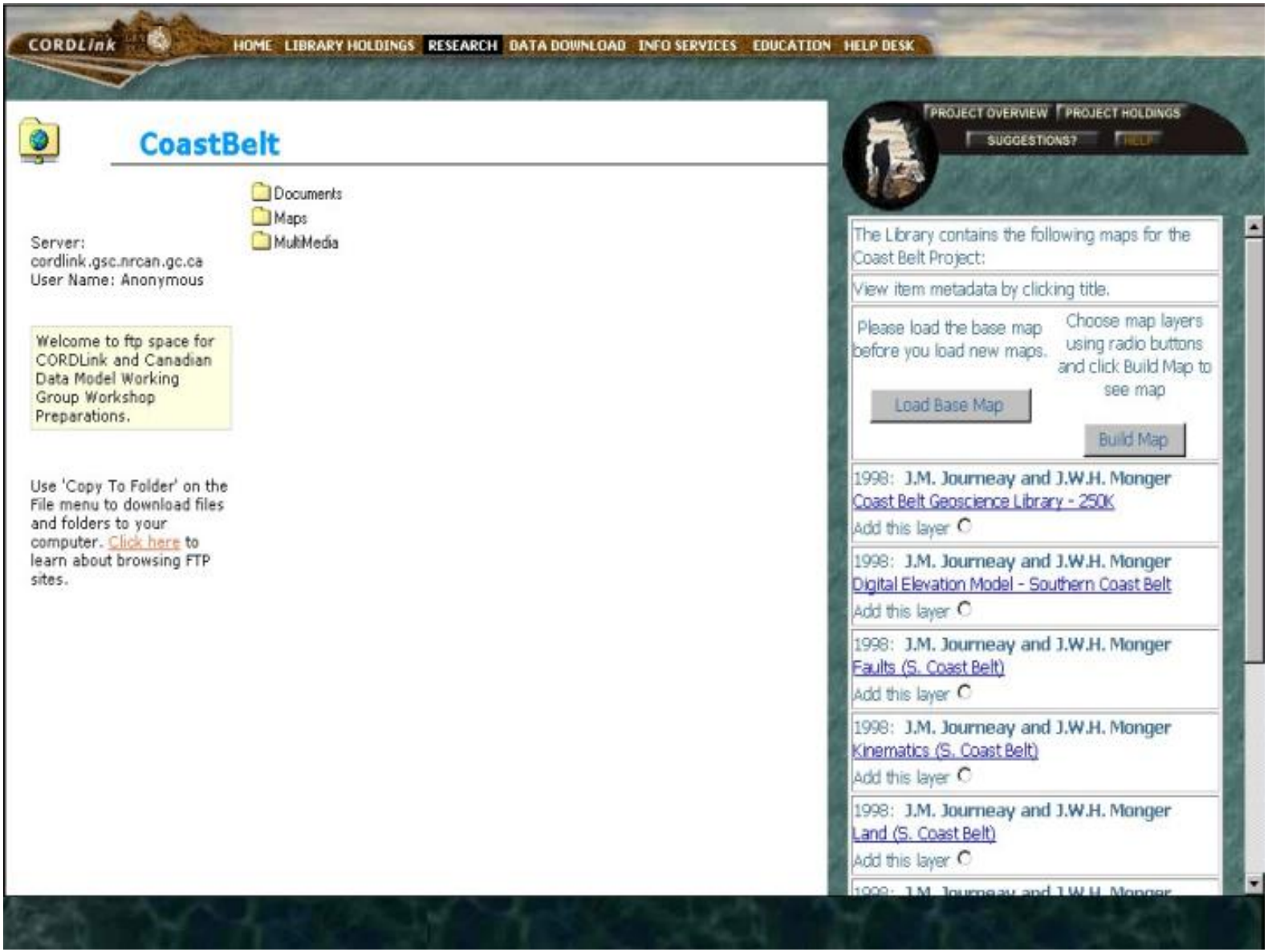
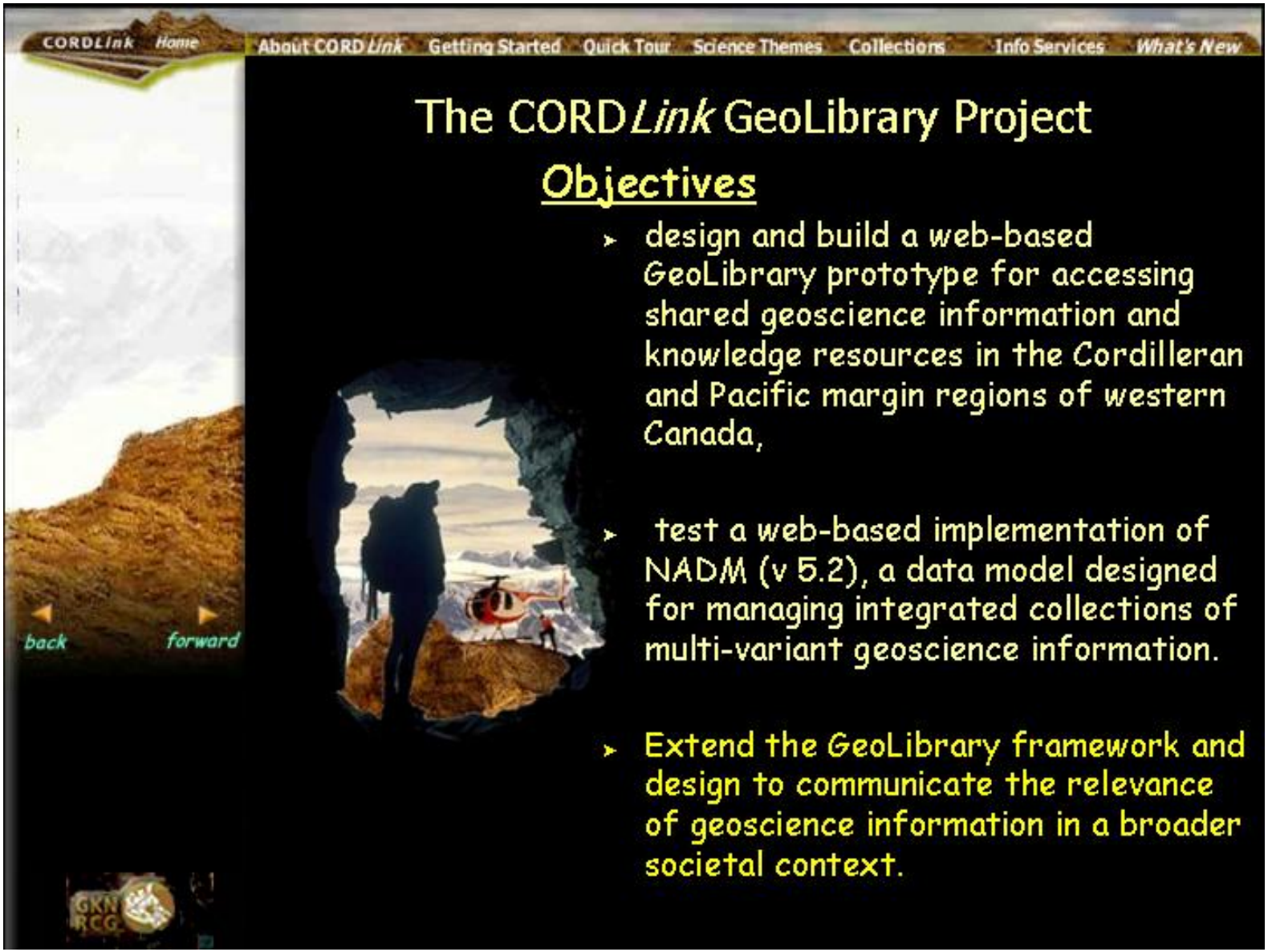
Local intranet


CORDLink
HOME
LIBRARY HOLDINGS
RESEARCH
DATA DOWNLOAD
INFO SERVICES
EDUCATION
HELP DESK
CoastBelt
Documents
Maps
MultiMedia
Server:
cordlink.gsc.nrcan.gc.ca
User Name: Anonymous
Welcome to ftp space for CORDLink and Canadian Data Model Working Group Workshop Preparations.
Use 'Copy To Folder' on the File menu to download files and folders to your computer. Click here to learn about browsing FTP sites.
PROJECT OVERVIEW
PROJECT HOLDINGS
SUGGESTIONS?
HELP
The Library contains the following maps for the Coast Belt Project:
View item metadata by clicking title.
Please load the base map before you load new maps.
Load Base Map
Choose map layers using radio buttons and click Build Map to see map
Build Map
1998: J.M. Journeay and J.W.H. Monger
Coast Belt Geoscience Library - 250K
Add this layer
1998: J.M. Journeay and J.W.H. Monger
Digital Elevation Model - Southern Coast Belt
Add this layer
1998: J.M. Journeay and J.W.H. Monger
Faults (S. Coast Belt)
Add this layer
1998: J.M. Journeay and J.W.H. Monger
Kinematics (S. Coast Belt)
Add this layer
1998: J.M. Journeay and J.W.H. Monger
Land (S. Coast Belt)
Add this layer


CORDLink Home
About CORDLink
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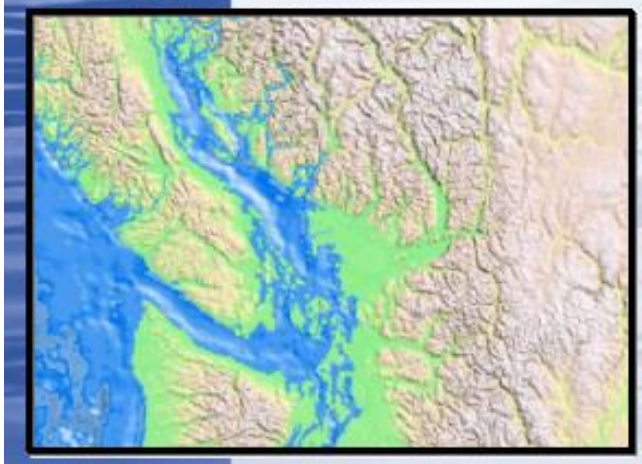
Collections
Info Services
What's New
back
forward
The CORDLink GeoLibrary Project
Objectives
design and build a web-based GeoLibrary prototype for accessing shared geoscience information and knowledge resources in the Cordilleran and Pacific margin regions of western Canada,
test a web-based implementation of NADM (v 5.2), a data model designed for managing integrated collections of multi-variant geoscience information.
Extend the GeoLibrary framework and design to communicate the relevance of geoscience information in a broader societal context.
GKN RCG

Sustainable Development Research Institute, UBC

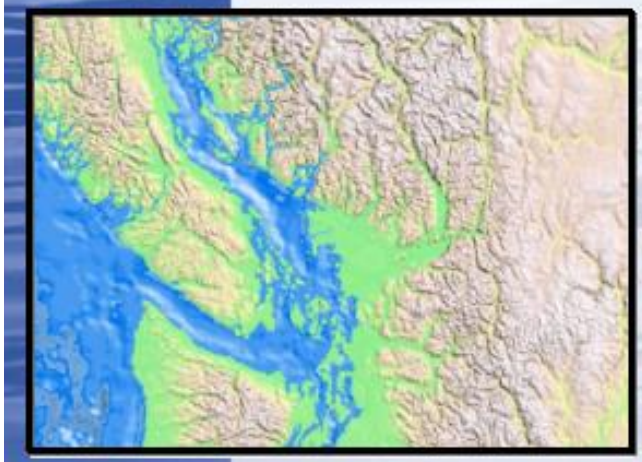


GEOIDE

The Georgia Basin GeoLibrary; A Learning Resource Network for Community Focused Sustainability

Murray Journeay, John Robinson,
Sonia Talwar, Michael Walsh,
Dave Biggs, Kevin McNaney, Bruce Kay,
Boyan Brodaric and Rob Harrap

Sustainable Development Research Institute, UBC



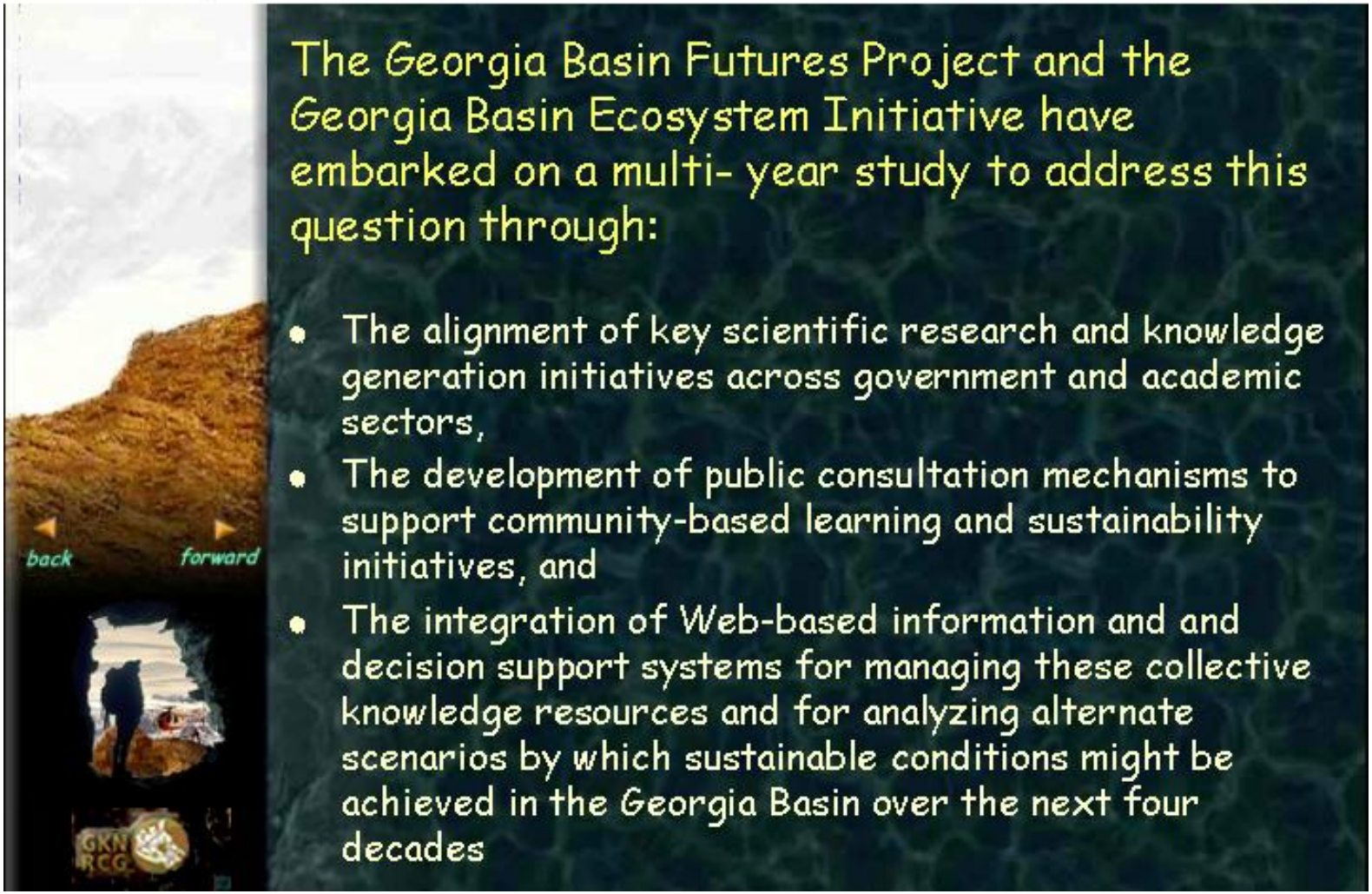
GEOIDE

A fundamental question driving current trends in sustainable development research is:

how can we enhance human well-being while protecting ecological health at the community level ?

To what extent, and in which ways can the Geoscience community contribute to a better understanding and balance of this equation?

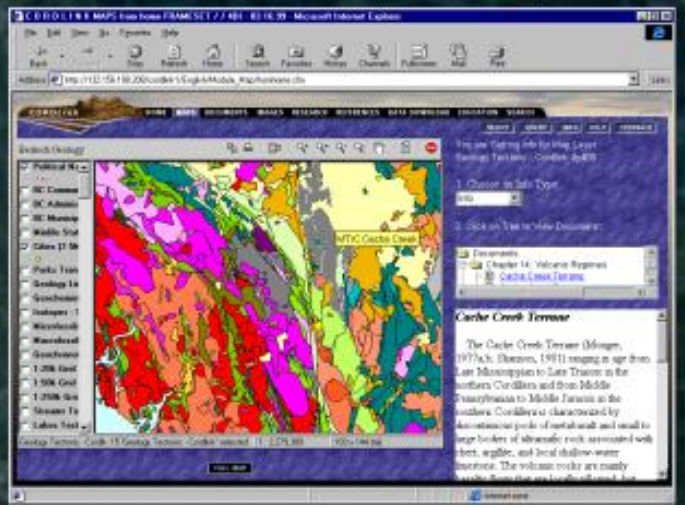
The Georgia Basin GeoLibrary project



The Georgia Basin Futures Project and the Georgia Basin Ecosystem Initiative have embarked on a multi- year study to address this question through:

- The alignment of key scientific research and knowledge generation initiatives across government and academic sectors,
- The development of public consultation mechanisms to support community-based learning and sustainability initiatives, and
- The integration of Web-based information and and decision support systems for managing these collective knowledge resources and for analyzing alternate scenarios by which sustainable conditions might be achieved in the Georgia Basin over the next four decades

The Georgia Basin GeoLibrary project



Decision Support Systems: Using the Georgia Basin region as a pilot study, SDRI is in the process of expanding QUEST for use in a Web-based environment to foster scenario modeling and public consultation activities in support of both the Georgia Basin Futures Project and the Georgia Basin Ecosystem Initiative.

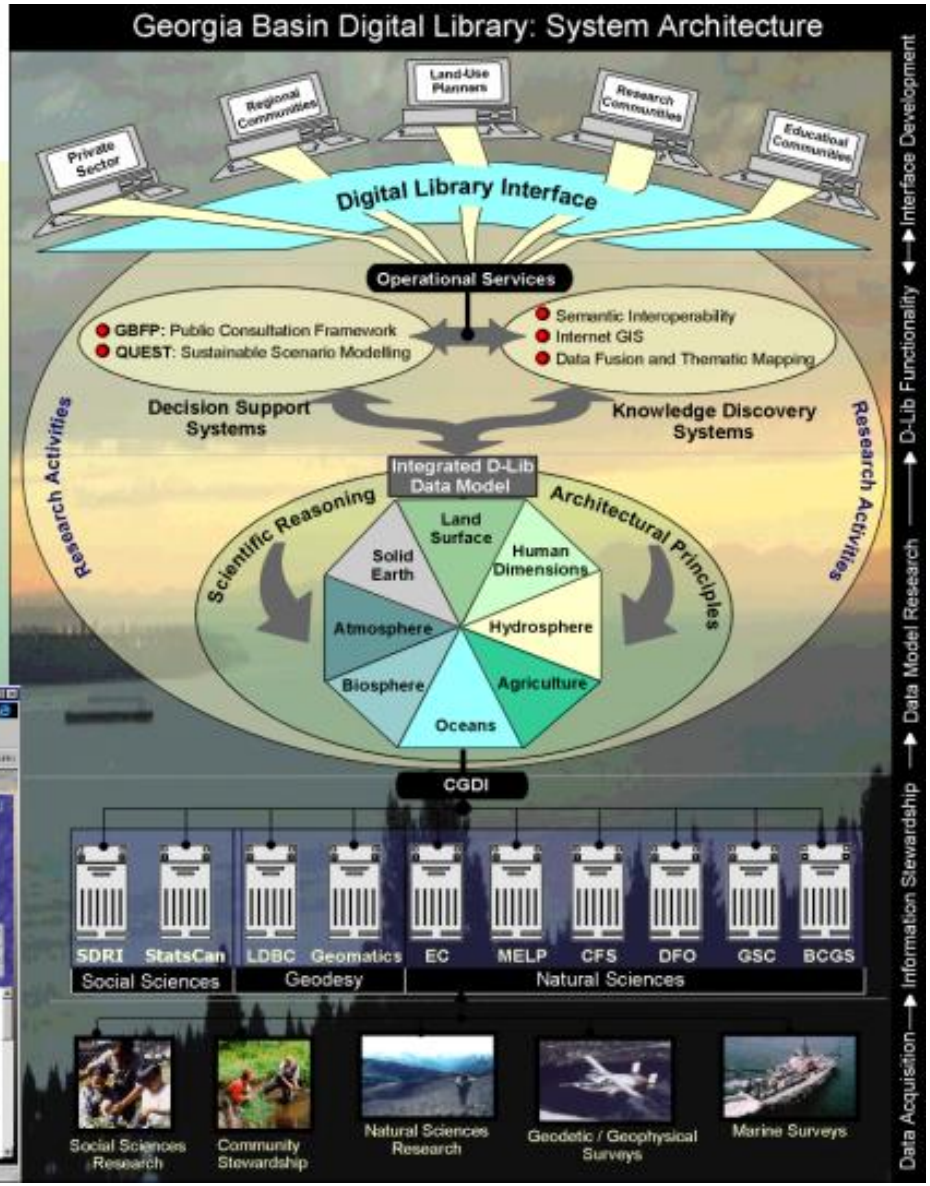
Geolibrary System: *CORDLink* represents one of the first efforts in Canada to successfully build a digital library prototype for managing multi-variant science information and knowledge resources in a distributed network environment

The Georgia Basin GeoLibrary project

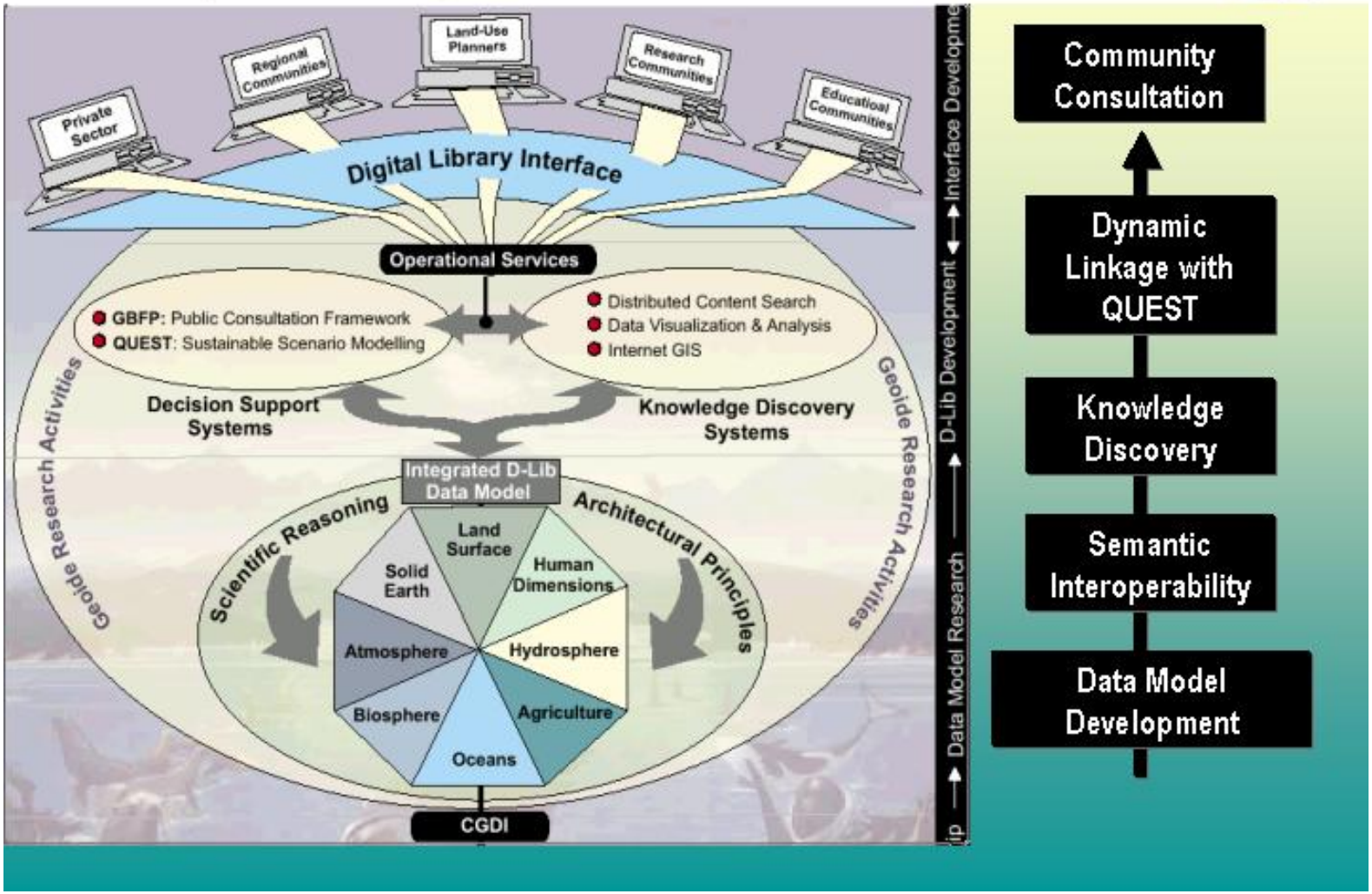
The Opportunity: Building a linkage between QUEST and digital library technologies provides an opportunity to develop operational procedures for better integrating natural science and socio-economic information for purposes of sustainability modeling and land-use planning.

Objectives: Develop the necessary conceptual framework for a Web-based digital library that will seamlessly integrate natural and social science information (GIS maps, images, and text) into a comprehensive information resource to support sustainability research, community-focused decision making and public consultation activities in the Georgia Basin region of western Canada.


GEOIDE
LOWER
FRASER
BASIN
QUEST
Start
About
Info
Exit
Cache Creek Terrane


Georgia Basin Digital Library: System Architecture
Private Sector
Regional Communities
Land-Use Planners
Research Communities
Educational Communities
Digital Library Interface
Operational Services
GBFP: Public Consultation Framework
QUEST: Sustainable Scenario Modelling
Semantic Interoperability
Internet GIS
Data Fusion and Thematic Mapping
Decision Support Systems
Knowledge Discovery Systems
Research Activities
Research Activities
Integrated D-Lib Data Model
Scientific Reasoning
Architectural Principles
Land Surface
Human Dimensions
Solid Earth
Atmosphere
Hydrosphere
Biosphere
Agriculture
Oceans
CGDI
SDRI
StatsCan
LDBC
Geomatics
EC
MELP
CFS
DFO
GSC
BCGS
Social Sciences
Geodesy
Natural Sciences
Social Sciences Research
Community Stewardship
Natural Sciences Research
Geodetic / Geophysical Surveys
Marine Surveys
Data Acquisition
Information Stewardship
Data Model Research
D-Lib Functionality
Interface Development

The Georgia Basin GeoLibrary project

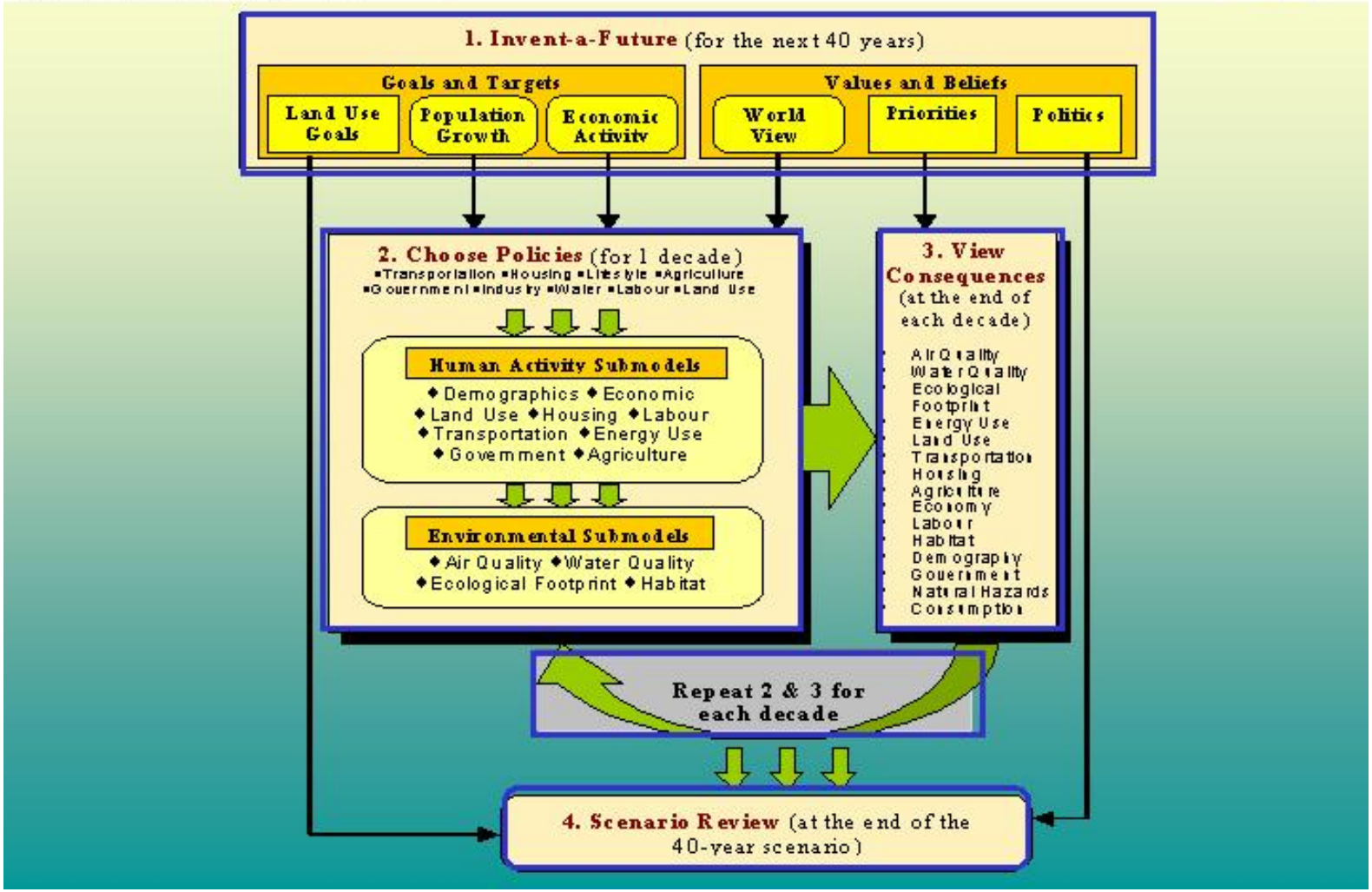


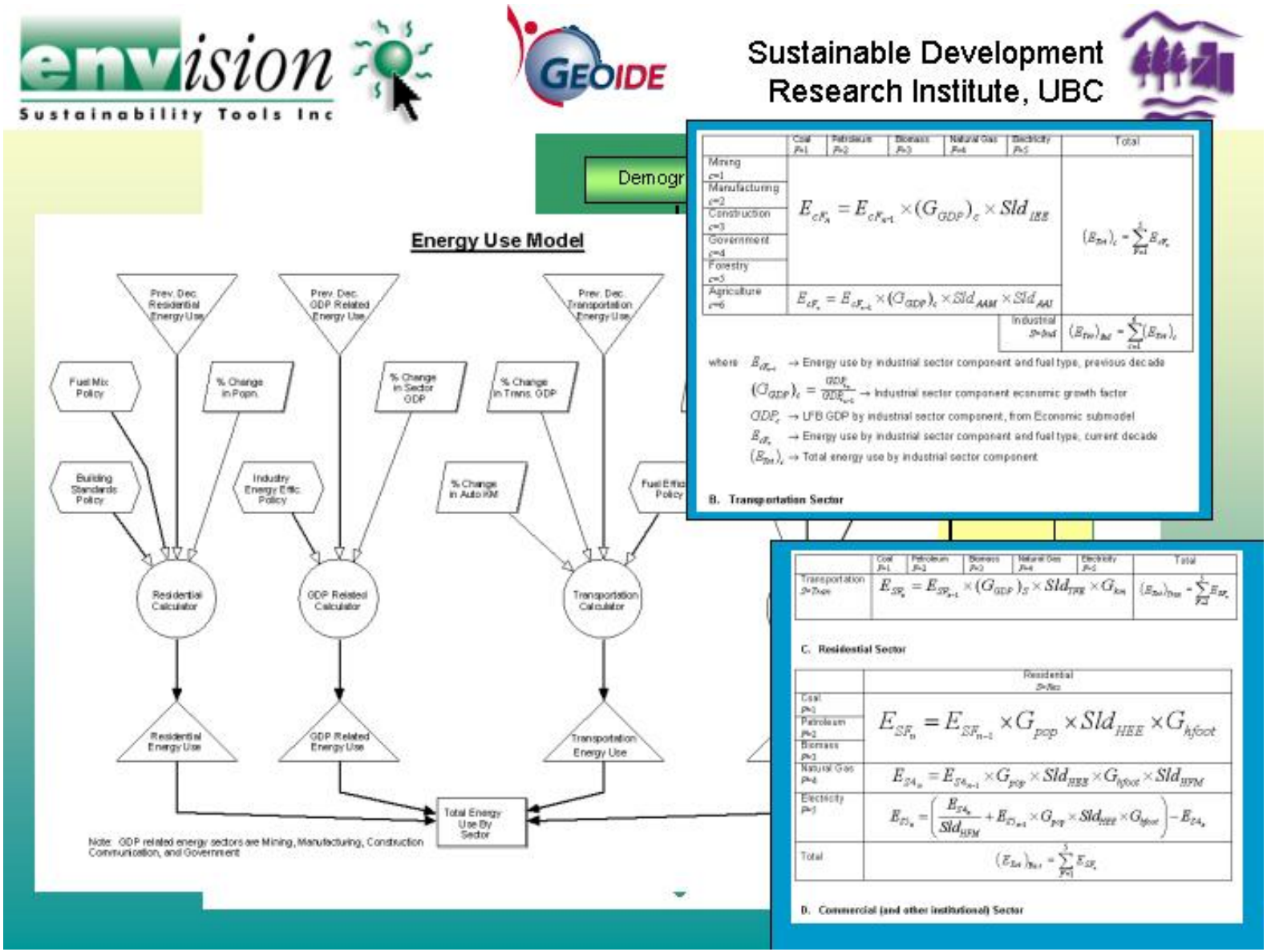
The Georgia Basin GeoLibrary project

envision Sustainability Tools Inc

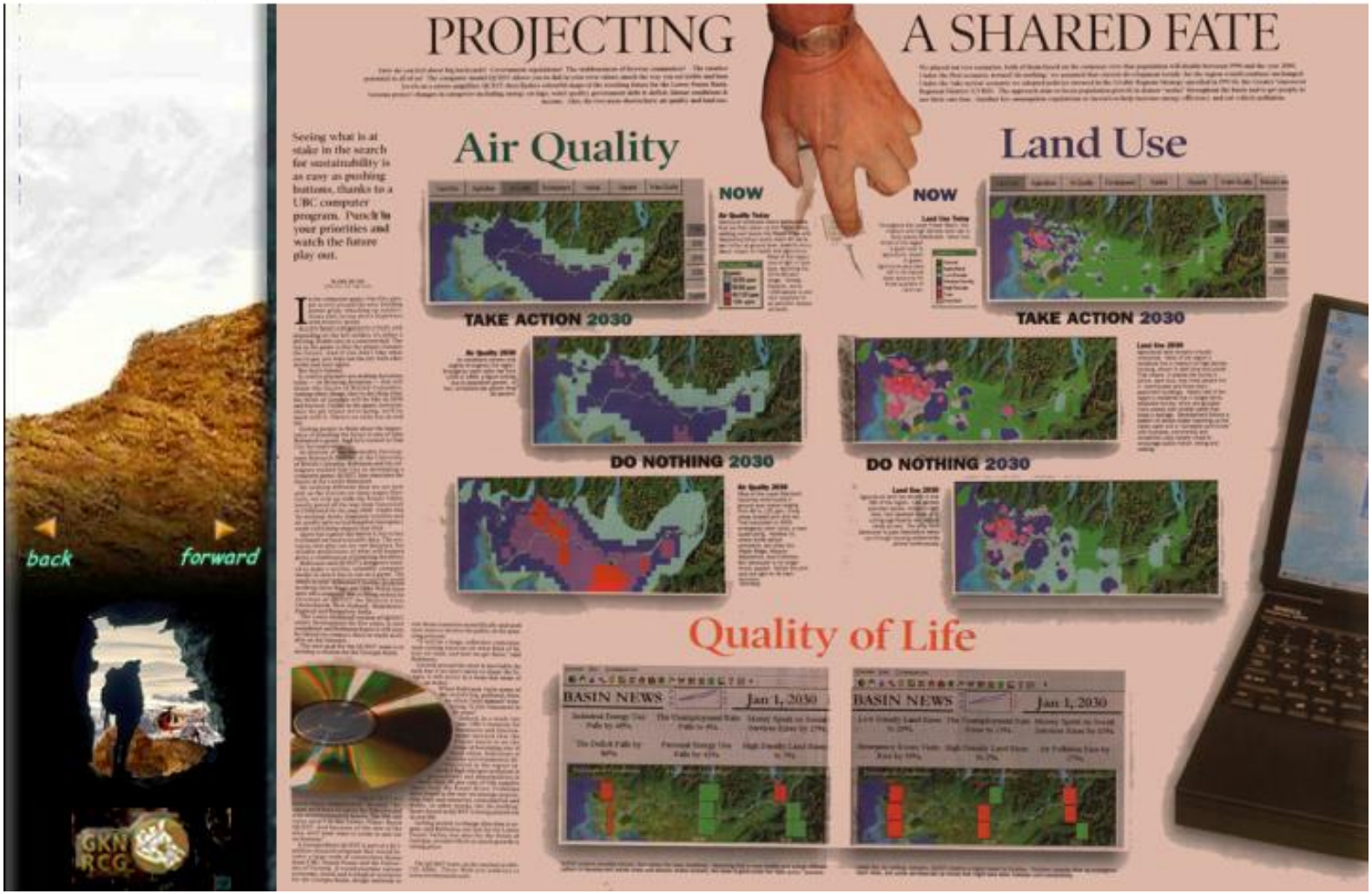
GEOIDE

Sustainable Development Research Institute, UBC




envision
Sustainability Tools Inc
GEOIDE
Sustainable Development
Research Institute, UBC
Demogr
Energy Use Model
Prev. Dec. Residential Energy Use
Prev. Dec. GDP Related Energy Use
Prev. Dec. Transportation Energy Use
Fuel Mix Policy
% Change in Popn.
% Change in Sector GDP
% Change in Trans. GDP
Building Standards Policy
Industry Energy Effic. Policy
% Change in Auto KM
Residential Calculator
GDP Related Calculator
Transportation Calculator
Residential Energy Use
GDP Related Energy Use
Transportation Energy Use
Total Energy Use By Sector
Note: GDP related energy sectors are Mining, Manufacturing, Construction Communication, and Government
Coal
Petroleum
Biomass
Natural Gas
Electricity
Total
Mining
Manufacturing
Construction
Government
Forestry
Agriculture
Industrial
where → Energy use by industrial sector component and fuel type, previous decade
→ Industrial sector component economic growth factor
→ UFB GDP by industrial sector component, from Economic submodel
→ Energy use by industrial sector component and fuel type, current decade
→ Total energy use by industrial sector component
B. Transportation Sector
Transportation
C. Residential Sector
Residential
D. Commercial (and other institutional) Sector

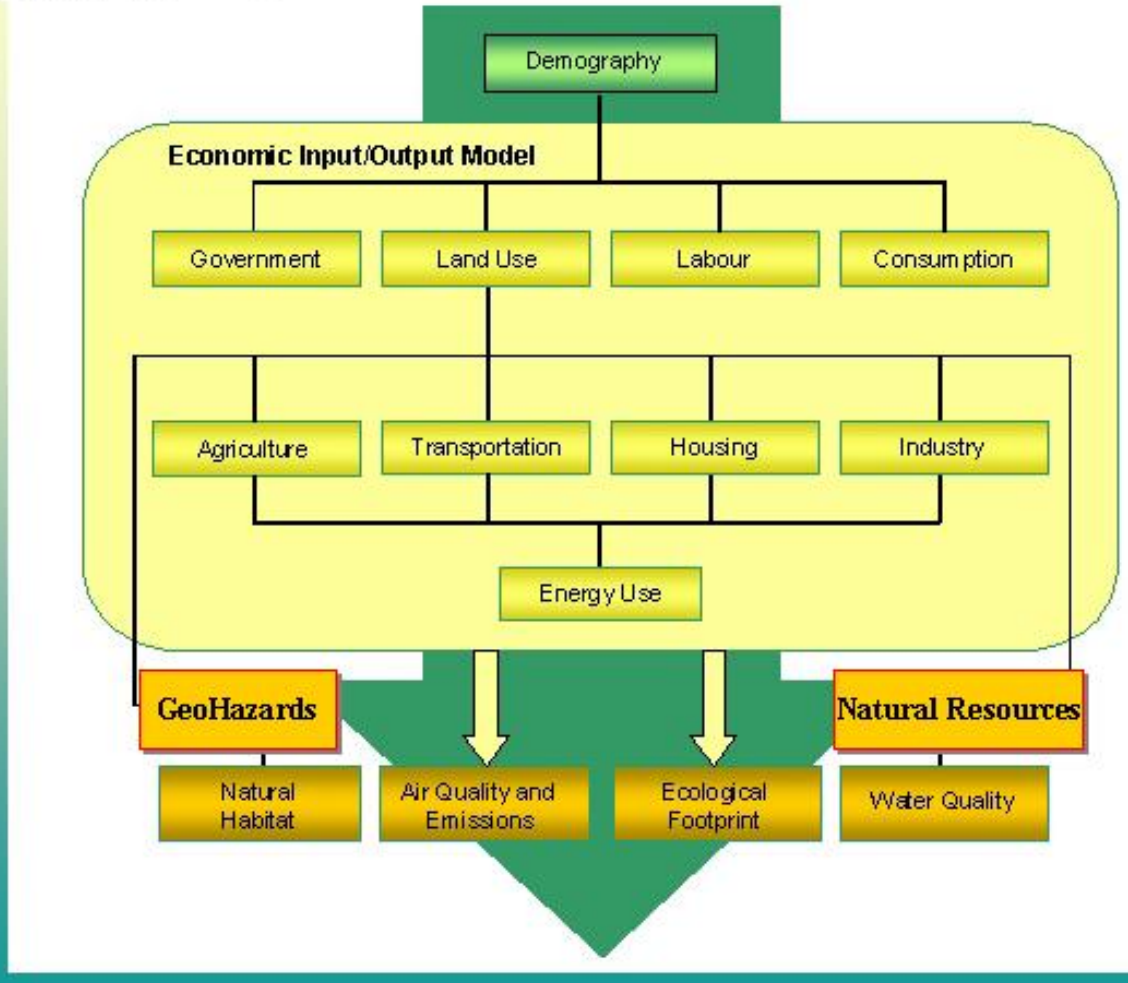
The Georgia Basin GeoLibrary project



envision Sustainability Tools Inc

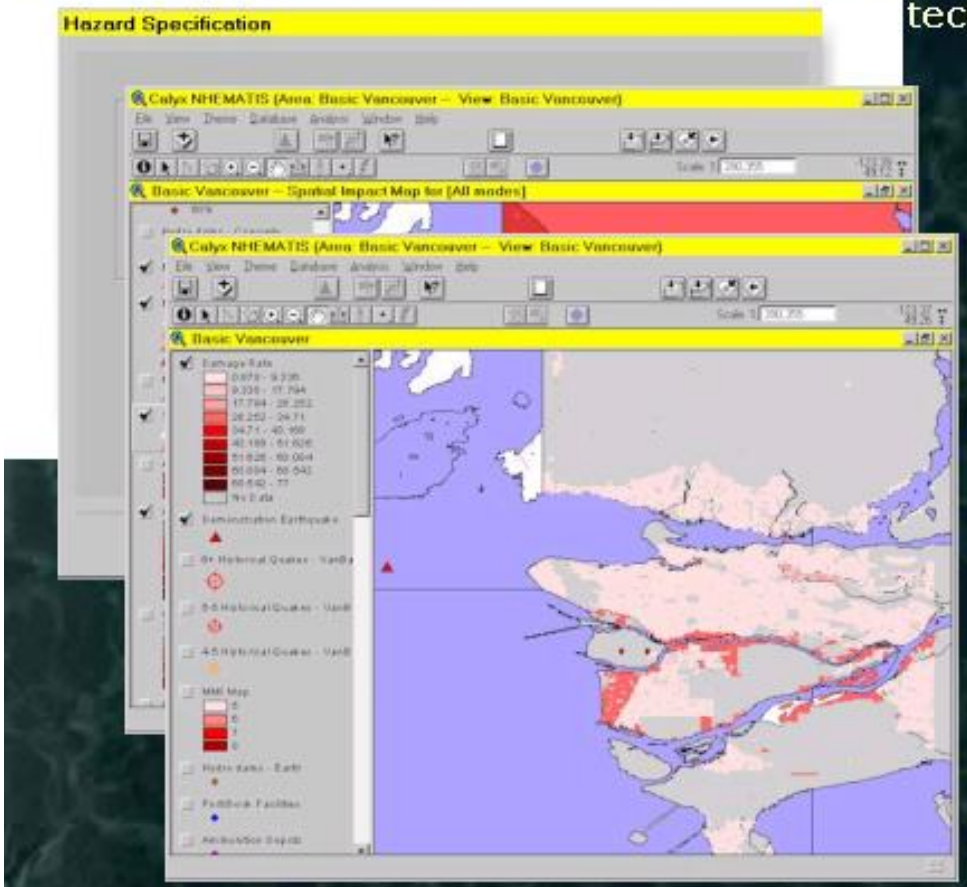
GEOIDE

Sustainable Development Research Institute, UBC



The Georgia Basin GeoLibrary project

NHEMATIS for Natural Hazards Planning and Assessment

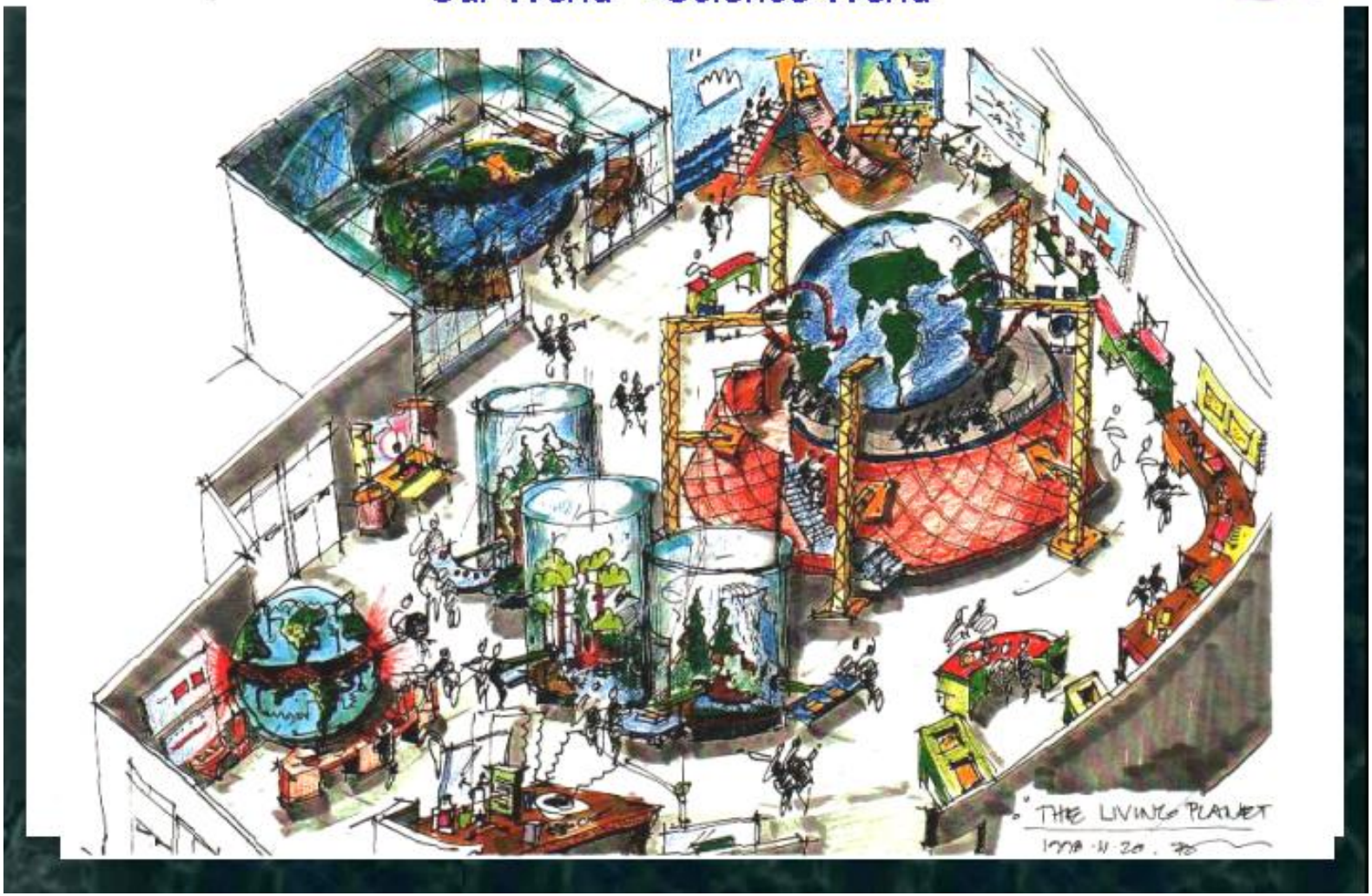


To conduct its analyses, NHEMATIS uses the following technologies and data:

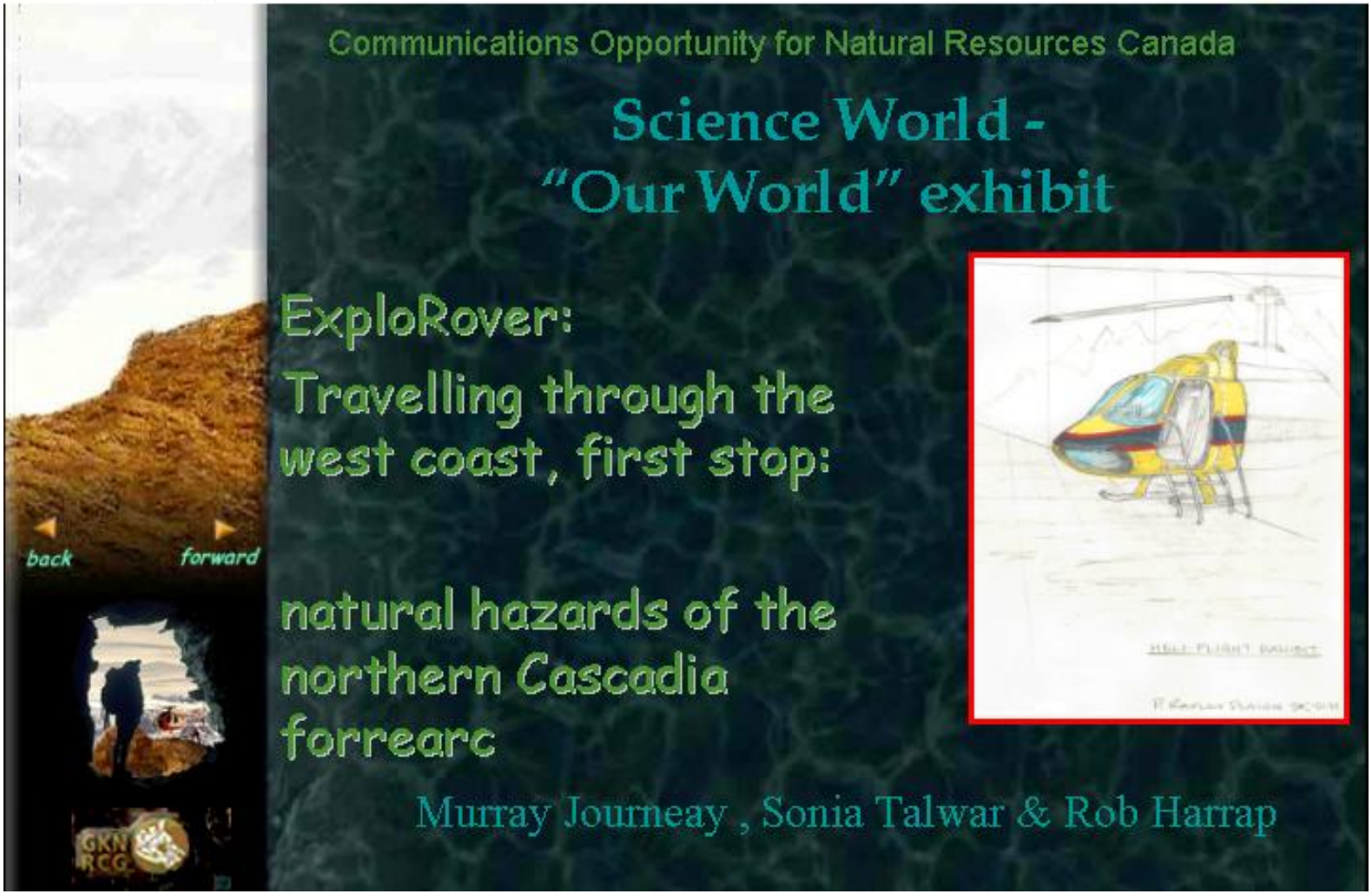
- Advanced models and algorithms used to predict earthquake damage from shaking, liquefaction, landslides, and fire.
- A general algorithmic approach for estimating building damage from earthquakes, floods landslides, and other hazards.
- Damage and Injury Map outputs based on the impacts of the hazards on combinations of different building and facility types
- Network analysis tools for determining areas which may lose essential services due to damage to roads, pipelines, or other linear facilities

The Georgia Basin GeoLibrary project

Our World - Science World



The Georgia Basin GeoLibrary project



The Georgia Basin GeoLibrary project

ExploRover - a helicopter, submersible and earth mole transformer

The Experience: Users enter the ExploRover and receive Earth observation transmissions from the mothership. The first of several missions is to explore geohazards in the forearc & the potential societal impact of these events.

The Georgia Basin GeoLibrary project

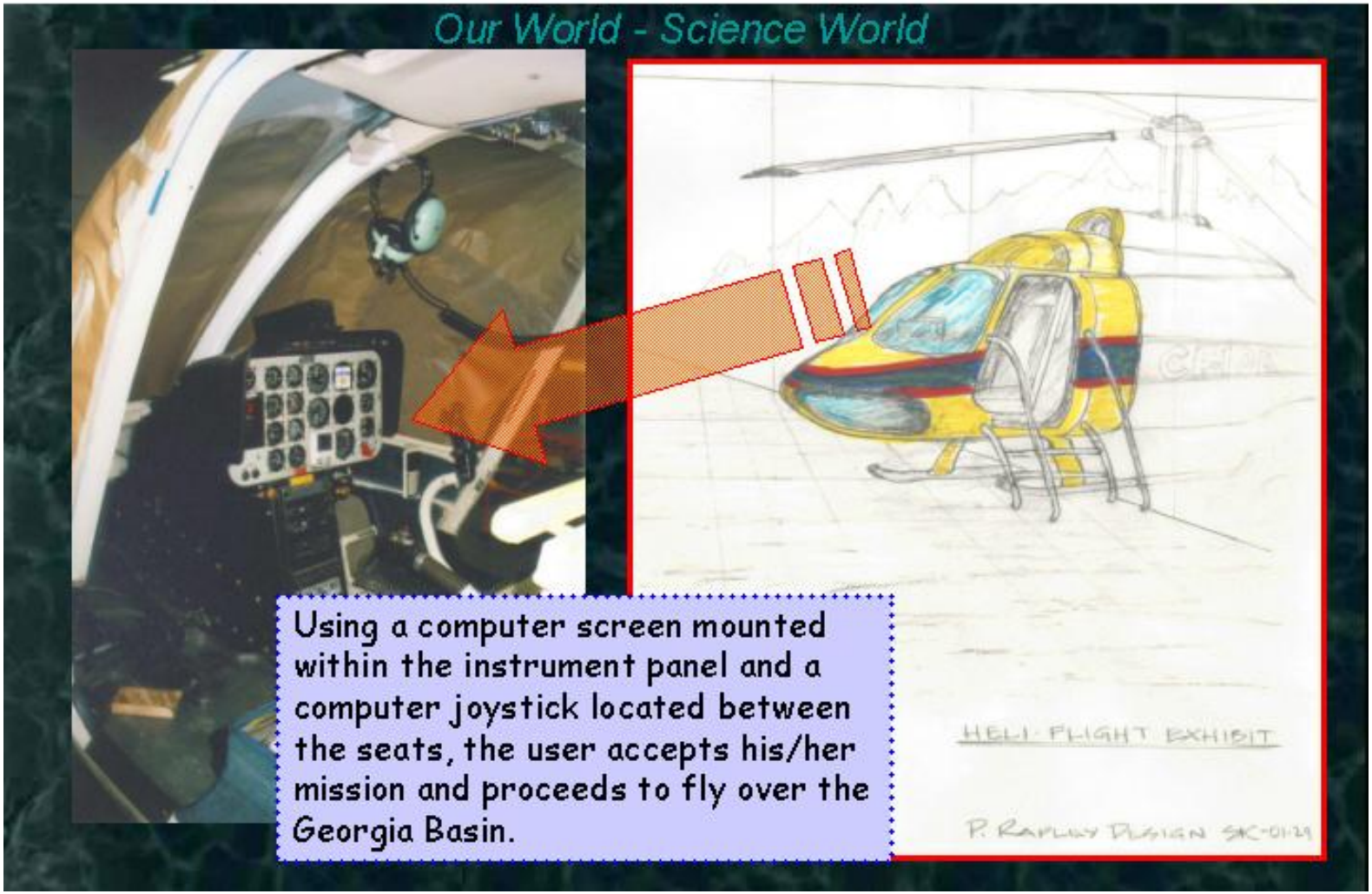
Our World - Science World

While cruising over the Strait of Georgia, the user decides to take the plunge. S/he switches the device into submersible mode, splashes into the water and with X-Ray mode on, peels back the surface to explore three different types of earthquakes: subduction zone, interplate, and shallow crustal.

Locations of earthquakes and images and/or newspaper articles describing the event are presented..

[Mechanisms to rattle and shake the ExploRover to simulate earthquake are being explored.]

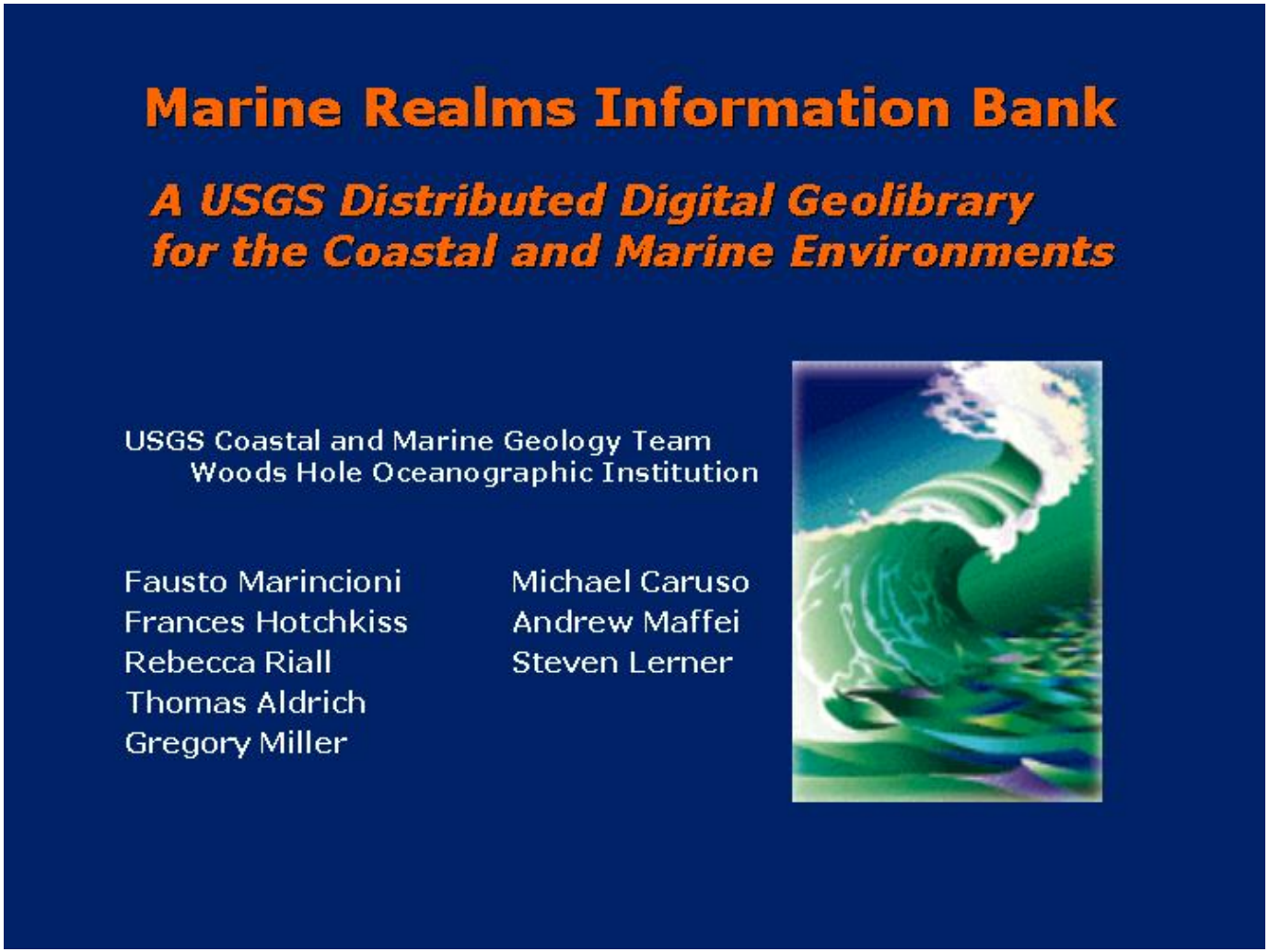
The Georgia Basin GeoLibrary project



The Georgia Basin GeoLibrary project

Appendix VI

Overheads:Presentation: Fausto Marincioni – Marine Realms Information Bank



Marine Realms Information Bank

"A distributed geolibrary ...

... is a vision for the future. It would permit users to quickly and easily obtain all existing information available about a place that is relevant to a defined need. ... A geolibrary is a digital library filled with geoinformation – information associated with a distinct area or footprint on the Earth's surface – and for which the primary search mechanism is place. A geolibrary is distributed if its users, services, metadata, and information assets can be integrated among many distinct locations."

National Research Council, 1999. Distributed Geolibraries: Spatial Information Resources.

http://www.nap.edu/html/geolibraries/index.html

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Coastal and Marine Geology Team

Marincioni, Hotchkiss, Riall, Aldrich

Marine Realms Information Bank

Objective

- Reveal what information is available and what is not ...
- Present information in context
- Incorporate quality control
- Work for a diverse group of users

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Marine Realms Information Bank

Concept

The basis of MRIB is a comprehensive organizational structure that integrates web-based information from across the USGS coastal and marine program, places it in context, and shows what is known and what is unknown about the marine and coastal environments.

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Marine Realms Information Bank

Challenge

How can the web-distributed information about the marine realms be integrated and put into a sensible context?

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Marine Realms Information Bank

Method

Electronic Index Cards

Card ID: 932147061.63461 Modified: 1999/07/16 12:57:29
Card Author: R. S. Stork - rstork@usgs.gov
Title: Hurricane Dennis Impact Studies
Project: Hurricane and Extreme Storm Impact Studies
Description: Coastal and nearshore mapping with LIDAR prior to and following Hurricane Dennis to quantify amounts of coastal change.
Agencies: USGS_SPFC NASA NOAA
Principal Investigator: Abby Sallenger - asallenger@usgs.gov
Contact: Trent Faust - webmaster@cfcg.ar.usgs.gov
WebSite Last Modified: 2000/02/04
WebSite URL: http://coastal.er.usgs.gov/hurricanes/dennis
WebSite Icon: http://coastal.er.usgs.gov/hurricanes/dennis/images/locationsmap.gif
Start Time Data Collection: 1996/07/17
End Time Data Colelction: 1999/08/08
Keywords: Hurricane Dennis Coastal Mapping Disasters Impact Erosion LIDAR
Max Latitude: 37 Min Latitude: 34
Max Longitude: -75 Min Longitude: -78
Elevation: 0
GeoTime: 0 (Present)
Disciplines: Geology Oceanography Information_and_Technology.Mapping
Themes: Environment.Sediment.Deposition Environment.Sediment.Erosion Disasters.Erosion.Coastal Disasters.Erosion.Storm_Impact
Methods: Remote_Sensing Field_Observation.Bathymetry

If we assign to each information object a metadata profile, we will be able to efficiently order, search, and sort information available in the web. Fashioned after old 3x5 library index cards, MRIB EICs allow fast and easy storing of any specifics necessary to consistently classify information objects.

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Marine Realms Information Bank

Operational

MRIB is constituted by three independent modules:

Database

Collection of the metadata profiles associated with the referenced information objects.

Sorting Engine

Database software that organize and sort the metadata on the basis of the chosen criteria.

Web Interface

Web site through which the outputs of the sorting engine are made available to users.

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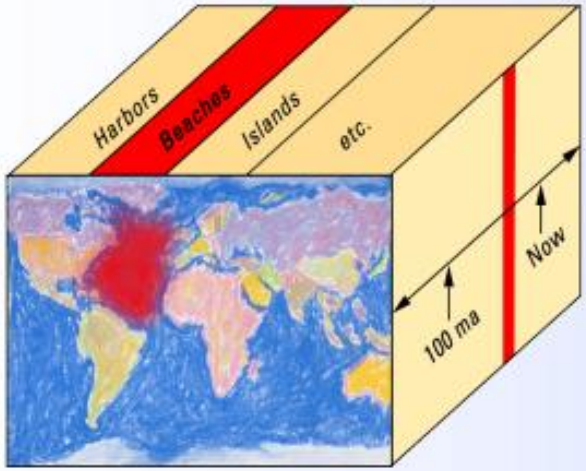
Intersecting Categories



Information Circle

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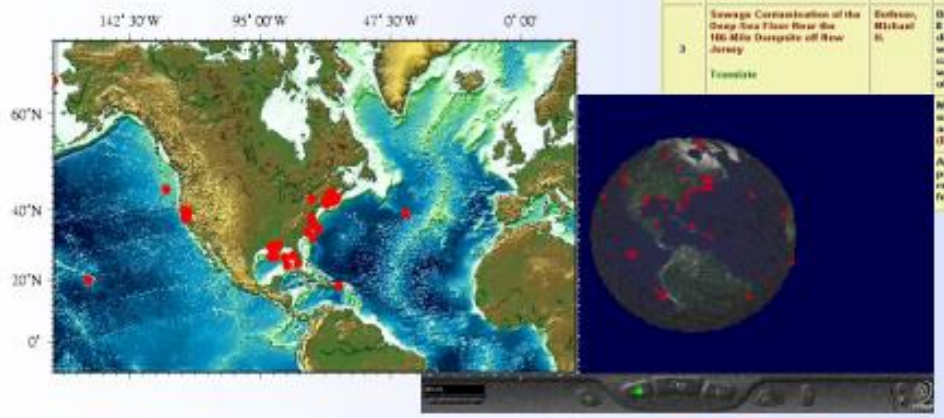
Marine Realms Information Bank

Outputs



Item	Title	Author	Description	Dates
1	Hurricane and Extreme Storm Response Translate	Abby Sallenger	Hurricane and Extreme Storm Response (Details)	1998
2	Determination of Nutrient Loads to East Coast Canals Project Proposal 1998 Translate	Arthur C. Lietz	Determining the nutrient load delivered into Biscayne Bay by the canals Project Proposal 1998 (Details)	1998
3	Sewage Contamination of the Deep-Sea Floor Near the 106-Mile Dumpsite off New Jersey Translate	Bothner, Michael H.	Between 1986 and 1992 approximately 8 million tons of sewage sludge were discharged annually at the surface in water depths of 2500 meters. Model calculations and field measurements were undertaken to determine the fate of this material on the seafloor (Details)	1994
			Mapping of the South Florida ecosystem with particular emphasis on aquifers and ecosystem variability (Details)	1995 1999/10
			An attempt to find the most appropriate parameter for representing flow resistance due to vegetation typically found in the Everglades (Details)	1995

4DGeoBrowser outputs are Table, Imap and 3D Plot.

These contain brief descriptions or symbols showing the geographical location of the selected information objects, and hyperlinks to remote information sources.

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Inserting MRIB METADATA in a web page ...

```
<html>
<head>
<!--Start MRIB Metadata-->
<meta NAME="Media" CONTENT="Online.http">
<meta NAME="Format" CONTENT="Imagery Tabular Text">
<meta NAME="URL" CONTENT="http://mrib.usgs.gov">
<meta NAME="Title" CONTENT="Marine Realms Information Bank">
<meta NAME="Agencies" CONTENT="USGS_WHFC WHOI">
<meta NAME="Principal_Investigator" CONTENT="Aldrich, Thomas">
<meta NAME="Principal_Investigator_Email" CONTENT="taldrich@usgs.gov">
<meta NAME="Contact_Email" CONTENT="fmarincioni@usgs.gov">
<meta NAME="Last_Modified" CONTENT="2000/28/03">
<meta NAME="Geologic_Age" CONTENT=" ">
<meta NAME="Latitude" CONTENT="41.53">
<meta NAME="Longitude" CONTENT="-70.66">
<meta NAME="Elevation" CONTENT="15">
<meta NAME="Class" CONTENT="Knowledge">
<meta NAME="Discipline" CONTENT="Oceanography">
<meta NAME="Subjects" CONTENT="Environment.Climate">
<meta NAME="Methods" CONTENT="Modeling.Conceptual">
<!--End MRIB Metadata-->
<title>Page Title</title>
</head>
<body bgcolor="#FFFFFF" link="#800000" vlink="#550000" alink="#808000" topmargin="0" leftmargin="0">
```

Here goes the visible part of the web page ...

USGS
science for a changing world

Marine Realms Information Bank: A Distributed Geolibrary

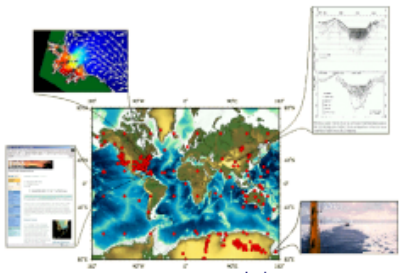
http://mrib.usgs.gov

The Marine Realms Information Bank (MRIB) is a prototype web-based distributed geolibrary that organizes, indexes, and delivers online information about the oceanic and coastal environments. The significance of MRIB lies both in the utility of the information bank and in the implementation of the distributed geolibraries concept. Systems like MRIB can be applied widely as unifying portals for extensive or rapidly developing information bases, for which a centralized repository would be impractical.

The improvement of computer power and connectivity of the 1990s, by enabling very fast exchange of data online, has shown that effective information management does not automatically result from quicker connection or large broadband. To be really useful, information banks require both quality control and also classification systems that integrate and organize the information.

In 1999 the National Research Council proposed the concept of distributed geolibraries, which are online digital libraries able to provide a simple mechanism for searching and retrieving information in response to topical and geographically defined needs.

Distributed geolibraries could assume an authoritative role as subject gateways. To be referenced through a scientific geolibrary, information sources must meet quality standards set by the library gatekeeper.



MRIB outputs contain links to remote information.

The MRIB prototype is a distributed geolibrary for information about the coastal and marine environments. MRIB provides access to information, but it is not an information repository. It incorporates information that exists in remote sources, without modifying formats or content. This system succeeds by building a central index that contains metadata about the information sources, their geographical areas, and their network locations.

The ontology of MRIB is expressed in the classification system through which users can explore the available information. MRIB currently classifies information with 13 types of categories (facets): Location, Geologic Time, Features, Biota, Discipline, Scientific Method, Hot Topics, Project Name, Agency Name, Author, Class, Format, and Audience. Classification of information is performed by a librarian, which is both the major benefit and the major operating cost of MRIB.

Users can combine the multiple criteria of the MRIB catalog to find exactly the information they need.

MRIB can be found on the Internet at: **http://mrib.usgs.gov**

February 2001

For more information, please contact:

Fausto Marincioni
Telephone: (508) 457-2278
Email: fmarincioni@usgs.gov

Frances L. Lightsom
Telephone: (508) 457-2242
Email: flightsom@usgs.gov

U.S. Geological Survey
384 Woods Hole Road
Woods Hole, MA 02543-1598

Appendix VII

Trent Faust: CMGP New Home Page

Appendix VIII

Brainstorming – Action Items from the Workshop

This Appendix summarizes the brainstorming and voting results for "to do" items that workshop participants suggested. To make the list more manageable, these items were subdivided into five related categories after the workshop: For Internal Development, For Improving Science in Discourse, For Interactive Discourse, For Non-scientific Communications, and For Outreach/Education/Public Displays. These were arbitrary, but convenient, categories.

The voting was done on the basis of three components: Importance, Immediacy, and Communication. Importance refers to a subjective ranking of the likely impact this item will have on furthering the visibility and effectiveness of the Program (from 1 = low to 3 = high). Immediacy defines the likely time frame in which the action item is likely to be achievable and have an impact (from 1 = short-term to 3 = long-term). Communication refers to the style of communication (from 1 = one-way to 3 = discourse).

The voting was done after the workshop via a web site. Only 9 of the 35 participants voted, so these results are included for interest only, and are not representative of a workshop consensus. The tallies are given in the table in two forms: by actual vote and an average. The actual vote gives three numbers, e.g., 2/3/2, which refer to the number of votes for "1" (i.e, 2 votes), "2" (i.e., 3 votes) and "3" (i.e., 2 votes). In this example, only 7 votes were cast. The average is calculated by a weighted mean assuming 9 votes, for which any blank votes (in this example, 2 blank votes) count as "1". Hence the average is therefore:

{(2 x "1") + (3 x "2") + (2 * "3") + (2 x "1" (blank)) }/9 = 1.78

This weighted average yields a range of values from 1.00 (low) to 3.00 (high). Rankings that receive a numerical average of 2.5 or greater are highlighted with shading.

Table 8-1: Action Items for Internal Development

For Internal Development	Importance 1=low* 3=High	Immediacy 1=shortterm* 3=longterm	Communication 1= one-way* 3= discourse
Short video library	2/3/2 **1.78**	2/4/1 **1.86**	6/0/0 **1.00**
Slide & photo library	1/2/4 **2.11**	4/3/0 **1.43**	6/0/0 **1.00**
Fact sheet every project	0/2/7 **2.78**	5/4/0 **1.44**	5/1/2 **1.63**
Exit interviews	2/0/3 **1.67**	2/2/1 **1.80**	1/2/2 **2.20**
Personnel directory	0/1/6 **2.44**	6/1/0 **1.14**	4/0/2 **1.67**
Video narratives	2/4/1 **1.67**	1/3/3 **2.29**	4/1/1 **1.50**
Journalist, anthropologist, historian, theologian on staff	4/1/3 **1.78**	2/1/5 **2.38**	0/0/7 **3.00**
"Geo-Shaman" mascot that looks like Tom A.	7/0/0 **1.00**	2/1/3 **2.17**	3/0/2 **1.80**
DB of local/regional policy makers	1/4/2 **1.89**	1/5/1 **2.00**	3/0/3 **2.00**
Direct links to data	1/1/6 **2.44**	3/2/3 **2.00**	3/1/3 **2.00**
Power point library for every project	3/4/0 **1.44**	2/3/2 **2.00**	4/2/0 **1.33**
Bibliographies for every project	1/2/5 **2.33**	5/2/1 **1.50**	5/0/2 **1.57**
Web page for every project	0/1/8 **2.89**	6/2/1 **1.22**	3/3/2 **1.88**
Designated contact for every big issue/region	0/4/5 **2.56**	6/1/2 **1.56**	3/3/3 **2.00**
Imagery page within area	0/3/3 **2.00**	1/4/1 **2.00**	3/1/1 **1.60**
Non-flat web pages/presences with some depth	1/1/6 **2.44**	1/5/1 **2.00**	4/1/2 **1.71**
Handicap accessible	0/1/6 **2.44**	6/1/0 **1.14**	5/0/2 **1.57**
Metadata	0/1/8 **2.89**	6/2/1 **1.22**	5/0/3 **1.75**
Continuing education for program staff (to broaden, rather than how to do your job).	0/6/3 **2.33**	0/4/5 **2.56**	1/4/3 **2.25**
Capture the wisdom of principal scientists in a formal way (e.g., web pages on expertise, data base, etc. that are linked to projects).	0/4/3 **2.11**	1/4/2 **2.14**	5/1/0 **1.17**
Logo similar to Bull Seis. Soc. America Atomic Clock that showed a count-down in the nuclear age	6/1/0 **1.11**	1/2/4 **2.43**	6/0/0 **1.00**

* Actual votes (e.g., 2/3/2) and weighted average (**1.78**); shading indicates an average>2.5.

Table 8-2: Action Items For Improving Science in Discourse

For Improving Science in Discourse	Importance 1=low* 3=High	Immediacy 1=shortterm* 3=longterm	Communication 1= one-way* 3= discourse
Decision support system like Murray's	0/2/4 **2.33**	1/3/2 **2.17**	1/2/3 **2.33**
Synthesis of existing base maps	0/3/5 **2.44**	3/5/0 **1.63**	3/3/1 **1.71**
Predictive models	1/1/7 **2.67**	1/2/6 **2.56**	3/2/4 **2.33**
Layers-data, derived, knowledge, narratives	0/1/6 **2.44**	0/3/4 **2.57**	3/2/2 **2.14**
Flybys of terrain, processes	1/6/1 **1.89**	2/3/3 **2.13**	3/2/2 **2.14**
Centralized long-term storage of important data	1/2/5 **2.33**	0/4/4 **2.50**	2/1/4 **2.29**
Hazard assessments	0/0/7 **2.56**	2/4/1 **1.86**	3/1/2 **1.83**
Zoomable searches	0/4/4 **2.33**	2/4/2 **2.00**	3/1/3 **2.00**
Regional synthesis	0/3/5 **2.44**	0/6/2 **2.25**	4/1/2 **1.71**
Virtual reality/3D scenarios	2/5/1 **1.78**	1/3/4 **2.38**	4/1/2 **1.71**
Ensure dynamism ñ keep fresh	0/1/5 **2.22**	2/2/2 **2.00**	2/1/0 **1.33**
Dynamic maps historical changes	0/5/3 **2.22**	0/6/2 **2.25**	4/2/2 **1.75**
Land use changes in project areas coastal zone	0/4/3 **2.11**	0/6/1 **2.14**	2/2/3 **2.14**
Vulnerability maps	0/1/7 **2.67**	0/7/1 **2.13**	3/1/4 **2.13**
Yearly estimates - status & trends freeboard on the lifeboat & sea statue (include clever graphic to show adjustable freeboard and adjustable sea state).	2/2/3 **1.89**	2/1/4 **2.29**	5/1/1 **1.43**
Visiting Scholars visit USGS for a week to present seminars	2/2/5 **2.33**	5/3/1 **1.56**	2/0/7 **2.56**

* Actual votes (e.g., 2/3/2) and weighted average (**1.78**); shading indicates an average>2.5.

Table 8-3: Action Items for Interactive Discourse

For Interactive Discourse	Importance 1=low* 3=High	Immediacy 1=shortterm* 3=longterm	Communication 1= one-way* 3= discourse
Interactive chat room/Geol.	4/1/3 **1.78**	4/3/1 **1.63**	0/0/8 **3.00**
Best practices for interacting with partners/public	1/3/2 **1.78**	1/3/2 **2.17**	1/0/3 **2.50**
Why people should give a damn	1/3/2 **1.78**	2/2/2 **2.00**	2/2/2 **2.00**
Interactive USGS kiosks	4/1/3 **1.78**	2/3/3 **2.13**	1/4/3 **2.25**
Science forums	0/1/6 **2.44**	2/4/1 **1.86**	0/1/6 **2.71**
Spam congressional staffers	3/1/3 **1.78**	5/0/1 **1.33**	1/0/5 **2.67**
Real time cruise pages	2/3/3 **2.00**	3/3/1 **1.71**	3/2/2 **1.86**
Myknowledgebank.com customize by user	2/5/0 **1.56**	0/3/4 **2.57**	1/5/1 **2.00**
Audio, multimedia on web	1/6/1 **1.89**	1/6/1 **2.00**	4/3/1 **1.63**
Feedback surveys	0/1/7 **2.67**	5/2/1 **1.50**	0/2/6 **2.75**
Citizen dialog features	2/1/3 **1.78**	2/4/0 **1.67**	0/2/4 **2.67**
Mailing list for web page updates	2/2/4 **2.11**	4/4/0 **1.50**	3/3/2 **1.88**
TV ads	4/2/2 **1.67**	3/1/4 **2.13**	5/2/1 **1.50**
Daily/weekly in-depth feature	4/2/1 **1.44**	2/2/3 **2.14**	4/3/0 **1.43**
Earth & sky - radio program beach & ocean	4/1/3 **1.78**	4/0/4 **2.00**	4/3/1 **1.63**
sim city with geology added - sim coast	2/3/2 **1.78**	1/2/3 **2.33**	2/3/1 **1.83**
Geology games/free prize for feedback	4/1/3 **1.78**	2/4/2 **2.00**	2/2/4 **2.25**
Outside advisory boards	0/3/5 **2.44**	3/5/0 **1.63**	1/1/7 **2.67**
Virtual tours/IPIX	1/5/2 **2.00**	2/3/3 **2.13**	3/3/2 **1.88**
Pick a few mediagenic spokespeople	4/4/0 **1.44**	3/2/2 **1.86**	2/2/3 **2.14**
Prototype to start dialog	2/3/1 **1.56**	1/3/1 **2.00**	0/1/3 **2.75**
Case studies successful/failed science public discourse	1/4/2 **1.89**	0/7/0 **2.00**	2/2/2 **2.00**
Formal relationships local libraries & stakeholders	1/5/1 **1.78**	1/4/2 **2.14**	2/3/2 **2.00**
Geology of NPS - state/local coastal parks & seashores	0/3/5 **2.44**	3/4/1 **1.75**	1/3/4 **2.38**
Clipping service for special interest newsletters - push and pull	2/2/5 **2.33**	3/4/2 **1.89**	1/4/4 **2.33**
Geographic/historical summaries why is city/mountain	2/4/1 **1.67**	2/3/2 **2.00**	3/2/2 **1.86**
Lists of known causes & effects	1/3/3 **2.00**	2/4/1 **1.86**	5/1/1 **1.43**
Link/dialog with professional societies/environmental groups/other advocacy groups	0/3/5 **2.44**	4/3/1 **1.63**	0/2/6 **2.75**

* Actual votes (e.g., 2/3/2) and weighted average (**1.78**); shading indicates an average>2.5.

Table 8-4: Action Items for Non-scientific Communications

For Non-scientific Communications	Importance 1=low* 3=High	Immediacy 1=shortterm* 3=longterm	Communication 1= one-way* 3= discourse
Stories & articles like National Geographic	0/4/4 **2.33**	2/3/2 **2.00**	3/2/2 **1.86**
Narratives first	1/4/2 **1.89**	1/3/2 **2.17**	4/1/1 **1.50**
Visualizations of census data in regions we work on	3/1/2 **1.56**	3/1/1 **1.60**	4/1/0 **1.20**
How much CO2 is that?	2/3/4 **2.22**	5/1/2 **1.63**	3/2/3 **2.00**
Literary, artistic & other cultural perspectives	1/4/2 **1.89**	1/3/2 **2.17**	1/1/4 **2.50**
Sound management & adequate resources	0/1/5 **2.22**	1/2/2 **2.20**	2/1/1 **1.75**
Coastal & Marine Geology for Dummies	3/3/1 **1.56**	1/4/1 **2.00**	3/3/0 **1.50**
Thesaurus	0/6/1 **1.89**	2/4/0 **1.67**	4/2/0 **1.33**
Multimedia glossary of all C&M scientific/tech terms	2/5/0 **1.56**	0/5/1 **2.17**	4/2/0 **1.33**
Gazeteer (geographic) submarine features	0/5/3 **2.22**	3/4/0 **1.57**	5/1/1 **1.43**
Congressional briefings	1/0/6 **2.33**	6/1/0 **1.14**	0/2/5 **2.71**
Field trips for congressional staffers	2/0/6 **2.33**	4/3/1 **1.63**	1/1/5 **2.57**
Restoration success stories	1/1/4 **2.00**	3/2/1 **1.67**	3/0/3 **2.00**
National Geographic style maps (with interpretive text on other side)	2/4/2 **1.89**	1/5/1 **2.00**	3/2/2 **1.86**
Seminar series to discuss social context of our science	1/3/4 **2.22**	4/2/1 **1.57**	0/2/5 **2.71**
Telephone line recording of someone singing CMGP concept of the day (is the Reston cafeteria lady available?	6/1/0 **1.11**	3/0/3 **2.00**	4/1/1 **1.50**

* Actual votes (e.g., 2/3/2) and weighted average (**1.78**); shading indicates an average>2.5.

Table 8-5: Action Items for Outreach/Education/Public Displays

For Outreach/Education/Public Displays	Importance 1=low* 3=High	Immediacy 1=shortterm* 3=longterm	Communication 1= one-way* 3= discourse
Links to classrooms	2/2/4 **2.11**	2/4/2 **2.00**	1/2/4 **2.43**
Educational materials - downloads & handouts	0/0/8 **2.78**	4/3/1 **1.63**	3/2/2 **1.86**
Geologist.com	3/0/2 **1.44**	3/0/2 **1.80**	2/0/2 **2.00**
Field trip guides	1/3/2 **1.78**	0/5/1 **2.17**	3/2/0 **1.40**
Scientists school field trips	1/4/2 **1.89**	1/3/3 **2.29**	1/1/4 **2.50**
Involve high schools in projects	0/5/2 **2.00**	3/1/3 **2.00**	0/1/5 **2.83**
Geologic essay & photo contests (non-USGS)	2/4/2 **2.00**	3/4/1 **1.75**	1/4/2 **2.14**
Traveling displays	1/2/5 **2.33**	3/2/3 **2.00**	1/3/4 **2.38**
Trading cards - people, concepts, stuff	5/1/0 **1.11**	1/1/4 **2.50**	3/2/0 **1.40**
Trinkets	6/1/0 **1.11**	2/1/4 **2.29**	6/0/0 **1.00**
Geology postage stamps	4/1/3 **1.78**	1/3/4 **2.38**	4/3/0 **1.43**
Open houses	0/2/6 **2.56**	5/1/2 **1.63**	1/1/5 **2.57**
Public lecture series	0/1/7 **2.67**	5/3/0 **1.38**	1/1/5 **2.57**
C&M visitor centers	2/2/3 **1.89**	2/3/2 **2.00**	1/0/5 **2.67**
Ads in Subways and Buses	6/1/0 **1.11**	1/1/5 **2.57**	6/0/0 **1.00**
Partnerships (and staff exchange) with aquariums, National Seashores, Marine Sanctuaries, etc.	0/1/7 **2.67**	3/5/0 **1.63**	0/2/5 **2.71**
Summer intern program for high-school science teachers	0/1/6 **2.44**	3/3/1 **1.71**	0/3/3 **2.50**

* Actual votes (e.g., 2/3/2) and weighted average (**1.78**); shading indicates an average>2.5.

Appendix IX

List of Participants

NAME	AGENCY/LOCATION	E-MAIL
Aldrich, Tom	USGS/Woods Hole, MA	taldrich@usgs.gov
Bratton, John	USGS/Woods Hole, MA	jbratton@usgs.gov
Butman, Brad	USGS/Woods Hole, MA	bbutman@usgs.gov
Eittreim, Steve	USGS/Menlo Park, CA	seittreim@usgs.gov
Faust, Trent	USGS/St. Petersburg, FL	tfaust@usgs.gov
Frodeman, Bob	University of Colorado	Robert.Frodeman@colorado.edu
Gaylord, Art	WHOI/Woods Hole, MA	art@whoi.edu
Hammar-Klose	USGS/Woods Hole, MA	ehammark@usgs.gov
Hastings, Polly	USGS/Woods Hole, MA	phastings@usgs.gov
Henkel, Heather	USGS/St. Petersburg, FL	hhenkel@usgs.gov
Hotchkiss, Fran	USGS/Woods Hole, MA	fhotchkiss@usgs.gov
Hutchinson, Debbie	USGS/Woods Hole, MA	dhutchinson@usgs.gov
Journeay, Murray	GSC/Vancouver, BC	mjourneay@gsc.nrcan.gc.ca
Marincioni, Fausto	USGS/Woods Hole, MA	fmarincioni@usgs.gov
McDermott, Michael	USGS/Reston, VA	mmcdermo@usgs.gov
McFaden, Robert	GHG Associates/Washington, DC	Mcfadden-ghg@worldnet.att.net
Miller, Greg	USGS/Woods Hole, MA	gmiller@usgs.gov
Moore, Laura	USGS/St. Petersburg, FL	ljmoore@usgs.gov
Newman, Donna	USGS/Woods Hole, MA	dnewman@usgs.gov
Norton, Cathy	MBL/ Woods Hole, MA	cnorton@mbl.edu
Paskevich, Valerie	USGS/Woods Hole, MA	vpaskevich@usgs.gov
Porter, Jene	University of Saskatchewan	porter@sask.usask.ca
Reid, Jamey	USGS/Woods Hole, MA	jreid@usgs.gov
Reid, Jane	USGS/Santa Cruz, CA	jareid@usgs.gov
Riall, Rebecca	USGS/Woods Hole, MA	rriall@usgs.gov
Robb, Jim	USGS/Woods Hole, MA	jrobb@usgs.gov
Sanders, Rex	USGS/Menlo Park, CA	rsanders@usgs.gov
Serrett, Laurie	USGS/Woods Hole, MA	lserrett@usgs.gov
Soderberg, Nancy	USGS/Woods Hole, MA	nsoderberg@usgs.gov
Sundquist, Eric	USGS/Woods Hole, MA	esundquist@usgs.gov
Uhlinger, Eleanor	MBL/Woods Hole, MA	euhlinger@mbl.edu
Waite, Bill	USGS/Woods Hole, MA	wwaite@usgs.gov
Wendt, Gail	USGS/Reston, VA	gwendt@usgs.gov
Wertz, Rob	USGS/St. Petersburg, FL	rwertz@usgs.gov
Williams, Jeff	USGS/Woods Hole, MA	jwilliams@usgs.gov