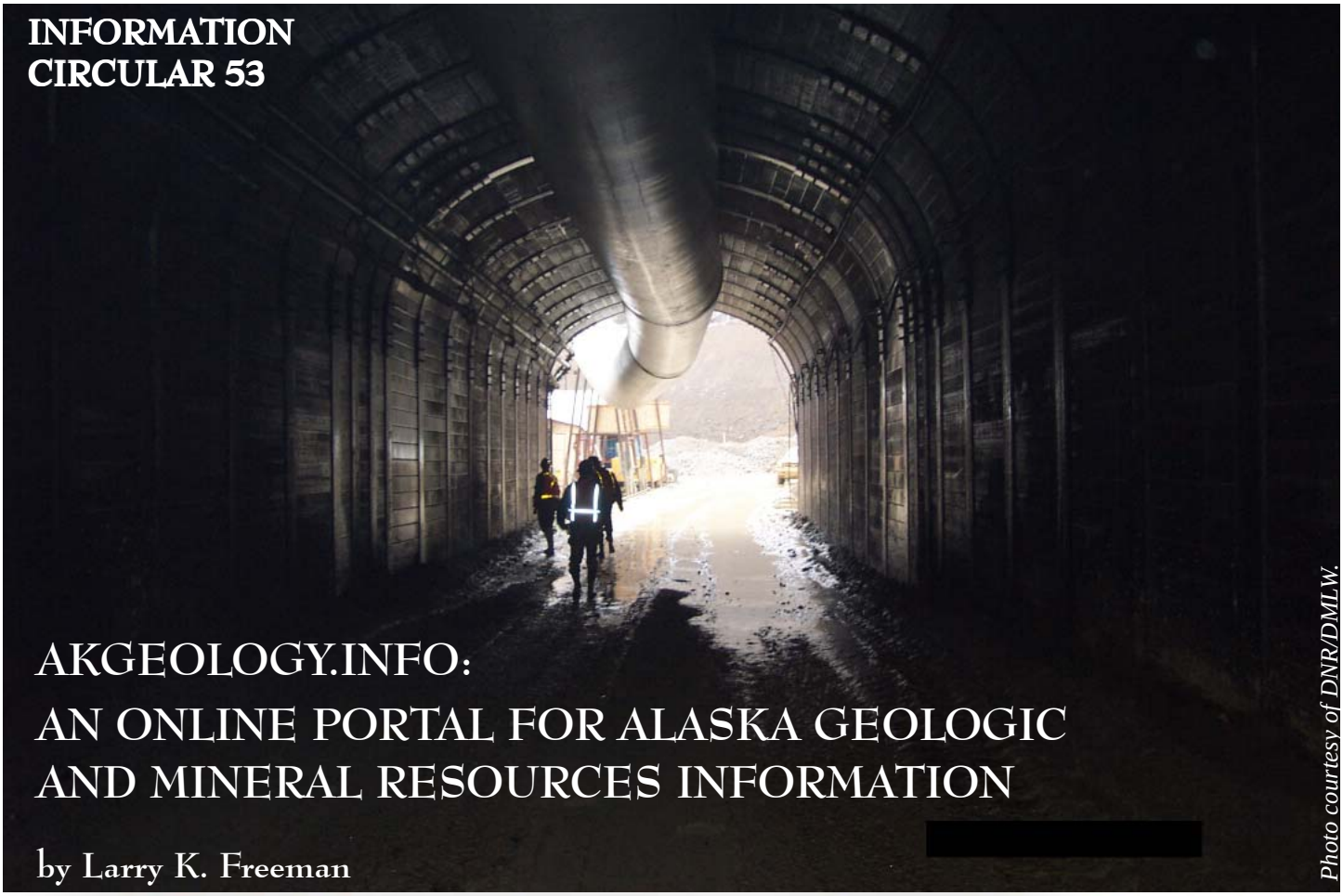
INFORMATION
CIRCULAR 53



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AKGEOLOGY.INFO:
AN ONLINE PORTAL FOR ALASKA GEOLOGIC AND MINERAL RESOURCES INFORMATION

by Larry K. Freeman

AKGeology.info
Minerals
Data
Information
Rescue in
Alaska

October 2006
STATE OF ALASKA
Department of Natural Resources
Division of Geological & Geophysical Surveys

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BACKGROUND

The website AKGeology.info is an internet portal for geologic and minerals resources information for Alaska, bringing together data from multiple State and Federal agencies (fig. 1). It is the culmination of the federally funded Minerals Data and Information Rescue in Alaska (MDIRA) program, a five-year program mandated by Congress in 1998 and managed by the U.S Bureau of Land Management (BLM) and the U.S. Geological Survey (USGS). Upon initiation of the MDIRA program in 1998 five goals of the program were identified (MDIRA Liaison Committee, 2005):

1. Network the existing libraries; prepare a guide to geologic and minerals information; and catalog all the major collections of geology and minerals information.
2. Develop up-to-date digital databases of Alaska mineral deposits, geologic literature, and geochemistry data.
3. Provide for the physical preservation of core and other physical samples collected in the field; in particular, ensure the continued existence of the Geologic Materials Center.
4. Develop an authoritative digital claim information system to include both State and Federal claims, including a business process that would keep it up to date.
5. Provide for development, archiving, management, and dissemination of new geologic maps and minerals information. This proposed component of the program was not funded.

The AKGeology.info portal delivers the products of the MDIRA program, including library collections of geologic information, updated digital geologic databases, an interactive mining claim database, and an interagency bibliography through links and individual search engines that are available on the main page. Within the next two years additional databases will be updated, geologic materials will be cataloged, and all the information will be integrated into a single map-based search utility that delivers the data in a consistent format.

LIBRARY COLLECTIONS

Publications and library collections of historical records are frequently used by geologists and prospectors as the primary source of mineral resource information. Much of this information is scattered among multiple agencies, libraries, and private entities. The MDIRA program produced a guide to the diverse collections of mineral resource information (Daley, 2004). Many older publications have been lost or damaged, so a major effort is underway to create a digital archive of these historic maps and reports, and to produce an index of the geologic mapping in the state. Mining industry data and reports have never been indexed or made available.

Legacy agency publications

Publications of the USGS, BLM, U.S. Bureau of Mines (USBOM), and the Alaska Division of Geological & Geophysical Surveys (DGGS) that contain geologic and mineral resource information about Alaska are being scanned and will eventually all be available to the public online. USGS publications on Alaska and all DGGS publications can be viewed or downloaded (fig. 2) as Adobe Portable Document

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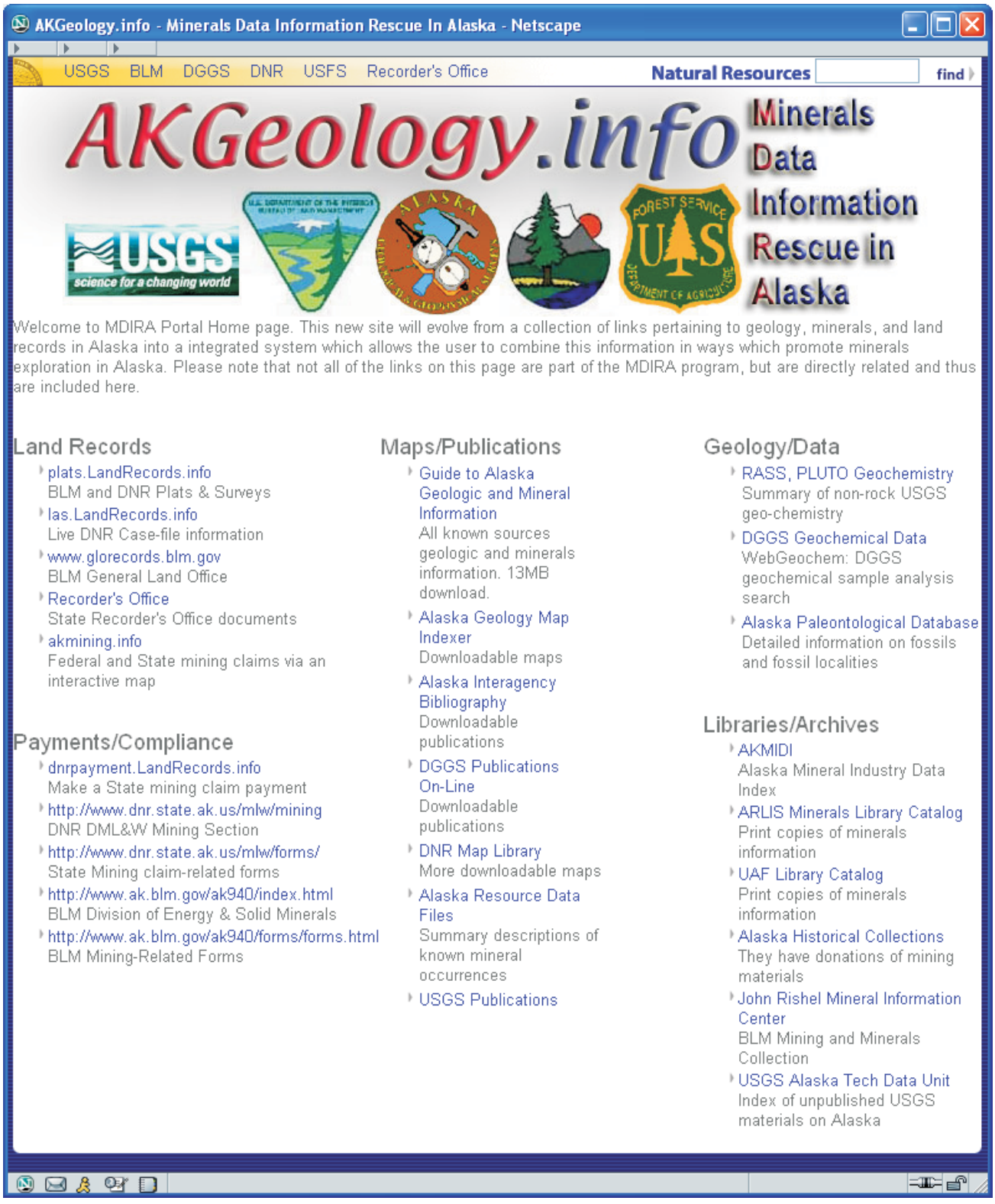

Figure 1. AKGeology.info *portal provides a collection of public sector links pertaining to geology, minerals resources, and land records* (http://akgeology.info). *The links provide access to all the individual digital products generated under the Minerals Data and Information Rescue in Alaska Program* <http://akgeology.info>.

Files (PDF) or, for some maps, as Lizardtech MrSID files (Davidson and others, 2002) from http://wwwdggs.dnr.state.ak.us/pubs/pubs.

Alaska Geologic Map Index

An interactive index of geologic mapping in Alaska combines map-based display with tabular listing of geologic maps of Alaska (fig. 3) published by DGGS at http://maps.akgeology.info/. The map-based display portrays coverage areas of geologic maps, while links in the tabular display lead to those maps that are available online. Maps are also classified by standard thematic categories. The index was

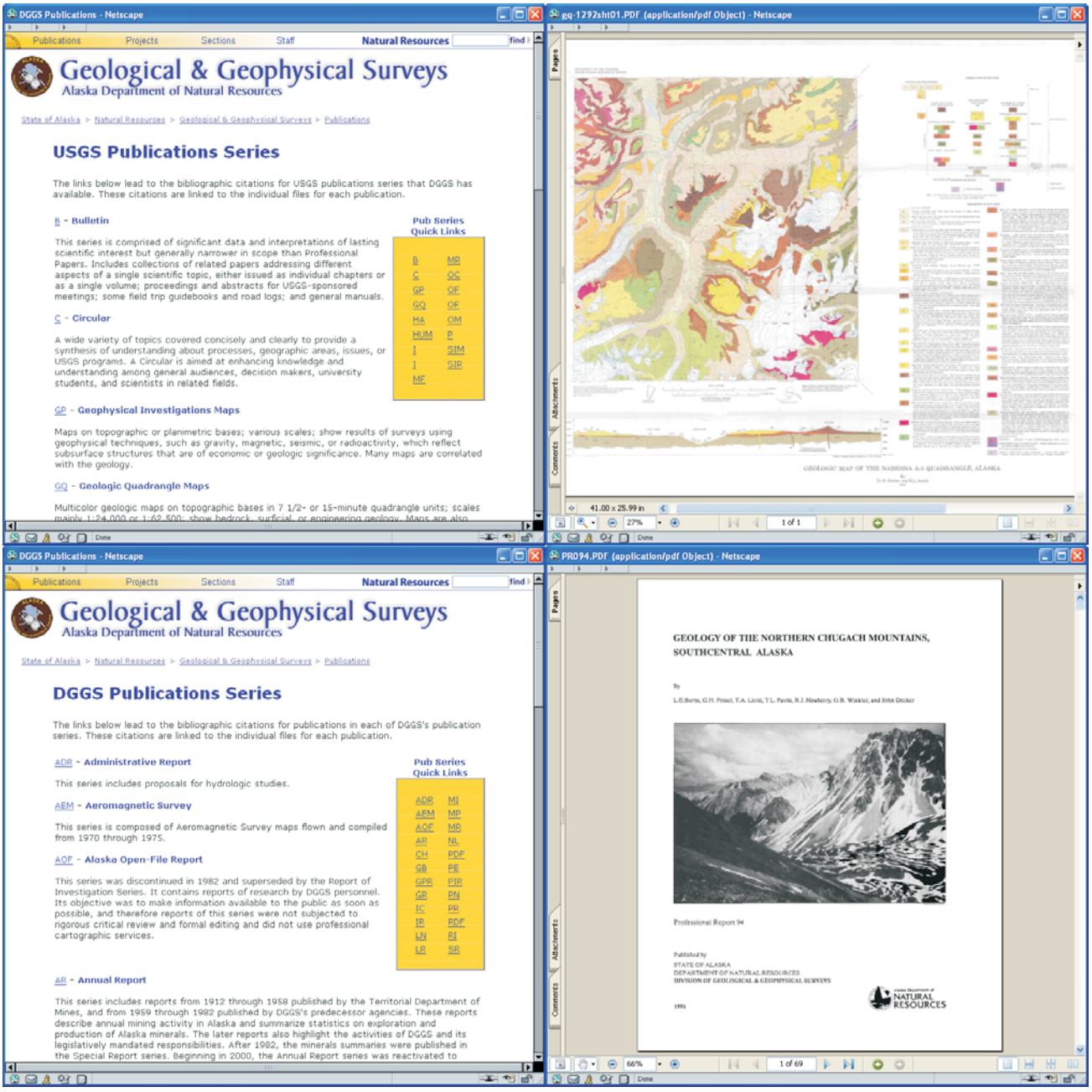

Figure 2. *Legacy agency publications have been scanned and are made available on the web. The Division of Geological & Geophysical Surveys is an online repository* <http://wwwdggs.dnr.state.ak.us/pubs/pubs> *for legacy U.S. Geological Survey publications (top) and Alaska Division of Geological & Geophysical Surveys publications (bottom).*

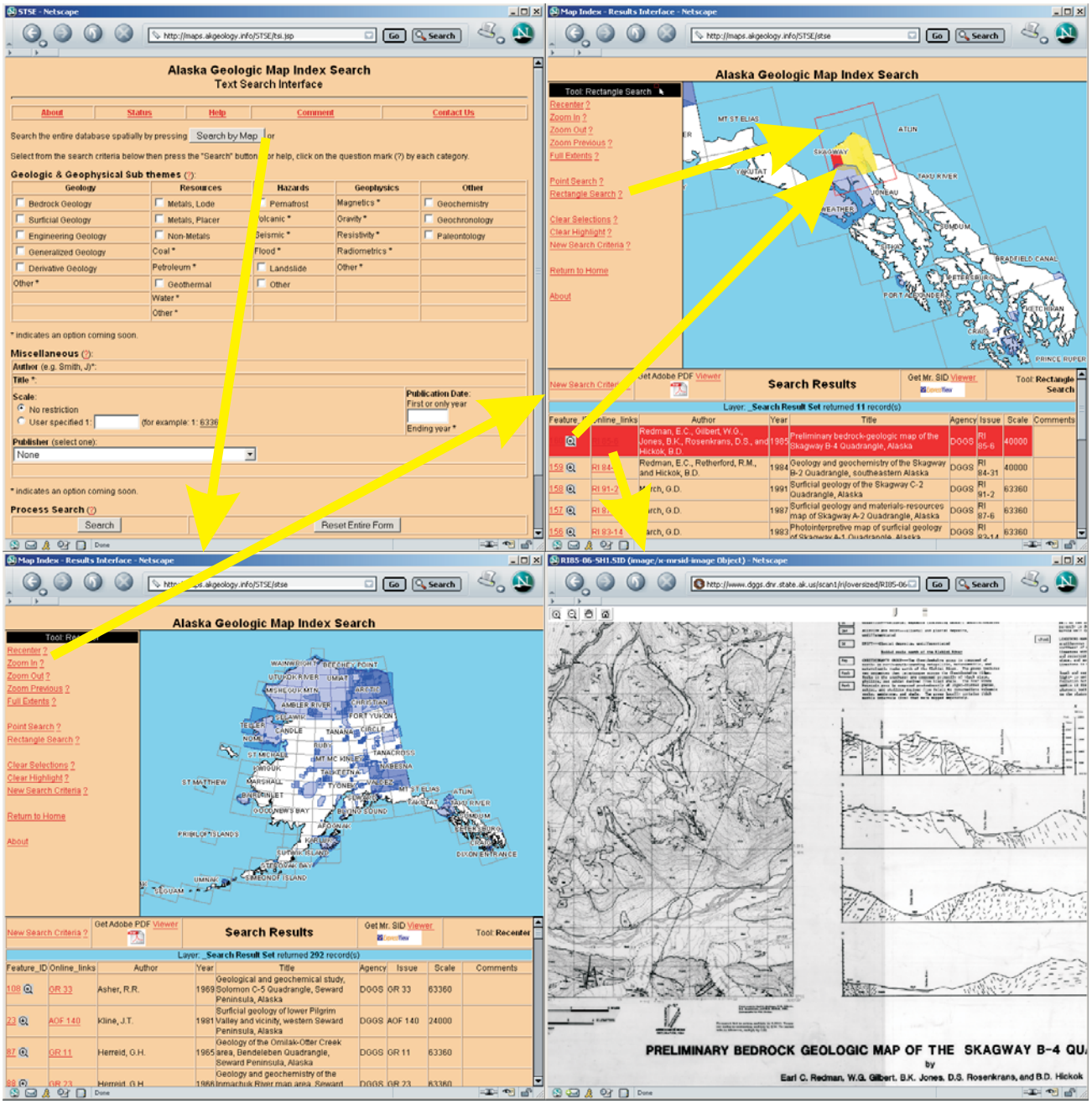

Figure 3. *Alaska Geologic Map Index is a searchable map- and keyword-indexed catalog of public-sector geologic maps in Alaska. The initial search page (upper left) has an option to view all geologic maps or to select maps by theme, scale, or other attributes for display. The map display page (upper right) consists of three frames: navigational tools on the left side of the screen control the map scale in the map view on the right side of the screen and allow the user to select maps. Selected maps are highlighted in yellow and listed in the table in the bottom frame (lower left); users can highlight a single map outline in red by selecting the "Feature_ID" of the map in the table. By clicking on the "Online_Link" for a map, the user is led directly to the map stored in an online repository (lower right)* <http://maps.akgeology.info>.

designed to allow quick identification of the pertinent available geologic mapping for any area of Alaska. Over the next year the interface will be upgraded and geologic and geophysical maps from all government agencies will be included.

Alaska Mineral Industry Data Index (AKMIDI)

AKMIDI is an index or database of nearly 16,000 records of mineral information that are owned by 18 different groups around the state, including Native corporations, private companies, and state libraries and land managers. A search engine (fig. 4) for this database is available at http://akmidi.akgeology.info/. The types of information included in this index include industry reports and maps, field notes, drill

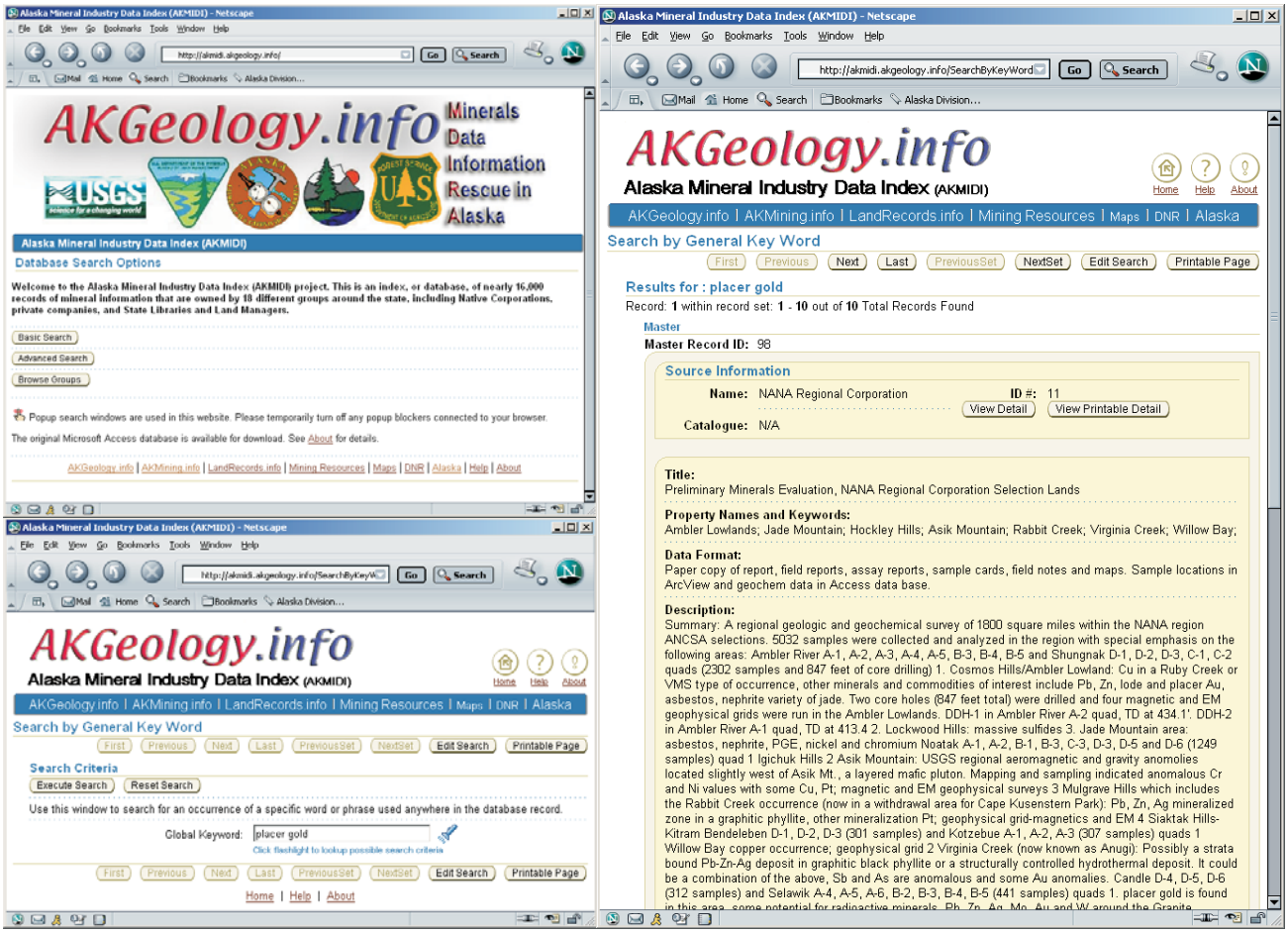

Figure 4. *Alaska Minerals Data Index (AKMIDI) catalogs unpublished mineral and geologic data holdings of private- and public- sector entities. Two search options are available (upper left), including a simple global keyword search (lower left) where the user's entered keyword is used to search all the index attributes. The advanced search allows users to apply keywords to specific index attributes. The search results (right) are displayed in a full page for each record, and tools are provided for browsing through each record that meet the search criteria* <http://akmid.akgeology.info>.

logs, and other archived data from the private sector. The actual data may still be held and controlled by the private entities (Crafford, 2004).

DIGITAL DATASETS

A major MDIRA task was recovery and renewal of legacy datasets and information. These datasets were reconstructed and reformatted either because they had not been updated, were on old electronic storage media, or were not gathered into coherent collections. The legacy data recovery effort is ongoing and will include continuing efforts to renew publications, bibliographic information, geochronologic data, and catalogs of archived geologic materials, mining company data, and agency field observation records, among others. The MDIRA data recovery will be completed in the next two years. The datasets listed below are among those recovered to date.

Alaska Resource Data Files (ARDF)

The ARDF consist of updated descriptions of mines, prospects, and mineral occurrences throughout Alaska (fig. 5). The ARDF descriptions are collected and published for individual U.S. Geological Survey 1:250,000-scale quadrangles in Alaska as USGS Open File Reports and may be downloaded from http://ardf.wr.usgs.gov/.

USGS geochemical data

USGS geochemical analyses on samples from Alaska have been recovered, reformatted, and published (Bailey and others, 2000). The data are available by quadrangle and sample type at http://

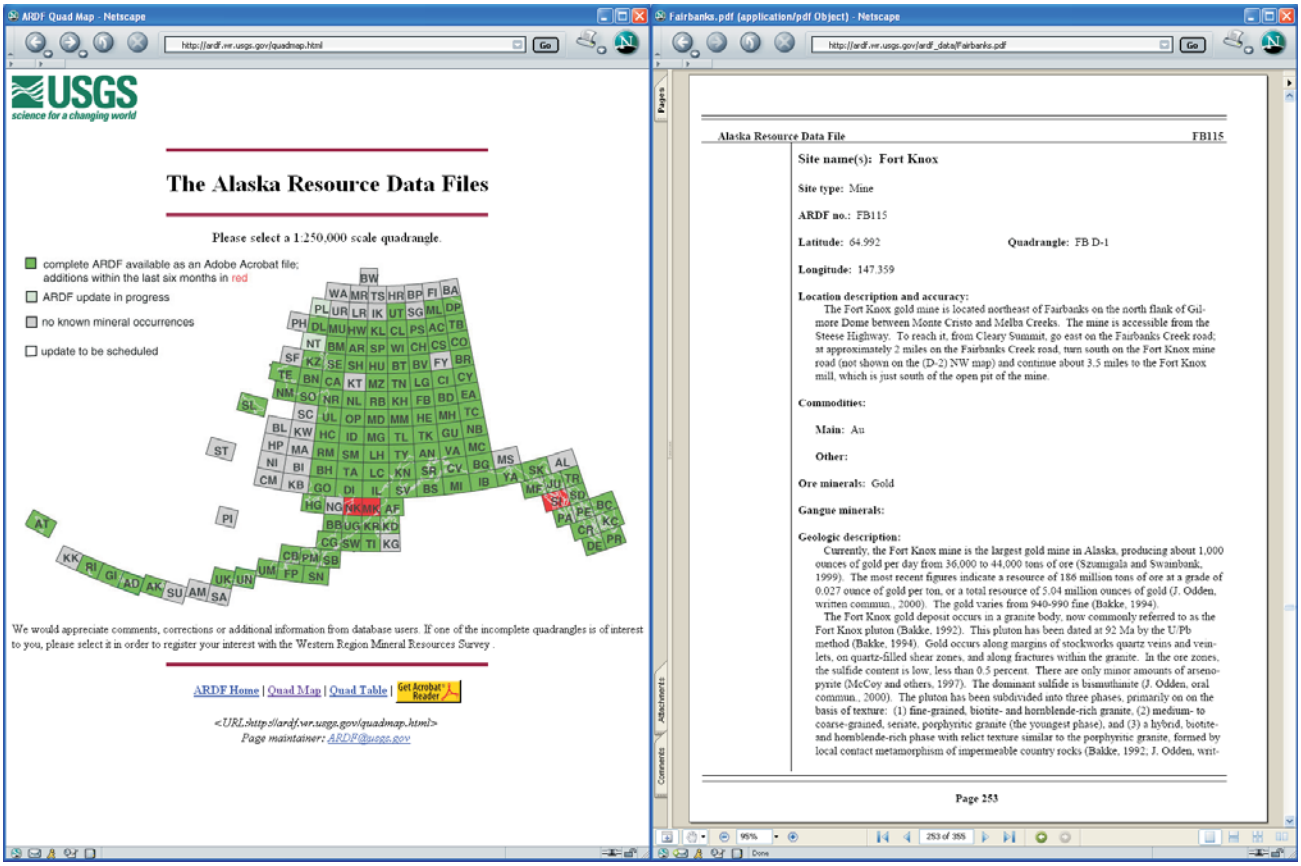

Figure 5. *Alaska Resource Data Files (ARDF) contain recently compiled reports on mineral occurrences throughout Alaska* (http://ardf.wr.usgs.gov/). *They are published by 1:250,000-scale USGS quadrangle (left) as U.S. Geological Survey Open-File Reports and can be downloaded as Adobe Portable Document Files (right), FileMakerPro databases, or comma-delimited ASCII files* <http://ardf.wr.usgs.gov>.

geopubs.wr.usgs.gov/open-file/of99-433/ (fig. 6) or on DVD from the Alaska Branch of the USGS Western Region Minerals Division.

DGGS geochemical data

DGGS geochemical analyses are being recovered and are available through a search engine http://wwwdggs.dnr.state.ak.us/webgeochem that retrieves geochemical data collected from many published sources (fig. 7). Fifty percent of DGGS geochemical analyses are currently available through this database. Data from future field projects will be added to this database, which is part of a much larger agency-wide centralized database (Papp, 2005).

Alaska Paleontological Database

This database (Zhang and Blodgett, 2003) contains detailed information on fossils and fossil localities in Alaska. The information is derived from unpublished USGS fossil reports, published literature, and data released by industry sources. The database includes both text- and map-based search engines (fig. 8) at http://www.alaskafossil.org/.

MINING CLAIM INFORMATION

Up-to-date mining claim and mineral estate ownership maps are an important part of any mineral exploration and development program. In the past prospectors were required to make multiple visits to multiple agencies to do a complete claim status review of a prospective area. One component of the MDIRA program has made mining claim information available on the web.

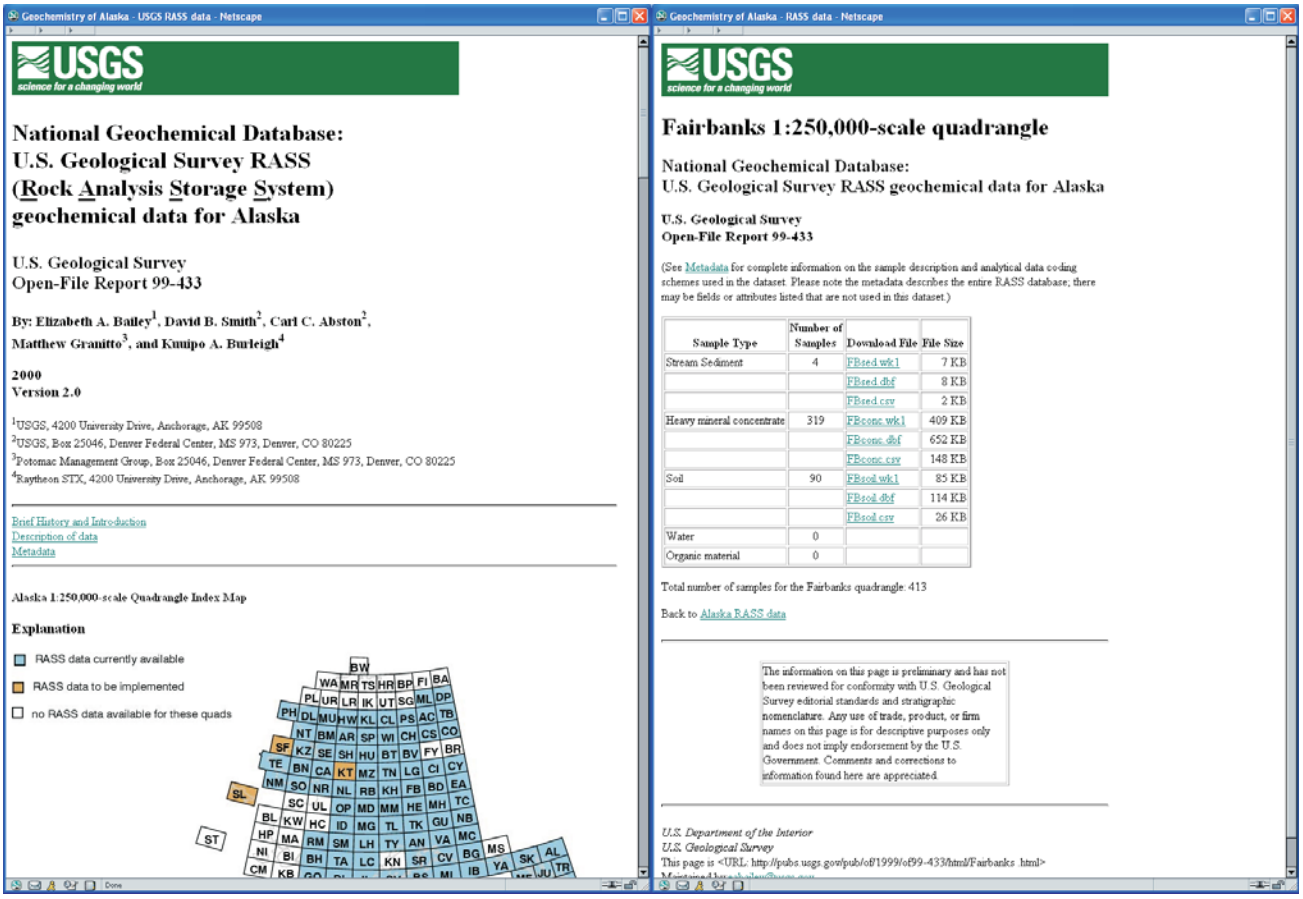

Figure 6. *U.S. Geological Survey (USGS) Geochemical Data available online includes data recovered from the Rock Analysis Storage System (left). The data are collected as individual datasets organized by USGS 1:250,000-scale quadrangles and sample types, and are available in multiple file formats (right)* <http://geopubs.wr.usgs.gov/open-file/of99-433>.

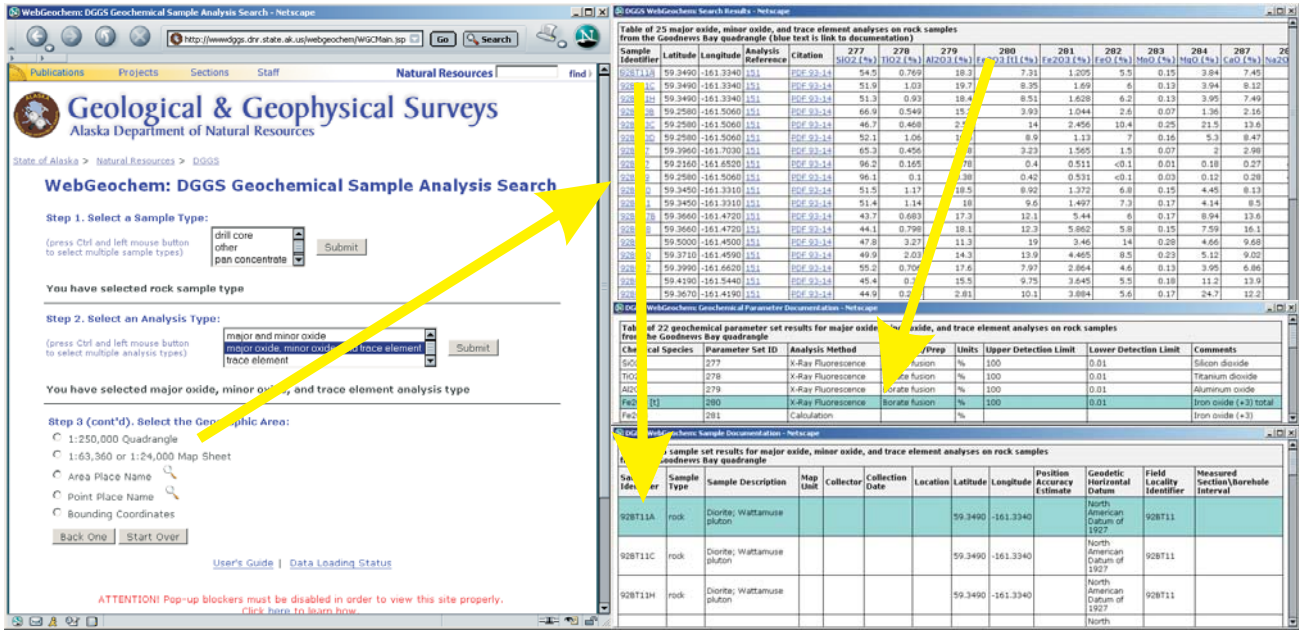

Figure 7. *Alaska Division of Geological & Geophysical Surveys geochemical data is available through a web-based search engine called DGGS WebGeochem. The search engine leads the user through several query options including several geographic search methods (left). Search results are displayed in a pop-up window formatted as a table (upper right) that includes links to documentation about the analytical methods (middle right) and the samples and localities (lower right)* <http://www.dggs.dnr.state.ak.us/webgeochem>.

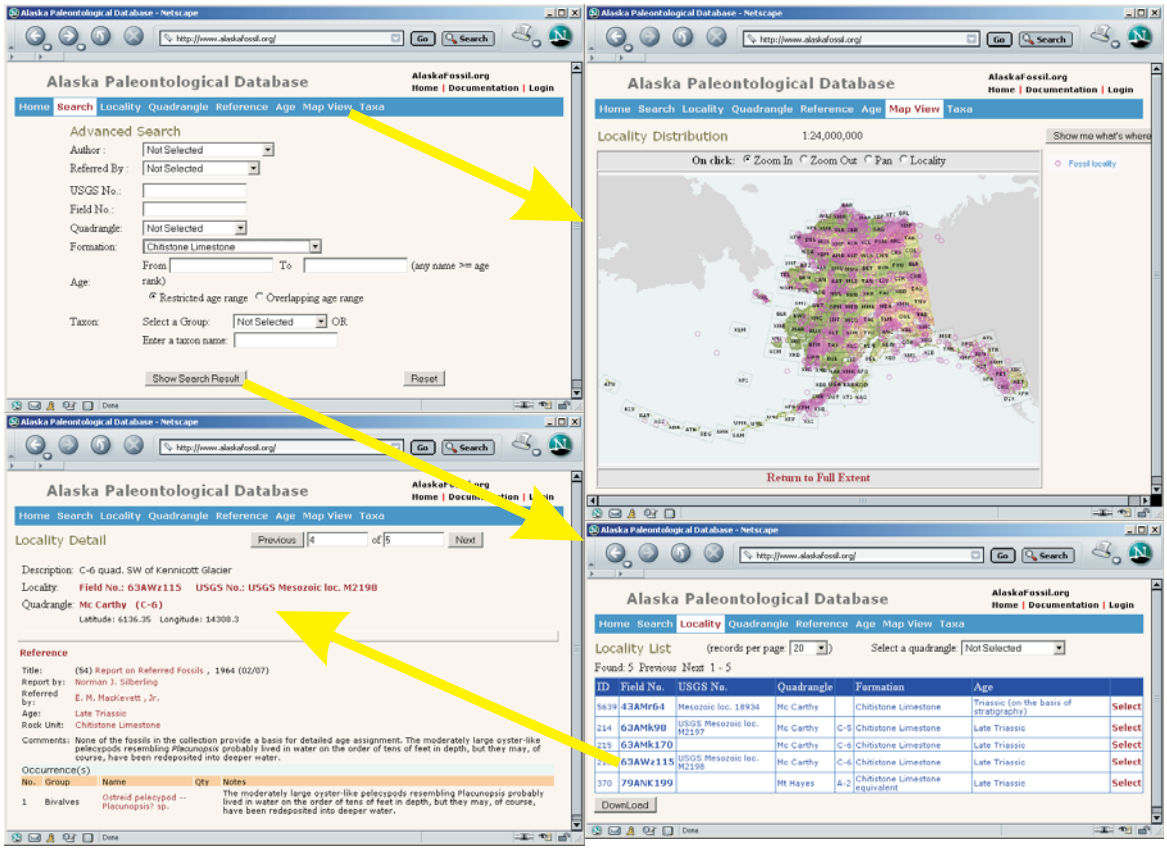

Figure 8. *Alaska Paleontological Database has collected information about fossil localities from the entire state of Alaska from multiple sources. The database includes a tabular search form (upper left), a map interface that displays the sample localities (upper right). The search results are displayed in a table (lower right); clicking on the "Select" box on the right side will bring up a detail page (lower left) that describes and documents the locality* <http://www.alaskafossil.org>.

Interactive Claim Maps

Actively updated mining claim status can be searched and viewed through a web-based interactive mapping application at http://www.akmining.info/ (fig. 9). Users can view active mining claim and leasehold locations along with mineral estate ownership. There are tools that allow users to interactively zoom in and out, pan, and change visible map layers. Map-based query tools allow users to view information about single or multiple claims. Query result windows contain links that lead to summary information, case history, and even to images of recorded location notices and affidavits.

Download claim data

The new version of the State's Alaska Mapper application, which is the backbone of the AKmining.info map interface, provides improved map navigation tools and data output tools, including the ability to download selected GIS data for the mineral estate status layers (Alaska DNR LRIS GIS Unit, 2006).

INTERAGENCY BIBLIOGRAPHY

The third goal of the MDIRA program was to integrate recovered information into a single delivery system. The Interagency Bibliography integrates bibliographic information from multiple sources and provides direct access to online repositories of the indexed publications. Publications of the BLM, USGS, USBOM, and DGGS (including predecessor agencies) contain most of the publicly available information on Alaska mineral resources and geology. The Interagency Bibliography includes citations to all "numbered series" publications of these agencies that are pertinent to Alaska geology and minerals, and links to those publications that are available online. Entries in the bibliography also include identified Master's theses and Ph.D. dissertations that pertain to Alaska geology and mining. Participating agencies may add other bibliographic references for Alaskan geology and mineral resources; however, this bibliography is not intended to be an exhaustive listing of geologic references on Alaska. All listings are spatially indexed by USGS 1:250,000-scale quadrangles.

The Bibliography includes multiple search tool options (fig. 10) and display formats for the bibliographic information. There is an extensive user's manual available on line (Parker, 2004).

The Interagency Bibliography has required committed efforts of several agencies to pool their resources and expertise, and the result is a data delivery system that will facilitate research for those interested in exploring, evaluating, and making decisions about Alaska's earth resources.

Search Options

The Interagency Bibliography includes multiple search options to allow users to compile references on specific areas or subjects, and to find individual publications that are available online at http://www.bib.akgeology.info/.

The Basic Search has options to use any combination of publication title, author, publication year, or USGS 1:250,000-scale quadrangle (QMQ) names in a simple text based form. These are the attributes most commonly used to search for Alaska geologic and minerals information.

Experienced users can make more advanced searches of the Interagency Bibliography using complex Boolean arguments using the Advanced Search. This option allows users that are familiar with database searches to restrict their search by nearly any bibliographic attribute. Users can save and retrieve search statements for repeated use.

The Quadrangle Search option provides an interactive map that aids users in selecting the quadrangles that cover the geographical area of Alaska in which they are interested.

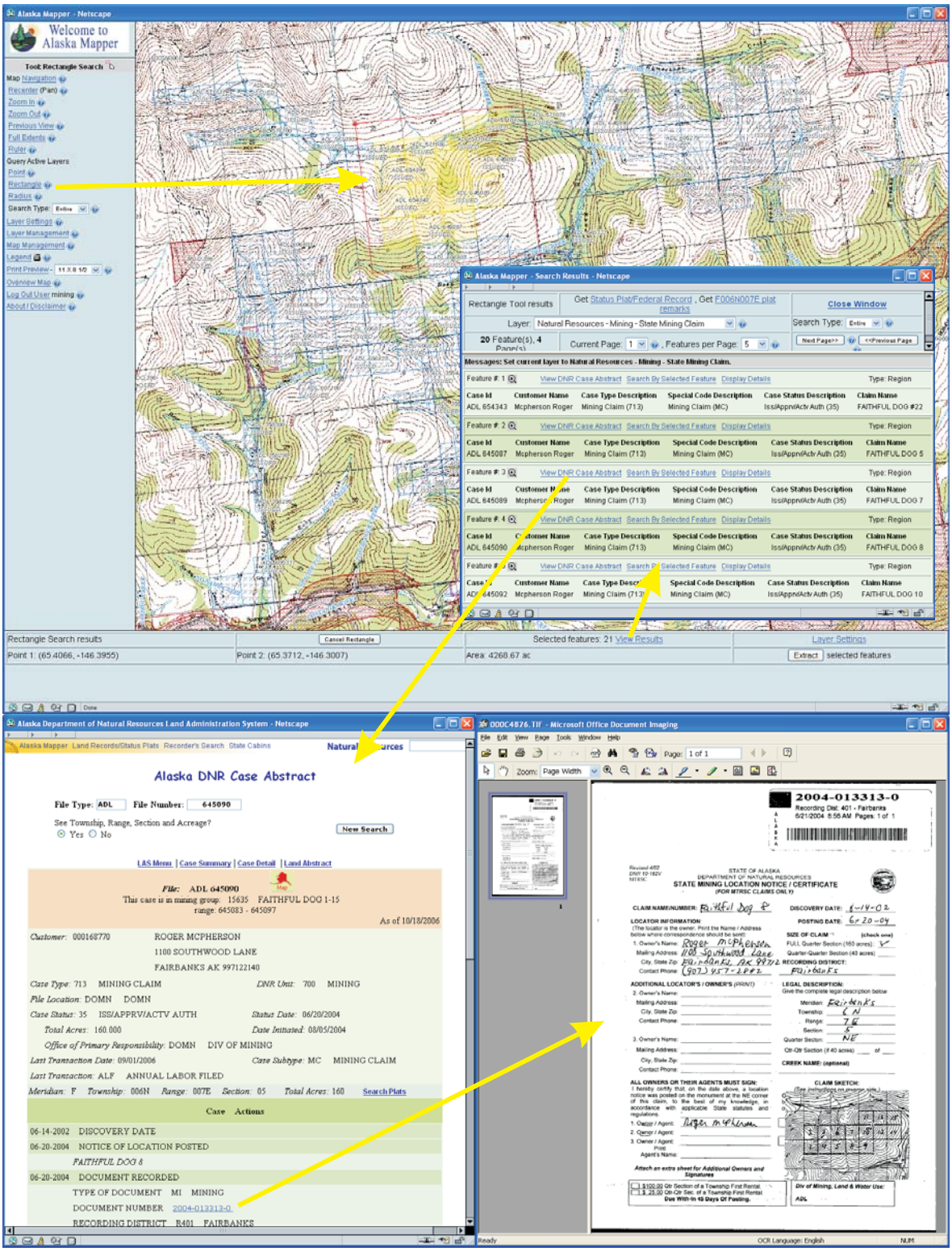

Figure 9. *Federal and State mining claims can be viewed and researched by a web-based interactive mapping tool. The mining claim mapping tool is part of Alaska Department of Natural Resources' "Alaska Mapper" application. The interactive map tool (top) has three frames: a navigation tool frame on the left, the interactive map display on the right, and a status frame on the bottom. Users can graphically select features in the map and display information about the selected features in a pop-up window (middle right). If a detailed case history for a feature is available it can be displayed in an additional window (bottom left). Finally, if recorded documents are available at the Recorders Office, they can be viewed (bottom right) from links in the case history file* <http://www.akmining.info>.

Search Results

Results are displayed in tabular form that allows users numerous options for browsing the bibliographic listings that met the search criteria (fig. 11). The Search Results table includes additional options so that users can view detailed information about an individual bibliographic record, print a formatted list of the bibliographic references, and export the results to a parsed text file or a formatted text file that meets the editorial requirements of USGS *Suggestions to Authors* (Hansen, 1991).

If a user sees an error in any bibliographic entry, there is tool on the detailed listing page (fig. 11) that enables the user to notify the agency responsible for the bibliographic record in the detailed listing.

Any individual publications that are available online are shown in red (fig. 11) in the results table, and are actively linked to the online repository where the publication can be viewed online.

Contributing Agencies

In addition to the tools provided for the public users of the bibliography, tools are provided so that each contributing agency can edit, delete, and add individual records of its publications and holdings. Charging agencies with maintaining their individual contributions will help ensure that the content of the bibliographic database is kept current.

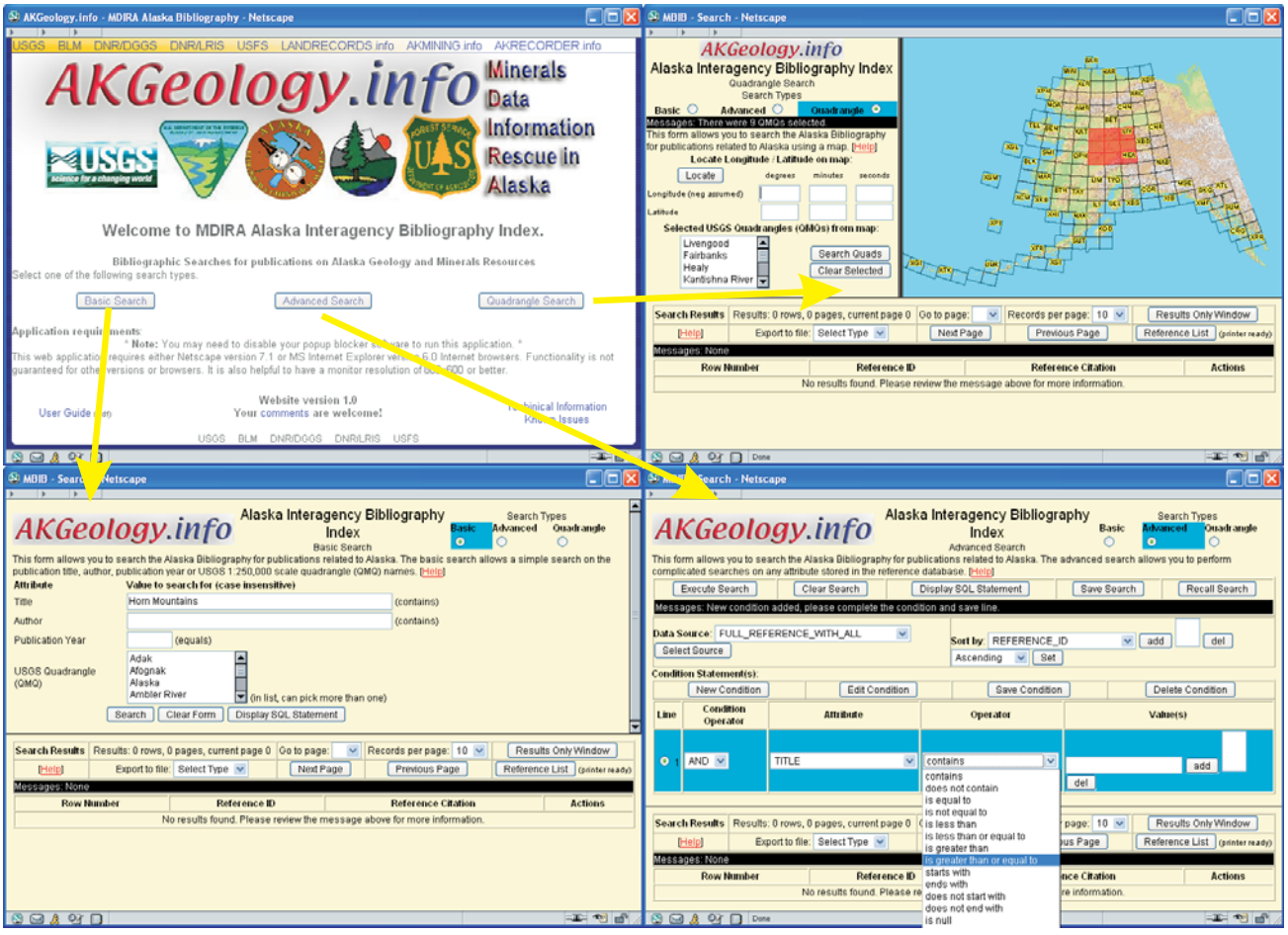

Figure 10. *Interagency Bibliography provides search tools for the statewide bibliography of agency publications of the Alaska Division of Geological & Geophysical Surveys, the U.S. Geological Survey, the U.S. Bureau of Land Management, and the U.S. Bureau of Mines. The Basic Search (lower left) gives users a quick form-based search based on author, title, keyword, publication year, or quadrangle. The Quadrangle Search (upper right) is a map-based search that enables users to outline or point to the part customized Boolean searches of all the bibliographic attributes; a tool allows users to save their search for future use* <http://www.bib.akgeology.info>.

Repositories

As an ongoing part of this bibliography project, legacy publications are scanned and the resulting electronic files are linked to their citation in the database. Newer publications, which frequently are published directly to the web, also are linked through the database. Currently, electronic files of all DGGS publications and those USGS publications that pertain to Alaska are available (fig. 12). When the MDIRA projects are completed (by the end of 2007), all Alaska publications from the USGS, BLM, USBM, and DGGS will be available, and will be indexed in and linked in the Interagency Bibliography at http://bib.akgeology.info.

ONGOING PROJECTS

The next two years should see completion of several ongoing data recovery tasks including the creation and publication of public sector geochemical and geochronologic databases for Alaska.

Geologic Materials

At the Geologic Materials Center in Eagle River the catalog of archived geologic materials, in particular for the U.S. Bureau of Mines samples, DGGS samples, and mining industry "hard rock" core collections, are being updated and overhauled and will be made available on the web over the next two years.

Integrated digital data

Finally, for the AKGeology.info site, a single integrated portal is being created that uses the collaborative model of the Interagency Bibliography and the technology of the Alaska Geologic Map Index and Mining Claim map interface. This portal will provide search, display, and download utilities for all the recovered MDIRA datasets (fig. 13). This new data delivery system is currently in development.

ACKNOWLEDGMENTS

The author played only a small role in the overall project and simply serves as messenger to report a successful collaboration of many agencies and individuals. The U.S. Congress authorized and appropriated funding for the five-year Minerals Data and Information Rescue in Alaska program starting in 1998. The program was administered by the USGS and BLM, with oversight from a liaison committee consisting of stakeholders from the participating agencies and the private sector. Participating agencies include the Alaska Branch of the U.S. Geological Survey Western Region Minerals Division, the Solid Minerals Branch of the Alaska Office of the U.S. Bureau of Land Management, the U.S. Forest Service, the Alaska Division of Geological & Geophysical Surveys, the Alaska Department of Natural Resources Land Records Information Section, the Alaska Resource Library & Information Services, and the Keith B. Mather Library of the Geophysical Institute and International Arctic Research Center at the University of Alaska Fairbanks. This article was expanded from a poster presentation by Freeman and Triplehorn (2005).

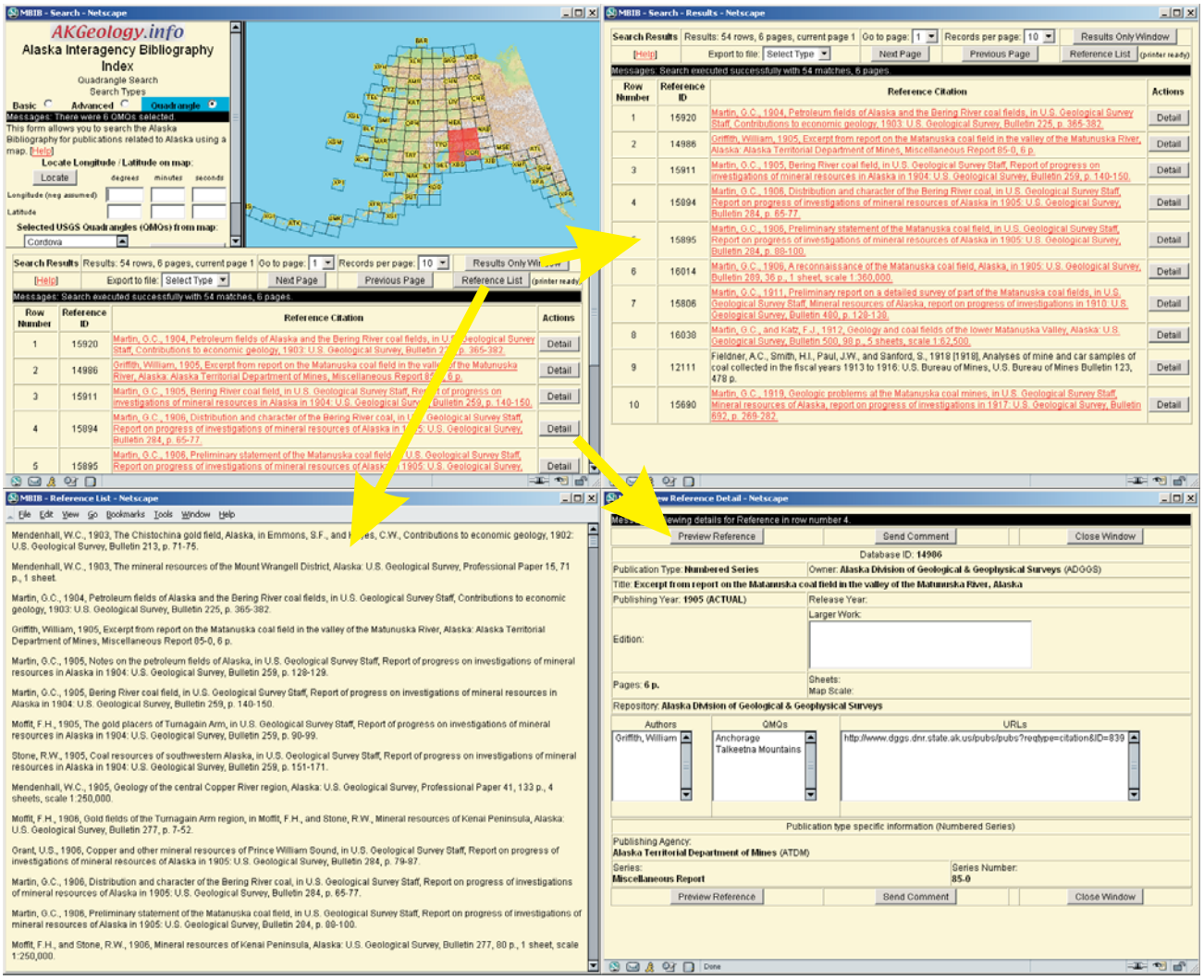

Figure 11. *Interagency Bibliography results are displayed in tabular form in a frame below the search frame (upper left) once a search is issued. Users can enlarge the search results into a results-only window (upper right) and browse through the results. There is an option for viewing the details of the bibliographic listing (lower left); a tool for the user to provide feedback to the contributing agency is available. The result set can be formatted into a printer-ready bibliographic list (lower left), or downloaded as a parsed dataset or a formatted bibliographic list. References that are highlighted in red have links that lead to the repository where the document can be viewed online.*

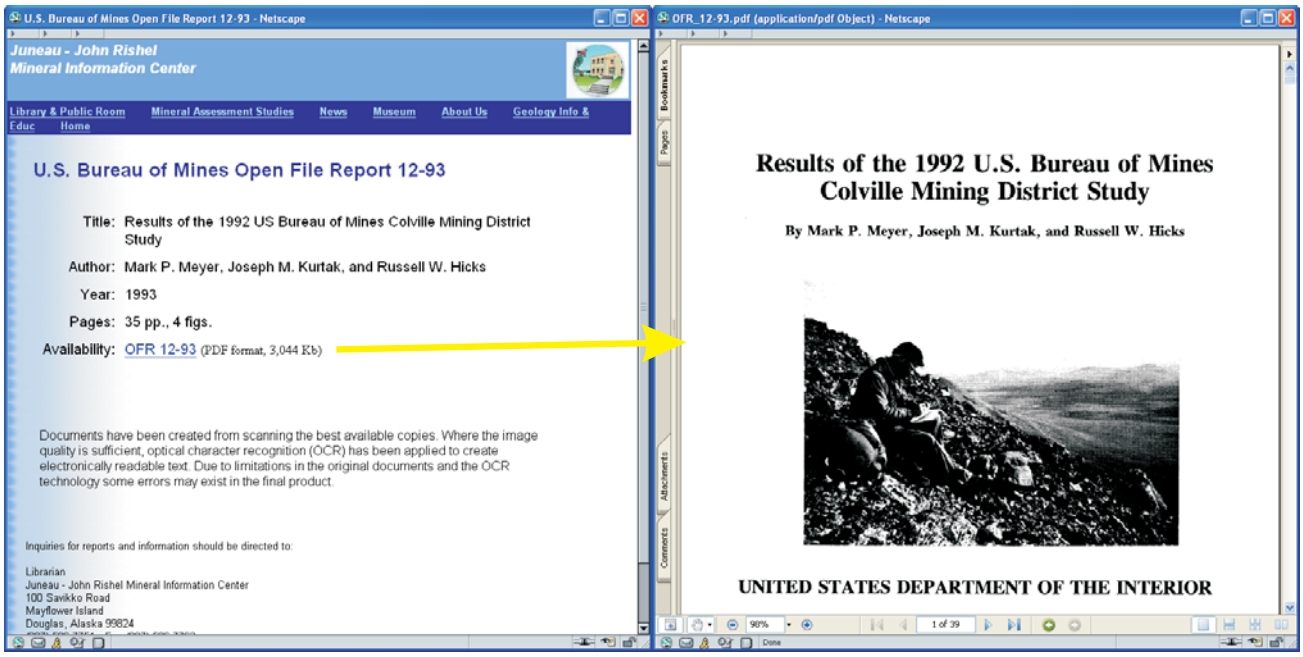

Figure 12. *Online repositories host the agency publications that are listed in the Interagency Bibliography. Typically the link in the Interagency Bibliography will lead to a page that describes the publication and its component files (left). If the documents are available online then there will be a link to the Adobe Acrobat portable document format (PDF) files (right).*

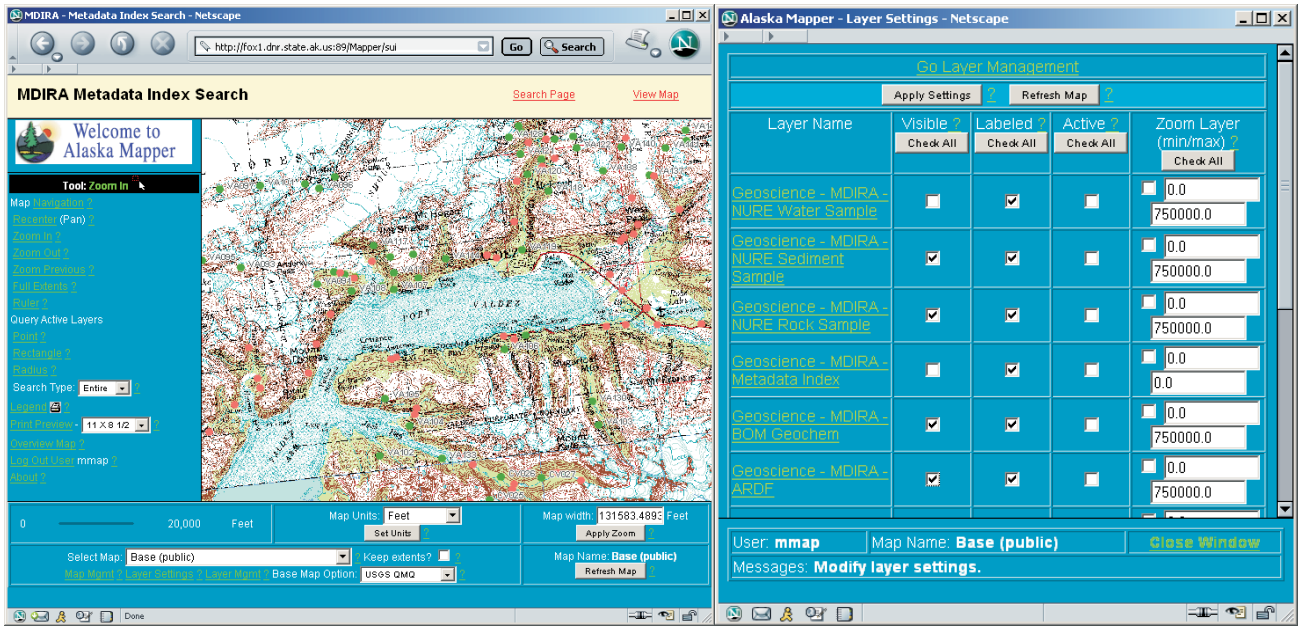

Figure 13. *Alaska Minerals Data Mapper is an application that is being developed to integrate all the datasets that have been recovered and compiled by the Minerals Data and Information Rescue in Alaska program. The data will include bibliographic and data indexes, mineral localities, mining claims, geochemical data, fossil localities, and more. The application will use the same "Alaska Mapper" framework as the geologic map index and the* AKmining.info *interfaces. Users will have the ability to browse and search for data using an interactive map interface, and will be able to download customized datasets. Availability for some of the datasets is expected by the end of 2006.*

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Zhang, Ning, and Blodgett, R.B., 2003, Alaska paleontological database—a versital[sic] tool for geologists in field mapping and terrane analysis [abs.]: Geological Society of America Abstracts with Programs, v. 35, no. 6, September 2003, p. 559 http://gsa.confex.com/gsa/2003AM/finalprogram/abstract_62723.htm