

# Data Access Working Group Meeting

November 17-18, 2003

Golden Buff Conference Room

Boulder, Colorado

## Attendees

Bob Arko – via telecon  
Bruce Caron  
John Caron  
LuAnn Dahlman  
Ben Domenico  
Jack Fellows  
Katy Ginger  
Ted Habermann  
Greg Janée  
Larry Kendall

Tamara Ledley  
Cathy Manduca  
Mary Marlino  
Chuck Meertens  
Dave Mogk  
Rajul Pandya  
Anupma Prakash  
Bill Prothero  
Michael Taber  
Mike Wright

## Access to DAWG Documents

<http://www.dlese.org/workgroups/dawg/index.html>

Email Archive

[http://www.dlese.org/MailingLists/archives/html\\_banner/dawg/maillist.html](http://www.dlese.org/MailingLists/archives/html_banner/dawg/maillist.html)

Meeting Swiki Page

<http://swiki.dlese.org/dawg/>

DAWG Meeting Agenda

[http://www.dlese.org/workgroups/dawg/dawg\\_agenda.html](http://www.dlese.org/workgroups/dawg/dawg_agenda.html)

## Executive Summary

The Data Access Working Group (DAWG) met in Boulder, Colorado on November 17 and 18, 2003. Twenty people—representing data providers, tool and resource developers, and DLESE infrastructure—met with the DLESE Data Services team to discuss strategies for facilitating the use of data in education. The meeting was funded by the National Science Foundation through the DLESE Program Center.

The general goals for the DAWG are to make recommendations to help facilitate data discovery, provide access to data analysis and visualization tools, facilitate the integration of seemingly disparate datasets, facilitate the development of educational resources that utilize data, and to act as an advisory group to the DLESE Data Services team. The goal of the meeting was to develop a practical plan to move data access efforts forward through the next two to three years.

The group reviewed recommendations from the February 2001 DAWG meeting as well as accomplishments that have been attained since that meeting. The group also learned about current work in data access and about NSF's Cyberinfrastructure efforts.

Attendees unanimously supported a recommendation that DLESE offer a specific place in the library for accessing datasets that are in a form useful to developers. The group also generated a list of issues that it might address to increase educational access to data. When individual participants discussed how they would like to contribute to data access efforts, the issues cited for attention most frequently were

- determine appropriate metadata standards for datasets in the library
- develop and distribute guidelines for developers of data-rich educational resources
- develop review criteria that is applicable to datasets, including those that are not part of a "finished" educational product
- facilitate data discovery

The DLESE Data Services team solicited and received input regarding the program and the choice of strategic partners for its first annual Data Services workshops. DAWG attendees agreed to contribute ideas and text to the preparation of position papers on topics related to facilitating data access.

Bruce Caron accepted the position of chair of the DAWG, and the group adopted general guidelines for its operation. The current 12-member DAWG will meet annually in conjunction with the DLESE Data Services workshops; one third of the members will rotate out of the group each year, to be replaced by new members.

## Meeting Summary

### Anticipated Outcomes

[http://www.dlese.org/workgroups/dawg/DAWG\\_Outcomes\\_rev.pdf](http://www.dlese.org/workgroups/dawg/DAWG_Outcomes_rev.pdf)

The general goal for this meeting is to develop a practical plan that provides a coherent structure to move data access efforts forward through the next two to three years.

This goal was formalized by five Expected Meeting Outcomes:

1. Review and possible revision of the charge to the DAWG
2. Statement of how the DAWG will operate and the selection of a chair
3. Review and update of the recommendations made by the previous DAWG and the Developers Workshop
4. Provide guidance on the DLESE Data Services Workshop agenda, after reviewing planning to date, to facilitate successful workshops
5. Provide recommendations of possible strategic partners for DLESE Data Services

## **Review of February 2001 DAWG Meeting Outcomes**

Background information and an overview of the recommendations from the 2001 DAWG meeting were presented.

Correction: Tom Boyd and Cathy Manduca convened the 1<sup>st</sup> DAWG meeting; participants were not self-identified, as reported in a summary document.

2001 DAWG meeting outcomes are posted at:

[http://www.dlese.org/documents/reports/meeting/Feb\\_01/dawg20801\\_outcomes.html](http://www.dlese.org/documents/reports/meeting/Feb_01/dawg20801_outcomes.html)

<http://www.dlese.org/documents/presentations/DAWG/DAWGplan.ppt>

Points from those documents discussed by the group included

1. Develop a “cookbook” on how to use Earth science data in an educational context for teachers (this now exists as the Earth Exploration Toolkit)
2. Create a demonstration project involving integrated access to datasets spanning the Earth systems (THREDDS and DLESE Data Services will help address this)
3. Educational users and people creating data-rich resources don’t have a common vision; they need clearer understanding of each other’s roles (DLESE Data Service Workshops will help address this need)

Several comments were made acknowledging that discussions and contacts made during 1<sup>st</sup> DAWG meeting plus subsequent sessions presented at AGU expanded data access efforts by interesting more people and groups to work on improving data accessibility.

## **A Special Place for Data in the Library?**

Recommendations from the **Using Data in the Classroom report**

[http://serc.carleton.edu/research\\_education/usingdata/report.html](http://serc.carleton.edu/research_education/usingdata/report.html) and the **DLESE**

**Developers’ Workshop 2003: Report on Workshop Outcomes**

[http://www.dlese.org/libdev/workshops/2003\\_Dev/Dev\\_Wkshop\\_Report2003.pdf](http://www.dlese.org/libdev/workshops/2003_Dev/Dev_Wkshop_Report2003.pdf) were

also discussed. This led to a discussion of the idea of identifying a special place in the library for data.

A suggestion was made that a special section of the library be developed for data, to make them available and discoverable through DLESE for researchers and educational resource developers. The Developer’s Workshop report had issued a similar recommendation (Note: The need for this was also expressed in the strands dealing with using data in the classroom at the 2003 DLESE Annual Meeting.) Data providers in the group agreed with the idea as well: they felt that they would benefit from having a clearer pathway for getting data into digital libraries.

It was pointed out that the Using Data in the Classroom Portal already has a mechanism for getting data sets cataloged, utilizing the existing metadata framework. Data providers (like Unidata) pointed out that the huge number of different datasets and the sheer

volume of data produced each day requires automated rather than manual generation of metadata to get these datasets cataloged into digital libraries.

A concern was voiced about introducing materials into the library that are not finished educational products—library users might be overwhelmed with “data” hits, and might not be able to find the educational resources that the library currently contains.

Another potential issue for a Data Section in the library would be quality control. Group discussion touched on how to identify and implement a review mechanism for datasets and what pathways into the library might be provided for materials that don't make it through whatever review process is established.

It was pointed out that because of the inherent difficulty of finding data of the desired granularity, there is no “silver bullet” that will help everyone find every kind of data they want. We need to think carefully about what works from different points of view... What are the best ways to go about discovering data in different situations? How do we provide assistance in data discovery for the whole range of data users? One simple way to increase data access would be to educate users about existing methods to discover data.

## **Significant Work in Data Access for DLESE**

### **1. Data Access Services, Tamara Ledley**

[http://swiki.dlese.org/dawg/uploads/16/DLESE\\_DATA\\_SERVICES.1.ppt](http://swiki.dlese.org/dawg/uploads/16/DLESE_DATA_SERVICES.1.ppt)

Major activities of DLESE Data Services

- Re-start the Data Access Working Group (DAWG)
- Annual Workshops: Bring together data providers, tool developers, educational resource developers, and classroom teachers to increase the use of data in education
- Identify (for cataloging) existing educational modules that utilize Earth science datasets and data analysis tools
- Develop and administer an Earth Science data Needs Assessment instrument to determine the pedagogical needs of educators for Earth science datasets and data analysis tools
- Involve specific data providing organizations as Strategic Partners in Data Access workshops
- Develop Earth Exploration Toolbook chapters to facilitate data use in education
- As follow up to annual Data Access Workshops, generate summary reports of recommendations for data providers, tool developers, and resource developers from output recorded in meeting swikis
- Follow-up with curriculum developers to facilitate completion of EET chapters initiated at the meeting

- The THREDDs project, as a partner of DLESE Data Services, develops middleware to integrate real-time environmental data into online educational materials and digital libraries (DLESE, NSDL)

## **2. Using Data in the Undergraduate Classroom, Cathryn Manduca**

<http://swiki.dlese.org/dawg/uploads/16/UsingDataWorkshops.ppt>

- The **Using Data in the Undergraduate Classroom** report, synthesized from geoscience faculty workshops, summarizes opinions on what faculty wants from data services
- The findings are robust—the same list of answers is generated by virtually every faculty group that is questioned on the subject
- The Cutting Edge’s Using Data portal serves as a method for getting information to developers and as a discovery mechanism

### **Range of current practices in using data**

- Students collect and interpret their own data in the context of a larger data set or model
- Students use existing data sets to answer questions, including asking their own new questions
- Students collect data, develop a model of processes at work, and test the relationship between model predictions and observed data

### **Recommendations for Developers**

Within data-rich educational modules, students need to be able to:

- Find and access data relevant to the topic they are investigating
- Evaluate the quality of this data
- Manipulate data to answer questions
- Combine data sets to solve a central problem
- Generate visualizations and representations that communicate interpretations and conclusions
- Contribute student data to larger data sets
- View individual student data in the context of larger data sets

### **Repeating Themes in data access**

- Finding data is hard for the non-expert
- Data use and exploration will vary dramatically with learning goals, course context, faculty style
- Faculty and students like to adapt and create their own resources
- Learning to use data analysis tools takes time for students and faculty—return must be worth the investment
- Data and tools must be reliable
- Understanding data uncertainty is an important aspect of working with data

## **3. Earth Exploration Toolbook (EET), LuAnn Dahlman**

[http://swiki.dlese.org/dawg/uploads/16/EET\\_DAWG.ppt](http://swiki.dlese.org/dawg/uploads/16/EET_DAWG.ppt)

- The EET is a website that provides concrete guidance for teachers who want their students to learn Earth system science by working with data
- Standalone chapters use a cookbook approach to help teachers become competent data users, providing them with direct practice accessing specific data and tools, manipulating tools appropriately to analyze data, and interpreting results
- Each chapter features a case study that provides a storyline for scientifically valid data analysis
- Authors build EET chapters using a Content Management System. Page templates describe the information to be entered in each field, and an accompanying author's support document describes best practices for building consistent chapters
- Teams of data providers, tool developers, and educators will use the template to build EET chapters at the DLESE Data Services Workshops
- EET offers Professional Development Seminars in which teachers participate in 90-minute online + teleconference hands-on exploration of a single chapter

#### **4. THREDDS, Ben Domenico**

<http://swiki.dlese.org/dawg/uploads/16/THREDDStorDAWG.ppt>

#### **Thematic Real-time Environmental Distributed Data Services**

Traditional Unidata approach to distributing mainly meteorological data--

- Subscription system pushes data to user sites
- Unidata Program Center provides data analysis tools for use on data at user sites

THREDDS Enhancements

- Broader menu of Earth system data
- Local client access from remote servers
- Less arcane, more general and accessible tools
- Integration of data and analysis tools into educational modules and digital libraries
- Serving more than 160 institutions

Unidata's Internet Data Distribution (IDD) has multiple sources injecting 17 Gigabytes of data into the system per day. THREDDS data servers combine IDD "push" of data with several forms of "pull" and DL discovery

THREDDS emphasizes connecting people with data. One goal is to associate the words (text) of science content with available datasets through the development of compound documents: educational modules with embedded analysis tools that access real-time datasets.

## 5. VGEE, Rajul Pandya

[http://swiki.dlese.org/dawg/uploads/16/VGEE\\_DAWG.ppt](http://swiki.dlese.org/dawg/uploads/16/VGEE_DAWG.ppt)

VGEE is a demonstration project about ENSO that embodies an inquiry- and data-based learning environment. It is an instance of a compound document, integrating data access with interactive tools to explore the data, augmented by prepared visualization modules that assist users in interpreting the results of their data analyses.

VGEE integrates

**Documents:** HTML-based multimedia document presents curriculum content

**Tools:** A scientific visualization tool with an interface for students and concept models to inform student data exploration

**Data:** Multiple data sets for exploration from THREDDS catalog

VGEE can also be considered as a developer's tool-kit: educational materials developers can find data sets in THREDDS thematic catalogs (in NSDL/DLESE), find related concept models in DLESE/NSDL, and modify (or build a new interface for) the IDV engine (including importing concept models), using VGEE as a scaffold to build curriculum.

## 6. Users Perspective, Bill Prothero

[http://swiki.dlese.org/dawg/uploads/16/Data\\_Browsers\\_Issues.ppt](http://swiki.dlese.org/dawg/uploads/16/Data_Browsers_Issues.ppt)

[http://swiki.dlese.org/dawg/uploads/16/Whats\\_a\\_profile.mov](http://swiki.dlese.org/dawg/uploads/16/Whats_a_profile.mov)

### **Where does data access and display fit into the big picture?**

- Data users need to construct a mental model that connects a data representation to a physical process or theory and to fit data observation to a theory, including the presentation of results and interpretations

### **In order to use data effectively, students need**

- Easy-to-use data annotation and drawing tools
- Convenient access to information about the data
- Enough theory or background information about the relevant processes

### **Students get overwhelmed by too large a data library**

- Resources should provide enough data to answer a rich range of questions (more than a single student or group would address) yet leave out irrelevant data

### **What to do about the problem of too much data**

- The data deliverer must be strongly connected to the educators that use the data so that appropriate datasets can be selected and the range of potential investigations defined
- Comprehensive examples of how data can be used to investigate interesting phenomena are essential

### **Advice for tool builders/curriculum developers**

- Research based data browsers are often quite complex, making students less likely to use them or the data they distribute—to be useful, data browsers must run on Mac's and PC's

- Make an interface that you would like to use yourself, if you were working with unfamiliar subject matter
- Watch students use your tool and note where they get confused, then fix it
- Be dedicated to “lifetime” maintenance for your products

### **Two Examples of Successful Data Delivery Resources**

- Our Dynamic Planet
- Global Ocean Data Viewer

## **7. UNAVCO/GEON/EarthScope, Chuck Meertens**

[http://swiki.dlese.org/dawg/uploads/16/UNAVCO2\\_DAWG.ppt](http://swiki.dlese.org/dawg/uploads/16/UNAVCO2_DAWG.ppt)

### **Information Technology requirements to make EarthScope data accessible to scientists, educators and the public**

- Reliable and open access to data and products
- Near real-time access
- Handle and store large volumes
- Long-term security
- Complex 4-D datasets
- Integration with analysis, modeling, and visualization tools

EarthScope features a single repository for **metadata**. It uses internet data transfer to simultaneously deliver **data** to users, archives, and processing facilities.

EarthScope’s Common Portal will initially contain links to existing data discovery sites and mechanisms for obtaining data and data products. Ultimately, it will include data handling interfaces that allow processing software to gather data and metadata as well as tools for working with EarthScope science products into these tools.

### **GEON research activities rely on and contribute to improvements in data access**

- Geology map integration—Data compilation for 4D analysis addressing tectonic history of the Northern Rockies (0-15Ma)
- Concept space development—igneous rocks, metamorphic petrology, and integrated determination of crustal structure
- Finite element modeling of tectonic deformation in Western US since the Laramide
- 3D modeling of earthquake records for crustal analysis
- Gravity/Magnetic data compilations and tools development (USGS/NIMA/NOAA collaboration)
- Physical properties database development
- Paleogeography (PGAP) database development
- Yellowstone database development
- Education and DLESE

### **UNAVCO Plans:**

- Convene mini-workshop in January 2004 to discuss software



- architecture for interaction environment and visualization
- Build an Integrated Data Viewer (IDV) Demonstration for GEON
- Use federated middleware that utilizes metadata querying to provide researchers with API-level data access so they can concentrate on science rather than on technology

## **How Should the DAWG Evolve from Here?**

<http://swiki.dlese.org/dawg/uploads/16/StrategyGoalsStrawman.ppt>

### **DAWG Strategy and Goals**

1. Facilitate discovery across distributed data archives
2. Provide tools to help instructors and learners parse, process, and visualize datasets
3. Facilitate the integration of seemingly disparate datasets
4. Facilitate the development and dissemination of educational content that utilizes datasets and datastreams

In addition to these original goals of the 1<sup>st</sup> DAWG, a fifth goal was added:

5. Review and update the goals that will be integrated into the activities of the DLESE Data Services

This statement met with general agreement that the DAWG will act as an advisory group to the DLESE Data Services Team. The need for practical goals and plans, including specific tasks for different groups was pointed out as well.

### **Afternoon Discussion: What should the DAWG do?**

The group discussed a number of recurring issues in data access, but had difficulty prioritizing just a few issues for more in-depth discussion. The following list of issues was compiled throughout the afternoon as a menu of items the DAWG might address. Many of the discussion comments that led up to or followed these items being placed on the list appear in the Discussion Points document, available at [http://swiki.dlese.org/dawg/uploads/16/discussion\\_points.doc](http://swiki.dlese.org/dawg/uploads/16/discussion_points.doc)

### **Issues the DAWG might address**

1. If DLESE will cover the full spectrum from developer to student - what metadata standards will be needed for data contributions?
2. How do we get people to create these metadata?
3. DAWG should generate and distribute guidelines for developers of data-rich educational resources. More inclusively, they should characterize and advertise such support services for developers
4. Evaluation
5. Quality
6. Data discovery
7. Strategic partners
8. What kinds of data are needed?
9. What kind of infrastructure and/or visualization tools are needed
10. Tell NASA what we want in the way of data-rich resources

### **Input for DLESE Data Services workshops**

- Each annual workshop will have about 14 different groups of data providers represented
- Data Services team asked DAWG attendees to consider which data providers should be chosen as strategic partners and which groups should be invited to the workshops
- Strategic partner ideas include having more intensive interaction with the partner groups before, during, and after the workshops so we can learn what's working and what isn't in the efforts to develop data-rich educational resources
- Choosing any group as one of the strategic partners would also be a way to ensure that the group would participate in the workshop
- Data Services may choose to work each workshop around a theme – want partners with rich data for application who also have vested interest in this area – choosing partners that cross disciplines that would be important to cyberinfrastructure – real time local models an area of interest
- Workshop theme suggestions included:
  - hydrology
  - plate tectonics
  - carbon cycle
  - land use change
  - climate change
  - severe weather hazards
  - ocean systems
  - evolution of earth - earth history
  - planetary evolution

### **NSF's CyberInfrastructure Efforts**

<http://swiki.dlese.org/dawg/uploads/16/CyberInfrastructure.ppt>

Information from a recent NSF meeting on Cyberinfrastructure in the Geosciences was summarized. Discussion focused on opportunities for DLESE and the potential influences that CI might have on digital libraries and education.

In the near future, NSF envisions an environment of ubiquitous computing, where the public will want unlimited information access 24 hours a day, wherever they are. Cyberinfrastructure efforts intend to bring recent advances in computer science together with other science disciplines to make this possible.

Cyberinfrastructure is a follow on of the Information Technology Research program ("Son of ITR"). The NSF report, *Revolutionizing Science and Engineering through Cyberinfrastructure* is the driving force behind these efforts. The report is commonly referred to as the "Atkins Report" after Dan Atkins, chair of NSF's Advisory Committee for Cyberinfrastructure. The report recommends spending \$1 billion per year on CI efforts.

Recommendations from the NSF workshop:

- Establish a technology forum for sharing and learning
- Create partnership projects that integrate domain science and computer science for research and education
- Recognize that a balance is needed between an investment in innovation and the provision of reliable services involving long term support (“everything is an experiment”)
- Initially, focus on a few narrow efforts, as opposed to broad and shallow
- Recognize education as a first class partner

NSF is still sorting out several issues. These include questions of service, centralization, planning, security, access control, data discovery in digital libraries, and workforce issues. It’s possible that the first CI solicitation from NSF will appear in FY 05.

## **Wrap up Discussions**

Based on the list of issues identified the previous day, attendees offered comments on what they thought should be done to facilitate the use of data in education, and gave descriptions of their perceived roles in these efforts.

Of the ten issues that the DAWG might address:

1. Determine metadata standards for data for the broad spectrum of users
2. Develop/distribute guidelines for developers of data-rich educational resources
3. Characterize support services for spectrum of developers
4. Evaluation
5. Quality—develop a part of the DLESE review criteria that is applicable to datasets, including those that are not in a “finished” educational product
6. Facilitating Data discovery
7. Strategic partners for DDS
8. What kinds of data are needed
9. What kinds of infrastructure are needed: tools and middleware
10. Tell NASA what we want

The **items cited most frequently** for action by attendees were:

1. Determine metadata standards for data for the broad spectrum of users
2. Develop/distribute guidelines for developers of data-rich educational resources
5. Quality—develop a part of the DLESE review criteria that is applicable to datasets, including those that are not in a “finished” educational product
6. Facilitating data discovery

The group established general consensus for the following statement:

**“There is a need for a place in DLESE for datasets in a form useful to developers.”**

In order to implement this recommendation effectively, it was stated that the following issues would need to be addressed at some level:

- How should datasets be described (will new or different metadata standards be required to appropriately characterize these data?)
- How would developers be encouraged to use this resource and disseminate derivative resources?
- How could online developer communities be formed and maintained?

The following four areas were put forth as important for facilitating the educational use of Earth data:

1. Facilitating discovery and visualization of data
2. Development and dissemination of teaching resources that utilize datasets and data analysis tools
3. Professional development of educators to enable and encourage use of these tools
4. Support independent learning from data

### **Position Papers**

A suggestion was made that the DAWG produce and distribute a position paper to data providers so they know what educators want. The group was reminded that two reports will come out of Data Service workshops, one of which will address this issue.

The idea to generate and distribute position papers on a variety of topics was agreed upon. DAWG participants agreed that they would each submit a few paragraphs of writing on various topics to get started, then the group would put out a broad call to the DLESE community for input into a first draft. Once the first draft is prepared, another call for additional responses should be made. This would help establish community buy-in, an essential ingredient if the content of the papers are to be considered and adopted by the DLESE community.

The DAWG Swiki offers a mechanism for working on these position papers. Each paper would have an editor to put in final form. This group should try to get drafts together within the next couple of months.

- Possible topics for position papers included
  - Description of multiple pathways data is used in research and education (draw the cascading process)
  - Code and graphic reusability (a middleware perspective)
  - Metadata standards for data in the library
  - Guidelines/checklist for developers
- Action Plan:
  - On the DAWG Swiki, create a page listing all the possible topics for position papers (there are currently no plans to require passwords to protect the Swiki)
  - Create a page for every potential topic with at least one person assigned as the lead editor
  - Participants contribute paragraphs to all topics for which they have input, indicating their initials/name

- Editor puts text into draft paper form (editors not yet determined), and notifies DAWG to solicit input from DLESE community
- Resulting papers should be distributed broadly to the geoscience and digital library communities (i.e. articles in EOS, GeoEd listserv)

## **Outcomes**

### **1. Review and possible revision of the charge to the DAWG**

The original charge to the DAWG was left intact, and one additional goal was added. The responsibility of the DAWG is to:

1. Facilitate discovery across distributed data archives
2. Provide tools to help instructors and learners parse, process, and visualize datasets
3. Facilitate the integration of seemingly disparate datasets
4. Facilitate the development and dissemination of educational content that utilizes datasets and datastreams
5. Review and update the goals that will be integrated into the activities of the DLESE Data Services

### **2. Statement of DAWG operation and the selection of a chair**

Bruce Caron agreed to be the chair of this working group, and the group agreed to meet once per year, in conjunction with the annual DLESE Data Services workshop. The group will keep all its current members through the May 2004 Data Services Workshop, then begin rotating one third of the members off and replacing them with new members. Members will serve for two years. The DAWG currently includes 12 members. It might benefit from including input from a classroom educator and/or scientists.

After the meeting, it was determined that the DAWG will report to the DLESE Data Services group, and the MC will be kept apprised of the DAWG's activities and recommendations by the Data Services team. Ted Haberman will act as the Steering Committee's liaison to the DAWG, to keep the Steering Committee apprised of the DAWG's activities.

### **3. Review and update of the recommendations made by the previous DAWG and the Developers Workshop.**

Attendees agreed to contribute ideas and text to the preparation of position papers on the following topics.

1. A "best practices" document for educational resource developers that would embody the collected wisdom of individuals who have done work in the field
2. A document to illustrate the range of pathways data takes from raw, binary code to educational data products
3. Designing for reusability
4. Metadata issues for resource developers
5. Guidelines for data providers on how to make it easy for resource developers and educators to access and use your data

**4. Provide guidance on the DLESE Data Services Workshop agenda, after reviewing planning to date, to facilitate successful workshops.**

The group considered a list of data providers as potential strategic partners for the DLESE Data Services workshops and identified themes around which the group can focus its strategic partner efforts.

On Wednesday, November 19, immediately following the DAWG meeting, the DLESE Data Services team met to work on details for the May 2004 Data Services Workshop. Input from attendees helped to shape the draft agenda for the meeting, and further DAWG input will be solicited as plans are solidified.

**5. Provide recommendations of possible strategic partners for DLESE Data Services.**

A spreadsheet of data providers that are potential strategic partners was examined during the DAWG meeting. Following discussions by the Data Services team, the spreadsheet has been enhanced and distributed to the DAWG email list, with a request that members and attendees offer their opinions on which data providers would be likely to have the largest positive effects in facilitating data use if they were chosen as strategic partners for the Data Services Workshops.