

STRATEGIC PLAN

Version 12.0, October 29, 2001

Statement of vision

The mission of the Digital Library for Earth System Education (DLESE) is:

To improve the quality, quantity, and efficiency of teaching and learning about the Earth system, by developing, managing, and providing access to high quality educational resources and supporting services through a community-based, distributed digital library.

To achieve this vision, DLESE aims to be the source of first choice for resources and services that facilitate learning about the Earth system at all levels, in all environments: K-16, continuing education and professional development, learning in informal settings, and personal and independent learning. As such, DLESE will serve as a focus for earth system education.

DLESE is a federated organization (<http://www.dlese.org> - policies), with collaborating partners, serving the interests of a large and diverse community. Collaborating partners work with DLESE to further its aims, and have their own objectives that are compatible with those of DLESE.

DLESE aims to be a community-based organization and facilitate community activities, building on the rich heritage of traditional libraries. DLESE adds dimensions to library services and resources that were previously unimaginable:

- instantaneous, global distribution of information according to specific user needs
- effective access from the user's location, to resources and services in support of Earth system teaching and learning, distributed among many sites, through common access protocols
- access to real-time and archived datasets, and the ability to render this information in ways useful and meaningful to the widest range of users
- creation of new, virtual communities of educators and scholars who are both users of the library and also among its most important contributors

DLESE's role as a community-based and led organization is strengthened by its system of governance, which places ownership and direction in the hands of the user community.

DLESE supports Earth system education in numerous ways:

- in the development of reviewed collections of high-quality materials for instruction at all levels and covering all components of the Earth system
- by providing access to Earth datasets and imagery, including the tools and interfaces that will enable their effective use
- through the development of discovery and distribution systems and support services

- that allow users to find, create, and use materials easily and efficiently
- through new communication networks to facilitate interactions and collaborations across all aspects of Earth system education

At the heart of DLESE is a set of *core functions*. A function is defined as part of the core if it is essential to the library, such that its removal would jeopardize the entire library. Core functions may be *distributed* across several institutions as DLESE develops. In addition, DLESE engages with other organizations, groups, and individuals interested in extensions of those functions if such engagement contributes to the mission of DLESE.

Goals of DLESE

The following goals express the distinct ways in which DLESE aims to achieve its mission, and define its core functions:

G1. Collection-building goal

To assemble and foster the creation of educational materials from the community that are rich in science content; diverse in format, content, and topics covered; fresh, dynamic, and interactive; instructor-ready; and integrative across traditional disciplines.

G2. Community-building goal

To develop a community of Earth science educators and scholars that owns and governs DLESE, and uses and contributes to its collections and services.

G3. Library services goal

To provide the community with a suite of services that facilitate creation, discovery, assessment, and use of resources, as well as community networks.

G4. Data access goal

To improve the accessibility and use of data resources in support of Earth science education.

G5. Diversity goal

To build a community that includes all learners, and a library that achieves its mission with respect to all and is sensitive to the needs of all.

G6: Research goal

To increase the body of knowledge on digital library development, innovation, and sustainability; and on the impact of digital libraries on learning and the development of electronic communities.

Strategies and tactics

51. Governance

To strengthen the sense of ownership of DLESE by the community, the community's engagement in the governance of DLESE, and the responsiveness of DLESE to the community.

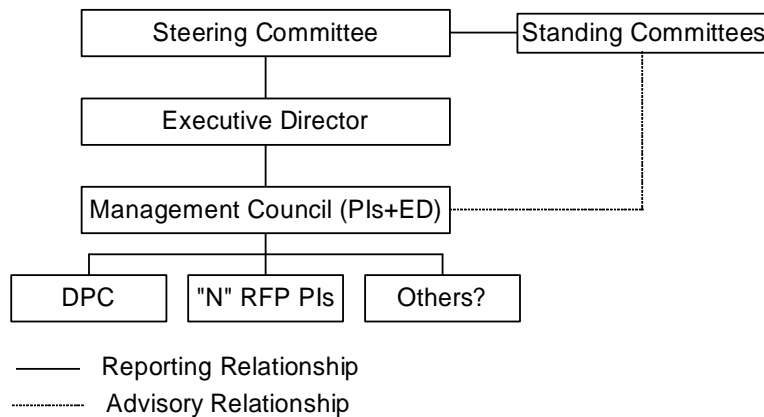
The DLESE governance strategy contributes to all goals by providing a strong framework for development of policy. It particularly contributes to Goal G2 by asserting the role of the community in the governance of DLESE; and will also contribute to Goal G5 by providing representation for traditionally under-represented groups.

DLESE is governed by the community through the Steering Committee, Standing Committees, the Management Council—which includes the Council of PIs—and other forums. The Steering Committee is responsible for strategic planning, for identifying core functions, and for identifying what policies are needed for DLESE core functions. The Steering Committee is charged to set policies that find appropriate balances between technological advancement and responsiveness to community needs; and between centralization and decentralization of DLESE operations. The Steering Committee is charged to enfranchise all of the partners contributing to DLESE, to attract new partners to the DLESE federation, and to create a sense of communal responsibility for contributing to and promoting the effectiveness of DLESE.

The Steering Committee gathers input from its Standing Committees, from the Executive Director and Management Council, and directly from the community. The Executive Director is selected with the guidance of the Steering Committee. Members of the Steering Committee are elected by the community, and serve for terms of three years. The Steering Committee receives guidance from four advisory groups, the Standing Committees. These are: Collections, Users, Services, and Technology. The chairs of the standing committees meet regularly with the Steering Committee. Standing Committees are essential to carrying out DLESE goals, as they provide mechanisms for broader community involvement, and undertake projects and activities appropriate to their charges. Other details concerning the committees and general governance are laid out in the *DLESE Community Plan*, p. 25-27, and in “Appendix II: A Governance Plan for DLESE” of the *DLESE Community Plan* (Manduca and Mogk, 2000).

The Management Council is composed of the Executive Director, Principal Investigators for core library functions, and Principal Investigators of individual projects that contribute to, support, and complement DLESE's mission. The Management Council provides opportunities for exchange of information and coordination of effort in areas that intersect with the mission of DLESE. The Management Council interacts with the Steering and Standing Committees (governance/policy considerations); working primarily with the Executive Director (see Figure 1). Management Council meetings are held at regular intervals throughout the year.

Figure 1: Distributed Model



SIT1: Clarify and implement the community election process to provide turnover and comprehensive representation on the Steering Committee and its Standing Committees.

SIT2: Work to improve the social diversity of the Steering Committee and its Standing Committees.

SIT3: Increase the visibility of the Steering Committee and Standing Committees and their activities in the community.

SIT4: Develop a formal, budget-supported mechanism by which development recommendations that come from Standing Committees, Management Council, and other working groups/interest groups can be assessed for feasibility and cost benefit, prioritized, and, where appropriate, implemented.

SIT5: Define the mandate, criteria for membership, and funding mechanism for the Management Council.

SIT6: Develop policies relating to key issues (e.g. intellectual property and privacy) in the near term (by January 2002), and develop other policies as needed over the next two to three years.

SIT7: Work to ensure that the membership of the Steering Committee and Standing Committees reflects the full range of disciplines engaged in studies of the Earth system.

S2. Management

To provide strong, coordinated, and flexible management of DLESE operations and core functions. To implement policies established by the Steering Committee, balance the priorities of competing goals, provide long-term continuity, and integrate the different dimensions of DLESE into a coherent whole.

Currently, management is provided by a group of principal investigators funded

[primarily by the National Science Foundation (NSF)] for some core DLESE operations, coordinated through the DLESE Program Center. This management model allows for decision-making by a small group of individuals, and was envisaged as the preferred model for the library prototype effort(s) funded in 1999 and 2000. The management group currently receives guidance and oversight from the Steering Committee.

During the next five years, management structures will certainly change, as the library grows and evolves. The directions that these changes will take are still under discussion within the Steering Committee and at NSF, and relate to both operational needs and likely NSF funding levels. One possible scenario is that management may become distributed across several centers (library services, community, collections) in the next five years. Another possible scenario is that the Executive Director's office may relocate to the Washington, D. C. area within the next two to three years.

In the interim (September 2001-September 2002), the Steering Committee, together with the current management group, has proposed that a part-time, interim Executive Director be charged with management of DLESE's core functions. He/she will ensure the integrity of the core functions in relation to the mission and goals of DLESE, facilitate linkages between DLESE core functions and DLESE-related efforts, and ensure that the policies of the library are carried out. The Executive Director communicates with the Steering Committee on a regular basis. The Executive Director serves with the support and at the direction of the Steering Committee.

The Co-Directors are managers responsible for the day-to-day operations of the core functions of DLESE. They serve with the support and direction of the Steering Committee on the recommendation of the Executive Director (ED). The Co-Directors and the Executive Director form the core of the Management Council, chaired by the Executive Director. The Management Council will also include all lead Principal Investigators funded for DLESE-related projects, and who have "deliverables" needed to ensure the success of the library. Appropriate agreements will need to be signed between the Executive Director's institution and PI institutions to provide the effective authority and accountability between the ED and PI.

S2M1: Put the management structure in place immediately (September 2001), for a part-time Executive Director to coordinate core functions across core project managers and institutions.

S2M2: Develop a plan for the next phase (post-September 2002) of DLESE management starting in November 2001.

S3. Operations

To provide a reliable, stable, and responsive set of services to the user community in support of the core functions of the library.

The DLESE Program Center (DPC) and other centers that may arise in the coming years provide some of the core management and operational functions necessary to ensure that DLESE meets its goals. Core functions will likely include services related to collection

building (solicitation, ingest, cataloging, evaluation/review, maintenance), community building (outreach, the annual assembly, discussion groups and bulletin boards), and library service delivery (search, discovery, browse, access, retrieval, visualization, analysis). These services must be perceived by the community to be reliable, technologically superior, and of the highest quality. The DPC (and other Centers) aim to make it possible for other DLESE-related projects to work with core systems (e.g., Discovery). Operations are under the day-to-day oversight of the DLESE project managers at individual centers, who are responsible for budgeting and resource allocation, recruitment, and staff evaluation for their projects.

The core functions of the library represent potentially independent priorities that must compete for a fixed level of resources. The management group is responsible for the setting of specific priorities consistent with DLESE policies. The technical investments needed to achieve operational status for the library's basic services, including services needed to support the community-building and collection-building processes, are expensive and should be given higher priority in the short term. In the longer term (once the basic services are established and before reaching full operational status) higher priority should be given to building the collection, and to building a high level of community interest in the library. DLESE must be actively promoted; a "build it and they will come" strategy alone will not result in the desired levels of utilization, and will not be adequately responsive to expressed community needs.

S3T1: Shift priorities in the allocation of resources during the next five years, from a higher rate of initial, centralized investment in technical services to higher rates of decentralized investment in collection-building and community-building.

S3T2: Promote DLESE services proactively among the user community in advance of full operational status.

It is important that DLESE not announce full operational status until all of its core functions have reached a sufficient level of maturity and reliability. Specifically, operational status will not be reached until there is a sufficient collection to satisfy the community's needs; until the community has become sufficiently engaged with DLESE and the community center has reached operational status; and until the delivery of library services has reached a sufficient level of stability and reliability. As the community will be fully engaged in all aspects of design, construction, and testing of the library, the definition of "fully operational" will be determined in part through assessment of the library effort by community members, through governance and outreach efforts.

S3T3: Achieve operational status in three stages: Version 1 ("A good start", released August 2001); Version 2 ("A library that is both useful and used", June 2003); and Version 3 ("Demonstrable impact", June 2005).

The table at the conclusion of this document lays out tentative thoughts on the desirable characteristics of each version on four dimensions, as follows:

1. Web dimension: A characterization of the major new features the user will see when interacting with DLESE web sites
2. Data dimension: A characterization of the services related to Goal G4
3. Use dimension: A characterization of the anticipated use (volume) and users (background and setting) the version is targeted at reaching
4. Building dimension: A characterization of the library building process, including partners, governance, and processes in place to enable maintenance, operations, and growth to support the target features, users, and anticipated use

Users of DLESE will expect its services to be reliable, over the period of advertised availability. The costs of maintaining such levels of service are high, requiring staff at center(s) to address problems rapidly, and to respond to calls for assistance. DLESE management must decide on the best balance between user expectations and cost, and ensure that the user community is fully informed of the schedule of availability of DLESE services.

S3T4: Determine and implement a schedule of service availability that is supportable given DLESE resources, and acceptable to a demanding user community.

S4. Technical development

To play a leading role in the assessment and exploitation of educational applications of new digital library technologies.

DLESE is a pioneering effort to exploit digital library technology in the interests of education, and is widely recognized as such. As noted in the statement of vision and Goal G6, DLESE attempts to extend the role of the traditional library by taking advantage of the power of information technology and communication networks. Technological developments are expected to continue and to accelerate, over the next few years. Thus it is essential that DLESE continue to keep abreast of these developments, and to assess their usefulness in reaching its goals.

Over the next few years many new developments in digital library technology will be incorporated in the National SMETE (Science, Mathematics, Engineering, Technology Education) Digital Library (NSDL). DLESE already has strong links with NSDL, and will be in an excellent position to capitalize on these developments. NSDL will also grow as an umbrella for discipline-oriented libraries such as DLESE, promoting common services and increased interoperability.

S4T1: Continue to play a leadership role in the application of digital library technology to education, with the advice of the Technology Standing Committee, and through interaction with NSDL and other initiatives.

S4T2: Interact with NSDL and monitor its development closely, to take advantage of new technologies, to provide useful advice to NSDL based on DLESE experience, and to ensure that DLESE is a substantial component of NSDL.

As the collection grows, users may value both precise search services, and also less precise services that allow browsing through the collection, supported by innovative techniques for visualizing large numbers of items in summary form.

S4T3: Explore the development of innovative browsing and visualization functions in addition to other forms of search (e.g., metadata-based searches).

Users should be able to access DLESE and other digital library resources simultaneously. This will require a degree of interoperability between digital libraries, a suitable topic for NSDL.

S4T4: Work with NSDL to ensure interoperability between DLESE and other digital libraries with educational objectives, particularly in disciplines that overlap or are strongly related to the Earth system sciences.

DLESE's user community is large and diverse, ranging across the full spectrum of education. Customized user interfaces that respond to individual needs will help users to feel more engaged with DLESE and add value to its services.

S4T5: Explore the development of customized and personalized user interfaces.

Unlike a traditional library, with its pre-defined constituency, the user community of a digital library like DLESE develops through a feedback loop: the collection attracts some users, whose desires and interests then influence the scope and balance of the collection, which then attracts the subsequent users. This environment calls for new conceptual and technological approaches to Collections Assessment, the librarian's formal process of comparing the actual collection with the desired collection. The digital nature of the library allows one to capture and analyze new kinds of information about both the desired collection (e.g., requests made to the Discovery System) and the actual collection (e.g., determining the patterns and frequency of combination of attributes across the collection).

S4T6: Exploit the digital nature of the library to develop new approaches to Collections Assessment suited for a library-without-walls, digitally capturing information about both the desired collection and the actual collection, and synthesizing this information in a way that can guide future development of the collection.

Users come to DLESE expecting to find high quality educational resources. In a traditional library, decisions about what items to acquire and to de-accession are made by professional librarians guided by well-defined budgets, and their knowledge of the needs of their pre-defined constituencies. DLESE depends on a combination of technologically-mediated information-gathering mechanisms, and community input, to guide decisions about what to include (and exclude) from the DLESE Broad and Reviewed Collections.

S4T7: Assess technologically-mediated information-gathering mechanisms with respect to their cost and/or feasibility, and their respective impacts on collections strategies, de-

accessioning, and the distributed nature of DLESE holdings.

S5. Collections and services development

To build collections consistent with Goal G1, and associated services for accession, evaluation, and de-accession; and to provide access to the collection together with services which add to the collections' values to user communities.

The DLESE collection will reference and facilitate the creation and contribution of materials from both the traditional Earth sciences, as well as integrative and cross-disciplinary materials that explore the Earth system as a whole. It will focus particularly on supporting materials that access and emphasize the emerging, exciting science at the interface between the traditional disciplines in earth systems sciences.

DLESE focuses on empowering the community to contribute and use materials by being a provider of services and a developer of tools. It develops systems for resource review, collections management, discovery, and collections assessment, allowing materials to remain in the hands of contributors, while being accessed, reviewed, and used by the community. DLESE is proactive in shaping the contents of the distributed collection, in accordance with DLESE goals, so that integrated, thematic collections that address the full range of Earth system sciences are created.

DLESE develops the metadata standards, and tools for metadata creation, that add value to collections by providing the basis for search, discovery, and assessment of fitness for use. DLESE's metadata schema is as compatible as possible with approaches used by other organizations, to enhance interoperability, and takes advantage of approaches developed in other, related areas, such as metadata schemata for geospatial data or for instructional materials.

The quality of the collection is assured through multiple accession review processes, through on-going evaluation and assessment by the community, through evaluation of demand, and through de-accession policies. These processes ensure that the collection is up-to-date and relevant to the changing needs of the Earth system science education community. DLESE's collections are maintained within clearly defined and well-publicized policies regarding intellectual property, privacy, and liability.

S5T1: Develop policies and procedures for accession and de-accession, determination of pre-accession review systems, collections assessment, and community-based collections definitions, by January 2002. This task will be carried out by the Steering Committee, following recommendations by the Collections Standing Committee, with substantial input from current DPC principal investigators, and other investigators funded by NSDL-based efforts.

As stated in DLESE's vision statement, DLESE is a distributed effort that requires the intellectual products of diverse creators and contributors. Many of these contributors will not be familiar with metadata schemata or interoperability considerations, and will need assistance from other creators.

S5T2: Develop strategies and allocate sufficient resources for DPC and/or other associated centers to assist creators of materials to link effectively to DLESE, and to create materials that employ “best practices” in design and content delivery.

Traditional libraries are much more than catalogs and collections of resources for shared use. Services and activities taking place in libraries support the culture of inquiry and learning and the use of resources, while community activities and networking are supported in the design of library spaces and in their administration. DLESE aims to emulate this rich heritage by creating virtual spaces, services, and activities that support teaching and learning about the Earth. This is particularly critical at this time when a collective community voice engaging the full breadth of the research and education in the geosciences is needed and both content and pedagogy are undergoing rapid change.

S5T3: Develop user services that take full advantage of technological capabilities, and which provide for forums and platforms for user interactions and community activities, relating to teaching and learning about the Earth.

In addition to the collections, users may value more personalized services, such as the ability to build personal collections of materials of particular interest.

S5T4: Explore the potential for personalized library services supported by DLESE that would allow users to maintain tailored personal collections.

S6. Community development

To take the necessary steps to develop a community of users, owners, and contributors, consistent with Goals G2 and G5.

The nature of DLESE as a community-owned enterprise must be reflected in all aspects of its operations. DLESE-supported staff and operations must be responsive to and driven by community needs. Although DLESE’s nature at the technological cutting edge gives it a leadership role, that role is viable only in so far as it addresses the expressed needs of the community.

Many potential users of DLESE will not enjoy the levels of access that are assumed to be normal by members of the academic community. Schools frequently block access to certain web sites, or interpose firewalls of various kinds. Bandwidth and computer access is very limited in some schools, and teachers often do not have high-bandwidth connections from home. Large areas of the world are effectively without Internet access, and many potential users of DLESE find themselves on the other side of the digital divide. For some users CDs and diskettes sent by mail may be the most realistic approach to distribution of materials.

S6T1: Develop and adopt technological solutions that address the special needs of users with low-bandwidth connections, or no connections at all.

S6T2: Sensitize all aspects of DLESE websites to issues of gender, race, age, ethnicity,

and disability.

The context in which students learn about the Earth system varies greatly, and includes urban students who have little or no personal knowledge of the natural environment. Language issues are also important in many areas, and can be addressed by specially tailored materials.

S6T3: Develop mechanisms to identify and disseminate materials that are effective with students whose backgrounds create special problems or opportunities with respect to Earth systems science.

Potential users of DLESE must be made aware of the library, and given the opportunity to use it and contribute to it. While the user community is comparatively small the annual assembly is a useful mechanism for outreach. But as the community grows this mechanism will not scale, and must be augmented by other mechanisms.

S6T4: Hold an annual DLESE assembly for the national community, with sessions on aspects of the library and sessions to collect user input. Explore whether a “virtual” annual assembly, allowing for more individuals to participate in library governance and oversight, will be a cost-effective avenue given continued community growth.

S6T5: Establish a DLESE presence at national and regional meetings of all Earth science disciplines.

S6T6: Develop links with national disciplinary organizations, and leverage their ability to raise awareness of DLESE within their own communities. Develop links with state departments of education to explore the need for specialized services that align with specific state standards and state-based resources.

A strong community must feel a sense of ownership of the library, and must have a real role in its affairs. DLESE decision-making and deliberations must be conducted in an open fashion. Contributors to the library must realize substantial personal benefits, by being rewarded professionally for their efforts.

S6T7: Exploit technologies that open DLESE meetings to the community in a cost-effective fashion, and provide opportunities for community input.

S6T8: Develop mechanisms that provide meaningful recognition to contributors in ways designed to influence professional advancement.

S7. Evaluation

To evaluate the quality and impact of DLESE continuously, at all levels (individual resources, collections, community, and “library as a whole”), and to use the results of evaluation in determining future directions.

Individual Resources in the Collection: DLESE has developed and adopted a comprehensive community review process for its collections. The results of this review process serve many purposes: they allow contributors to assess the value of their materials, and to make improvements to them; they allow users to assess the fitness of materials for use; and they allow DLESE to modify and redirect its accession policies, and to report on its impacts to the community and to its sponsors.

S7T1: Evaluate whether the existence of rigorous selection criteria and a feedback-rich review system encourage resource creators to improve the quality of their resources.

The Collection: The scope and balance of DLESE-linked collections will be compared against the desired collection through an ongoing program of collections assessment. Results from collections assessment, especially concerning gaps in the collection, will be disseminated to funders and resource creators.

S7T2: Develop mechanisms to methodically and comprehensively gather community input concerning the desired scope and balance of the DLESE collections.

The Community Center: The community-building services and pathways will be compared with community needs (which are sure to evolve) through an ongoing program of community outreach. Results from community canvassing efforts, especially concerning communities not fully engaged in DLESE, will be disseminated to funders, Steering Committee, and management group(s).

S7T3: Define the goals for the Community Center (Fall 2001), and metrics by which progress towards those goals can be evaluated.

Impact of the Library: In addition to assessing the quality of the materials in the collection, DLESE's evaluation strategy must provide the means to assess the library's overall impact and value, and thus its progress on achieving its mission. Outcomes-oriented assessment is also important to DLESE's sponsors.

S7T4: Develop instruments and associated metrics for assessing the overall impact and value of DLESE to the community, and overall progress with respect to the DLESE mission.

S8. Funding

To establish a diverse base of funding that can sustain the operations of the library into the indefinite future.

As the library matures and its operations stabilize, it is possible that the initial need for a high rate of investment in technological development will diminish. At that time, however, a high rate of investment in community and collection building will be appropriate, in order to ensure that the library has the intended impact on Earth system education. Moreover, it is clear that a steady stream of innovations in digital libraries can be anticipated in the next few years, suggesting the need for a continued level of

investment in new tools and services that take advantage of these innovations. In short, DLESE will require a constant, and possibly increasing, level of support over the next five years, and probably beyond, in order to sustain routine operations, upgrade and enhance tools and services, and foster the development, extension, and refreshing of library materials by users and contributors.

To date, almost all funding for DLESE has come from the National Science Foundation. NSF is clearly the major long-term partner for a digital library with DLESE's mission, but other sources of funding will be needed and must be developed. Funding may come from research-oriented agencies interested in advancing the state of knowledge in digital libraries; education-oriented agencies interested in impacting the state of Earth science education; and socially oriented agencies interested in DLESE's impact on educational opportunities for the disadvantaged.

S8T1: Align DLESE with NSF's strategic plans, and aim at obtaining between 20 and 40% of funding from NSF, primarily from the geosciences and education directorates.

S8T2: Develop funding sources in other federal agencies, including NASA, NOAA, USGS, and DOE, and aim at obtaining a significant percentage of funding from these sources.

The private sector benefits enormously from Earth science education, and has a direct interest in the success of DLESE. It may also be that funding can be generated through the carefully controlled advertising and perhaps sale of commercial products, including educational materials.

S8T3: Obtain a percentage of base funding (core functions) from the private sector via corporate sponsorship, and explore possible DLESE involvement in sales of commercially produced materials.

S8T4: Obtain some base funding (core functions) from foundations, and non-governmental organizations.

A successful DLESE will provide a range of opportunities for user fees and institutional subscriptions. Some traditional libraries have produced income from certain classes of users, and from the sale of certain products, such as compilations and authorities.

S8T5: Explore possible ways of obtaining income streams from institutional users through subscriptions and access fees.

S9. Data services

To develop services that enhance the ability of educators to access data of value to Earth science education.

The Earth sciences are accumulating vast resources of data, under a great variety of programs, and using a great variety of approaches, formats, and standards. Many

organizations are attempting to improve access to this vast and growing resource, and many have at least some concern for educational applications. In this crowded field, DLESE must be careful to commit itself only to programs that have direct value to its users, and that augment rather than duplicate what is already available. The DLESE Data Access Working Group (DAWG) has been charged with developing appropriate strategies.

S9T1: Continue the work of the DAWG, using DLESE's resources to add value to the data already available to Earth science educators through simplified user access mechanisms, portals to other sites, incorporation in educational materials, and other features and functions that directly address expressed user needs

	Version 1.0	Version 2.0	Version 3.0
<p>Web Dimension</p> <p>Discovery</p> <p>Collections</p> <p>Community</p> <p>Services & Support</p>	<p>Based on required metadata</p> <p>Modest (about 700 resources)</p> <p>Email groups, Opportunities, Announcements</p> <p>Search tips available; support for resource contributors provided</p>	<p>Geo-referencing (spatial and temporal footprints) and ESS Reviewed Collection(s)</p> <p>Spans NSES for K-12 and similar topic breadth for undergraduates</p> <p>Community Forum, Prototype teaching and learning center and forum for geosciences use by community; Posting center for opportunities, announcement, and other information</p> <p>Online end user support (FAQs, Tutorials); community support personnel available</p>	<p>NSES; Earth system events gazetteer; distributed discovery</p> <p>Thematic collections</p> <p>Robust teaching and learning center supports both teachers and learners; self-sustaining active groups operate to address earth system issues</p> <p>Community input mechanisms in place; some email support provided</p> <p>DLESE serves as community focal point for networking and exchanging information</p>
Data Dimension	<p>Datasets and tools present in Broad collection</p> <p>DAWG convened; demonstrator projects underway</p>	<p>Resources combining data, tools, and learning resources for K-16</p> <p>Geo-referencing provides some level of integrated data access</p> <p>Specifications for data access and delivery developed with DAWG</p>	<p>Integrated access to earth data and learning resources</p> <p>Earth system event gazetteer provides further integrated access</p> <p>Ability to create personalized collections of data and tools</p>
<p>Use Dimension</p> <p>Target Audience</p> <p>Volume Capacity</p>	<p>Builders and contributors; faculty early adopters</p> <p>1000s of sessions/month</p>	<p>Extended to mainstream K-16 teachers/faculty</p> <p>10000s of sessions/month</p>	<p>Extended to students and informal learners</p> <p>100000s of sessions/month</p>
<p>Building Dimension</p> <p>Governance</p> <p>Partners</p> <p>Collections Development</p> <p>Processes</p> <p>Evaluation</p>	<p>Committee process established; some policies in place</p> <p>Initial technical, collections, and community partnerships in place</p> <p>Focus on object-level growth</p> <p>Manual growth and maintenance processes</p> <p>Web metrics automatically collected; beta testing is routine.</p>	<p>Distributed management across centers functioning smoothly</p> <p>Support engineers available to work with distributed partners</p> <p>Collection-level growth; toolkit for collections developers ready</p> <p>Some collections management and harvesting processes automated</p> <p>Collection metrics automatically collected; formative evaluations are routine.</p>	<p>Self-sustaining, effective community-based governance</p> <p>Library growth driven by a mature distributed building process</p> <p>Collections-level QA and review done by developers and collections builders</p> <p>Some support for automatic resource / collection cataloging</p> <p>Summative evaluations by DLESE and independent evaluators demonstrate DLESE impact</p>