REQUEST FOR PROPOSALS

Data Management and Communication Services

The Great Lakes Observing System, 229 Nickels Arcade Ann Arbor, MI 48104

Release Date: Friday, August 12, 2011

SUMMARY AND PROPOSAL REQUIREMENTS

The Great Lakes Observing System Regional Association (GLOS) Board of Directors is issuing a Request for Proposals (RFP) for services to operate, maintain, and update as needed the existing Data Management and Communications (DMAC) System, as well as provide enhancements to a data catalog/query web portal to support public access to the GLOS data clearinghouse. This is an open and competitive process.

Proposals must be received by **Monday, September 12, 2011, 5:00 PM (Eastern Time).**
Proposals are to be submitted to Kelli Paige at kpaige@glos.us in PDF format.
All questions regarding this RFP, whether technical or procedural in nature, must be directed to Kelli Paige at kpaige@glos.us (no calls please) by Friday, August 19, 2011.
Responses will be posted to: http://glos.us/news-events/news/2011-07/rfp-data-management-services by Friday August 26, 2011.

I. BACKGROUND

The Great Lakes Observing System Regional Association (GLOS) is a nonprofit association dedicated to connecting data users with data providers in ways that are supportive of policy and decision making. GLOS is one of 11 regional associations of the national Integrated Ocean Observing System (IOOS) which is managed by NOAA with participation of approximately 14 other federal agencies. (http://www.ioos.gov)

In the Great Lakes region, GLOS helps coordinate Great Lakes observations, data products, and related services by developing a broad network of members and providing a forum for collaboration and communication. Through its role as a data management facilitator, GLOS makes a broad suite of data available to scientists, resource managers, decision-makers and other data users, allowing them to develop more complete characterizations of the Great Lakes by collecting and bringing data together to be used with other data sets, in models, and in data visualization products. The GLOS website serves as a portal to display and distribute data and data products.

Building and implementing an effective Data Management and Communications (DMAC) system is a crucial function for GLOS. GLOS is part of a national US IOOS Program and the development of the DMAC system is being done in close technical collaboration with US IOOS and 10 other US IOOS regions. As part of the national IOOS program, GLOS must address IOOS-specific data management objectives and guiding principles as described in the NOAA IOOS Program Office White Paper (v1.0), March 12, 2010, titled "Guidance for Implementation of the Integrated Ocean Observing System (IOOS) Data Management and Communications (DMAC) Subsystem" (http://ioos.gov/library/dmac_implementation_2010.pdf) and the Data Integration Framework is detailed further at: www.ioos.gov/dmac/welcome.html. GLOS is responsible for ensuring that data and information needs of regional decision makers, resource managers and other users are met through data discovery, translation, management and integration.

The selected team will report to and work with the GLOS Executive Director and the Program Coordinator, and the project is an integral component of the overall GLOS Data Management and Communication program. In addition to the services requested below, the selected contractor is expected to provide strategic thinking and advice to the Program Coordinator, Executive Director, and GLOS Board regarding the

continued progress and development of the DMAC system. The contractor will also receive input and direction through involvement with other GLOS activities including, but not limited to, facilitated or convened groups such as the Great Lakes Testbed, Technical Advisory Panel, and project-specific advisory committees.

Reference documents and additional information about GLOS are posted on the GLOS website along with this RFP at: http://glos.us/news-events/news/2011-07/rfp-data-management-services. If you have questions, please contact Kelli Paige at kpaige@glos.us.

II. PROJECT SCOPE AND REQUIREMENTS

OVERVIEW

Proposals are requested for providing GLOS data management, communication, and user product services for up to five years, renewable annually upon successful delivery of services. GLOS takes a service oriented, user-driven approach. Therefore, the successful project team will clearly demonstrate how they will integrate user needs provided by other GLOS sub-systems and liaise with the GLOS team to make that happen. Activities include:

1) Supporting the GLOS DMAC program through active participation in relevant IOOS, Great Lakes regional, or other collaborative initiatives, serving as the GLOS point of contact as needed;
2) Information and system architecture, data management, and planning and coordination related to both;
3) Website hosting and maintenance, server maintenance, and other IT infrastructure development and maintenance required to support operations and management of existing data products and applications as well as ongoing model output delivery services;
4) Providing data services, such as data mining and warehousing, data discovery and access, data transport, data archiving and storage, data standards development and implementation, metadata management, quality assurance/quality control, and IT security in line with previously referenced system requirements such as: service-oriented architecture, open data sharing, common data formats, common vocabularies and identifiers, etc;
5) Evaluating and developing plans to implement any necessary updates to existing products, services or applications such as but not limited to the OBS Explorer, Metadata Catalog, HECWFS viewer, and THREDDS Data Server and Data Catalog as needed;
6) Enhancing the Data Catalog as detailed below; and
7) Developing new web applications as funding allows.

Proposals should specifically address how they will incorporate the following principles in the development and implementation of the GLOS DMAC system:

1) Strategic thinking about data management planning and coordination in support of *Data Blueprint for Great Lakes Decision-Making* and *the Near-Term Design of the Great Lakes Observing System Enterprise Architecture* by supporting input to and integrating input from the other GLOS sub-systems – modeling and tools, observations, outreach and education;
2) Discoverability (e.g. facilitating access to data);
3) Usability (e.g. identify and meet user requirements for employing data to aid in decision support);
4) Sustainability (e.g. long-term, adaptable solutions that adhere to IOOS requirements); and
5) Analytics (e.g. metrics for determining success of DMAC system services).

The Great Lakes Observation System is a system of systems comprised of connections to information resources around the Great Lakes Basin that are maintained by partner organizations and agencies. A major component of this award will involve designing and developing a cyberinfrastructure that connects with partners' information systems and integrates resources through portals and other products and tools.

The successful team will work with federal and state agencies, universities, other research and monitoring programs through partnerships, facilitated by GLOS staff and Board members, with:

- The IOOS office and other IOOS Regional Associations;
- Regional members of the Interagency Ocean Observing Committee (IOOC) active in the Great Lakes, especially NOAA (GLERL and NWS in particular), USGS and EPA;
- Regional Research institutions led by the Cooperative Institute for Limnology and Ecosystem Research
- Other GLOS members
- Other regional partners as identified by GLOS staff.

Applicants should demonstrate how, using the existing tools and products developed by GLOS and other IOOS regions to date and consistent with national IOOS DMAC requirements, they will provide for a DMAC subsystem to:

- Enable access to and broad use of real-time, delayed-mode, and historical data for in-situ and remotely-sensed physical, chemical, and biological observations;
- Enable access to and broad use of model-generated outputs, including both nowcasts/forecasts, scenarios, and reanalysis, to GLOS (and IOOS) users;
- Operate and maintain user products and tools as they are developed; and
- Define gaps in capabilities and provide planning and recommendations for new cyberinfrastructure that might be needed to satisfy requirements; building and deploying these capabilities as funding allows.

REQUIRED SYSTEM COMPONENTS

Proposals for Data Management and Communication Services must include the following components:

A. Data Management, Planning and Coordination

In addition to administering the system as described in Sections B and C below, successful applicants will be expected to provide the personnel and costs of travel to:

i. Participate in GLOS approved/convened committees and teams in order to facilitate data integration and interoperability within the Great Lakes region;
ii. Participate in IOOS and other national and cross-regional committees, workshops and teams in order to further the development of a coordinated approach to IOOS data management (at least 1 call/month and 2 in person meetings/year, one with GLOS PI team and one with IOOS DMAC team in Silver Spring, MD);
iii. Work closely with the GLOS office, other relevant contractors, and appropriate advisory committees to implement identified user products, tools and their web interfaces; develop product requirements; and beta test and refine products in order to increase their utility (at least 1 meeting/month with GLOS staff);
iv. Provide regular reports as requested (at least quarterly); develop detailed work plans with measurable timelines, deliverables, and performance metrics (at least annually); and assist with development and review of funding proposals; and
v. Other relevant planning, coordination, and administrative tasks as requested.

B. Website, IT Infrastructure, and Data Product Support

Additional detail on the current status of GLOS IT infrastructure can be found in the supporting documents posted with this RFP at: http://glos.us/news-events/news/2011-07/rfp-data-management-services. A detailed inventory and summary of the GLOS IT system will be provided to the selected contractor prior to contract start date to facilitate transition. Existing GLOS hardware assets provide sufficient capacity for the scope of this contract and no new equipment purchases are anticipated. Applicants must describe and demonstrate the capacity to:

i. Manage hosting, maintain, and perform necessary system updates of the GLOS website (www.glos.us). The website is the primary public face for GLOS, as well as the primary entry point for the GLOS data system. Applicants should have experience in Drupal which is used as the CMS for the GLOS website and, in addition to regular system upgrades, may be asked to develop enhancements or customizations to the existing Drupal framework for improved functionality;
ii. Operate and maintain system servers and network and perform periodic systems back-ups (servers are located at a remote commercial facility but database, website (not content) and server maintenance are the responsibility of the contractor);
iii. Operate, maintain and ensure reliable access to current and future GLOS web products and tools (currently four, and two in development) including: user interface and visualization tools, data products, data query and access tools, decision-support tools, project tracking systems and databases, as well as IOOS Registry tools in a manner that is consistent with open source system architecture/design and compatible with US IOOS requirements.
iv. Other relevant website and data product operations and maintenance as requested.

C. Data Subsystem Services

Additional detail on the current status and envisioned scope of the DMAC system can be found in the supporting documents posted with this RFP at: http://glos.us/news-events/news/2011-07/rfp-data-management-services. Applicants should demonstrate capacity to maintain, build upon or modify the overall data system developed to date. Applicants must demonstrate how they would address these major functions:

i. ***Data Ingestion and Warehousing*****:** The GLOS data system should provide data ingestion and warehousing services as a regional Data Assembly Center (DAC), which is likely to connect to a national DAC in the future. Applicants should detail how they will work with other data providers (federal and state agencies, academic researchers, NGOs and private industry) to help bring their databases and data up to national interoperability standards, and help make their systems more automated and IOOS-compatible. Depending on the user products to be developed, and the priorities that are identified by GLOS staff and advisory committees, the system will be expected to ingest and archive some data sets including but not limited to real-time observations, delayed mode observation data, static data sets, and serving/enabling access to model outputs. Applicants should be prepared to work with GLOS staff and advisory committees on developing a process for prioritizing data acquisition, ingestion, and processing.

ii. ***Data Discovery and Access*****:** The primary entry point to the GLOS data system is the GLOS website. Data are accessible via IOOS web services, web products such as the Observations Explorer, and through other customized applications. In this section, applicants should focus on implementing, improving the existing, or proposing the development of new data discovery and access tools. Applicants should also include a proposed process for linking data and/or metadata to and/or from IOOS and key partners such as The Group on Earth Observations (GEO), the National Data Buoy Center (NDBC) and the National Oceanographic Data Center (NODC). Cost-effective mechanisms for "exposing" data and "delivering" data to users should be considered (e.g., subscription services, use of FTP sites, or other more advanced data products).

iii. ***Data Transport*****:** The national IOOS program requires the use of one or more web service protocols to perform data transport including SOS, WMS, WCS and OpenDAP. GLOS is currently compliant with these protocols, and now uses a THREDDS server for some gridded data sets. Proposals need to demonstrate how the applicant will continue to provide data transport, and in addition, establish and maintain a system for tracking, prioritizing and responding to data requests. Applicants should also clarify how policies for prioritization, especially among commercial and public users (including the potential for charging fees) will be developed in consultation with GLOS staff, Technical Advisory Committee and the Board.

iv. ***Data Archiving and Storage*:** Because a standard process for this activity has yet to be fully implemented, applicants should identify a process for developing a plan to determine which data, and how and where it will be archived and stored. Archiving should be compatible with US IOOS (i.e. with NODC's standard archival process/protocols).

v. ***Other Issues Related to Data System Services*:** In addition to the functions detailed above, applicants should also account for the following issues in their proposals:
Standards: GLOS participates in the national IOOS process for developing standards. The only defined standard that has been adopted by the national IOOS office is the one for data transport explained above however others are under review. Applicants should include time and resources to support future GLOS priorities for standards development in cooperation with IOOS and other related initiatives.
Metadata: GLOS has established a GeoNetwork catalog; however GLOS has not yet implemented a metadata standard. GLOS will require the use of complete and accurate metadata by all entities providing data to the system and therefore the observing system will need to effectively utilize the latest IOOS and international standards as they are developed. Metadata should be published to, at minimum, the GeoNetwork warehouse established by GLOS.
Vocabularies and Symbology: The team should identify and comply with any existing vocabulary and symbology standards. The team should also identify needs and opportunities for coordination of the development of standards where applicable.
QA/QC: GLOS has developed an organizational quality management plan and is in the process of finalizing a quality plan for DMAC. The contractor will work with GLOS staff to refine this document and will be required to implement it as necessary. Appropriate disclaimer language should be developed for inclusion on the website, in contracting, and other places as needed. All metadata should comply with appropriate standards.
IT security: The applicant should provide a security plan that encompasses both cyber and physical security and is consistent with industry standards. Industry standard security protocols should be followed for safeguarding systems, software and data.

D. Enhancements to GLOS Data Catalog

The GLOS Data Catalog is currently under development and the selected contractor will be expected to utilize this tool to support growth of the GLOS DMAC system. Enhancements to the preliminary tool will likely be necessary to accommodate its growing utility as a data portal. An overview of the current Data Catalog scope is provided with other supporting materials for this RFP at:http://glos.us/news-events/news/2011-07/rfp-data-management-services. The scope for enhancements to the Data Catalog should include:

(1) Development/utilization/enhancement of the back-end database(s), programming and data exchange services/technologies required to operate a comprehensive data search and access application and

(2) Development/utilization/enhancement of the web-based user interface that will serve as the public "storefront" for developing data queries, refining search criteria, previewing and accessing data and metadata as appropriate.

The Catalog should allow users who know what data they are looking for to search and find it with relative ease. Therefore, applicants should describe a methodology that ensures the Data Catalog will be:

- *Accessible and intuitive*- The query, selection, and delivery of the information and the way it is accessed must be easy and intuitive for a diverse range of ages, technology skills and data needs.
- *Informative and accurate*- The applicant will need to work with GLOS staff and partners to ensure that the necessary data can be accessed, integrated, operated, and maintained utilizing GLOS/IOOS

protocols and technologies. The tool should provide a mechanism for any metadata, disclaimers or quality flags needed to allow users to make informed decisions about how to use the data they access.

- *Responsive to user needs*- The development of the tool should be informed and evaluated by the information and access needs of the regional data using community. The applicant should be prepared to demonstrate the utility of the tool, with appropriate analytics and measures for success. The applicant should be prepared to revise the tool to meet user needs as necessary.
- *Easy to operate and maintain*- The applicant will need to develop the tool utilizing Open Source technology and work with GLOS staff to ensure the tool can be easily operated by appropriate staff, partners, or sub-contractors as needed.
- *Sustainable and adaptable*- The applicant should include a strategic approach (planning and implementation) that encompasses the processes and technologies required for growing the capacity of the Data Catalog. Examples include but are not limited to: identifying and prioritizing new data sets, developing standard protocols and process for data contributions to GLOS, identifying data exchange obstacles, and developing a strategic or conceptual plan for the Data Catalog itself.

In developing the tool, the contractor will be expected to:

- Coordinate with GLOS staff and partners as necessary to develop the programmatic policies necessary to support the growth and enhancement of the Data Catalog.
- Evaluate and confirm audience needs for effective data query and access. GLOS data catalog audiences include:
  - Researchers: academic, government, private industry/consulting who are looking for data or related resources, products and services. They may also be interested in contributing data to the catalog.
  - Resource managers or consultants that serve decision-makers: federal, state, or local government, NGO, or private industry/consultants typically looking for data or products/services specifically related to their field of work. They may also be interested in contributing data to the catalog.
  - Other GLOS members and partners: Academic, government, NGO, or private industry/consulting partners who manage complementary programs or projects; contribute or use data; develop models, products or tools; or are otherwise stakeholders in GLOS. They might be interested in developing, using or promoting GLOS services and products.
- Document and conduct an end-to-end data product development process including beta testing, refinement and operations with appropriate feedback loops from potential users.
- Develop, monitor, and report on performance metrics to demonstrate and track utility of the tool.

III. PROPOSAL CONTENTS

Proposals should not exceed 25 pages, with one-inch margins and 12 point font and should be submitted in PDF format.

Proposals shall provide the following information:

A. Introduction: Summarize your understanding of the project and the key points of the proposal.

B. Company/Organization: Provide the full name, address and contact information of the company/organization (and subcontractors if part of your project team), and include the name/ contact information for the proposed project manager and contract manager.

C. **Prior Experience:** Describe the team's relevant experience for undertaking this work, including up to three similar projects. Provide a one page project profile for each project, including title, date of completion, project cost, key staff, methods, outcome, relevance to this project, url, and the client's name, contact person, address, phone and email. *(Note: project profile pages do NOT count toward the 25 page limit and can be included as appendices.)*

D. Key Staff: Provide the background and relevant experience of the individuals principally responsible for completing the proposed work. Identify the roles, responsibilities and time commitment of all key staff. Include one-two page resume for each team member. (*Note: resumes do NOT count toward the page limit and can be included as appendices.)*

E. Methodology: Provide a detailed methodology outlining how the proposed scope of work will be accomplished. Provide a detailed description of the work to be performed including goals, methods, and appropriate technical details. Applicants are invited to identify any refinements/ adjustments to the proposed scope of work accompanied by an explanation as to how these refinements/adjustments will fulfill project goals in a timely and cost efficient manner.

F. Deliverables: Provide a timeline of major milestones and deliverables congruent to the anticipated timeline specified in Section VII.

G. Budget: Provide budgetary information (and associated description/justification) in the following categories:

- Personnel (hourly rate and number of hours by individual);
- Overhead costs (if not included under personnel);
- Travel (identify number of trips and detail anticipated expenses);
- Equipment (single equipment purchases over $5,000 are not allowed under this contract, unless justified by comparing to the lease/rental of the same equipment for the time required and accompanied by sufficient documentation for reviewers to make that comparison);
- Supplies (provide details);
- Miscellaneous: (all other expenses not identified above);
- If a university, not-for-profit, state or local government, provide indirect cost rate, including a copy of the paperwork negotiated with your cognizant federal agency.

Note: the successful bidder may be required to provide additional budget detail prior to the award.

IV. Proposal Terms:

The GLOS Board reserves the right to reject any and all proposals received as a result of this RFP. Further, issuance of an award to the successful bidder is contingent upon availability of funds through the National Oceanic and Atmospheric Administration. Selection will be made by the GLOS Board on the basis of criteria outlined in Section VI below. The GLOS Board reserves the right to modify the proposed scope of work in consultation with applicants, at any time before a contract is awarded. The GLOS Board reserves the right to reject any and all bids, to waive or not waive informalities or irregularities in bids or bidding procedures and to accept or further negotiate cost, terms, or conditions of any bid determined by the GLOS Board to be in the best interests of GLOS even though not the lowest bid. **The award will be granted contingent upon the bidder's acceptance of the contract.**

Proposals must be signed by an official authorized to bind the bidder to the proposal's provisions for a period of at least 90 days. Failure of the successful bidder to accept the obligation of the contract may result in the cancellation of an award. In the event that it becomes necessary to revise any part of the RFP, addenda will be provided. Deadlines for submission of proposals may be adjusted to allow for revisions. To be considered, the proposal in pdf format must be submitted via email to kpaige@glos.us on or before the specified date and time. Proposals should be prepared simply and provide a concise description of the bidder's ability to meet the requirements of the RFP. Bidders must follow the guidance provided in preparing their response; failure to do so is grounds for disqualification from the process. All equipment, hardware, software code and products purchased and/or developed as a result of this award belong to the Great Lakes Observing System unless otherwise agreed to.

V. Company/Organization Eligibility:

Proposals are sought from companies or organizations with expertise in developing intuitive, web-based applications. All U.S. and Canadian entities are eligible to bid on this project including federal, state and local units of government, academic institutions, for-profit companies and not-for-profit organizations. Proposals submitted by a team of organizations are acceptable. However, teams must demonstrate a history of working together successfully to complete similar projects.

VI. Evaluation:

The Board will use the following criteria as guidance in determining successful proposal:

- **Methodology:** a comprehensive and concise methodology that provides a step-by-step description of how project goals and objectives will be achieved in an efficient, effective and timely manner (25%);
- **Team Capability and Qualifications:** a thorough description of the team's background, including company/organization overview; depth and breadth of expertise relevant to the project; key staff and their roles on the project; and demonstrated ability to meet/exceed all project goals and objectives within the specified time period and budget. If the proposal includes working with another company/organization, evidence of past successful collaboration with those entities (25%);
- **Relevant Projects:** evidence that the bidding team has successfully completed similar projects in a timely, efficient and cost-effective manner. (25%);
- **Cost:** evidence that the bidding team will accomplish all stated project goals and objectives within the proposed budget. The GLOS Board will look particularly favorably on the most cost-effective proposals and those that are able to leverage additional funds through cost-share arrangements. (25%)

VII. Timeline:

GLOS anticipates the project time period will be approximately one year. Proposals should include a project timeline that corresponds to the following:

August 12, 2011	RFP release date
August 19	Submission of written questions on RFP to Kelli Paige (kpaige@glos.us) by 5pm EDT; answers will be posted on GLOS website by August 26
September 12	Proposals due by 5:00pm EDT to Kelli Paige (kpaige@glos.us)
September 12-23	Review of proposals and selection of top candidates
October 4-5	In-person interviews with top candidates at TBD location in Ann Arbor
October 10-14	Award negotiations
November 1	Award begins
October 31, 2012	Award Ends

VIII. Funding Award(s)

It is expected that funding will be awarded as a contract agreement in October 2011 with a start date of November 1. Funding for future years will be contingent on satisfactory review of the previous year's work and approval by the GLOS Executive Director of the work plan and deliverables for the future/continuing year contract. Review will be necessary before an annual report is due as a decision must be made before the end of the grant year.

Funding availability: Funding is subject to annual appropriation, but is estimated to be between $150,000 and $220,000 per year, although additional funds could be available depending on federal appropriations and other funding sources. GLOS reserves the option to use some of the funding included for Data Management and Communication Services to employ in-house management and coordination, depending on the proposals received in response to this RFP.