



ISSUES AND ACTIONS

THE NATIONAL MAP REPORT

November 30, 2001

Companion Document to “*The National Map: Topographic Mapping for the 21st Century*” dated November 30, 2001

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ISSUES AND ACTIONS

THE NATIONAL MAP REPORT

The following issues and actions were compiled from more than 130 responses to *The National Map* report received after the public comment period that ended in June 2001. n USGS reactions to the public comments were assessed in a second, more limited, review that ended in October. Commenters represented other Federal agencies; professional organizations; State, regional, and local governments; private industry; and universities. Numerous comments endorsed *The National Map* vision and its key components; other comments relayed cautions and concerns about the complexity and magnitude of the undertaking. The diversity and thoughtfulness of responses on particular issues provoked substantial consideration of alternative perspectives on key aspects of *The National Map*. As a result, the report has been modified in significant ways to better explain the goals and principal strategies of the vision. The revised report serves as the foundation for strategic planning for the Cooperative Topographic Mapping Program of the USGS, and as the basis for further exploration of partnership opportunities that are fundamental to *The National Map* implementation.

Although we are unable to respond directly to every commenter, we hope that our categorization of the comments and our responses convey the seriousness with which we considered every response, and our commitment to the success of *The National Map*. The issues and responses are organized into sections that correspond to the structure of *The National Map* report. The final version of *The National Map* report was updated to incorporate decisions based on the comments received. The report and this document are available in Adobe document format (.pdf) at <http://nationalmap.usgs.gov>.

DISCLAIMER

Selected endorsements and cautions/concerns are reported in the two following sections. These comments represent organizational and individual responses from all geospatial community sectors: government (all levels), professional organizations, the private sector, and universities. All selections are unedited. Responses marked “C” for “Corporate” are those in which the writer stated that he or she was replying on behalf of an organization (including government agencies, private corporations, nonprofit groups, professional societies, and other professional entities such as State GIS councils), or in which the title of the writer indicated that he or she was a principal of the organization. Responses marked “I” for “Individual” are responses in which the writer stated that their comments were their own and may or may not represent the views of the organization with which they are affiliated. When the classification was unclear, comments were recorded as “Individual;” these comments may not be the official response of or position of the cited organization on The National Map and on the issues addressed.

REPRESENTATIVE ENDORSEMENTS OF *THE NATIONAL MAP* VISION

General Agreement

(I) National Wetlands Research Center, USGS

I find the concept of *The National Map* very intriguing. Although this is not a new concept, the formulation of the idea in a comprehensive fashion is novel, and the attempt to take the bold step to implementation is indeed laudable. After 30 years of mapping experience, even as I read through the document I found the wheels in my head turning with questions of "how can we do this portion, what technology can we bring to play for this part, or what will we have to sacrifice to get this part accomplished? This is great first step. I hope this report will become an initiative that will build-upon the USGS experience and expertise and revolutionize the development and availability of spatial data within the nation.

(I) Harvard College Library

You have defined an excellent set of strategic goals that will significantly affect the future mapping of the United States. I look forward to the evolution of *The National Map* and hope that it increases access to information for an even larger diversity of users.

(I) National Oceanic and Atmospheric Administration

I totally support "*The National Map*" concept and proposal, and all its many components as described in the concept paper. It would, in fact, be difficult not to agree with it, since the Office of Coast Survey (OCS) is, literally, doing everyone of these things (mentioned by the USGS concept paper) with regard to its bathymetric data, its nautical charts and its other products and services, and with virtually the same approaches and uses of technology. Things like: rapid updates of data; seamless national digital coverage; higher resolution and positional accuracy; print on demand; digital products in various forms using vector data; increased reliance on partnerships; consistency and standards; integration; variable resolution; change detection with help of the public and private sector and/or using satellite imagery, etc., etc. We agree with it all and we are working on all of it in the marine areas of the U.S.

(C) New Mexico Geographic Information Council, Inc.

Basically, the whole concept of *The National Map* is beyond useful, it's incredible! I absolutely love the components of seamlessness, currency, and consistency.

(C) Cartographic Users Advisory Council

It is an impressive vision of the future of government mapping and access to cartographic information that will have a profound effect on mapping in this country.

(C) EROS Data Center, USGS

Several of us at EDC have reviewed the final draft of "*The National Map*" and we like it. It certainly presents a huge challenge but if successful, the USGS will certainly be the leaders in providing basic spatial data of the Nation to our many customers with the content and timeframe they so desire today.

(C) Bureau of Land Management

After reviewing *The National Map* Strategy, we in the BLM are strongly supportive of the concept and look forward to participating in its development. Clearly there are many issues to be resolved, but we believe that the concept is sound and it will provide sorely needed capabilities. We congratulate all involved with the project for preparing a well thought and clearly stated case for *The National Map* initiative.

(C) SouthWest Data Center, Inc.

For the most part the proposal for *The National Map* is a sound concept and represents a significant move in the right direction. A maintainable spatial database of the United States and its territories is a logical, desirable and obtainable goal for the 21st century.

(C) U.S. Fish and Wildlife Service

The Service strongly supports the notion that a national topographic data set is needed that reflects accurate spatial data. This data set should provide seamless, digital coverage, and be maintained and readily accessible to all potential users. We also agree that the data should be updated to remain as current as possible given financial and technical constraints.

(I) Department of Natural Resources, State of Washington

Sounds good. We need to start somewhere, so let's get on with it. Thanks for the efforts that have put forth, thus far. Keep it going!

(C) Association of American State Geologists

The Association of American State Geologists (AASG), representing the state geological surveys of all fifty states and the territory of Puerto Rico, strongly supports the availability of high-quality topographic maps and up-to-date digital spatial data for the Nation.

(C) U.S. Census Bureau

The proposal for *The National Map* is sweeping in scope and vision, leaving few concepts untouched.

(C) Mountain Images

As to vision and objectives, it is all exemplary. You have identified where we would like to be in ten years.

(I) Nevada Natural Heritage Program, Department of Conservation and Natural Resources

The vision that the report presents is excellent and worthwhile in all aspects, and is a much needed and increasingly over-due modernization of the current national mapping data infrastructure.

Ambitious Vision

(C) Six Rivers National Forest, Forest Service, U.S. Department of Agriculture

The National Map is a tremendous and very bold idea as expressed in the first paragraph of this section. Do you really believe you can pull it off?

(I) National Oceanic and Atmospheric Administration

The National Map proposal by the U.S. Geological Survey (USGS) is an ambitious project with genuine merit. The concept is sound and the technology is in development to make spatial data accessible from distributed locations.

(I) U.S. Department of Transportation

I want to congratulate USGS on proposing the development of *The National Map*. It represents a very ambitious plan to improve the quality of and dissemination of national and local geospatial data sets.

(C) Natural Resources Conservation Service, U.S. Department of Agriculture

The vision of *The National Map* is both ambitious and important to the future of the geodata community.

(I) Maryland Department of Natural Resources

This is an ambitious project with a far-reaching vision.

A Natural Evolution of USGS Mapping

(I) National Geodetic Survey

This is an idea whose time has come. An integrated, Federal, spatial database, even at a partial level of implementation, would be of immense utility. In a sense, this project would be as fundamental to our geospatial information infrastructure as the national highways are to our transportation infrastructure.

(C) Region 2, Forest Service, U.S. Department of Agriculture

It is most appropriate that USGS pursue the goal of a nationwide geospatial dataset organized into standard themes that is always within days or weeks of being current. It is a natural evolution of the realized goal of producing a nationwide standardized set of

topographic maps.

(C) Energy Information Administration, Department of Energy

The Department of Energy (DOE) believes that the proposed National Map represents a logical, necessary, timely evolution in the Federal government's creation, maintenance, and delivery of its most basic geospatial information. *The National Map* will be of much value to DOE. It will clearly be a major asset for the geospatial information community at-large.

Fulfilling the Mission of the USGS/ Role of USGS

(I) New York State Center for Geographic Information

I am encouraged to see a renewed focus on base mapping as a core activity of the USGS, after years of decline and shifts in focus away from this responsibility.

(C) Louisiana Geographic Information Systems Council

We applaud the USGS for its far sightedness and for taking the lead in this endeavor. We agree the Nation needs a base map to serve as the foundation for decision making for all Americans.

(C) Western Association of Map Libraries

We are very pleased to see USGS take a leadership role in this project. *The National Map* has the potential for bringing a consistency to all geographic information produced by the Federal Government. We are intrigued by the ideas put forth therein.

(I) University of North Carolina

The National Map is an impressive vision of government mapping and cartographic information access. I appreciate the U.S. Geological Survey taking the initiative to expand, update, and maintain the national base map data.

(C) National Aeronautics and Space Administration (NASA)

NASA's review of *The National Map* finds the project to be a worthy national challenge for the first decade of the 21st Century and a great vision that builds and expands on USGS mandates. The resulting national database of standard digital map products is recognized as a valuable baseline needed to serve a range of critical research and application programs.

Impacts of *The National Map* on the Nation

(I) Colorado School of Mines

I believe the goals of *The National Map* are excellent and the end result will be a boon to academics, scientists, commercial interests, and the general public.

(C) New Mexico Geographic Information Council, Inc.

On behalf of the Executive Board of the New Mexico Geographic Information Council, I would like to commend the USGS for the timely and salient vision that is *The National Map*. Although this is such a massive undertaking that it quite literally boggles my mind (!), it is probably no less ambitious as was the USGS' goal fifty or so years ago to provide complete topographic map coverage of the U.S. at a scale of 1:24,000, and just as doable! Perhaps the target year of 2010 is overly optimistic, but hey, we got to the moon in 9 years! I mention these lofty accomplishments because I believe *The National Map* can and will have an equal or greater impact on our 21st Century society as did the fulfillment of these goals on our 20th Century. Having said that, let me tell you that you have the full support and a probable future partnership of the NMGIC.

(C) California Geographic Information Association (CGIA)

CGIA applauds USGS for its vision in developing the concept for *The National Map*, and offers its support for *The National Map*. Tremendous benefits will be realized with the ready availability of current, seamless, high-resolution geospatial data.

(I) Tongass National Forest, Forest Service, U.S. Department of Agriculture

The National Map proposal has the potential to be enormously useful and valuable. This is by no means a simple task, and the fact that USGS is endeavoring to tackle it is commendable. The document balances the compelling vision with good insight into the possibilities and difficulties of achieving it.

(C) Open GIS Consortium

Overall, we support the objective of the USGS to formulate and operationally maintain a National Map through broad partnerships with other organizations. We agree that the concept of *The National Map* addresses key areas of basic spatial data that is vital to decision-making at the federal, state, and local government levels and for our citizenry. We also believe that *The National Map* is poised to enrich commercial opportunities for maintenance and growth of this resource, and to influence US industry prosperity by providing opportunity for commercial interests to produce value added information and services. This point could not be more profound than in the e-government / business and location based services arenas, where reliable spatial information at a national coverage level will be crucial to grow intelligent services to meet public and private needs.

(C) U.S. Fish and Wildlife Service

The US Fish and Wildlife Service (FWS) fully supports the main premise of the proposal, that current, accurate, and nationally consistent basic spatial data sets are needed by the Federal Government as well as many citizens of the country.

(C) Office of Environmental Information, U.S. Environmental Protection Agency

EPA supports the overall vision outlined in this document. When implemented, *The National Map* would provide useful data for many EPA business operations.

(C) Federal Emergency Management Agency

This initiative as discussed in the report sounds quite promising, and we foresee many benefits that such a database and map will provide. While the project will certainly encounter many challenges in its implementation, we commend the USGS for its vision. We will be glad to support the efforts as best we can.

REPRESENTATIVE CONCERNS AND CAUTIONS ABOUT THE NATIONAL MAP VISION

Partnerships

(I) New York State Center for Geographic Information

It is disturbing, for example, to know that the Census Bureau is contemplating a major spatial improvement project on TIGER without any involvement from the USGS, and at a time when USGS is under increasing budget pressures. The federal agency inequities will have a large bearing on the success or failure of the "National Map", and must be addressed.

(I) Maxwell School of Citizenship and Public Affairs, Syracuse University

What mechanisms will be used to guarantee that other federal agencies will live up to their commitments to *The National Map*? If across-the-board budget cuts were mandated, it would be tempting for some of these agencies to renege on their commitments in order to protect what their officials see as core responsibilities.

(I) Natural Resources Conservation Service, U.S. Department of Agriculture

Practically, the barrier is the existing federal, state, tribal and local mapping system. Partnering is not going to solve the problem. Each government layer has its own funding and responsibilities. Unless there are meaningful funding incentives and penalties for acquiring standard data layers from all organizations, *The National Map* will be nothing more than an empty data shell.

It may be a bit of a surprise to USGS but many federal, state, tribal and local

governments do not need USGS products. Many local government have been quite successful at developing and maintaining mapping data which answers their problems without any aid from USGS. Digital orthos for example have been procured faster, cheaper and at a higher resolution by local governments. In many instances, the ortho images are projected into their own county coordinate systems. Try importing and reprojecting these digital orthos into UTM for example. It is not a trivial procedure. Unless there is an incentive or penalty to provide their information in a standardize format, *The National Map* is not going to happen.

(I) USGS (Retired)

My fears are that the logistics for implementation of this program may become clogged with budget restrictions, rivalries between Federal and other types of interested institutions, and conflicting mapping priorities set by prevailing economic and political forces.

(I) Maryland Dept. of Natural Resources

I noticed language in many sections that referred to "federal needs" and "federal agencies." As a mapping professional working at the state level, if *The National Map* is to succeed, the requirements MUST address the needs of ALL users. While this may be a tall order, without it, this project will not gain and keep the support of non-federal agencies.

Support/Budget

(I) Maxwell School of Citizenship and Public Affairs, Syracuse University

I am leery of the Congress's willingness to support this activity on a regular, consistent, and fully funded basis. Recall the senseless cutbacks during the 1980s, and the looming tab for old-age benefits. Can a country willing to let its bridges go to rot be trusted to maintain its mapping? The current obsession with tax cuts is not at all promising. My point here is that officials overseeing *The National Map* will surely need a series of fall-back plans. Moreover, discussion of these priorities should be a part of the current review. It makes no sense to assume that everything that needs to be done will be done.

(C) Department of Natural Resources, State of Wisconsin

Funding sources for this initiative are unclear, and obtaining support may prove difficult in an environment of diminishing resources.

(I) Coastal and Marine Geology Program, USGS

There is nothing in the document to show the approximate cost of developing *The National Map*. While a visionary document is good, at some level you need to be realistic about what it will take to develop this map - and the infrastructure to support and improve it is not likely to be cheap!

Unattainable Goals

(I) Water Resources Division, USGS

Setting a goal of seven days for updates when the average age of the primary topo series maps is 23 years old not only severely strains believability, but risks having this dynamic vision viewed as a joke. Furthermore, seven-day turn around implies to many that there can't be human QA. I think that an update time horizon measured in months would be a tremendous improvement, be much more achievable with adequate and believable QA, and reasonably address most users needs far greater than the current product line does.

(C) Louisiana Geographic Information Systems Council

Your concept spells out the ideal. However, to accomplish the ideal is the challenge. The development of the processes to move forward to include local, regional and state data will be critical. Some goals seem to be out-of-reach today, especially the "current to within seven days."

(C) Geospatial Service and Technology Center-Advanced Systems Center, U.S. Forest Service

There are obviously some serious hurdles to be cleared in order to reach the goals laid out in this report...how to acquire data that is current within 7 days, how to guarantee accuracy when data will be coming from so many sources, how to move from a cartographic data base to a geographic data base, and then how to make cartographic products from geographic data, how to cope with mixed levels of accuracy, resolution, and currency, etc. Solving these problems will require new tools, new processes, and new ways of thinking. *The National Map* will be a major undertaking.

Timeline

(I) BAE Systems Mission Solutions

Is 2010 soon enough to meet needs? Is it provided in a timely manner consistent with National NEEDS? Maybe a more aggressive schedule should be considered.

(C) EROS Data Center, USGS

Several of us feel that there are few technology barriers to achieving this plan, however, there is concern as to whether consistent, seamless, and integrated content will really be there on a national scale and, more importantly, can we wait 10 years to see the "National Map". Many of us believe that the timeline must be accelerated, the implementation made less elegant, and significant milestones need to be achieved much sooner in order to establish credibility and advocacy. There indeed may be significant capabilities or accomplishments that will result sooner. It would be nice to see a timeline of how this concept is expected to roll-out and what goals we may have 2 years out, 5 years out, 7 years out, etc.

(C) California Geographic Information Association

The report first mentions the goal of achieving *The National Map* by 2010. Given the scale of the project, the current economic environment, and the fact that many agencies and businesses are operating at reduced staffing levels, is the timeframe realistic? The concept requires participation by these agencies who will readily tell you that there just isn't any leeway for taking on additional projects. USGS may need to put forth a significant marketing program to educate potential participants of the long-term benefits to be gained by contributing to the project.

USGS Leadership and Coordination

(I) Assessor's Office, Ada County, Idaho

I don't think you can create this for the entire country by 2010. You don't have the organizational infrastructure or leadership to accomplish this. Your "Next Steps" section implies some of this, but I think it's fraudulent to try to sell this project on the basis of this draft plan—you need much more detailed plans and time lines. (Of course, if the entire country makes this a priority like The Manhattan Project, anything might be capable.)

Does the USGS have the leadership for such an enormous effort? It was a previous generation of employees who made the decisions that resulted in creating those 23-year-old 24K topo maps. Who in the USGS today has the vision and the drive to make this new effort succeed? I've watched your employees in action for twenty years—how many have the fire in their belly to make this happen? Please, please, please convince me that you have (or can attract) the human resources needed for success.

(I) Bureau of Transportation Statistics, U.S. Department of Transportation

The coordination effort to accomplish this is enormous. I do not believe that USGS or the Federal Geographic Data Committee can coordinate these activities as they are presently staffed. The I-Team activities and the GeoData Alliance are unproven models. There are no governing rules to guarantee participation or conformance to standards. Coordination activities have been ongoing for approximately ten years with limited success.

Similar Efforts Have Been Tried

(C) Federal Emergency Management Agency

We caution that the framework of the concept put forth here is similar to a concept first discussed in 1990 by the USGS. The current proposal is less detailed in some aspects than the 1990 concept. It is essential that more detail be included with the concept to allow interested parties to provide valuable feedback. We encourage the use of the USGS Website as much as possible to promote this concept.

(I) USGS

National Map Implementation - how does the USGS plan to implement *The National Map* and how is this truly different from previous endeavors pursued by NMD? Twenty years ago NMD had big plans to produce nation-wide digital coverage by converting our existing 1:24,000-scale paper maps into DLG and DEM data. This effort is only half complete in a very haphazard fashion for DLGs and the resulting DEMs are very coarse as previously noted. For the most part, I would classify both of these products as failures because they are not widely utilized for base mapping purposes and consequently the GIS industry has not produced many tools for using these products. How will *The National Map* address these deficiencies in our digital data and ensure that newer revised data is accepted as a standard geospatial product by the American public?

General/Other Cautions

(I) Natural Resources Conservation Service, U.S. Department of Agriculture

From what I read in the report, I did not see any concrete ideas or solutions that would make *The National Map* goals feasible by 2010! All I read were generalizations. The report does not reflect any innovative approaches to developing a truly current, seamless, scalable, national database.

It is okay if USGS wishes to take leadership to develop a National Map. However, the USGS must first determine if there is a way for the mapping herd to follow.

(I) U.S. Dept. of Transportation

The National Map also represents a very complex structure of partners and a major investment in time and resources to accomplish the task - especially given the USGS timeframe of ten years.

(I) Bureau of Transportation Statistics, U.S. Department of Transportation

This is a very ambitious project. In theory I think this could be a wonderful product. In practice I have many doubts whether it can succeed without mandates or legislation. I'm not sure if a mandate or legislation would sit well in the state and local communities.

*Comments addressing specific topics are organized into two domains: general comments that apply broadly to the vision for *The National Map* and its key concepts and (2) comments that address individual components of *The National Map* report. The latter are further organized by headings that correspond to the report structure.*

GENERAL COMMENTS

Issue - clarify the benefits of *The National Map* to multiple sectors and to whom the benefits accrue

Not enough science/community needs.

We acknowledge the Federal-centric focus of the report, but agree that the role of local governments and communities in data maintenance partnering is fundamental to the success of *The National Map*. We will change wording of the report to better reflect these roles. See “The USGS’s Role in Meeting These Needs” and “Organizational Issues and Strategies” in the report.

Need to emphasize societal impact. Current updates, shared maintenance will provide positive impact

Benefits to society are addressed through reference to emergency response (for example, the vignettes) and economic impacts. No action.

Economic value/merit. A nation with ready access to free or low cost geospatial data for all is providing knowledge that stimulates growth.

We will investigate commissioning a study of the economic multiplier of readily available base geographic information.

Issue - scope of *The National Map*

Clarify the role of The National Atlas as part of *The National Map*.

The National Atlas is a separate compendium of diversified information that can be linked to *The National Map* content that relates to primary series topographic mapping and higher resolution, best available data. In addition to being a foundation of small-scale general reference information, The National Atlas links to numerous specialized data sets that, taken together, provide a synoptic view of the interrelationships between diversified socio-economic, physical and other phenomena.

The National Atlas is a component of the USGS Cooperative Topographic Mapping Program. *The National Map* is the overarching concept that links all USGS Geography activities and products. See “Roles of the USGS” in the report.

The report is too general and not innovative.

The National Map vision is purposefully generalized, but has received widespread and enthusiastic endorsement, both within USGS and other sectors of base geographic information creators and users. Specific strategic goals, implementation strategies, and details of business and technological approaches are part of the Cooperative Topographic Mapping Program 5-Year Plan, annual program of work, operations concept, and pilot project plans

Involve other agencies.

The National Map vision is heavily dependent on partnerships with other government agencies and the private sector to work together to leverage collective resources to create, maintain, disseminate, and apply data that will eliminate duplicative effort, be mutually beneficial for respective missions and permit general access and exploitation. Several agencies have made specific proposals for direct and sustained involvement in *The National Map* based on this vision. Examples include the National Oceanic and Atmospheric Administration (bathymetric data as part of the elevation theme) and the Bureau of the Census (roads and boundaries). Other agencies have committed to be part of the initial set of pilot projects that will validate *The National Map* concepts and pursue research issues and business relationships.

Need for alignment with the Federal Geographic Data Committee and National Spatial Data Infrastructure.

The National Map will be a contribution to National Spatial Data Infrastructure and is a reflection of the mission and mandate of the USGS to provide base cartographic data for the Nation. The USGS is committed to using Federal Geographic Data Committee and Open GIS Consortium promoted spatial information standards (e.g. accuracy, metadata, and data exchange.) The report will be modified to reflect this relationship.

There is confusion regarding to what the name, “*The National Map*,” refers.

The National Map is a digital, Web accessible assemblage of topographic base information and derivative standard series maps that align with Federal Geographic Data Committee standards. *The National Map* content shall be maintained as up-to-date as is necessary and possible; data for some themes, in some areas, will be as current as 7 days and will be maintained through a continuous revision process. In this context, *The National Map* is the domain of the USGS Cooperative Topographic Mapping Program.

In addition to this application of *The National Map*, USGS uses the term to refer collectively to the three Geography discipline programs: Cooperative Topographic Mapping, Land Remote Sensing, and Geographic Analysis and Monitoring. All programs, and other USGS programs, depend on and contribute to the availability of *The National Map* base data content, and link their own outputs, such as the results of geographic research, to *The National Map* as the geographic foundation of the USGS enterprise-wide geographic information system.

What is *The National Map* governance model to be?

Working relationships, roles, and responsibilities necessary to execute *The National Map* are being developed. The Cooperative Topographic Mapping Program staff is responsible for strategic planning, overall resource coordination, and internal and external program coordination and promotion. USGS regional staffs are responsible for developing and executing the annual program of work to achieve program goals. Cooperative Topographic Mapping is investigating the formation of an external advisory group, as a resource to participate in the evolution of the strategic plan and goals, to assess progress, and to refine *The National Map* vision. A National Map Implementation Team, or steering committee, links the Cooperative Topographic Mapping and regional staffs. Partnership representatives will be consulted and included at all levels.

Role of NOAA and bathymetric data.

Bathymetric data are generated by NOAA who is the appropriate partner to maintain these data as a component of the elevation theme of *The National Map*. USGS and NOAA will need to agree on and employ a common model for elevation and bathymetric data representation so that land surface and bottom surface data are seamless.

If *The National Map* is the Nation's general-purpose base map, what about all the other spatial information that exists?

The National Map vision is to ensure that there is a foundation of nationally consistent, current base information to which other data can be related, either as attributes of the base information, additional content within the same themes of data, or different themes that are associated through the base geography. An example of additional attribute information is ground-based imagery of historic structures that might be obtained and maintained by the National Park Service, linked to structures represented in *The National Map*. Examples of associated themes of information are US Public Lands Survey System data, parcel ownership delineations, population characteristics, and species inventories that are related by geographic coordinates and feature associations to *The National Map*. The key

objective is to minimize duplication of effort in providing the base map so others can devote their resources to data needs specific to their unique missions.

Also see issues and comments under “Title and Preface.”

Keep *The National Map* focus on a core set of data

The National Map core data are orthoimagery, elevation (including bathymetry), hydrography, transportation, structures, boundaries, geographic names, and land cover. These data align closely with the traditional content of USGS primary series topographic maps, although *The National Map* vision endorses further consolidation of content (similar to the Federal Geographic Data Committee/National Spatial Data Infrastructure) and incorporation of content within other themes (for example, orthoimagery may be the vehicle for providing selected cultural information that may have been explicitly shown on USGS topographic maps in the past). These issues will be discussed in detail with partners and representative customers before specific commitments to data themes and feature/attribute content are made.

Don't forget Alaska

Alaska is a critical consideration for *The National Map*. We recognize that its rugged wilderness and large size have driven USGS to a different primary map series scale (1:63,360), with selected areas covered at 1:24,000 scale. Renewed interest in Alaskan energy resource development has stimulated state funding initiatives for new geospatial data. The concepts of *The National Map* apply as well to Alaska as to any other part of the Nation. Specific consideration will be given to partnership opportunities and mission requirements to apply these concepts to meet unique needs for base geographic information and topographic maps in Alaska.

Issue - business plan funding; can USGS afford *The National Map* and who is going to contribute?

There is an existing funding base for USGS topographic mapping. The Cooperative Topographic Mapping Program is the largest USGS program, as measured by appropriated funding. In addition, our topographic mapping activities have attracted full repay or matching funds from other Federal and State agencies. We will honor our existing commitments to these partners for data and map products, and we will evaluate all additional cooperative opportunities to ensure maximum alignment with *The National Map*. *The National Map* is a redefinition of the National Mapping Program. We will seek to grow the program by leveraging our resources through creative partnerships, in fulfilling the USGS role to encourage and stimulate base geographic data creation and maintenance. In addition, as the tangible benefits of current and nationally consistent information to the Nation are demonstrated by *The National Map* successes, we hope for increased direct funding and indirect support to fully achieve *The National Map* vision.

Issue – your timelines are unrealistic and/or unachievable.

Is 7-day currentness even possible?

We received many comments on the 7-day criterion. It remains as *The National Map's* ultimate challenge. We understand that this is not achievable for all themes in all areas, given today's technology and resource constraints. We will come as close to 7 days as funding, sources, and technology permit, and we will continue to seek to improve currentness in our efforts to meet user needs and expectations. We do expect to achieve or approach 7-day currentness through innovative combinations of technologies and strategies for some data themes in some areas, within the time horizon of *The National Map* vision document.

See also "Issue - specify a more realistic currentness expectation" under "DATA CHARACTERISTICS" in this document.

The Nation can't wait until 2010.

We are starting to implement *The National Map* on October 1, 2001 through pilot projects and reintegration of our individual data programs and map revision program. We will use existing data for the initial implementation if that is all that is available. During fiscal year 2002, we will commit to partnerships to accrue and maintain additional content. We will conduct cartographic research focused on tools and methods for *The National Map*. We understand that USGS must make tangible and meaningful progress toward *The National Map* goals and concepts in the next two to three years. We fully understand both that we cannot wait until 2010 for this, and that we must look well beyond 2010 to make the most intelligent decisions. Clearly, certain capabilities and portions of *The National Map* content will be ready sooner than others, and we will achieve some goals (like relinking our data theme programs and the topographic map) sooner than others, such as achieving full 7-day currentness for all *The National Map* content.

Issue – other general comments

How realistic is the use of volunteers?

This is an exciting possibility. Numerous Federal, State, and local government programs rely on volunteers for data collection and maintenance. Volunteerism is an American tradition. In 1998, more than 109 million volunteers contributed an average of 3.5 hours per week to volunteer activities. Examples of successful Federal programs that rely on volunteers are the National Weather Service Cooperative Observer Program, the U.S. Coast Guard Auxiliary, and the National Park Service Volunteers-In-Parks. Within the mapping discipline, NOAA's Office of Coast Survey has operated a very successful volunteer Cooperative Charting Program for more than 35 years and has recently evolved it to an Adopt-

a-Chart Program. Volunteers form the USGS Earth Science Corps. More than 2,000 volunteers provide on-site information to assist with topographic map revision. At the same time, USGS recognizes the challenges in implementing a quality volunteer program, and is committed to maintaining high accuracy base geographic information regardless of the data source. We will pursue the volunteer concept carefully and thoughtfully. Perhaps certification of volunteers through a Web-based self-paced training program can be used; USGS area maintenance offices might provide a local interface with the volunteer community. A first step may be to certify volunteers to contribute to a Web-based revision notes database in which information about base information content changes could be entered and attached to the applicable feature or geographic coordinates for validation by local partner government agencies that have responsibility for the particular data theme. At the very least, we want to learn more about the potential for mass participation in national topographic mapping and offer opportunities for involvement where it makes sense.

What's new about *The National Map*?

Individually, some of the concepts, business approaches, or technologies may not be new. What is new and exciting is the synthesis of *The National Map* components, the redefinition of USGS roles and responsibilities for topographic mapping, and the commitment to sharing those responsibilities through creative partnerships. Future coalescence of technologies also offers some unique possibilities to fundamentally change the ways in which data are collected, communicated, and applied.

TITLE AND PREFACE

Issue – Clarify the relationship between *The National Map* and Gateway

Agree. Reword the last sentence of the 1st paragraph, “The USGS’s Role in Meeting These Needs” in the report:

Within the U.S. Geological Survey (USGS), *The National Map* will be one of many data sets accessible through the USGS Gateway portal, and will be the organizing mechanism for spatially referenced scientific information as the foundation data of an enterprise-wide geographic information system.

Issue – Consider modifying *The National Map* name – suggestions include adding “Topographic” and “Land Characterization.”

The National Map should remain as is – it is short and memorable. However, we do need to clarify the domain of *The National Map* and its applications to (1) topographic

mapping in USGS, (2) Geography in USGS, (3) all of USGS, (4) the national mapping community...see comments on Other/General issues. Within USGS, *The National Map* is now used to as the overarching term referring to the aggregation of all Geography discipline (ex-National Mapping Division) programs (Cooperative Topographic Mapping, Land Remote Sensing, and Geographic Analysis and Monitoring).

Reword the “Preface” in the report:

To meet the needs....and to which users could tie additional data, to meet their individual needs. *The National Map* concept is the unifying construct that incorporates all Geography programs of the USGS: Cooperative Topographic Mapping, Land Remote Sensing, and Geographic Analysis and Monitoring. USGS will provide the leadership needed to develop and continuously maintain *The National Map* through partnerships between Federal, State, local, and tribal governments, the private sector, other organizations, and the general public.

USGS invites partners, customers, and the public to contribute to achieving the goals of *The National Map*. Suggestions can be sent by electronic mail to: nationalmap@usgs.gov.

Issue – Update the description of the process used to develop the report.

See changes made to the report.

THE NEEDS OF THE FEDERAL GOVERNMENT, AND THE NATION, FOR A COMMON SET OF BASIC SPATIAL DATA

Issue – beef up the discussion of the roles of and benefits to non-Federal sectors of *The National Map* and clarify that *The National Map* must meet the needs of all users.

Modify the report to reinforce that the Federal government needs local data. Acknowledge that others are increasingly likely to be creating and maintaining data that are useful to a national data set. In the second paragraph, insert the words “created and” before “used by...” In the same paragraph, current second sentence, delete the words “developed to meet Federal needs...”

Issue – emphasize the economic impact of *The National Map*.

This is an appropriate theme for *The National Map*. Reword the 2nd paragraph of “The Needs of the Federal Government...” section:

The economic multiplier of freely available public domain geographic data is substantial. Entire industries are built around these data. Base geographic data should be considered and supported as part of the Nation's infrastructure.

THE USGS's ROLE IN MEETING THESE NEEDS

Issue – clarify the Federal role.

Clarify the duality of the Federal government's role in providing a nationally consistent and complete set of geographic base data: (1) producer and maintainer where appropriate and (2) (and this particularly applies to the USGS role in *The National Map*) supporter, facilitator, encourager and stimulator of the capabilities and activities of all sectors including States and local governments. See specific changes in next issue...

Issue – clarify the role of other Federal partners in *The National Map*

Clearly acknowledge the roles of key Federal partners (e.g., Census, NOAA, USFS, NPS) as providers and maintainers of *The National Map* information such as roads and boundaries, bathymetry, National Forest areas, National Park lands. This means backing off somewhat of the USGS-centric theme of this section.

Specifically acknowledge that others have lead roles for some data themes. Overall, USGS coordinates and advocates a national perspective on the data. The USGS works to achieve *The National Map* strategic objectives through the combined efforts of all sectors. USGS takes responsibility for ensuring the availability and accessibility of *The National Map* content (with the exception of bathymetry). In particular, two paragraphs need to be reconsidered: (1) the one starting... "Most Federal agencies do not have responsibilities to develop or maintain these data." and (2) the last paragraph... "As the Nation's largest civilian mapping agency.."

Specific rewording of first paragraph:

A common set of current, accurate, and consistent base information that describes the Earth's surface and locates features is the starting point for most geographic activities. *The National Map* will be a composite of continuously maintained basic spatial data for the United States and its territories, and will serve as the Nation's topographic map for the 21st century. It will be a data foundation that could be extended and enhanced, and to which additional data could be tied (Then continue with sentence starting "It would contain...")

Specific wording of second and third paragraphs:

The U.S. Geological Survey (USGS) has a mandate to provide base topographic information to the Nation, including meeting the needs of its own scientific

programs and those of other Federal agencies. This mission is consistent with the Office of Management and Budget Circular A-16, “Coordination of Surveying, Mapping, and Related Spatial Data Activities.”

The most widely known form of topographic information is the USGS primary series of topographic maps¹... (Continue with the rest of the paragraph as is, except change “numerous Federal activities” to “numerous government activities”)

CHANGING NEEDS FOR SPATIAL DATA AND OPPORTUNITIES FOR MEETING THESE NEEDS

Issue – need for a “spatial information management utility.”

This is an implementation issue.

Issue – strengthen technology bullet.

Reword to state: “Technology will continue to evolve, and will provide new ways to collect, maintain, access, and use basic spatial data. For example, the convergence of personal digital devices, Global Positioning System capabilities, and wireless communications is stimulating numerous location-based services that provide access to geospatial data by users at remote sites, and will make possible real-time collection and update of data by those same users.

INFORMATION CONTENT

Issue – should USGS assemble and maintain a nationally consistent, “reduced resolution” *The National Map* data set that meets needs for complete, already-integrated, internally consistent data and link that data set to the best available information for any theme/area?

Although *The National Map* is based on the “skyline” concept of best available data for any given theme and geographic area, other data may be included on a case-by-case basis. An example is Landsat data linked to the best available orthoimagery. The introductory paragraph for “*The National Map*” (p. 8) will be rewritten as (deleting reference to 2010):

The proposal for *The National Map* sketches the initial concept and way of moving forward to meet national needs for basic spatial data. The goal of *The National Map* is to provide a nationally consistent set of integrated, current topographic information that supports these needs. The resolution of the data will

vary depending on geographic area and availability (for example, more detailed and accurate elevation data for flood plain or coastal areas). In no case will the resolution of the best available data in *The National Map* be lower than that associated with USGS primary series topographic maps of that area.

See also “Issue – will *The National Map* be staged as a derived data set...” in “DATA CHARACTERISTICS” in this document.

Issue – clarify what is meant by “high resolution”.

The nationally consistent, complete foundation data set of *The National Map* will contain data at no lower resolution than that associated with primary series topographic mapping. Lower resolution data sets may be part of *The National Map* (e.g. *The National Atlas of the United States* ® medium-scale topographic data, 30- or 15-meter Landsat data) as appropriate to respond to national needs for these data, or as phased implementations of *The National Map* until nationally complete, consistent, and maintainable higher resolution data are available.

The “best available” data in *The National Map* will vary in resolution depending on geographic area (e.g., tighter DEM grid spacing and more rigorous vertical accuracy for flood plains), and by availability. See issue above.

Modify the “High-resolution digital orthorectified imagery” bullet under “Information Content” to note that Landsat imagery will be part of *The National Map* data set.

Issue – describe the broader geographic context of *The National Map*.

The National Map can be thought of as the U.S. component that can be used in conjunction with other North American (Mexico and Canada) topographic data, and as a component of global data sets (e.g., NIMA). This concept raises other issues, such as data copyright and license issues. Defer this concept to future strategic planning.

Issue – acknowledge “remote sensing” tools and sources.

Remote sensing tools and methods are a critical component of *The National Map* concept. Add specific reference to “remote sensing” to the definition of orthoimage and land cover components of *The National Map*. For orthoimage, “...aircraft- and satellite-based remote sensing capabilities.” For land cover, “...aircraft- and satellite-based remote sensing sources.”

Issue – provide for additional content, specifically bathymetry (this also applies to Landsat imagery, see above).

NOAA requested that bathymetric data be part of *The National Map* vision, and other users want a continuous surface data set that extends beyond the shoreline. The bathymetric component will be added to “Information Content” with words to the effect

that NOAA is responsible for this component, to clarify that USGS' roles - particularly guarantor of national data completeness and owner/producer - do not apply to bathymetry. Also, incorporation of bathymetry begs the questions of what extent (e.g. to the Exclusive Economic Zone boundary – this should be a NOAA decision) and to what shoreline (this issue must be resolved between USGS and NOAA and is an implementation issue).

Suggested wording:

“High-resolution elevation data, including offshore bathymetric data maintained by the National Oceanic and Atmospheric Administration...”

Include a similar change under “Federal Partners” in the “Roles of Partners” section in the report.

Issue – be clearer about the role of *The National Map* insofar as content is concerned.

Reword the report to reinforce that *The National Map* is a foundation data set of features with basic attribution that is of general interest and applicability (might give the example of roads – include feature ID, name, route number, address range, and class...but not surface type, load capacity, width, etc.)...a core of information that is linkable and extensible to other data that have a geolocational component (such as DOT data on other road characteristics such as accident locations).

See modifications to the paragraph on vector feature data in the report.

Issue – acknowledge need for and commitment to provide metadata.

This is a critical issue. There were more than 22 comments...everyone wants metadata. Expand the wording on metadata, including metadata at the feature level where appropriate, as a bullet in the Data Characteristics section. Recognize the intent to adhere to the Federal Geographic Data Committee specification in the short term and the emerging International Organization for Standardization metadata standard in the future.

Suggested bullet wording:

- Metadata. At a minimum, metadata will meet Federal Geographic Data Committee Standards, to document the content and characteristics of *The National Map* data, such as lineage, positional and attribute accuracy, completeness, and consistency. Metadata will be maintained at the feature level when applicable. The metadata will be published over the Internet, using standard Web protocols such as the National Spatial Data Infrastructure Clearinghouse, to enable users to find and evaluate the reliability and usefulness of data for their unique applications.

Issue – provide more detailed definition of *The National Map* features and attributes.

There is a clear relationship with the Federal Geographic Data Committee’s list of framework features and attributes, as outlined in the Federal Geographic Data Committee’s “Framework: Introduction and Guide – 1997” and its predecessor, “Development of a National Digital Geospatial Data Framework – 1995.” Data models and more detailed content specifications have been defined for some data layers in Federal Geographic Data Committee content standards. The exact content specification is an implementation issue and needs to be further developed, then documented in *The National Map* plans and specifications.

Issue – need to track changes at the feature level

Note that vector data need to be assigned unique IDs allowing attribute attachment, content extension, and maintenance of change information at the feature object level. Add specific reference in the paragraph on vector content... “These data will have unique feature identifiers, metadata, and minimal associated descriptive information...”

Issue – acknowledge plan to maintain an archive of historical information.

This applies to both digital data and to primary series maps that predate *The National Map*. Various solutions are possible, but these are implementation issues. Add a paragraph under Data Characteristics – another bullet. Note that more than 29 respondents identified this issue.

Suggested wording:

- Temporal dimension. To facilitate tracking of changes over time, the USGS will ensure that *The National Map* content is permanently archived by retaining versions of data sets or feature-based transactional information. Existing paper topographic map archives also will be preserved.

Issue – need for a digital visualization of *The National Map*.

We recognize the need for tools for visualization of data from *The National Map*. We will continue to work with all of our partners, including our colleagues in the private sector through Cooperative Research and Development Agreements and other mechanisms, to support their development.

Issue – reword description of high-resolution digital orthorectified imagery

Use suggested wording from a commenter: delete “...from which displacements...have been removed” and change to “...from which most displacements caused by terrain relief and sensor geometry have been removed.”

Issue – reword description for high-resolution surface elevation data

Use wording from a commenter: “At a minimum, these data will have sufficient detail and accuracy to yield contours for primary series topographic maps, to support geometric correction of imagery, to support three-dimensional perspective views and fly-throughs, and, in areas of subtle relief variation such as flood plains and coastal areas, to support hydrologic and other modeling.”

Issue – clarify that vector data are represented by the object model

Modify wording to: “Vector feature data for the themes of...”

Issue – rely on imagery for the structures information content, except where available from partners, or depend on the Bureau of the Census for this information.

The report notes that imagery may be used to provide information content such as structures, as opposed to extracting and representing structures as features. Decisions about needs for, and ways to obtain, structure feature content and associated attributes will be based on interaction with partners. The possible role of the Bureau of the Census is discussed under “Organizational Issues and Strategies.” Three agencies (FEMA, NIMA, and the Bureau of the Census, have specifically identified a need for structures feature content to meet their mission needs.

Issue – geographic names content description is incomplete given *The National Map* content and partnerships.

Add to description to note that names go beyond U.S. Board on Geographic Names content, such as highway and street names (see next issue).

Issue – improvements are needed to GNIS to support *The National Map* applications

Suggested wording:

Geographic names. These names include those for physical and cultural geographic features needed to support the U.S. Board on Geographic Names, and other names, such as for highways and streets. Names will be associated with their corresponding feature, and the accuracy of names not associated with a feature specifically represented in *The National Map*, such as a locale or a ridgeline, will be improved.

Issue – there is confusion over “land characterization” data vs. “land cover” resulting in concern over the need for and achievability of a common classification scheme.

Modify the description of the land characterization data component to reference land cover, and not land characterization.

Suggested wording:

Land cover information. These data classify the land surface into categories such as open water, perennial ice/snow, evergreen forest, and high density residential according to a pre-selected scheme. The data satisfy the need for nationally consistent content for topographic mapping applications. Land cover data are developed from a combination of aircraft- and satellite-based remote sensing sources, supplemented by ground truth information.

DATA CHARACTERISTICS

Issue – specify a more realistic currentness expectation.

Modify the unqualified 7-day currentness expectation. Also see “Issue – your timelines are unrealistic” under “GENERAL COMMENTS.”

Delete the last sentence in the “Currentness” bullet in the report and insert the following:

Currentness will vary depending on the data theme, local characteristics (for example, rate of change), user requirements, source availability, technology, and resources.) Data expected to be significantly more current during the near future include imagery, elevation (depending on the applicability of new remote sensing technologies), and features for which surrogate indicators of change are available (such as construction or occupancy permits).

Issue – the term “seamless” needs to be defined more precisely.

Replace the second bullet under “Data Characteristics” with:

Seamlessness. Features will be represented in their entirety, and not interrupted by arbitrary edges such as 7.5-minute map boundaries.

Issue - separate variable resolution and variable completeness.

We need to address both, but define as two separate characteristic bullets. Remove the words “...and completeness...” from the “Variable resolution and completeness” bullet title.

Reword the “Variable resolution” bullet text as:

Data resolution, or pixel size, may vary among imagery of urban, rural, and wilderness areas. The resolution of elevation data may be finer in flood plain, coastal, and other areas of low relief than for areas of high relief. A tool to generalize data of varying resolution within a specified geographic area will be provided. Reduced-resolution, internally consistent representations may be pre-computed and stored, or generated on the fly, depending on the complexity of the data and size of area selected.

Add a new bullet, “Completeness,” to address the concept of comprehensive (i.e., inventory) coverage for a theme, as opposed to representative (i.e., sample) content:

Data content will include all mappable features (as defined by the applicable content standards for each data theme and source). Content will not be generalized (e.g., features deleted or aggregated) as may be required for graphic representation. Tools will be provided to support data generalization and symbolization for graphic display.

Issue – clarify the data integration approach and expectations

Modify wording of the “Consistency and integration” bullet to explain that vertical integration involves more than simply bringing separate themes to the same projection and datum:

Content will be delineated geographically (that is, in its true ground position within the applicable accuracy limit) to ensure logical consistency between related features. For example, the terrain surface will be accurately depicted by the combined elevation and hydrography data, such that streams and rivers consistently flow downhill and each structure will be located correctly relative to other local features such as roads and other buildings.

Issue – will *The National Map* data be staged as a derived data set (i.e., preprocessed) or will data integration and other processing required to produce standards digital data and map products be accomplished on demand?

The ultimate goal for *The National Map* is that delivery of derivative data and topographic maps that comply with *The National Map* be accomplished on the fly for the best available data, each time any user defines a unique geographic area and content need. These processes are to be software-based and transparent to the user, such that the delivered products are internally consistent in content, accuracy, vertical alignment, symbolization, and other characteristics. However, the knowledge to fully automate these processes does not exist today, and is not likely to be available to the full spectrum of *The National Map* users for some time. Therefore, it is necessary that the USGS, or other partner in *The National Map*, employ a combination of methods to bring source data into national compliance. This may be done most efficiently by preprocessing data

to a standard product. The USGS and its partners will conduct cartographic research into the search, identify, extract, validate, reformat, generalize, edge match, vertical register, and symbolize functions required to provide an automated, on-demand approach as soon as is practical.

Issue – Address both absolute and relative accuracy.

Add the following sentences at the end of the “Variable positional accuracy” bullet:

Actual positional accuracy will be reported in conformance with the Federal Geographic Data Committee’s “Geospatial Positioning Accuracy Standard.”
Relative accuracy will be achieved through attention to logical consistency and data integration.

Issue - Address the common reference system and datum as an independent characteristic

Remove the sentence “The coordinates forreferencing system” from the “Variable positional accuracy of spatial data.” bullet:

Add a new bullet covering spatial reference systems:

Spatial reference systems. The coordinates for spatial data in *The National Map* will be based on defined horizontal and vertical datums, and encoded in a defined coordinate system. Tools will be provided to integrate data that are mapped using different datums and referenced to different coordinate systems, and to reproject data to meet user requirements.

Issue – How will verification and uncertainty be represented?

Add in the “Metadata” bullet under “Data Characteristics” (see rewording under “Issue – acknowledge need for and commitment to provide metadata” in the “INFORMATION CONTENT” comments):

...”lineage, positional and attribute accuracy, completeness, and consistency...”

DEVELOPMENT, MAINTENANCE, AND OPERATIONS

Issue – will *The National Map* have provisions for an archive?

Comments expressed concern for an archive for *The National Map*. An archive should support change analysis studies and a variety of other applications that require historical data. We will support an archive for *The National Map*, provide snapshots of *The*

National Map, and include a feature-based versioning strategy as appropriate. See “Issue – acknowledge plan to maintain an archive of historical information” under “INFORMATION CONTENT” in this document.

Issue - what is the relationship between the National Spatial Data Infrastructure and *The National Map*?

Comments reflected confusion with respect to the relationship between National Spatial Data Infrastructure and *The National Map*. *The National Map* will be a contribution to National Spatial Data Infrastructure and is a reflection of the mission and mandate of the USGS to provide base cartographic data for the Nation. See “Issue – scope of *The National Map*” under “GENERAL COMMENTS” in this document.

Issue – what steps will USGS take to assure a standard level of quality and document the source of data included in *The National Map*?

Numerous comments were received that expressed concern for the quality of data in *The National Map*. Some comments indicated that the USGS should institute a certification process for data in *The National Map*. Particular concern was expressed regarding data provided by volunteers. The suggestion was also made to publish a spatial data reliability report on data contributed by partners and volunteers. It was also suggested that the USGS implement a publicly accessible feedback file for *The National Map* to register users opinions about the usefulness, quality, content, and other characteristics of *The National Map*.

We recognize the importance of assuring a high standard of quality for the data in *The National Map*. The USGS is committed to providing a certification and quality assurance/quality control process for *The National Map*. We do recognize both the complexity and the magnitude of this issue and remain committed to data quality. We will consider the suggestions for reliability reporting and a feedback mechanism as implementation plans are developed. Also see “Issue – other general comments” under “GENERAL COMMENTS” in this document.

Issue – what data standards will be used in the building of *The National Map*?

Comments generally reflected concern that USGS use widely accepted standards in the development of *The National Map* and specifically referenced Federal Geographic Data Committee and Open GIS Consortium standards as being useful. We agree. This will be addressed in forthcoming implementation plans. The USGS is committed to using industry-accepted standards from the International Organization for Standardization geographic information standards (principally ISO/TC 211), American National Standards Institute geographic information system standards (principally from NCITS L1), Federal Geographic Data Committee data content and framework, and Open GIS Consortium protocols consistent with the direction provided by the Office of Management and Budget Circulars A-16 and; A-119. Also see “Issue – acknowledge

need for and commitment to provide metadata” under “INFORMATION CONTENT” in this document.

Reword the 4th paragraph of Development, Maintenance, and Operations:

Computing and telecommunications technologies will allow a number of options for sharing responsibilities. *The National Map* may develop as a networked, distributed collection of databases, operated by public or private sector organizations, that, as data stewards, agree to provide basic spatial data that meet common standards and levels of service. While the data archive may be distributed among many sites, the data in *The National Map* will appear seamless to users. *The National Map* will follow relevant national and international standards that are supported by industry.

Issue - how will metadata be addressed for *The National Map*?

Comments on this issue highlighted the need for metadata at the feature level including information such as the agency making an update, the source of the information, and date/time stamping. The USGS recognizes the value of feature-level metadata and plans to implement these concepts in *The National Map* as appropriate. Metadata serves as an efficient way to identify the agencies that contribute data to *The National Map*. USGS plans to preserve each contributing agency’s identification. Other methods of identifying and crediting contributing agencies will also be pursued. Also see “Issue – acknowledge need for and commitment to provide metadata” under “INFORMATION CONTENT” in this document.

Issue – will *The National Map* be implemented as a centralized or distributed collection of data?

Comments reflected confusion as to whether *The National Map* will be housed and disseminated by USGS or on a distributed network managed by many supporting organizations. *The National Map* will be implemented on a distributed network. The report states in the 4th paragraph under “Development, Maintenance, and Operations” that “*The National Map* may develop as a networked, distributed collection of databases.....While the data may be distributed among many sites...”

Issue – has the USGS developed an implementation plan for *The National Map*?

Many of the comments made implementation suggestions. The report deliberately is focused on the vision for *The National Map* and is not intended to be an implementation plan. All suggestions will be considered as the 5-year plan for the USGS Cooperative Topographic Mapping Program is developed and maintained, and as detailed implementation and annual work plans are prepared.

Issue – what is the plan for handling updates to *The National Map*?

Commenters suggested that automatic notification about changes be delivered to users who are interested in specific content and/or geographic area coverages of *The National Map*. A spatial subscription service was envisioned such that users might sign up on a Web page to receive this information via e-mail. This is a good suggestion that we will consider in planning the implementation of *The National Map*.

ACCESS AND USE

Issue – will *The National Map* be in the public domain?

Comments reflected a very strong and widespread desire to have *The National Map* content in the public domain. As the role of private industry grows in providing and maintaining data, and in providing tools and applications of *The National Map*, concerns rise about the public's ability to freely (i.e., without restrictions) access and use the data. Our intention is for *The National Map* content to be in the public domain, and to be accessible over the World Wide Web at low or no cost. Unrestricted access to *The National Map* is of vital importance for emergency and disaster response given the wide variety of agencies that have requirements for immediate access to these data. To assure access for these critical needs, *The National Map* will be designed with redundant servers, sufficient bandwidth, and 24x7 operational support.

Reword the 2nd paragraph of “Access and Use” in the report:

The USGS is committed to assuring that *The National Map* content remains in the public domain and is made accessible over the World Wide Web through multiple Web-based services, including an image service (Web mapping), feature services (data streaming in support of location-based services and metadata browsing), and data extract (feature access and spatial data transfer). All services will use industry-supported, open standards-based protocols, as appropriate, to allow these data to be accessed freely and readily, for maximum utility to all users. Unrestricted and immediate access to *The National Map* is of vital importance to public and private organizations for emergency and disaster response. To assure access for these and other critical needs, *The National Map* will be designed with redundant servers, sufficient bandwidth, and around-the-clock operational support. In cases where rights to data are held by private organizations, the negotiation of unlimited distribution and use rights will be required.

Issue - how will interoperability with other USGS disciplines and agencies be accommodated?

Modify the 2nd paragraph of “Access and Use” (see “Issue – will *The National Map* be in the public domain?” above) to note that *The National Map* will be accessible through

multiple Web-based services, including an image service, feature service, and data extract service. These services will be provided using industry-supported open, standards-based protocols, as appropriate.

Issue – will USGS continue to support the paper topographic map?

Comments reflected a consistent requirement for the paper topographic map. There was concern expressed that USGS continue to support the traditional 1:24,000-scale topographic map series and provide newly revised maps to Federal Depository Libraries at no cost. The USGS is committed to support the production of paper topographic maps. The provision of these maps over time will transition from the traditional process to one in which maps are generated directly from *The National Map*. The USGS will ensure that the content, accuracy, and graphic quality of the maps will be maintained throughout any technological and business method transitions. At no time in this transition will we abandon support for the hard copy map user. We recognize the importance of the Federal Depository Library Program and will continue its support through *The National Map*.

Also see “Issue – what steps will USGS take...” under “DEVELOPMENT, MAINTENANCE, AND OPERATIONS” in this document.

Issue – methods by which paper topographic maps should be printed.

Libraries and some USGS business partners who sell maps urge that the current high quality of printed USGS topographic maps be sustained and that a stock of paper maps be maintained. They added that current “print on demand” technologies do not provide the quality needed by their customers and clients, and that they can not support the operational and maintenance costs of print-on-demand technologies (such as kiosks). Other comments noted that the rapid update of information anticipated in the report would require printing of only very small press runs and that the burden of maintaining a stock of tens of thousands of unique printed maps with frequent replacement, would be excessive.

The USGS now provides hard copy maps both through a print-and-warehouse approach and, through partnerships with the private sector, through print on demand at kiosks. *The National Map* vision of continuous update does not mean that paper maps stocked at a warehouse will be reprinted to reflect every change. Print-on-demand methods can meet the need for extremely current hard copy maps. The USGS will use its experience and work with its partners and customers to implement the best blend of technologies that are affordable and available to a wide range of map users. In this way, we will continue to provide hard copy maps that meet diverse user requirements, generated from the digital data in *The National Map*.

ORGANIZATIONAL ISSUES AND STRATEGIES (INCLUDES “ROLES OF THE USGS” AND “ROLES OF PARTNERS”)

Issue - clarify *The National Map* roles and relationships with ongoing activities and organizations.

The most frequent requests for clarification of USGS' roles involved interfaces with the National Spatial Data Infrastructure, Federal Geographic Data Committee, Office of Management and Budget Information Initiative (I-Teams), the GeoData Alliance, and State GIS councils.

The relationship between *The National Map* and organizations and activities mentioned by reviewers range from those which are commonly known in the spatial data community and have been in existence for years to those which are relatively new and still emerging. Clearly, the broad National Spatial Data Infrastructure and the activities of the Federal Geographic Data Committee are quite well known and USGS has been a participant in these activities. *The National Map* is an USGS initiative and is within its scope and mission. *The National Map* concept fits within the National Spatial Data Infrastructure goals for providing basic map category data to the spatial community while eliminating duplication through coordination and partnerships. The USGS has been an active participant in Federal Geographic Data Committee activities and this will continue. The implementation of *The National Map* will be closely coordinated with the activities of the Federal Geographic Data Committee. Also see “Issue – scope of *The National Map*” under “GENERAL COMMENTS” and “Issue – what is the relationship between the National Spatial Data Infrastructure and *The National Map*” under “DEVELOPMENT, MAINTENANCE, AND OPERATIONS” in this document.

Suggested wording for the “National Spatial Data Infrastructure” bullet in Appendix 1:

The National Spatial Data Infrastructure provides the context for developing and maintaining basic spatial data. The National Spatial Data Infrastructure is the technologies, policies, and people necessary to promote sharing of geospatial data throughout all levels of government, the private and non-profit sectors, and the academic community. The goals of the National Spatial Data Infrastructure are to: (1) reduce duplication of effort among agencies, (2) improve quality and reduce costs related to geographic information, (3) make geographic data more accessible to the public, (4) increase the benefits of using available data, and (5) establish key partnerships with States, counties, cities, tribal nations, academia and the private sector to increase data availability. Under Executive Order 12906, the Federal Geographic Data Committee coordinates the Federal Government's development of the National Spatial Data Infrastructure. The National Spatial Data Infrastructure encompasses policies, standards, and procedures for organizations to cooperatively produce and share geographic data. The 17 member Federal agencies of the committee cooperate with organizations from State, local, and tribal governments, the private sector, and the academic

community to develop the National Spatial Data Infrastructure. The USGS participates in the committee, and leads several of its activities. *The National Map* concept aligns with the goals of, and is one of several USGS activities that contribute to, the National Spatial Data Infrastructure.

I-Teams are an example of how USGS Area Maintenance Offices will operate with consortia.

Reword the 2nd sentence under “State, regional, and local partners” to read: “...and regional consortia, such as State geological surveys, State GIS councils, or Implementation Teams, which coordinate...”

Add the term “I-Team” to the Glossary:

Implementation Team (I-Team) – a collaborative group organized to build portions of the National Spatial Data Infrastructure for a geographic area, such as a State or region. Participants may include local, State, Federal, and tribal organizations, private sector companies, and other organizations. A team prepares a comprehensive plan for compiling, maintaining, and financing a spatial data infrastructure for a geographic area. The planning includes alignment of participants’ needs and resources, identification of participants’ responsibilities, and development of milestones. Planned activities must adhere to National Spatial Data Infrastructure principles, and include the development, testing, and use of standards.

Issue – have the Bureau of the Census provide stewardship for structures.

A partnership with the Bureau of the Census for structures was proposed in the original draft report. In its comments on the report, the Bureau of the Census offered a partnership on roads and boundaries. Bureau of the Census staff note that, under Title 13, they may not provide information about individual structures because of privacy concerns. The USGS is working with the Bureau of the Census on some projects that allow USGS access to structures data before the data are processed for Census purposes.

Issue – will privacy issues make reports of events such as utility hookups unavailable to Area Maintenance Offices?

The USGS recognizes the growing concern about privacy issues relating to information about individuals. We also recognize the responsibilities of organizations and companies to protect the rights of individuals when private information is served among business partners. As legislation and practices relating to what constitutes public records versus what is private information evolve in our information society, *The National Map* will seek and use only those records that are public or for which specific access permission has been given. Only those public records that contribute to the information content of *The National Map* will be considered.

Modify wording under “State and regional partners” to note that Area Maintenance Offices will develop business relationships needed to access public reports of events. Eliminate “utility hookups” as example of area maintenance offices receiving report of events.

Issue – *The National Map* should rely on data (as-is) made available by partners and not require that source data be based on an imposed specification.

The approach described in the issue is preferred, assuming that the goals for information content, data characteristics, and efficiency of *The National Map* can be achieved. The description of commonly-needed content and characteristics will be useful to help achieve the described approach, as will be research on data integration and increased adoption of open technologies, standards, and processing methods.

Issue - concern about the quality of data contributed by volunteers.

One of the major roles of the USGS is to ensure data quality of *The National Map*. The USGS recognizes that using volunteers to contribute to *The National Map* will require training and constant monitoring to ensure data quality. One of the roles of Area Maintenance Offices will be to establish quality assurance procedures to ensure the quality of data from all sources and from all partners, including volunteers. Also see “Issue – general comments” under “GENERAL COMMENTS” and “Issue – what steps will USGS take to assure a standard level of quality and document the source of data included in *The National Map*” under “DEVELOPMENT, MAINTENANCE, AND OPERATIONS” in this document.

Modify wording under “Partnerships with the Public” in the report:

“These persons will be trained through a virtual “volunteer academy.” Area Maintenance Offices will interact routinely with volunteers to ensure adequate training and data quality. To support...”

Issue – the report needs specific information on how the organizational infrastructure and governance model will work to implement *The National Map*.

Specific details that were requested include:

- how will conflicting priorities among multiple partners be resolved?
- how will data consistency among contributors be ensured?
- how will *The National Map* be funded?
- how will administrative support be provided (e.g., legal, funding)?
- how will partnership commitments be ensured?
- how will budget be coordinated?

There are many specific questions about how *The National Map* will function and what types of partnerships will be developed. Concurrent with the review process for the

vision report that defines *The National Map* concept, the USGS has prepared a 5-year plan for the Cooperative Topographic Mapping Program, including an operations concept. In addition, annual work plans will be developed and periodically assessed to ensure that major milestones are achieved. Pilot projects are being conducted to demonstrate and test *The National Map* concepts. Several partnership proposals have been received and are being evaluated. The USGS will organize its resources to focus on activities that contribute to the goals of *The National Map*. As procedures are established and planning documents written, they will be broadly communicated. The USGS plans to include partners in *The National Map* effort to define these procedures and to establish implementation plans.

Also see “Issue – scope of *The National Map*” and “Issue – business plan funding; can USGS afford *The National Map* and who is going to contribute” under “GENERAL COMMENTS” and “Issue – has the USGS developed an implementation plan for *The National Map*” under “DEVELOPMENT, MAINTENANCE, AND OPERATIONS” in this document.

Issue – heavy dependence on cooperative partnerships and reliance on existing data from private industry, result in an unbalanced program.

Commenters are concerned that the availability of current base geographic information would tend to be higher in highly populated or developed areas that are rich in data sources and resources. Areas with lower partnership interest or commercial data opportunities would receive little attention and low priority.

The USGS is responsible for ensuring that *The National Map* provides map data for the entire country. Program planning for *The National Map* will address a balance between those areas with greater partnership and commercial potential with those areas that have little or no interest. The USGS will review its data holdings to determine areas of insufficient mapping or inadequate data for *The National Map*. The Cooperative Topographic Mapping business plan needs to define a strategy to achieve currentness goals by balancing funding priorities between the “haves” and the “have-nots.” The USGS will include in its strategy initiatives to seek additional resources and to create partnerships to address this imbalance.

Issue – data quality.

There was concern from many comments regarding the data quality of *The National Map*. Furthermore, it was suggested that the USGS establish certification processes for *The National Map* content.

To ensure the data quality of *The National Map*, the USGS will continue its strong role in standards development, including support of the ISO/TC 211, the NCITS L1, the Federal Geographic Data Committee and the Open GIS Consortium. The USGS will also establish a quality assurance program to assist and certify data providers, and validate

data acquisition and maintenance processes. The USGS will also review contributions to *The National Map* from all sources.

Add to the 1st paragraph under “Roles for the USGS”:

“The USGS also will ensure the quality of *The National Map* data through standards development, by devising and implementing quality assurance procedures, and by promoting process certification criteria for content providers.”

Issue – how will the USGS ensure that participants of *The National Map* meet their commitments?

The success of *The National Map* will depend in large part upon sustained support from USGS leadership, the Department of the Interior, the Administration (e.g., the Office of Management and Budget and other Executive Branch agencies), and the Congress. The Cooperative Topographic Mapping Program is built on a foundation of funds appropriated specifically for topographic data and map production and maintenance. To fully meet the objectives of *The National Map*, the USGS budget must be leveraged through partnership agreements for data production, maintenance, archive, and distribution. If a partner in *The National Map* can no longer fulfill its agreement, the USGS will seek other participants to fulfill the void. Lacking any alternatives, the USGS will modify its operating plan to address and prioritize unmet requirements, and will provide content through contracted or in-house production. This is in agreement with the USGS role as “guarantor of national data completeness, consistency, and accuracy.”

Although the review draft of *The National Map* report discussed the possibility of seeking a legislative initiative, patterned on the National Cooperative Geologic Mapping Act, to clarify Federal responsibilities and to support partnerships with State, regional, local, and academic organizations, this topic requires considerable further discussion and validation within the USGS, the Department of the Interior, and the Administration before any concrete actions are undertaken.

Issue - the report lacks detail on academic roles and research areas.

While there is only one sentence that addresses the role of academic partners, it is clear that the implementation of *The National Map* concept depends on solving critical research issues in the field of cartography, geography, and information science. More detail is discussed in the “Needed Research and Development” section and specific topics are outlined in Appendix 2. Funding mechanisms are also suggested in Appendix 2.

Reword the “Academic and library partners” section:

“...USGS will work with universities by ...”

Reword the “Private industry partners” section:

“The USGS will partner with private organizations...for broad public access, for research on cartographic technologies and issues, and to develop open technology and processing standards...”

Reword the 2nd paragraph under “Needed Research and Development” section:

“...Appendix 2 contains a partial list of topics that require investigation.”

Issue – USGS reaction to partnership offers.

The participation of all interested parties is welcomed. The agencies and the specific data sets listed in *The National Map* vision report are highlights of possibilities for a national program. The USGS will consider all further agency recommendations for partnering on *The National Map* for specific data sets and/or other business relationships. The key criterion will be: does the partnership adhere to and further the concepts on which *The National Map* is built?

Under “Federal partners” change “...Bureau of the Census (roads and structures)...” to “...(roads and boundaries)...”

Also see “Issue – provide for additional content, specifically bathymetry” under “INFORMATION CONTENT” and “Issue – scope of *The National Map*” under “GENERAL COMMENTS” in this document.

Issue - *The National Map* vision report sounds like a top down approach instead of a bottom up one for data development, incorporation, and maintenance.

The USGS recognizes that the most current, accurate, and complete high resolution data that can contribute to the goals of *The National Map* are often developed and maintained by local, State, and regional authorities. Therefore, the USGS is interested in and expects to develop partnerships to incorporate local data into *The National Map*. Access to local partnerships may be through established State and regional consortia or directly with local entities, whichever is most appropriate. Area Maintenance Offices will be the principal conduit for developing and sustaining these relationships.

Reword the “State and regional partners” section in the report to:

“...strengthen coordination with State and regional consortia to develop partnerships with State, county, city, local, and other organizations for high resolution data for *The National Map*.”

Issue - clarify the role of private industry in supplying data.

The USGS will seek existing data that satisfies the concepts of *The National Map*. When existing data are not available or useful, USGS will seek data from other sources (including the commercial sector), such as through contracts for data production with

private industry. All data in *The National Map*, regardless of source, must support public domain dissemination and application requirements. In addition, *The National Map* may provide links and pointers to other data, including data produced, enhanced, packaged, and sold by private industry.

Issue - clarify the role of libraries, including support for the existing network of Federal Depository Libraries.

The USGS recognizes the importance of the national network of public and university libraries as a mechanism to provide access to *The National Map* content and derivative maps. As *The National Map* evolves, the USGS will continue to consult and support the library community to ensure that users have access to current data and topographic maps. The USGS also will work with libraries to research issues of information archive and access relating to *The National Map*.

Change the section heading “Academic partners” to “Academic and library partners.”

Add text under the heading “Academic and library partners:”

The USGS will continue to rely on the Federal Depository Library Program as a vehicle for ensuring public access to *The National Map* and for feedback about geospatial information needs. The USGS also will work with the library community on issues relating to information archive and distribution of *The National Map*.”

Issue – clarify the domain of USGS’ role as a producer of data for *The National Map*.

Reword the section “Roles of the USGS,” item 5:

(5) owner and data producer of content for *The National Map* when no other suitable and verifiable source for those data exist.

NEEDED RESEARCH AND DEVELOPMENT

Issue – is the USGS open to partnering on R&D activities?

Comments from agencies indicate that much research needs to be done to develop technologies that will meet the needs of *The National Map*. Technology and other research and development topics are also being pursued by other agencies that expressed support for cooperation with USGS. We were encouraged by the number of organizations expressing interest in partnering with USGS in order to avoid duplication

of effort and achieve better collective support for *The National Map*. The USGS actively seeks research partnerships to address topics such as those listed in Appendix 2.

NEXT STEPS

Bullets were added to the report to address activities to: (1) plan for a review of *The National Map* concept by the Mapping Sciences Committee of the National Research Council, (2) plan for the operation of the USGS Cooperative Topographic Mapping Program to implement *The National Map*, (3) implement data stewardship responsibilities, (4) identify the role of commercially-produced data, and (5) seek and secure funding to encourage partner data maintenance and dissemination activities.