



A Concept for American Recovery and Reinvestment

**NSDI 2.0: Powering our National Economy, Renewing our
Infrastructure, Protecting our Environment**

Authors and Collaborators

Jeff Harrison, jharrison@thecarbonproject.com

John Moeller, jjmoeller@cox.net

Julia Harrell, Julia.Harrell@gmail.com

Jason Mann, JMann@ashevillenc.gov

Edric Keighan, ekeighan@cubewerx.com

Steven Johnson, sjohnson@traversetechnologies.com

Julie Stamper, StamperJ@co.pasquotank.nc.us

David G. Smith, dsmith@synergist-tech.com

Bill Dollins, dollins.bill@gmail.com

Summary

The American Recovery and Reinvestment Plan will create jobs in the short-term and spur economic growth and competitiveness in the long-term. But this plan must be designed in a new way. We must make smart strategic investments that serve as a down payment on our long-term economic future, create millions of new jobs - and provide the American workforce with new skills. To build a 21st century economy, we must engage Local, State, and Federal agencies and their partnering contractors across the nation to create jobs rebuilding crumbling roads, bridges, electric grids and schools - but these organizations need an updated online information network that will allow them to rebuild in a smart, efficient, environmentally conscientious and sustainable way. An investment in community-based mapping, updated with environmental information, will speed economic recovery by producing jobs and tie together ongoing government initiatives. An “NSDI 2.0” will leave the country with a public resource, a national spatial data infrastructure that will become a foundation for new business and technology investment – including broadband infrastructure development efforts now under consideration. Most importantly, this network provides a sustainable information infrastructure and investment in innovation that will create thousands of new jobs and contribute to the economy for many years to come.

Concept

The American Recovery and Reinvestment Plan being developed by US Government is an enormous undertaking to spur economic growth and competitiveness. The need to coordinate projects and protect our environment at the same time will be challenging, requiring online access to information and services in both the private sector and government. Now is the time for our country to build a new information network combining the best of the past with the best of the future. This network would combine online mapping with vital environmental data, providing public access using modern information sharing technologies, and speeding economic recovery by producing jobs in a competitive and productive environment. Recent and ongoing projects sponsored by agencies such as the USGS and EPA successfully produced open and interoperable technologies and procedures. Based on the work started under these efforts, a National Spatial Data Infrastructure (NSDI) 2.0 can be built quickly, immediately creating a competitive environment for small high-tech businesses and spurring job creation. With NSDI 2.0 federal, state and local agencies will create, serve and share vital information, providing a resource that helps preserve our Green Infrastructure at the same time it renews our Grey Infrastructure. NSDI 2.0’s collaborative and interoperable technology will support the infrastructure life cycle (design, build, maintain) and will save America billions of dollars a year. In addition, the proposed NSDI 2.0 recognizes it’s time to change the philosophy that says our infrastructure development, security and environmental concerns stop at our border. Accordingly, an NSDI 2.0 will engage SDI stakeholders in Canada and Mexico, stimulating trade and promoting “smart power” to our closest trading partners.

Technical Philosophy of NSDI 2.0

The technical philosophy of NSDI 2.0 is that geospatial data and environmental information should be maintained locally, closest-to-source, and then shared with the Nation through online services. State and local government agencies are the entities that create and maintain the high-quality spatial data for our streets, streams, parcels, addresses, tax mapping, aerial photography, critical infrastructure, elevation data, environmental interests, permitted facility locations, public transit, economic incentive areas, and other important spatial datasets. The NSDI 2.0 is based on two established public information networks – the NSDI and the National Environmental Information Exchange Network (NEIEN). The existing NSDI is an information network intended solely to share geospatial information. As defined by the Federal Geographic Data Committee (FGDC), the United States NSDI includes the technology, policies, criteria, standards and people to promote geospatial information sharing throughout all levels of government, the private and non-profit sectors, and academia. The NEIEN is a well-established data sharing partnership among states, tribes, and the U.S. Environmental Protection Agency that is revolutionizing exchange of both the tabular and spatial aspects of environmental information. Partners on the NEIEN share data efficiently and securely over the Internet using web services; this network provides a unique ability to transform data from many partners in many formats, on the fly, to a single community format. This new approach is providing real-time access to higher quality data while saving time, resources, and money for partner states, tribes, and territories.

Creating an open and collaborative environment that includes the NSDI and NEIEN will provide a comprehensive online information network to help rebuild our physical infrastructure, and improve our ability to preserve the life, health and safety of both citizens and the environment. Integration of the NSDI and NEIEN is based on the work of the World Wide Web Consortium (W3C), the Open Geospatial Consortium (OGC), the International Organization for Standardization (ISO), the Open Source Geospatial Foundation (OSGeo), the Exchange Network Leadership Council (ENLC) and other consensus standards organizations that have produced a framework for online services. The Geospatial Profile of the Federal Enterprise Architecture, the Geospatial Line of Business (LoB), The National Map (TNM) 2.0, the Framework Data Standard and NEIEN Node 2.0 use many of these standards and provide architecture components for building NSDI 2.0. An increased usage of open specifications and free and open source software will reduce the considerable cost of entry barriers to smaller and more rural local government jurisdictions, and translate the development of community-owned tools into more sustainable practices.

The NSDI 2.0 is a network implemented as a series of online services providing high-speed access to mapping and environmental content. The standards-based “online service provider” model of NSDI 2.0 mitigates traditional barriers associated with accessing and manipulating information. The NSDI 2.0 model will provide real-time access to mapping and environmental content enabling both developers and users to focus on value-added Web 2.0 applications and processes. The NSDI 2.0 will leverage open standards for online data access, collaborative update and sharing. Through these services, the NSDI 2.0 will provide the Nation with a standards-based

interoperability solution for data access and use. The NSDI 2.0 can also leverage existing security protocols for secure online access and use of sensitive datasets. These services will be maintained by IT/GIS staff and their contractors at local, state and federal levels, creating thousands of new green IT jobs. As an online network, NSDI 2.0 will rely heavily on broadband infrastructure development efforts now under consideration. NSDI 2.0 is a key example of how expanding broadband infrastructure in the United States would not simply improve the speed of connections for entertainment purposes, but also bring a wealth of online knowledge to businesses, government and citizens in more areas.

Additionally, new resources for state and local government data stewards to improve critical spatial and environmental data production and maintenance operations will have a ripple effect far beyond the initial investments to create and maintain the next generation of the nation's spatial data assets. Freely available, high-quality, high-resolution spatial and environmental data will allow the nation to modernize and streamline a multitude of outdated, paper-based business processes – increasing efficiency and transparency at all levels of governance, and reducing the cost of doing business.

High quality data from those organizations closest to the ground, widely available in open standards and formats has tremendous potential to foster innovation. The fertile ground for innovation in the geospatial industry is widely apparent and is well illustrated by the “Apps for Democracy” effort led by Vivek Kundra in Washington, DC. Open data from the local and state levels will serve as a secondary economic engine through the creation of jobs around innovations from this newly available resource. We believe an NSDI 2.0 meets the needs of communities and the nation and provides the best option for sustaining our economic, social and environmental well-being for future generations.

Leadership Philosophy for NSDI 2.0

The leadership philosophy of NSDI 2.0 is that primary coordination and investment should be at state and local levels where infrastructure and environmental expertise and data creation responsibilities reside. Investment would be provided to these local levels for data modernization and maintenance, and the information shared with the Nation. Investment resources would be provided to enable local service providers to set up information nodes and comply with the NSDI 2.0 guidelines and standards for information collaboration. The synergies between a revamped NSDI, job creation, and the need for modern technology training for displaced and unemployed workers naturally points to the Community College systems nationwide as a critical partner. Building on previous efforts such as President Bush's Community-Based Job Training Grants and the High Growth Job Training Initiative, significant opportunities exist for local and state agencies to partner with Community Colleges to retrain workers displaced from other economic sectors. The Community-Based Job Training Grants program was designed to strengthen the role of community colleges and builds upon the High Growth Job Training Initiative. As implemented by the U.S. Department of Labor, the High Growth Job Training Initiative has identified Geospatial

Technologies as an economically vital sector. Community Colleges have a recognized and demonstrated expertise in retraining displaced workers in changing economic environments. In this manner federal funds will get localities to rapidly modernize and ultimately be more efficient in stimulating economic growth, revitalizing our physical infrastructure, and protecting our environment - a win-win for the Nation. Finally, an NSDI 2.0 recognizes that our infrastructure, security and environmental concerns do not stop at our border – and will engage GeoConnections, a Canadian organization coordinating the implementation of the Canadian Geospatial Data Infrastructure (CGDI) and the Mexican Spatial Data Infrastructure (IDEMex), through the INEGI (National Institute for Statistics, Geography and Informatics).

NSDI 2.0 could operate as an extension to current programs - coordinated through a joint partnership of the USGS and FGDC, the Environmental Protection Agency, the Department of Labor and the Department of Homeland Security (DHS), with significant involvement from USDA, DOT and DOD. Each of these agencies has already developed detailed recommendations on how to build components of the NSDI 2.0. A key first step is to establish an integrated governance framework and initiate a comprehensive effort to incentivize local and state data providers. The most important facet of this comprehensive effort is to provide augmentation to very limited local government resources for creating and maintaining the nation's high quality mapping data. Without this data an NSDI 2.0 would be lacking in content. The next facet of the effort will be to incentivize state and local governments to establish and maintain integrated OpenGIS map and feature services and Exchange Network data services to supply the nation with easily accessible and current imagery, spatial datasets and other information to create a complete tapestry of America – what is referred to as The National Map 2.0. These steps, along with outreach to promote and integrate environmental information into this tapestry, will be needed to make the network effective. Finally, it is important to note that an NSDI 2.0 network complements proposals for a National GIS. In fact, NSDI 2.0 has the potential to be the ‘always on’, community-powered dial-tone for a National GIS.

The NSDI 2.0 is a “digital infrastructure” investment. Job-generation estimates by the Information Technology and Innovation Foundation indicate that for every \$1B in funds spent on such infrastructure, over 30,000 jobs are created. ITIF studies also indicate investments in infrastructure at an early stage of development, like a national spatial data infrastructure, create even more jobs because new jobs are generated by “upstream investment in industries that create new and innovative applications and services to take advantage of the more robust IT network.”

Similar efforts have already begun across the northern border as Canadian commercial and government organizations show multi-year commitments to related efforts. Detailed cost breakdowns for NSDI 2.0 can be provided by engaging State-level geospatial councils, who have already begun compiling their own estimates for enhancing environmental and spatial data services. The key to success is empowering local spatial and environmental data producers to evolve their operations into the next generation of NSDI 2.0, engaging them directly, and ensuring their status as equal partners with the Federal Government and the Private Sector in a national endeavor.

About the Authors

This paper does not constitute the official position of the Agencies or Companies with whom the authors are currently employed, nor is an endorsement by any professional organizations or standards bodies they may serve on. It is a proposition offered by a collaborative grassroots coalition that advances a business case applicable to the entire geospatial and environmental business sector. It embodies an inclusive, collective approach that is well positioned to provide widespread economic success throughout public, private, and non-profit geospatial organizations of all types and sizes. This paper represents the consensus view of a collaboration between corporate entities, the non-profit sector, the open source GIS software community, as well as Municipal, County, Regional, and State Government Agencies who produce and rely upon the Nation's critical geospatial and environmental data resources.