

Overview of the Federal Geospatial Data Committee's (FGDC) National Spatial Data Infrastructure (NSDI) plan and Associated Implementation of Idaho Spatial Data Infrastructure (ISDI)

Background and History

Throughout the past 15 years, much research on organizational models that facilitate the collaboration and sharing of spatial data and information between GIS Users has taken place to establish practices and administrative structures improving the effectiveness of GIS initiatives (Crowell, 2009). Since the level of decision support provided from spatial data has increased within business entities and the high cost associated with implementing GIS software solutions, those who rely on spatial data can benefit from formal structures to help manage data development and use. To respond to the increased reliance upon geospatial data by governing bodies, the Federal Geospatial Data Committee (FGDC) was created by executive order to carry out implementation of National Spatial Data Infrastructure (NSDI) and facilitate all related activities of OMB Circular A-16. NSDI is defined by this circular as the “Technologies, policies, and human resources necessary to promote sharing of geospatial data throughout all levels of government, the private and non-profit sectors, and the academic community.” Effectively, the goal of the FGDC by way of the NSDI initiative is to implement a nationwide geospatial data framework, with documented standards, in order to reduce duplication of efforts among agencies, make geographic data more accessible to the public, increase benefits of using available data, establish key partnerships among different groups to increase data availability and enhance overall decision making (Flores, 2014). In support of this national effort, the FGDC has awarded many grants to support SDI implementation at the state level. With the National States Geographic Information Council (NSGIC) supporting state SDI initiatives, many active programs are underway, moving NSDI toward completion.

FGDC Structure

A graphical representation of FGDC organizational structure is included in the appendices to this paper (Appendix A: Figure 1. The FDGC is governed by an interagency Steering Committee who provides executive leadership for coordinating federal geospatial activities between, among and within agencies. This is accomplished primarily by establishing policies and providing guidance to member agencies. Membership in the FGDC includes Senior Agency Officials for Geospatial Data (SAOGIs) and representatives from the DOI, OMB, Executive Office of the President and Cabinet. A subset from the FGDC Steering Committee membership, whose

purpose is to provide advice and guidance to the FGDC Chair and Vice Chairs, is the FGDC Executive Committee (FGDC-EC). The FGDC-EC membership includes representation from the OMB as well as seven federal agencies most heavily invested in geospatial technologies.

Underneath the FGDC-EC and FGDC Steering Committee are a Coordination Group and numerous subcommittees who manages the day-to-day NSDI operations and provides advice to the aforementioned committees. Participation within these groups primarily comes from non-federal collaborating partners. It is at this organizational level that infrastructure and standards issues common to NSDI data themes are addressed.

The National Geospatial Advisory Committee (NGAC) is the main body that provides advice and recommendations regarding Federal geospatial policy and management issues to the FGDC. NGAC provides the forum to discuss views representative of partners in the geospatial community. Membership in NGAC has representatives from 28 Government and nongovernmental organizations who solicits input from State, tribal, regional, and local governments, academic institutions as well as the private sector.

FGDC Standards Policy

Standards facilitate the development, sharing and use of geospatial data and are more important as GIS projects span multiple physical locations. At the federal level, participation in the development and use of voluntary consensus standards is defined in the OMB Revised Circular A-119. This circular explains that federal agencies will not develop its own standards if previous voluntary consensus standards exist and are applicable. As such, the FGDC develops standards for implementing the NSDI only when no equivalent voluntary consensus standards exist. Voluntary consensus standards are those that are developed or adopted by domestic or international voluntary consensus standards bodies. When such standards are applied, Government can avoid costs from developing its own standards. These standards, when applied, additionally reduce the cost of good procured and the burden of complying with agency regulation (OMB, 1998). Endorsed internal and external standards can be accessed on the FGDC website (www.fgdc.gov). A table of standards currently in development can be seen in Appendix B of this document.

The FGDC Standards Reference Model provides guidance and direction to FGDC Standards developers and users regarding data and process standards. These standard definitions provide the methodologies for data collection, classification, presentation, transfer, usability and access but does not standardize the organization of data or computer information technologies that may be utilized. Separate standards, such as ASNI and ISO, may also be applied to NSDI. A number of documents provide the NSDI standard policies and can be viewed from the FGDC website.

NSGIC

Lead by senior state geographic information (GIS) managers, NSGIC is the primary proponent for state interest in regards to geospatial information technologies (GIT) at the national level and whose primary mission is to promote statewide geospatial coordination activities and act as an effective advocate of national geospatial policy and initiatives, thereby enabling the National Spatial Data Infrastructure (NSDI), defined as the technology, policies, criteria, standards and people necessary to promote geospatial data sharing throughout all levels of government, the private and non-profit sectors, and academia. The purpose of enabling NSDI is to provide accurate and reliable data for decision that enhance Americans' health, safety and welfare, security and prosperity (NSGIC, 2008). The NSDI will be a collaborative environment in which all government agencies that collect manage, or use geospatial data will facilitate data integration, sharing and access. NSGIC is particularly concerned with the creation of intelligent maps and databases that enable public and private decision makers to make better informed and timelier decision in a wide array of governmental areas.

“50 States Initiative”

The 50 States Initiative began in 2005 as a partnership between the FGDC and the NSGIC and outlines fundamental changes in coordination between all governments to build the NSDI. This initiative is one part of the FGDC's *NSDI Future Directions* strategic plan and identifies the criteria, activities and characteristics that will lead to effective coordination councils that will take an active role in NSDI coordination. The full Future Directions Strategic Plan is available to view on the FGDC website (www.fgdc.gov) To support the development of individual State strategic and business plans in regards to implementing States' SDI, the FGDC has issued Cooperative Agreement Program (CAP) grants from 1994 – 2012 in all 50 states including 2 territories, 8 tribal governments and Universities in 38 states. In addition to providing states monetary support for the development of strategic and business plans, some grants were awarded to support State SDI implementation activities. The FGDC has provided strategic and business plan development process guidelines and templates to support State SDI development activities. Due to federal sequestration, the CAP program was cancelled in 2013 2014 (FGDC, 2013). These grants have been credited by States as having helped achieve greater credibility of geospatial programs with state executive and budgeting officials (FGDC, 2010). Since 2003, the FGDC has supported the Global Spatial Data Infrastructure (GSDI) Program which maintains similar goals to NSDI but focuses on developing countries throughout the globe.

Idaho SDI (ISDI)

In February 2008, the State of Idaho received a Category 4 FGDC Cooperative Assistance Grant (CAP) for “Strategic and Business Plan Development in Support of the NSDI Future Directions Fifty States Initiative.” The grant supported the development and implementation of strategic and business plans for achieving ISDI. Completed in 2008, this project is managed by the Idaho Geospatial Council (IGC), established under executive order no. 2010-07 by Governor C.L. Otter. The IGC represents the geospatial community in Idaho and provides policy-level direction and promotes efficient and effective use of resources for matters related to geospatial Information (IGC executive order footnote). IGC abides by all policies, standards and guidelines set forth by the Idaho Technical Authority (ITA).

Under the Idaho Department of Administration, the IGC is led by Idaho Geospatial Council Executive Committee (IGC-EC) and is supported by Technical Working Groups (TWGs). These TWGs, 14 in total, manage the statewide coordination of the Idaho framework database by nominating datasets to be included in the Framework. The IGC-EC is the authoritative body who receives dataset nominations from TWGs and votes as to whether or not the dataset will be included as one of the fourteen framework layers of The Idaho Map (TIM).

TIM

TIM is the primary initiative of the Idaho Geospatial Office (IGO) and is designed to improve statewide coordination of geospatial processes and leverage existing technology investments statewide. Geospatial data and services produced from this framework will be provided via a reliable and accessible manner. TIM’s major components are:

- *Framework (base map) data*

TIM Framework consists of 14 data layers. 8 of these data layer themes are defined the FGDC and included in the NSDI initiative while six have been identified specifically by the Idaho GIS Community as applicable based on Idaho’s specific data needs.

- *Federated technical infrastructure distribution*

ISDI uses Regional Resource Centers (RRCs) whose mission is to support and coordinate GIS activities and users within geographic regions of the state. These RRCs coordinate with the overall efforts and long-term goals of the IGO and IGC. There are three RRCs across the state of Idaho split up by Northern, Southwestern and Eastern territories. Other roles of the RRCs defined by the ISDI Strategic Plan include providing technical support, training and professional networking to Users in the GIS Community.

- *Network of People and Organizations*

TWGs are the base level of ISDI where people representing agencies and groups throughout the state network and collaborate to meet the goals of individual TIM framework groups. TWG membership is on a volunteer basis and includes representation from various state agencies and academic communities.

- *Universal Applications*

Access to data and services provided by the IGO/TIM is readily available for use by all state agencies, research groups and individuals alike.

TWG Observations

Over the course of the Fall 2014 semester, four TWG meetings were attended. Notes from these meetings are provided as well as recommendations when applicable. Of special note, the IGC-EC and IGC annual meetings took place in Boise on November 7th. Failure of those coordinating the meeting from the state office resulted in the inability for those in different areas of the state to join the conference and participate. It is very important for coordinating statewide GIS efforts and implementing ISDI that these meetings are planned appropriately and those individuals who would like to participate via teleconference are able to join. Planned for this meeting was a vote to be taken on the acceptance or rejection of the NHD dataset inclusion into TIM framework. The dataset was nominated earlier in the semester by the Hydrography TWG. It is unknown if the NHD dataset nomination was addressed by the IGC-EC. The nomination documents are listed on the IGO Hydrography TWG website as well as other standards documents and current TWG activities can be viewed at the IGO website. (<http://gis.idaho.gov/portal>). Notes from TWG meeting that were attended are provided below:

TWG: Hydrography

Date: 9/19/2014

The NHD and WBD datasets were nominated prior to the Hydrology TWG that took place September 19, 2014. The main objective of this meeting was to vote on accepting these two datasets as the TWGs official recommendation to ITA as the official Hydrology datasets for the state of Idaho since they are the best data currently available for Hydrology features and undergo routine maintenance and updates. One particular area of concern in adopting the standard was the use of exclusions in the Standards Documents to avoid incorporating irrelevant features, such as swamp lands, into the state geospatial standards. The Standards Document at this time had not been authored, neither was the role of authorship assigned. Since having the Standards Document in place is not a pre-requisite for nomination, the NHD and WBD datasets were voted on, and passed as the Hydrography TWG official recommendation. An interesting point brought up at the meeting concerned the possibility of legal implications regarding a state authoritative dataset. In this case, rivers, a feature class of the NHD, is used to define county boundaries in some circumstances. How would NHD, being a state standard dataset, impress upon matters

regarding county or district boundaries, if at all? There is a scope of ideology specific to each TWG that defines the manner in which the standard spatial data will be applied. This manner should be expressed in official standards documents to indicate how the spatial data should and should not be used. The recommendation will be presented to the Idaho Geospatial Council at the November 7th, 2013 meeting, at which time it will be decided whether or not to pass along the recommendation to the ITA.

TWG: Transportation

Date: 09/25/2014

The goal of the Transportation TWG is to create a single centerline geometry for all public roads in Idaho that are routable and linearly referenced. This coincides with the federally mandated ARNOLD project, requiring all states to submit linear referenced road network geometries. Currently many cities and counties in Idaho maintain their own road centerline geometries, as well as ITD who maintains a statewide centerline road geometry in support of ARNOLD. Cooperation between agencies at the state and local levels appears to be the primary issue holding back TWG progress as local agencies appear to need more incentives to contribute to the TWG efforts. Eric Verner, the TWG chair, proposed the creation of three working groups within the TWG. The Technical, Policy Coordinating and Centerline Information working groups would each focus on their respective topics and make coordinated efforts to produce centerline data standards for Idaho.

TWG: Geodetic Control

Date: 10/30/2014

The Geodetic Control TWG is one of the more active TWGs within the TIM framework, having regular monthly meetings and continuing to make progress toward TWG goals. The Geodetic Control TWG provides the horizontal and vertical positional underpinning of all spatial datasets. The two current foci of the TWG is on implanting a real-time network over densely spaced continuously operating reference stations (CORS) and developing a multi-state control point database (MCPD). Topics addressed at this meeting included updates in regards to the joint geodetic controller positions funded by Idaho State University (ISU) and the Idaho Department of Transportation (ITD), RT Network updates and new additions to MCPD.

Keith Weber provided updates to the Geodetic Controller Position, stating that an offer has been made and accepted. The new Geodetic Controller, Kazi Arifuzzaman, is expected to begin work at the GIS Training and Research Center January, 2015. There were no new base stations mentioned at this meeting that were added to the RTN, however, District 3 is seeking funds to update the antenna on the existing base station in Boise. The MCPD program is being made more aware throughout state agencies. New points in the MCPD are added on a volunteer basis. Recent additions to the MCPD include the townships of Fremont, Jefferson, Cachia and Maddison. TWG members were made aware of existing points maintained by Ada county, the USFS and the BLM that are ready to be added to the MCPD. It was recommended that instructions to add points to the MCPD be included on the website. Workshops focused on the correct way to survey and use the MCPD have been submitted and accepted to begin training

surveyors and other individuals on the proper use of the MCPD. It was also recommended that a letter be drafted to various municipalities to raise awareness throughout the state of MCPD activities and request contributions to the dataset.

TWG: Imagery

Date 12/03/2014

The Imagery TWG has adopted the National Agricultural Image Product (NAIP) as the standard imagery for TIM framework. This data is collected nationwide, each state acquiring new imagery every four years. The most recent NAIP imagery for Idaho was acquired in 2013. The main topic of this Imagery TWG meeting was the reliability of the NAIP Image service which is hosted at two locations across the state, at the University of Idaho (UOI) and the Idaho National Lab (INL). While the UOI service has proved reliable and is accessible from InsideIdaho, the service at the INL has experienced intermittent disruptions, disabling the service for weeks at a time. This brings into question the long term reliability of services hosted from the INL and other options were discussed as alternatives to INL hosted services including hosting services at the GIS TReC at ISU. Although the NAIP imagery appears to be the standard for the TIM framework, no standard documentation exists on the IGO website.

Recommendations

Of the 14 TWG themes listed at the IGO website, in some cases 15 or 16 due to inconsistencies apparent on the IGO website, only 3 have some type of standards documentation in place. The cadastral, Land Use/Land Cover and Public Safety TWGs have exchange standards in place. Additionally, the Public Safety TWG has an Emergency Zones Framework standard in place. It is possible that there exist standards documents for the other TWGs that have not been added yet since the IGO website appears to have failed to keep up with current TWG activities. The most recent publication from the Cadastral/Parcels TWG dates to 2012. Examining the framework diagram from the IGO website reveals that many of the framework groups have changed leadership since the framework diagram was originally published. It is necessary to update the IGO website with all current stewardship information and TWG status. It was recommended by an IGC-EC member that the ISDI Strategic and Business Plans be updated as they have become outdated. This recommendation is reinforced in this document as having current information available is important for coordination efforts statewide. Many TWGs are currently not chaired by individuals and are thus, inactive. It is further recommended that the IGO find members of the Geospatial Community to fill these vacant seats so progress may continue. Methods for re-energizing the interest among the GIS Community in regards to ISDI framework themes are necessary.

Conclusions

As a result of the 2008 FGDC CAP grant awarded to the State, Idaho has succeeded in developing strategic and business plans for implementation of ISDI in support of NSDI. Implementation is undergoing as TWG activity changes from year to year due to changes in leadership and recognizing dependency of some framework datasets on others. While some TWGs are making great progress in implementing framework data layers for ISDI, others need stewardship assignments to lead and reenergize the individual TWG efforts.

Appendices

Appendix A

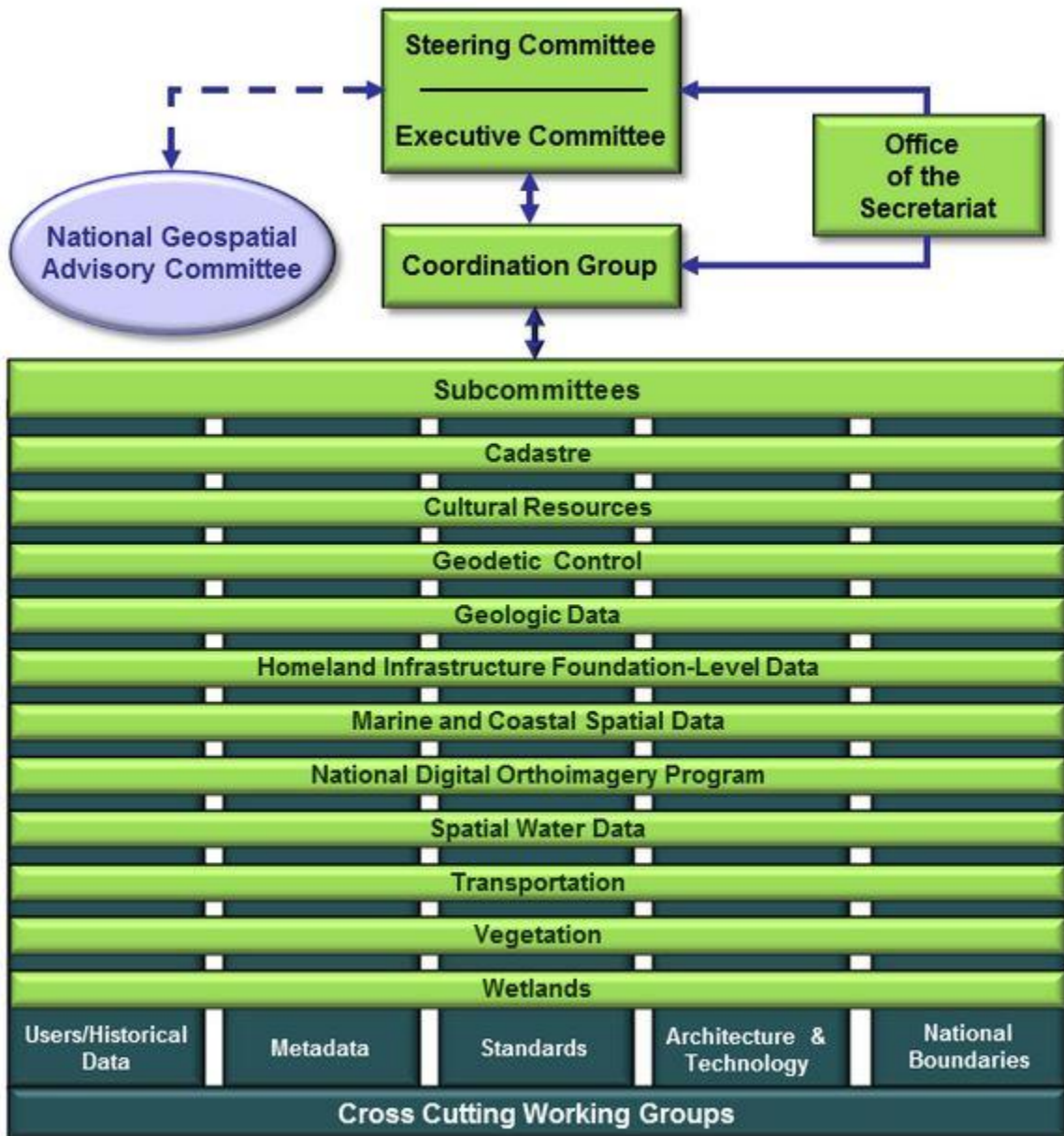


Figure 1 - Overview of the structure of the various components of the FGDC (FGDC, 2013)

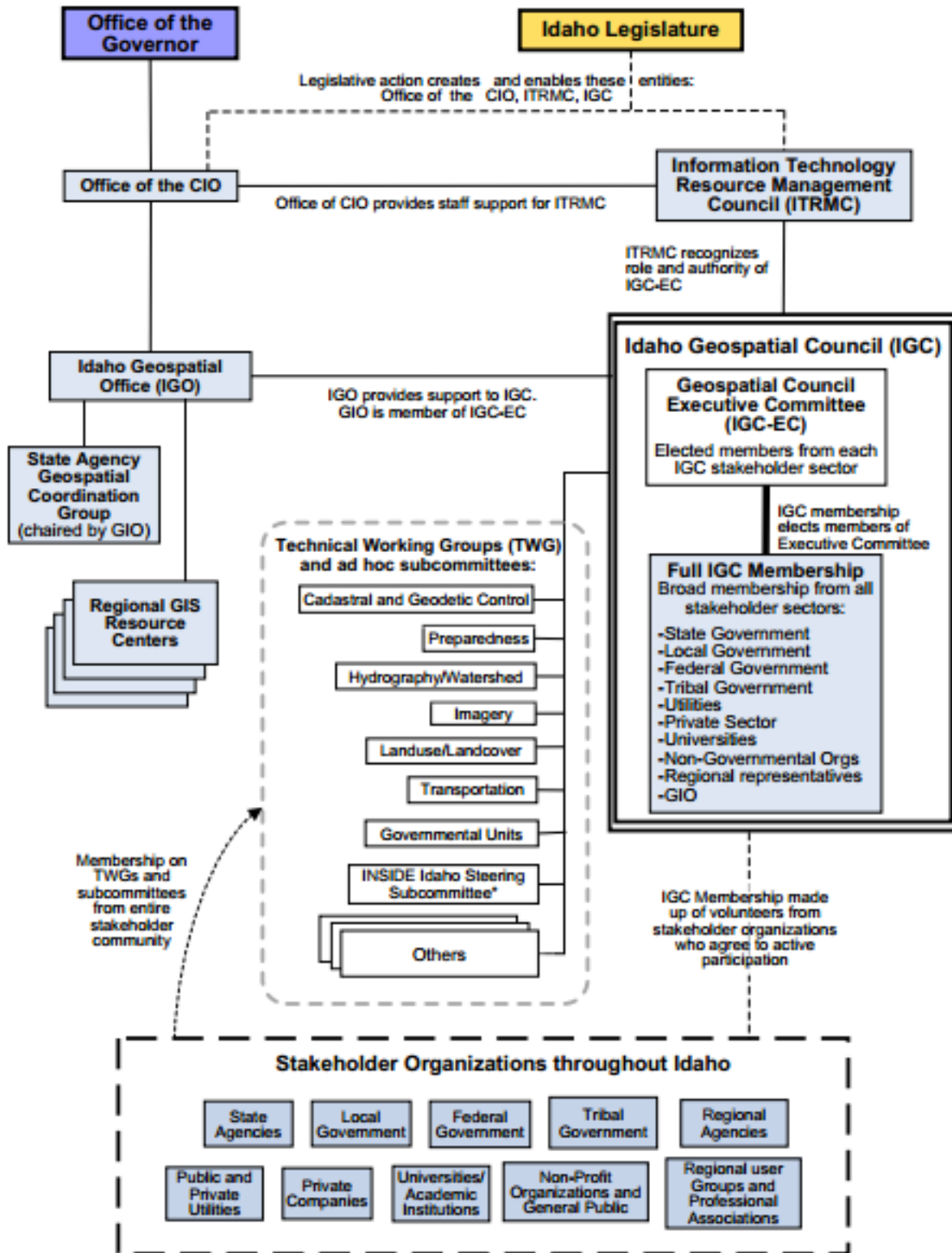


Figure 2 - Current Organizational Structure for Idaho SDI (IGO, 2009)

Appendix B

FGDC Standards in Development			
Standard▲	Most recent status	Document Date	Sponsor
Earth Cover Classification Standard	Proposal	1999/09/13	Earth Cover Working Group (inactive)
Encoding Standard for Metadata	Working draft	2000/02/17	Clearinghouse Working Group
Geologic Data Model	Proposal	2001/10/10	Geologic Data Subcommittee
Shoreline Data Content Standard	Public review draft	2007/03/07	National Geodetic Survey
FGDC Profile(s) of ISO 19115	Proposal	2001/06/13	Metadata WG
Content Standards for Framework Land Elevation Data	Final draft	1999/01	Subcommittee for Base Cartographic Data (retired)
Cultural Resources Geospatial Data Content Standard	Proposal	2008/02/14	Subcommittee on Cultural and Demographic Data
Federal Buildings and Facilities Geospatial Data Content Standard	Proposal	2010/01	General Services Administration (GSA)
Maintenance and Review of the National Wetland Classification Standard	Proposal	2010/02	Wetlands Subcommittee

Table 1 – Standards currently in Development at the FGDC

(<http://www.fgdc.gov/standards/projects/FGDC-standards-projects/FGDC-standards-in-development>)

Appendix C

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