Framework of GIS

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The fifty states initiative was started in 2005 and was a partnership between the National States Geographic Information Council (NSGIC) and the Federal Geographic Data Committee (FGDC). This Partnership was established to bring together public and private stakeholders for statewide Geographic Information Systems (GIS) coordination bodies that help to form partnerships and relationships between these bodies. It is important for coordination between agencies in states to improve efficiency in data collection and eliminate duplicate data sites and systems. This is important because government agencies rely on GIS to make decisions that affect citizens' daily lives. These include enhancing public health and safety, containing costs, managing growth, improving accountability, protecting the environment and reducing crime. With these important tasks it is important for a framework to be in place to identify important working groups and standards for data collection. This paper will look into these working groups and standards set by Idaho, Oregon and Federal agencies and areas for improvement. It will also look to the future for GIS in the state and federal agencies.

The fifty states initiative established the National Spatial Data Infrastructure (NSDI) with the presidential executive order 12906. NSDI was defined as "the technology, policies, standards and human resources necessary to acquire, process, store distribute and improve utilization of geospatial data". This was developed to share data between agencies. The FGDC is designed as the responsible agency for developing and implementing strategies. They identified seven framework themes for states to follow with the ability to add their own

framework needs to the list. The seven identified framework layers include geodetic control, cadastral, orthoimagery, elevation, hydrography, administrative units and transportation.

Geodetic control provides a common reference system for geographic data collected. It is important to provide accurate global positioning systems so that measured points are accurately measured on a horizontal and vertical reference system ~~scale~~. Geodetic control plays a crucial part in helping develop all framework and user application data. This is due to it providing the spatial reference source to register all other~~of the~~ spatial data. Geodetic control information can also be used to plan surveys, assess data quality, plan data collection and conversion and put new data areas into existing coverages.

Cadastral works with information about rights and interests in land. This can include real estate, parcel data, or tax information. Cadastral systems are important in rural and urban areas for different reasons. In urban areas it is essential to support the purchase, selling and renting of property. It is also essential for the efficient management of cities. For rural areas it is important for the production of agricultural development. It can also provide stability to areas where land is scarce.

Orthoimagery is imagery that has been remotely sensed and is geometrically corrected so that the scale is uniform. These images can be used to measure distances accurately. Orthorectification is necessary to remove radiometric distortions due to the topographic effect. Orthorectificaion is also able to reduce ground positional errors in data. That has already been geometrically corrected and rectify and resample remotely sensed data with off-nadir

Geometry. A national map has been created using orthorectified data with one meter or better resolution by federal agencies.

Elevation data is important for a wide range of applications. This includes agriculture, natural resource conservation, infrastructure and construction management, geologic resource assessment and hazard mitigation, flood risk management forest resource management, aviation navigation and safety, renewable energy resources, river and stream resource management, water supply and quality plus others. Today LiDAR is a key source for producing elevation models. Federal, state and local agencies were working on replacing data that is on average 30 years old and provide coverage where none previously existed.

**Commented [KTW1]:** The Shuttle radar topography mission of the late 1990's and early 2000's provided 10m elevation data to all the lower 48 states. It is thus less than 20 years old.

Hydrography has been divided into 2 data sets that states have taken stewardship of. The National Hydrography Dataset (NHD) is a comprehensive set of spatial data that represents common features such as lakes, ponds, streams, dams, canals, rivers and stream gages. The data is connected with flow arrows so it is possible to follow the path of what transported materials would take. The second dataset is the Watershed Boundary Dataset (WBD). This dataset is complimentary to the NHD and shows boundaries of drainage areas formed by landscape characteristics. These datasets can be important for fisheries, biologists, cartographers, hydrologists, pollution control and water resource management. Allowing stewardship allows the dataset to be updated by knowledgeable users to create the best dataset possible. Administrative units are governable boundaries that are critical for the stability of datasets that are boundary dependent. These boundaries can be important to tax code areas, elections, special service districts and agency and program management.

Transportation includes all transportation types whether it includes emergency vehicles or citizens. Emergency services can use the information to plan quicker routes. Those routes may be responding to criminal activities or transferring sick individuals to hospital care. It can also provide evacuation routes due to disasters in areas. Transportation is also important for city management. These can include future transportation development, toad design and construction and maintenance.

These are the seven identified by the FGDC. States have identified other areas that they would be important to have framework layers. Idaho has Identified 9 other layers that would be beneficial to the state. Figure 1 shows the Idaho framework identified. Oregon has a list that is almost identical but it did not separate parcels out of cadastral. Figure 2 shows the framework layers for Oregon. The reason for the groups being closely mirrored is due to Idaho seeing how well Oregon's system works and has tried to implement the same thing. Idaho has currently fallen short of populating the groups with leadership while Oregon has leadership for every one of their working groups. According to the Idaho Geospatial Office website the current groups that have leadership include geodetic control with Keith Weber, elevation with Nancy Glenn, governmental boundaries with Joe Johns, hydrography with Linda Davis, imagery with Margie Wilkins, land use and cover with Leona Svancara, public safety with Bill Reynolds and transportation with Eric Verner. This leaves six groups with no leadership. These groups are important to identify state standards for data collected. If state standards are not defined then the standards fall back to the federal standards. Although in some cases the federal standards may be the basis for the standards there are cased where the state standard is more

**Commented [KTW2]:** In a few places you have used the figure itself as a main point in the sentence. A paper will read better if you simply express the point you wish to make and then parenthetically refer to the figure. For example "The Idaho SDI framework consists of 15 layers (figure 1)."

**Commented [KTW3]:** And several of these, even with leaders (chairs) are not active.

rigorous than federal standards. Building this framework and establishing a spatial data infrastructure is the future of Idaho.

The future rests in an upcoming bill called the Geospatial Data Act of 2014. This bill will bring the ideas in the executive order 12906 into law. This will bring better structure and clear goals going forward for the national and state offices.

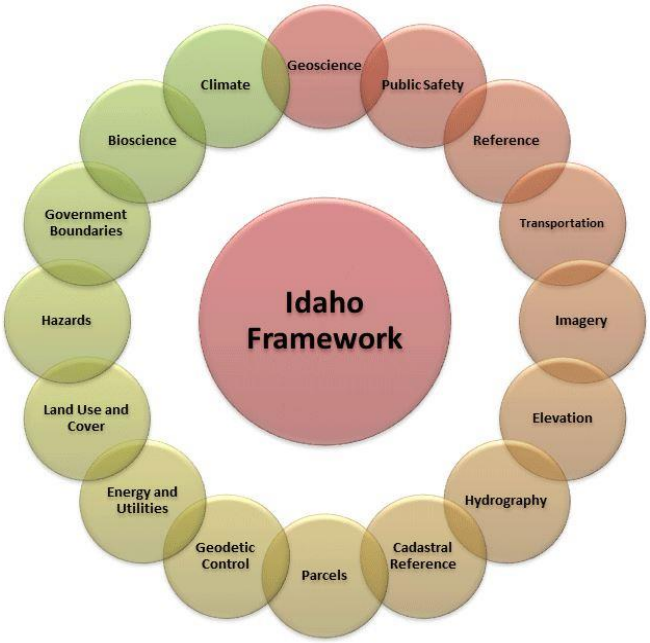


Figure 1. Idaho Framework layers.


Figure 2. Oregon Framework layers.

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