To: The Oregon Geographic Information Council

From: GPL Projection/Coordinate System Standard Committee
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Subject: Standard Projection/Coordinate System Recommendation

History

At a GIS Project Leaders meeting in May of 1996 it became apparent that a statewide standard projection system would benefit the exchange process between agencies. It also became apparent that opinions for a single statewide projection varied greatly and were strong in many cases. The Projection Committee was formed and charged with exploring issues related to projections, conducting a survey and determining a single projection for exchange purposes only.

Thirteen state agencies and two federal agency completed the survey. **The summary showed that there is no single projection standard in place for Oregon.** Because of varied data and analysis needs it appears that there would not be a single map projection that agencies use. As a result, **the committee's initial recommendation was to strongly enforce the use of projection metadata,** so user's simply "know what they are getting" and could convert accordingly.

Continued discussion at the GPL meetings, however, suggested that **the creation of a new map projection should still be considered to enable the exchange of data, to provide easier access to both low and high-end users for meeting some limited analysis needs, and to save time and money in converting geographic data.**

Finally, in presenting these recommendations, agencies should be aware that there is no ideal projection nor any easy solution; there needs to be a compromise when considering the *exchange and publishing of data.*

The Problem

- Data Conversion is a problem within and between organization.
- There is not a single commonly used projection language.
- There is disparity between agencies' varying needs for accuracy and the state's need for a standard.

Assumptions

- **The exchange standard is meant for clearinghouse or published data** and not for informal or working exchange between agencies. The exchange standard would not be an internal requirement.
- **The exchange standard will have an Oregon focus and will not be designed for national exchange.** Some accuracy will be lost for the sake of seamless data for Oregon. Re-projections will be needed when adjoining data from neighboring states.

Criteria

The process of comparing map projections involved creating a calculated length and area for each of the 7.5' quads for Oregon based on an equation by John Snyder of the USGS. The calculated length and area was then compared to the actual measurements after projection and a percentage error was calculated. The results of the errors were graphically displayed as maps using the same look-up table for all projections. The map images, a table showing the respective error for each of four projections, as well as the ARC/INFO macro used to calculate the errors can be found on the Internet at: http://www.odf.state.or.us/atlas/gpl.htm.

Recommendation

The GIS Project Leaders (GPL) Projection Committee recommends:

1. the SSCGIS strongly enforce the use of projection metadata by including projection information when implementing metadata standards.

2. state agencies convert completed coverages to **Oregon Lambert using NAD83 and International feet** when publishing data for the clearinghouse.

Parameters for an Oregon Centered Projection

1st standard parallel 42° 42' 30"
2nd standard parallel 45° 32' 30"
Central Meridian 120° 30'
Latitude of Origin 41° 50'
False Easting 400,000 meters

Oregon Lambert - Pros:

- The projection is new, compromise needed on everyone's part.
- Projection is Oregon focused.
- Projection works across the state as a seamless projection. (Data from all areas of the state fit together).
- Projection reduces error of distortion across entire state.
- USGS uses Lambert.
- Projection is best for east-west shapes.
- Projection is uniform scale in all directions.
- Projection has reasonable distance and area distortion errors (.068%) (.038%).

Oregon Lambert - Cons:

- Projection is customized, tailored for Oregon; re-projection needed for adjoining data from neighboring states.
- The specific parameters are new and therefore not currently in use.
- The maximum error is 1/10,000 for distance measurements in a state plan coordinate system.

3. for specific applications, it may be best to consult the source of data.

4. the SSCGIS be a resource for doing conversions and create a program that will automate the process with metadata requirements.

5. OGIC approves and promotes the use of the exchange projection by submitting the proposal to the OGIC GIS Plan for publication on the Website.

6. GPL encourages the use of the exchange projection as applicable among Oregon State Agencies.

Resources and References

- John Snyder, USGS
- Dean Anderson, Polk County
- Chuck Pierson, Washington County
- Bob Swank, LCOG
- Dick Bolen, METRO
- Jerry Daumiller, State of Montana

Attachment A
Projection / Coordinate System Survey

AGENCY	PREFERENCE	FUTURE	INTERACTION
SSCGIS	LAM 33-43 SSC	Flexible	State, Fed, local, public
	Needs/Goals: single proj meta doc policy easily understood, accuracy 40 +- ft.		
OWRD	ST. N NAD27	Flexible	Albers > USGS UTM > USFS Geo St. Plane > BLM (GCDB)
	Needs/Goals: dist. low, area + shape high, single projection, NAD 83-91		
DLCD	SSC LAM	no	Have SSC do conversions
	Needs/Goals: dist. and area high		
DSL	St. NAD 83 (both) -LAM because of how data arrives	Flexible	UTM - Feds St. P - Local LAM - state
	Needs/Goals: Area high, workable not an issue.		
USFS	UTM Albers	NAD83	No conversions, sometimes UTM10
BLM	UTM (district data)		
	Needs/Goals: metadata doc., single projection?		
Prison.Ind.	St. N.+S.	None. As requested by clients.	Not right now - will when Arc/Info arrives.
	Needs/goals: customer sets standards.		
ODFW	LAM 33-45	UNK	State, Fed, Non-profit
	Needs/goals: single projection		
ODF	St. N 83	St. N 83	State, Fed, Smll private landowners.
	Needs/goals: single projection, easily understood.		
DOR	St. NAD27 NAD83-91	None	NAD27>83 conversions
	Needs/goals: urban +- 1ft, rural +- 40ft.		

ODOT	LAM 33-45 NAD27	None	ODF> St.N + consultants UTM possible (ODF)
	Needs/goals: urban +– 40ft, rural ~ +– 150ft		
OEM	Geo NAD83 St N+S NAD83	No Change	SSC LAM to what they use.
	Needs/goals: distance +– 40ft, area & shape best poss.		
DEQ	Geo. NAD27 SSC LAM + others	Flexible	State, Fed, Local
	Needs/goals: +– 40ft, workable, easy, single projection		
UO	LAM & UTM SSCGIS ODOT	NAD83	State, Local
	Needs/goals: Varies a lot, metadata doc., single projection		
DOGAMI	LAM 33-45 NAD27 Geo.	None	State, Fed No convert
	Needs/goals: metadata, USGS accuracy standards		