ODFW Location Data Standard
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Data Standards Overview

The ODFW GIS Strategic Plan (October 2006) Goal 4, is to "Improve the consistency, compatibility and quality of GIS data" within the agency, with a defined objective of developing data standards. The ODFW GIS Implementation Plan (November 2007) recommended establishing and implementing appropriate data "standards" for creating and sharing data. GIS Standards will enable users to efficiently combine data from disparate sources, improve the ability to compare existing datasets and help to ensure that data products are fit for their intended use. While implementing standards will require staff to adjust how they create and manage data, those adjustments will be offset by the benefits of improved quality, compatibility and overall usability of the data.

Determining the Need for a Location Data Standard

Almost all data collected in the Department have a spatial, or "locational" component. In the absence of a location standard, location data have not been collected or documented with appropriate consistency. They have been collected and maintained in numerous formats, some of which are outdated, or have varying degrees of accuracy and documentation. Lack of an established location data standard reduces the value and usefulness of agency data, both within and across programs. The GIS Coordination Group (GCG), with representation from Fish and Wildlife Divisions and all regions, supports the establishment of an agency ***location data standard***.

Location Data Standard Description

The first agency data standard to be implemented is the ***location data standard***. The primary objectives of this standard are to improve the positional accuracy and documentation of location data within the agency. This standard describes appropriate coordinate systems that apply to both field data collection and data that are managed within a GIS.

For definitions on coordinate systems and the difference between Geographic Coordinate Systems and Projected Coordinate Systems, please see Appendix A, Definition of Terms. Additional details are available in the glossary of GPS and GIS Terms at: http://inside.dfw.state.or.us/gis/docs/GIS_GPS_Terms.pdf

The following sections outline the specifics of when and how to use a Geographic Coordinate System vs. a Projected Coordinate System in creating and managing location data.

Geographic Coordinate Systems

- For data collected with a GPS in a geographic coordinate system, i.e. latitude/ longitude, the required unit format is Decimal Degrees, with decimals collected out to the fifth decimal place. The format is hhh.DDDDD° (e.g. -121.54358 Other formats such as degrees, minutes, seconds 121° 57’ 08’’ W would not be acceptable).
    - It is recognized that some exceptions to this format are necessary for specific purposes but these exceptions should be rare, and when used, properly documented.

- For NEW data collection efforts, where the data are not a continuation of a multiple year collection effort and is instead a newly begun and stand alone effort, the required datum standard is North American Datum 1983 (NAD83) in accordance with the state adopted standard, and GPS units should be checked and set to this datum prior to use.
    - For specific purposes, World Geodetic System 1984 (WGS84) may be used, but must be properly documented.
    - The North American Datum 1927 should ***not*** be used for new data collection efforts.

- For EXISTING data collection efforts, where the data is a continuation of a multiple year collection effort and cannot stand alone without supplemental data, the North American Datum 1927 (NAD27) may still be used until such a time as the project managers feel comfortable transitioning the dataset to the current North American Datum 1983 (NAD83). The datum employed, before and after transition, as well as the datum change date, should be properly documented and stored with the datasets.

Projected Coordinate Systems

- For data collected with a GPS in a projected coordinate system or used in a GIS software package, the following coordinate systems are acceptable:

    - UTM 10, NAD83* – which can be accurately used in the ocean off Oregon and in the following counties: Benton, Clackamas, Clatsop, Columbia, Coos, Curry, Douglas, Hood River, Jackson, Josephine, Klamath, Lane, Lincoln, Linn, Marion, Multnomah, Polk, Sherman, Tillamook, Wasco, Washington, and Yamhill

    - UTM 11, NAD83* – which can be accurately used in the following counties: Baker, Grant, Harney, Malheur, Morrow, Umatilla, Union, and Wallowa

    - The UTM projection should not be used in capturing data in the following counties: Crook, Deschutes, Gilliam, Lake, and Wheeler. Incorrect zone designation can introduce errors and degrade the accuracy of the location data. The Oregon State Lambert is a preferable projection to use in the part of the state where the zones split. Please see the following link for a map of UTM Zone 10 and 11 in Oregon: http://nrimp.dfw.state.or.us/web%20stores/nrimp/pub/gis/gps/utm10-11.jpg

- Oregon State Lambert – This is the statewide adopted projection standard and can be used in all counties and for all datasets with statewide extents

***** For specific purposes, World Geodetic System 1984 (WGS84) may be used, but must be properly documented.

Given that Oregon contains two UTM zones, Oregon State Lambert should be used for datasets that cover a statewide extent or cover where the UTM zones change to ensure maximum accuracy of all features. Additionally, datasets that are considered "agency-level", that is, used by multiple programs and designated as a department-wide resource, should either be collected in the Oregon State Lambert projection or be converted to the Oregon State Lambert projection post-collection. An example of an "agency-level" dataset within ODFW is the bear tetracycline dataset, where data is collected separately by each field office but is ultimately compiled for use in reports and analyzed at the statewide or regional level. By collecting each field office effort with the same location standard, mistakes in error accuracy will be reduced, and the required time and ease to compile the data statewide will be improved.

Phasing out North American Datum 1927

One purpose of establishing this Location Standard is to phase out the use of the North American Datum 1927 (NAD27) in current and ongoing data collection projects by December 2011. The US Geological Survey will be updating their paper 7.5' quad map series by that time and NAD27 will not be supported. Developed back in the 1920s, this datum has been superseded by the North American Datum 1983 (NAD83), which can improve the positional accuracy of features by a minimum of 200 feet. In most cases, 200 feet or more is an unacceptable amount of error for a location record, and the continued use of the 1927 datum in the agency undermines the validity and usefulness of ODFW's datasets.

Documenting Location Data

Previous to collecting field data or creating a GIS dataset, determine the required positional accuracy of the location data and the acceptable error tolerance.

Plan whether you will use a geographic or projected coordinate system and determine the datum (see the section, "Do you need to display your data with a projected coordinate system?" in the GIS and GPS Terms paper to help determine the appropriate coordinate system type: http://inside.dfw.state.or.us/gis/docs/GIS_GPS_Terms.pdf).

Document all aspects of the location data. See the GPS Documentation document at:
http://inside.dfw.state.or.us/gis/docs/Basic%20GIS%20Use.pdf
for further details.

Appendix A: Definition of Terms

Accuracy - a measurement of how close a recorded location is to its actual real-world location on the ground

Coordinate System - a coordinate system assigns a spatial location to features mapped in a GIS or collected with a GPS unit. “Describing the correct location and shape of features requires a framework for defining real-world locations.” – ESRI Help. That framework can be a geographic or a projected coordinate system.

Datum – A datum “provides a frame of reference for measuring locations on the surface of the earth. It defines the origin and orientation of latitude and longitude lines.... Whenever you change the datum, the coordinate values of your data will change.” – ESRI Help. NAD1983 and NAD27 coordinates can be different by as much as 500 feet

Error Tolerance - the acceptable amount of spatial error for locations

Geographic Coordinate System (GCS) - A geographic coordinate system is designed to capture a location in a 3-dimensional space (like on the earth). It consists of a datum (see definition below), an angular unit of measure (commonly degrees), and a prime meridian. The most common GCS is latitude/longitude, which uses degrees as the unit.

GPS Settings - the parameters the user selects on the GPS unit to ensure correct and accurate recording of GPS locations. They include: unit format, datum, and coordinate system (optional).

Map Projection - a mathematical formula that converts information from a curved surface to a flat one (because the earth is round and maps are flat). The process of flattening the earth causes distortion in one or more of the following spatial properties: distance, area, shape, direction. – From ESRI Help

Projected Coordinate System (PCS) - A projected coordinate system translates a location from a 3-D surface (like on the earth) to a flat surface, such as a printed map or a computer screen. A PCS consists of a linear unit of measure (usually meters or feet), a map projection, and a geographic coordinate system. A PCS is used to calculate area, shape and distance into measurable units. PCS are focused on a specific spatial area that attempts to reduce distortion as much as possible (e.g. continental extent, county-wide extent

Units - the format used to measure or describe the location of features, such as decimal degrees or meters. When collecting GPS coordinates, a unit format must be selected – decimal degrees or hdd.ddddd is the best option. Map projections have a unit of measurement, e.g. feet, international feet, meters, etc.