Using Coordinate Systems – Which is Better LDP or LDP?

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Introduction

What do we mean when we say LDP?

LDP – Low Distortion Projection

LDP – Local Datum Plane

What is the difference between them?

How did we get here and why do we need each?

Which LDP is the proper one for ODOT Projects?

Background

How did this start?

- Want to map in flat plane (easier) but Earth is "round".

Start small, assumed coordinates.

- Survey instruments make local planes perpendicular to gravity.

Needed to map bigger areas.

- Found distortion with projections over large areas.

Technology caused new problems.

- Could measure more accurately and had more data.

What does LDP mean?

LDP – Local Datum Plane

➡ The term Local Datum refers to aligning the spheroid to closely fit the earth's surface in a particular area and Plane generally refers to a flat surface used as a reference.

LDP – Low Distortion Projection

➡ The term Low Distortion refers to both the horizontal distortion from projecting a curved surface on a plane and the vertical distortion because these projections are also scaled to a regional height representative of the area to be covered.

Advantages of Each

Local Datum Plane

- Custom Coordinate System
- Scale to fit your project Area

Low Distortion Projection

- Grid coordinate zone distances closely match the same distance measured on the ground.
- Limited distortion and reduced convergence angle.
- Easy to transform between other coordinate zone systems.
- Maintains a relationship to the National Spatial Reference System.
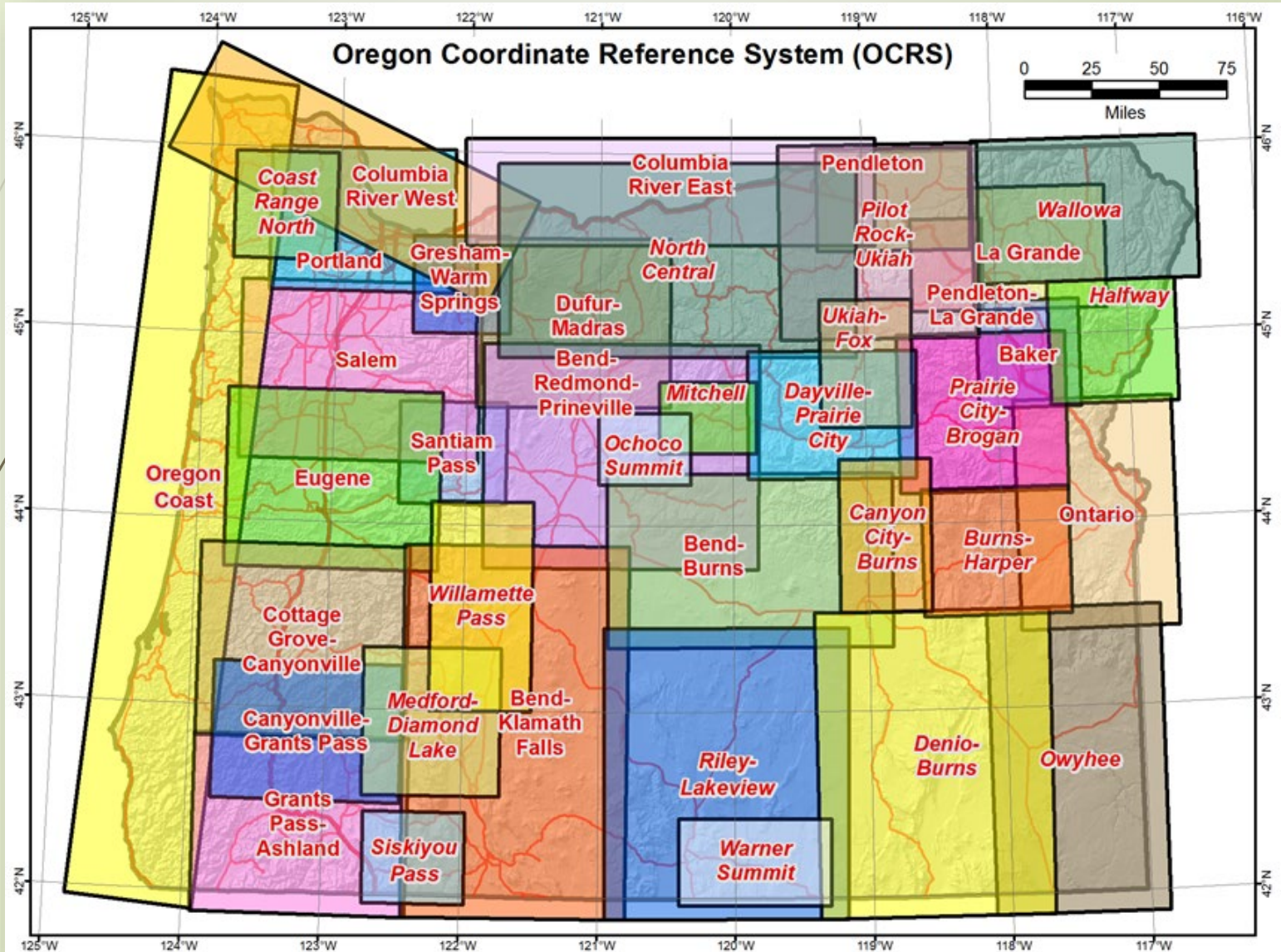- Can cover entire cities and counties, making them GIS-friendly.

How to choose which LDP?

- First Choice is Low Distortion Projection (OCRS Zone)

- Geometronics Toolkit Makes it easy to chose which of the 39 OCRS zones to use for your project

- If distortion is too large, then use a Local Datum Plane.

- **DO NOT** use an OCRS Zone with a Scale Factor for a Local Datum Plane. This can cause confusion and complicate the project coordinates.

- Use the State Plane projections or other statewide systems with a combined scale factor for a Local Datum Plane system.
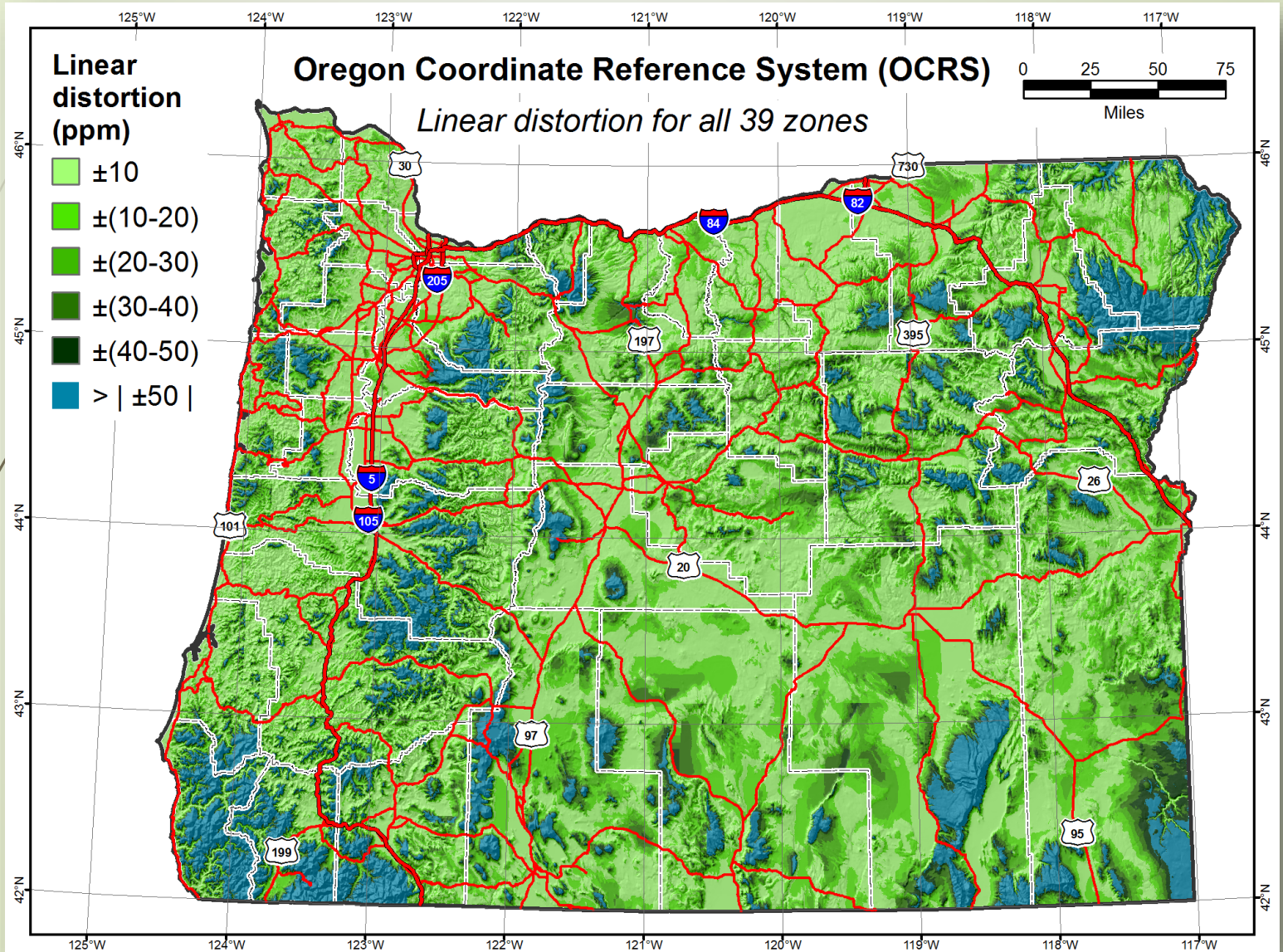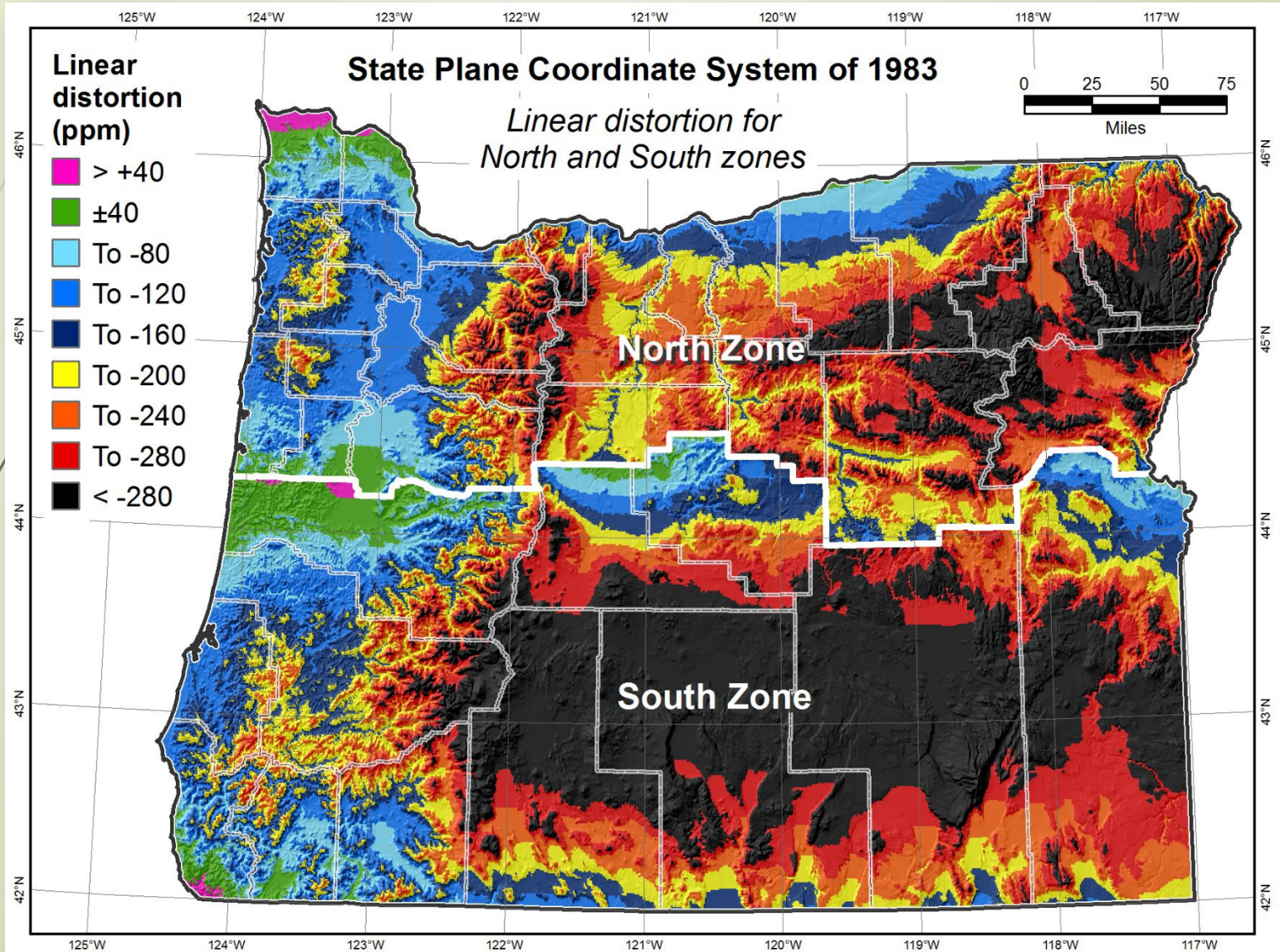
39 OCRS Zones

Oregon Coordinate Reference System (OCRS)

OCRS Distortion Graphics

Oregon Coordinate Reference System (OCRS)

Linear distortion for all 39 zones

Linear distortion (ppm)

- ±10
- ±(10-20)
- ±(20-30)
- ±(30-40)
- ±(40-50)
- > | ±50 |

SPCS Distortion Graphics

Common Questions

- When would you choose to use a Local Datum Plane?

- How easy is it to compute a Local Datum Plane?

- What information do you need to supply to allow others to use the same Local Datum Plane?

- Are you limited to State Plane North or South when Scaling?

- What happens when the new NSRS removes State Plane North and South?

Conclusion

- Local Datum Plane and Low Distortion Projection coordinates are equally valid.

- They both have advantages and disadvantages.

- Really depends on the needs of your project.

- With modern tools and the need to combine data from different sources the recommended coordinate system for ODOT projects is the Low Distortion Projection.

And I think we all agree…
LDP's are Best!

Questions?

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