

Esri Redistricting

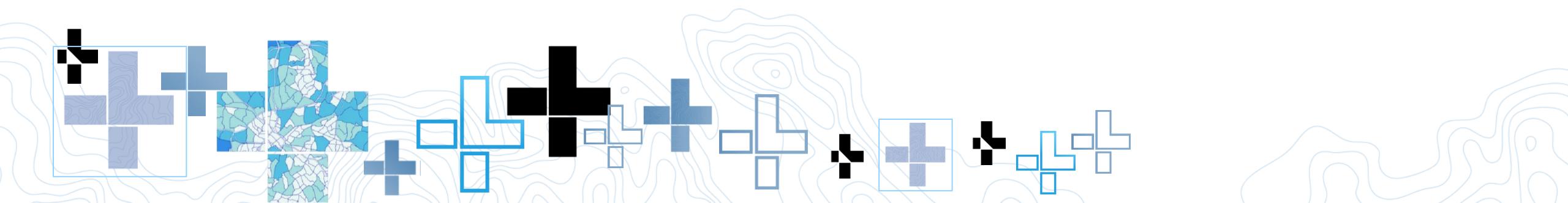
Oregon Senate Redistricting Committee

March 29th, 2021



Agenda:

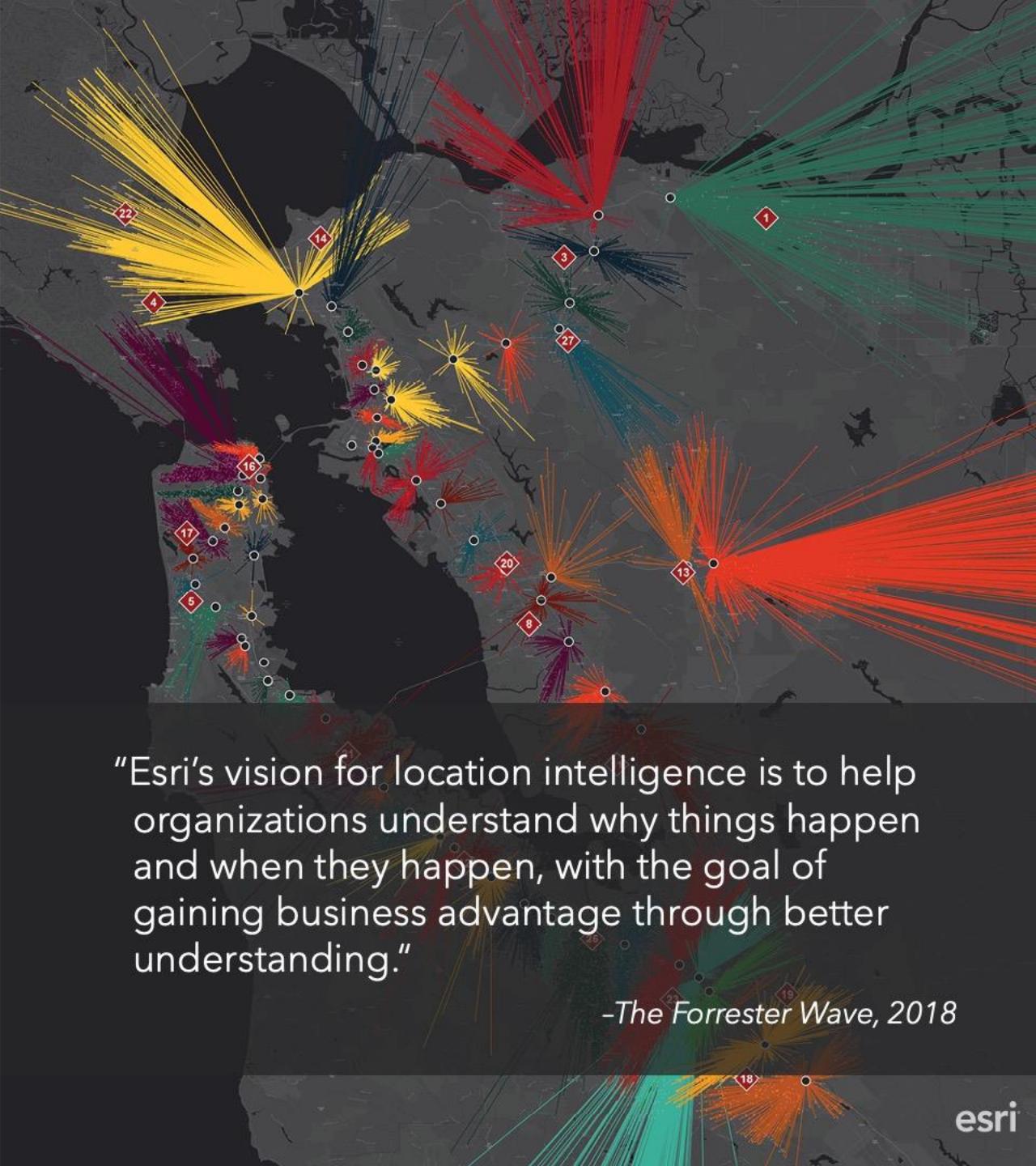
- Who we are.
- Our background in Redistricting.
- 2020 Census PL94-171 Data workflow.
- What does 2020 look like.
- Open questions and next steps.



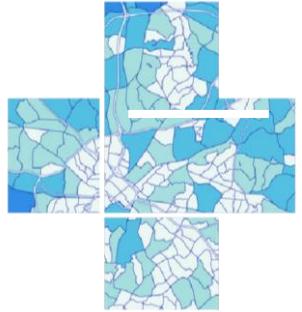
WHO WE ARE

Esri is the **global leader** in geographic information systems (GIS) software, location intelligence, and mapping.

With more than **100** offices worldwide and professionals from **67** countries, Esri provides organizations of every size and industry the tools to get deeper insights from their geographic and transactional data to improve operational and business results.



Redistricting Background



Some History:

1980's

Highly Constrained

1990's

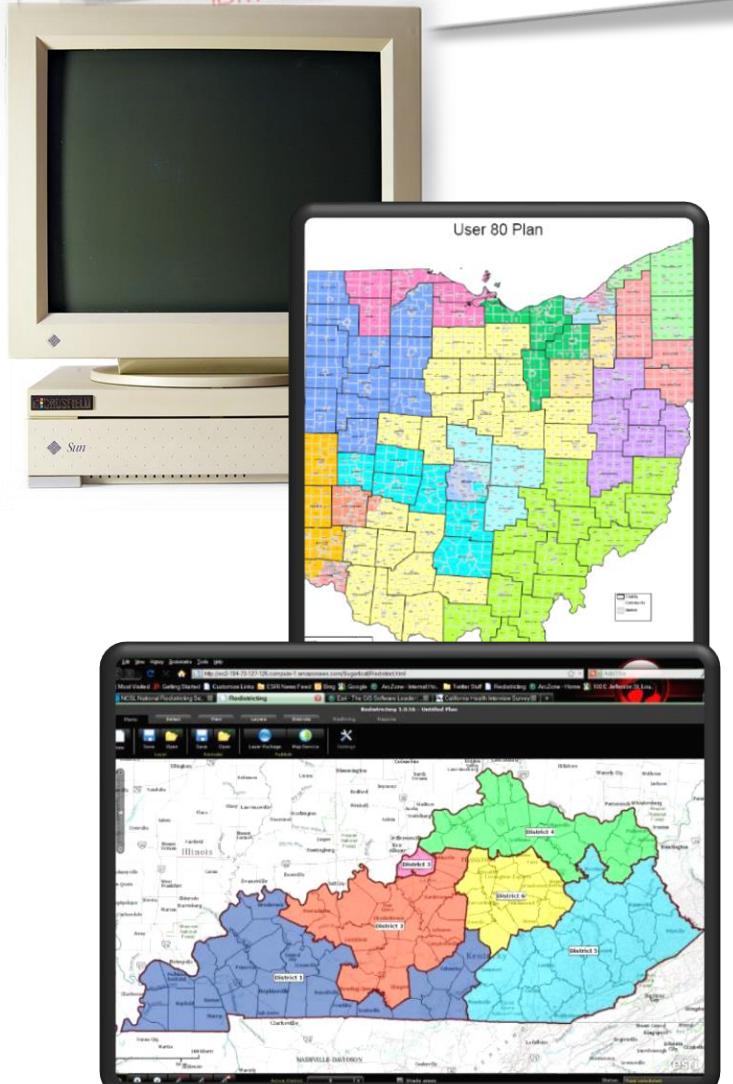
Tools available but cumbersome

2000's

Usability and some public involvement

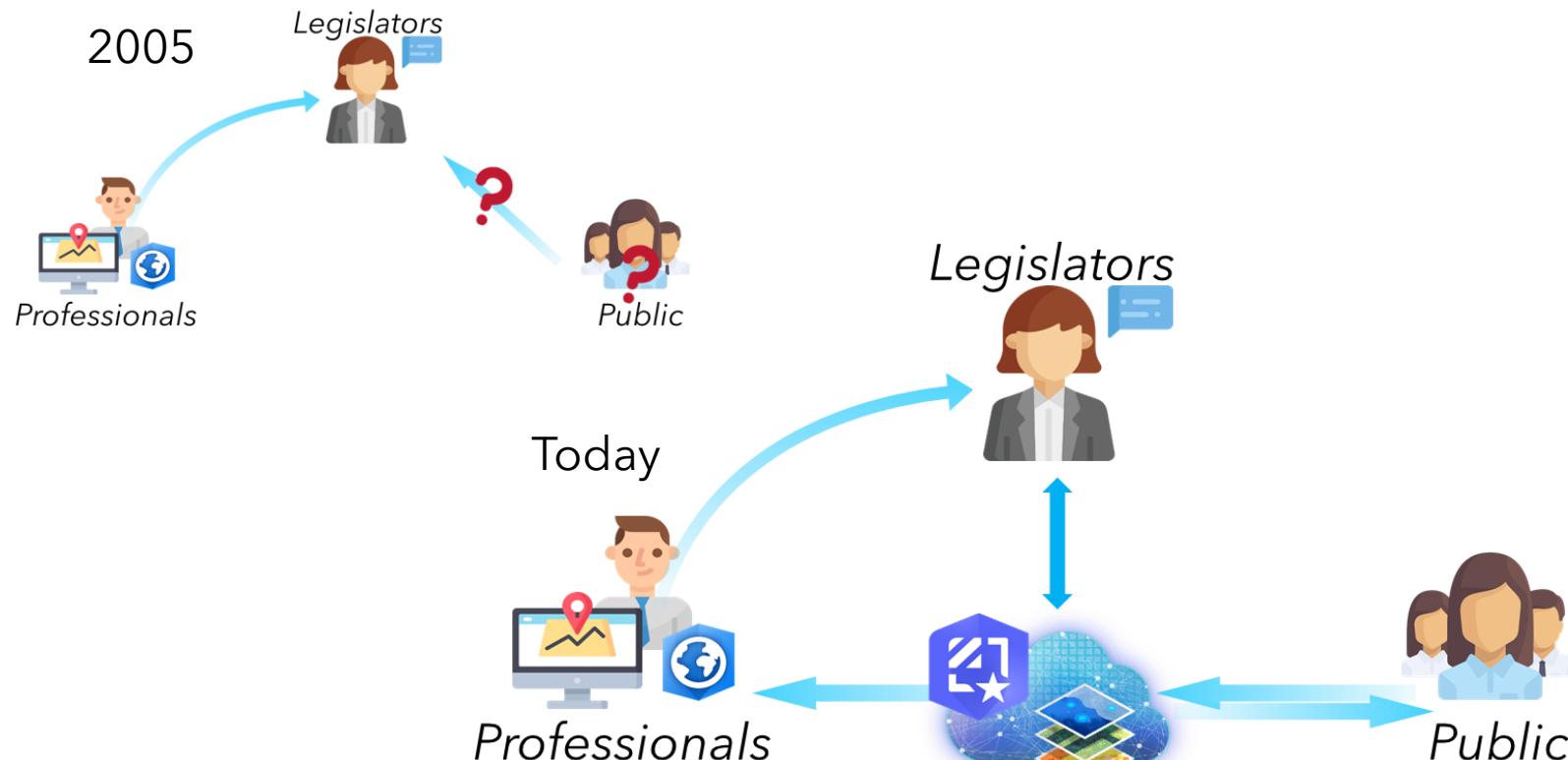
2010's

Almost consumer-level



A Vision for 2010 Redistricting

Esri Redistricting Story



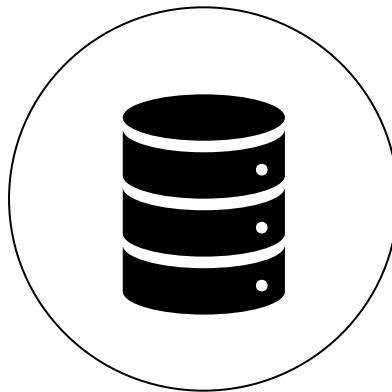
A browser approach would increase collaboration within the legislature and between citizens

- Provided via web browser
- Facilitates collaboration, sharing, and community building
- Easy to use interface reduces costs associated with training
- Minimal GIS experience required
- Centralized IT
- Cost effective way to provide access to citizens

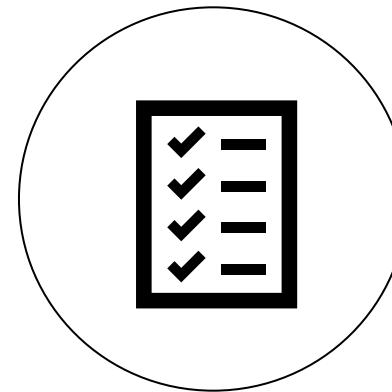
Features Overview



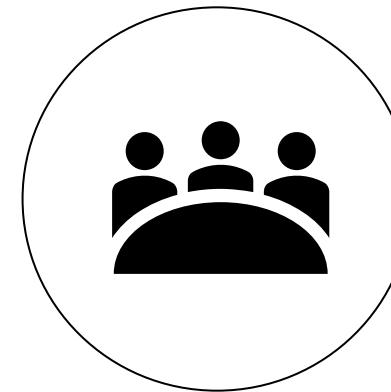
Esri Redistricting



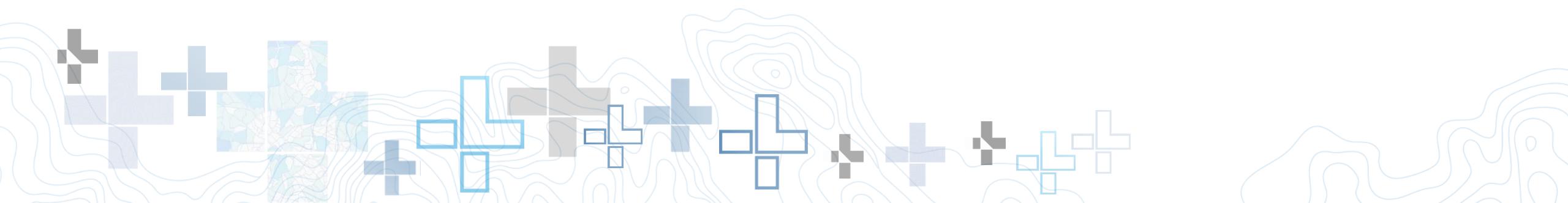
Data
Sources



Plan
Management



Collaboration



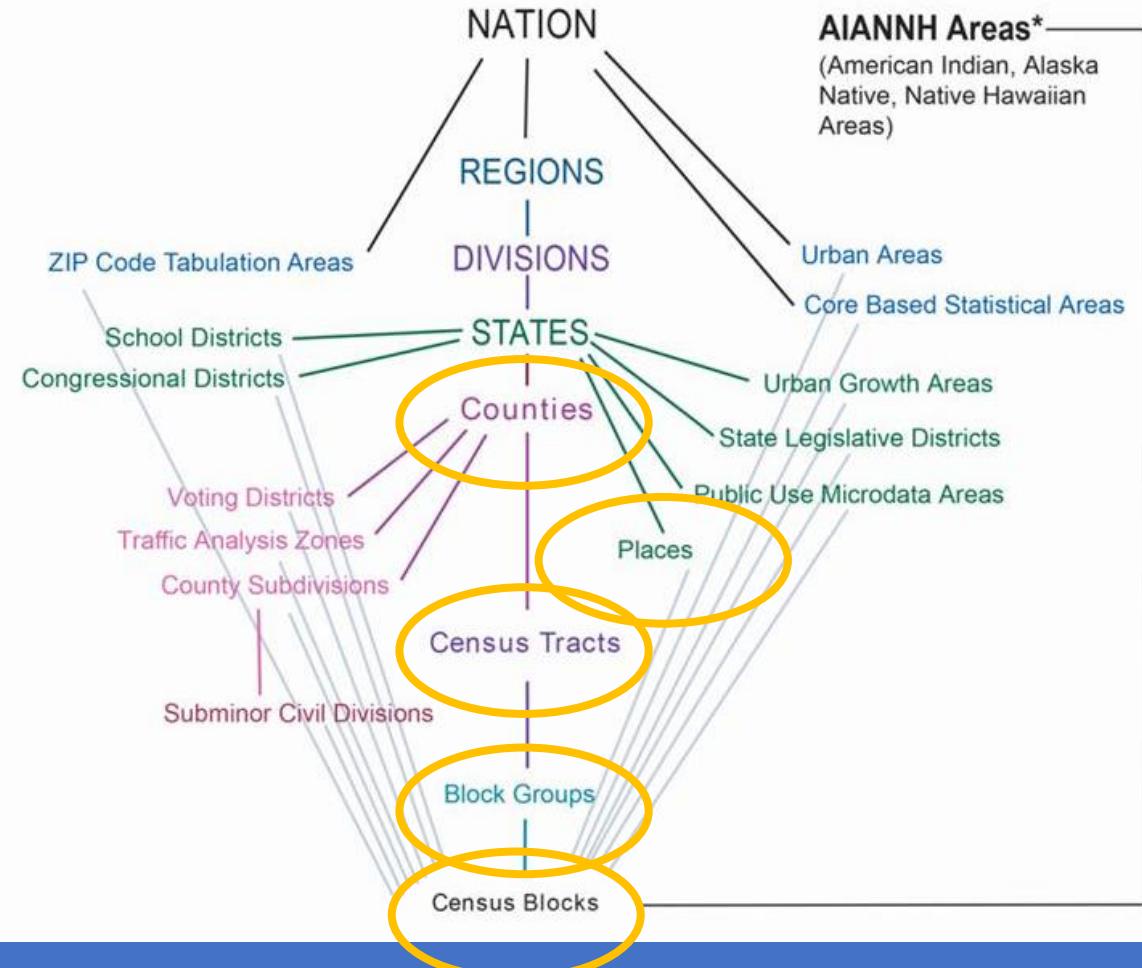
Census Data—The P.L. Story

Public Law (P.L.) 94-171

...enacted by Congress in December 1975, requires the Census Bureau to provide states the opportunity to identify the small area geography for which they need data in order to conduct legislative redistricting. The law also requires the U.S. Census Bureau to deliver this data no later than one year from Census day.

P.L. 94-171 requires the U.S. Census Bureau to furnish "basic tabulations of population" to each state, including for those small areas the states have identified.

Standard Hierarchy of Census Geographic Entities



The P.L. table as a Data Model.

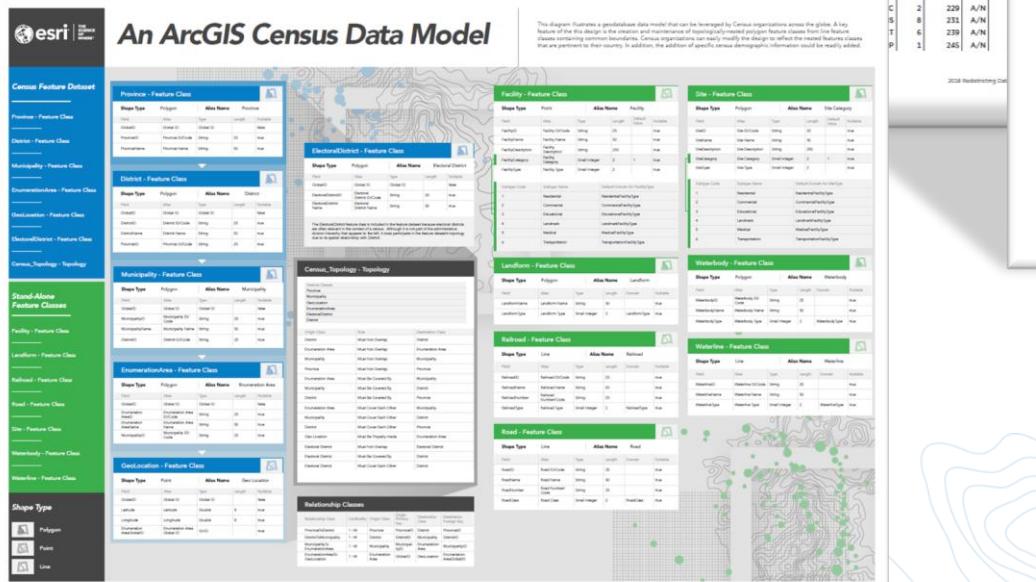


FIGURE 1-5. GEOGRAPHIC HEADER RECORD

Field	Data dictionary reference	Field size	Starting position	Data type	Summary levels						
					040	050	060	067	140	150	155
Record Codes											
File Identification	FILEID	6	1	A/N	X						
State/US-abbreviation (USPS)	STUSAB	2	7	A	X						
Summary Level	SUMLEV	3	9	A/N	X						
Geographic Component	GEODVAR	2	12	A/N	X						
Characteristic Iteration	GEODCOMB	2	14	A/N	X						
Characteristic Iteration File	CHARITER	3	16	A/N	X						
Sequence Number	CIFSN	2	19	A/N	X						
Logical Record Number	LOGRECNO	7	21	N	X						
Geographic Area Codes											
Geographic Record Identifier	GEOID	60	28	A/N	X						
Geographic Code Identifier	GEOCODE	51	88	A/N	X						
Region	REGION	1	139	A/N	X						
Division	DIVISION	1	140	A/N	X						
State (FIPS)	STATE	2	141	A/N	X						
State (NS)	STATENS	8	143	A/N	X						
County (FIPS)	COUNTY	3	151	A/N	X						
FIPS County Class Code	COUNTYCC	2	152	A/N	X						
County (NS)	COUNTYNS	8	156	A/N	X						
County Subdivision (FIPS)	COUSUB	5	164	A/N	X						
FIPS County Subdivision Class Code	COUSUBCC	2	169	A/N	X						
County Subdivision (NS)	COUSUBNS	8	171	A/N	X						
FIPS Subdivision Civil Division (FIPS)	SUBMCD	5	179	A/N	X						
FIPS Subdivision Civil Division Class Code	SUBMCDCC	2	184	A/N	X						
Subminor Civil Division (NS)	SUBMCDNS	8	186	A/N	X						
Estate (FIPS)	ESTATE	5	194	A/N	X						
FIPS Estate Class Code	ESTATECC	2	199	A/N	X						
Estate (NS)	ESTATENS	8	201	A/N	X						
FIPS Consolidated City Class Code	CONCIT	9	209	A/N	X						
FIPS Consolidated City Class	CONCITCC	2	214	A/N	X						
Consolidated City (NS)	CONCINTNS	8	215	A/N	X						
Consolidated City (NS)	CONCINTNS	8	216	A/N	X						

FIGURE 1-5. GEOGRAPHIC HEADER RECORD—Con.

Field	Data dictionary reference	Field size	Starting position	Data type	Summary levels						
					040	050	060	067	140	150	155
Block											
American Indian Area/Alaska Native Area/Hawaiian Home Land (Census Tract)	AIANHH	4	250	A/N	X						
American Indian Land/Hawaiian Home Land (Indicator)	AIHHTLU	1	254	A/N	X						
American Indian Area/Alaska Native Area/Hawaiian Home Land (FIPS)	AIANHFF	5	255	A/N	X						
American Indian Area/Alaska Native Area/Hawaiian Home Land Class Code	AIANHHC	2	260	A/N	X						
American Indian Area/Alaska Native Area/Hawaiian Home Land (NS)	AIANHHS	8	262	A/N	X						
American Indian Tribal Subdivision (FIPS)	AITSF	5	273	A/N	X						
FIPS American Indian Tribal Subdivision Class Code	AITSSC	2	278	A/N	X						
American Indian Tribal Subdivision (NS)	AITSSNS	8	280	A/N	X						
Tribal Census Tract	TTRACT	6	288	A/N	X						
Tribal Census Block Group	TBLKGSP	1	294	A/N	X						
Alaska Native Regional Corporation (FIPS)	ANRC	5	295	A/N	X						
ANRC Alaska Native Regional Corporation Class Code	ANRCC	2	300	A/N	X						
Metropolitan Statistical Area/Micropolitan Statistical Area (NS)	ANDCNS	8	302	A/N	X						
Metropolitan Statistical Area/Micropolitan Statistical Area (FIPS)	CBSA	5	310	A/N	X						
Metropolitan/Micropolitan Indicator	MEMI	1	315	A/N	X						
Combined Statistical Area	CSA	3	316	A/N	X						
Metropolitan Division	METDIV	5	319	A/N	X						
New England City and Town Area	NECTA	5	324	A/N	X						
NECTA Metropolitan/Micropolitan Indicator	NMMEB	1	329	A/N	X						
Combined New England City and Town Area	CNECTA	3	330	A/N	X						
New England City and Town Area Division	NECTADIV	5	333	A/N	X						

FIGURE 1-5. GEOGRAPHIC HEADER RECORD—Con.

Field	Data dictionary reference	Field size	Starting position	Data type	Summary levels						
					040	050	060	067	140	150	155
Area Characteristics											
Area (Land)	AREALAND	14	419	N	X	X	X	X	X	X	X
Area (Water)	AREAWATR	14	431	N	X	X	X	X	X	X	X
Area Base Name	BASENAME	100	437	A/N	X	X	X	X	X	X	X
Area Name—Legal/Statistical Area Description (LSAD) Term—Part Indicator	NAME	125	547	A/N	X	X	X	X	X	X	X
Functional Status Code	FUNCSTAT	1	672	A/N	X	X	X	X	X	X	X
Geographic Change Use Note Indicator	GCUNI	1	673	A/N	X						
Population Count (100K)	POP100	9	674	N	X	X	X	X	X	X	X
Housing Unit Count (100K)	HU100	9	683	N	X	X	X	X	X	X	X
Internal Point (Latitude)	INTPLAT	11	692	A/N	X	X	X	X	X	X	X
Internal Point (Longitude)	INTPLON	12	703	A/N	X	X	X	X	X	X	X
Legal/Political Area Description Code	LSADC	2	715	A/N	X	X	X	X	X	X	X
Part Flag	PARTFLAG	1	717	A/N	X						
Special Area Codes											
Urban Growth Area	UGA	5	718	A/N	X						

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Field	Data dictionary reference	Field size	Starting position	Data type	Summary levels						
					040	050	060	067	140	150	155
Area Characteristics											
Area (Land)	AREALAND	14	419	N	X	X	X	X	X	X	X
Area (Water)	AREAWATR	14	431	N	X	X	X	X	X	X	X
Area Base Name	BASENAME	100	437	A/N	X	X	X	X	X	X	X
Area Name—Legal/Statistical Area Description (LSAD) Term—Part Indicator	NAME	125	547	A/N	X	X	X	X	X	X	X
Functional Status Code	FUNCSTAT	1	672	A/N	X	X	X	X	X	X	X
Geographic Change Use Note Indicator	GCUNI	1	673	A/N	X						
Population Count (100K)	POP100	9	674	N	X	X	X	X	X	X	X
Housing Unit Count (100K)	HU100	9	683	N	X	X	X	X	X	X	X
Internal Point (Latitude)	INTPLAT	11	692	A/N	X	X	X	X	X	X	X
Internal Point (Longitude)	INTPLON	12	703	A/N	X	X	X	X	X	X	X
Legal/Political Area Description Code	LSADC	2	715	A/N	X	X	X	X	X	X	X
Part Flag	PARTFLAG	1	717	A/N	X						

FIGURE 1-5. GEOGRAPHIC HEADER RECORD—Con.

Field	Data dictionary reference	Field size	Starting position	Data type	Summary levels						
					040	050	060	067	140	150	155
Area Characteristics											
Area (Land)	AREALAND	14	419	N	X	X	X	X	X	X	X
Area (Water)	AREAWATR	14	431	N	X	X	X	X	X	X	X
Area Base Name	BASENAME	100	437	A/N	X	X	X	X	X	X	X
Area Name—Legal/Statistical Area Description (LSAD) Term—Part Indicator	NAME	125	547	A/N	X	X	X	X	X	X	X
Functional Status Code	FUNCSTAT	1	672	A/N	X	X	X	X	X	X	X
Geographic Change Use Note Indicator	GCUNI	1	673	A/N	X						
Population Count (100K)	POP100	9	674	N	X	X	X	X	X	X	X
Housing Unit Count (100K)	HU100	9	683	N	X	X	X	X	X	X	X
Internal Point (Latitude)	INTPLAT	11	692	A/N	X	X	X	X	X	X	X
Internal Point (Longitude)	INTPLON	12	703	A/N	X	X	X	X	X	X	X
Legal/Political Area Description Code	LSADC	2	715	A/N	X	X	X	X	X	X	X
Part Flag	PARTFLAG	1	717	A/N	X						

How to Use This Product
2010 Redistricting Data—Precise (Public Law 94-171) Summary File
U.S. Census Bureau

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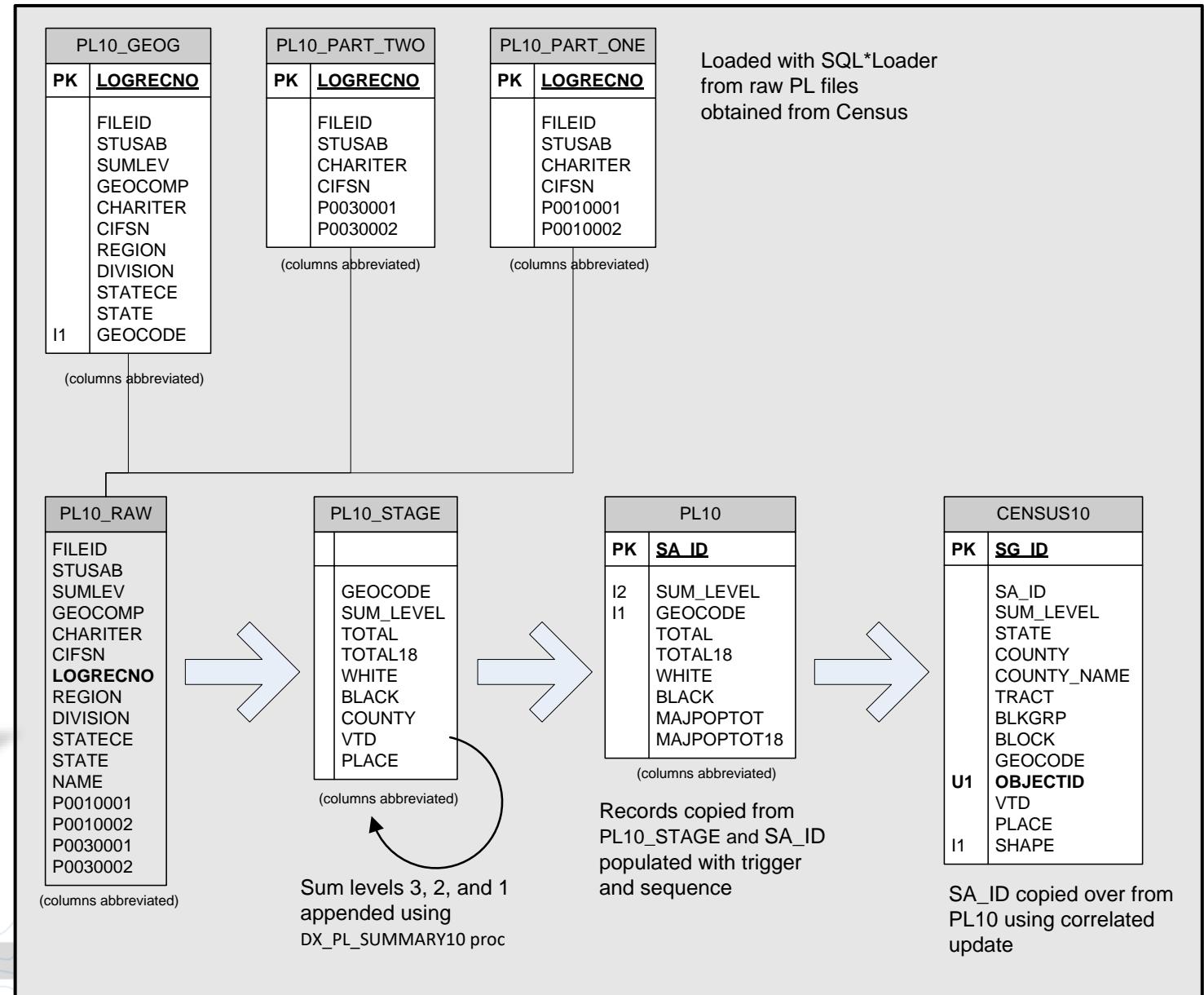
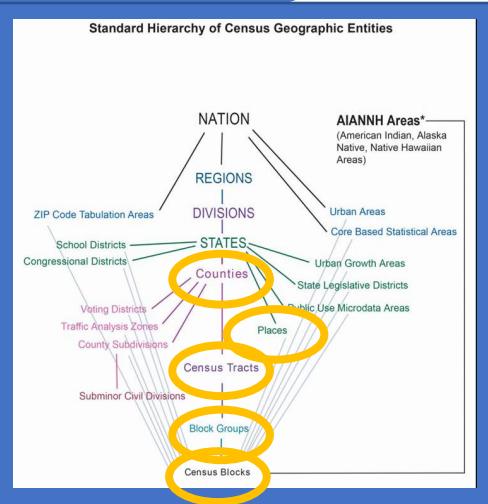


How the P.L. table is populated.

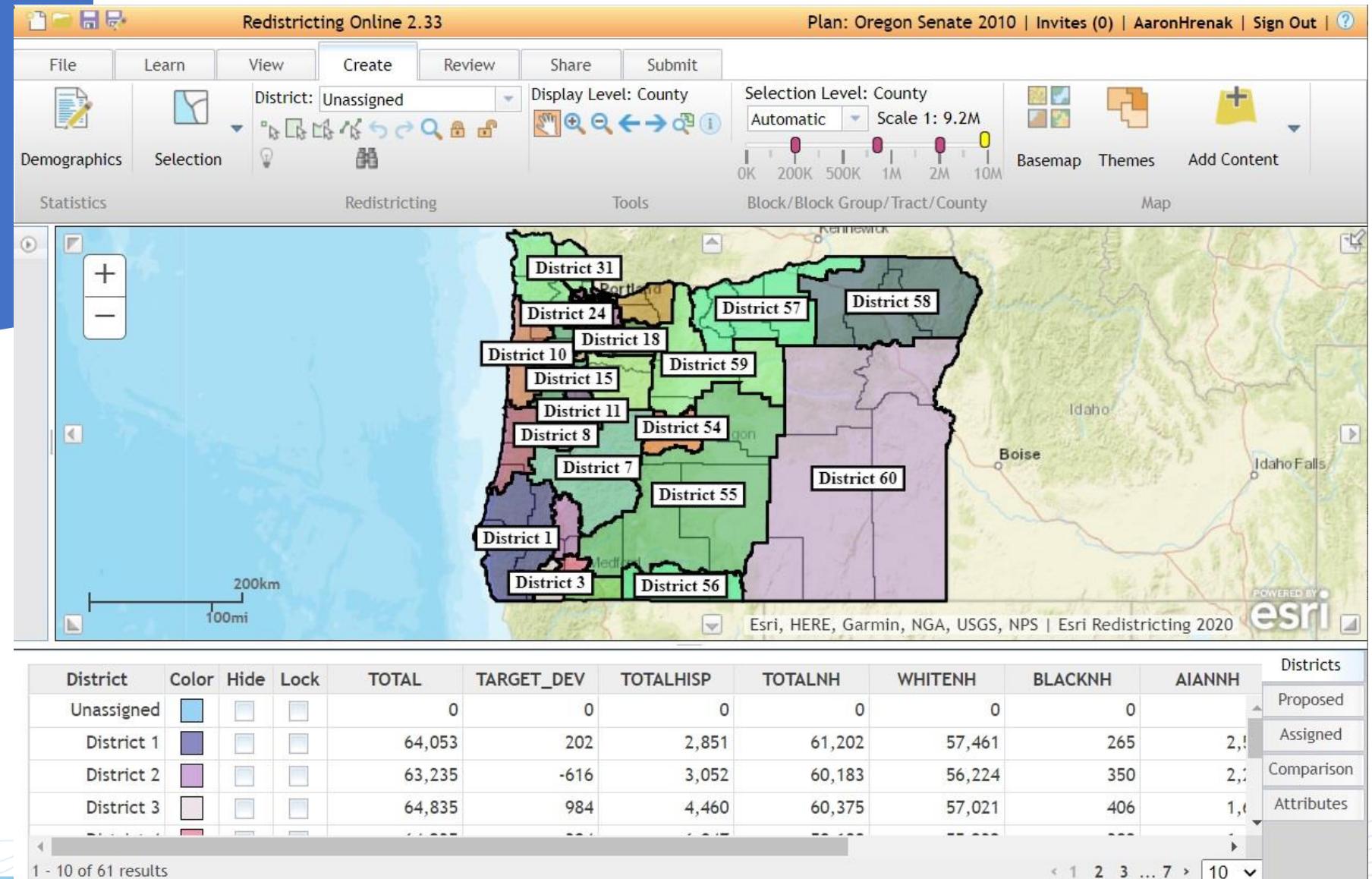
Steps for processing 2020 Census P.L. data

1. Download 2020 Census PL94-171 data from Census Bureau
2. PL data is loaded into staging database, the separate parts are joined into a singular table
3. Summarization of all relevant attributes is performed per hierarchy (block, block group, tract, county, place, voting district)
4. Summary data is joined to corresponding geography
5. Data is exported to file geodatabase for delivery to Product Team
6. Modified Edges feature class added to each state file geodatabase
7. ArcGIS Pro document created for each state
8. Map Service published for each state
9. App configuration file updated to include new service
10. Software updated to latest build
11. Regression testing performed
12. Implementation coordination with customer

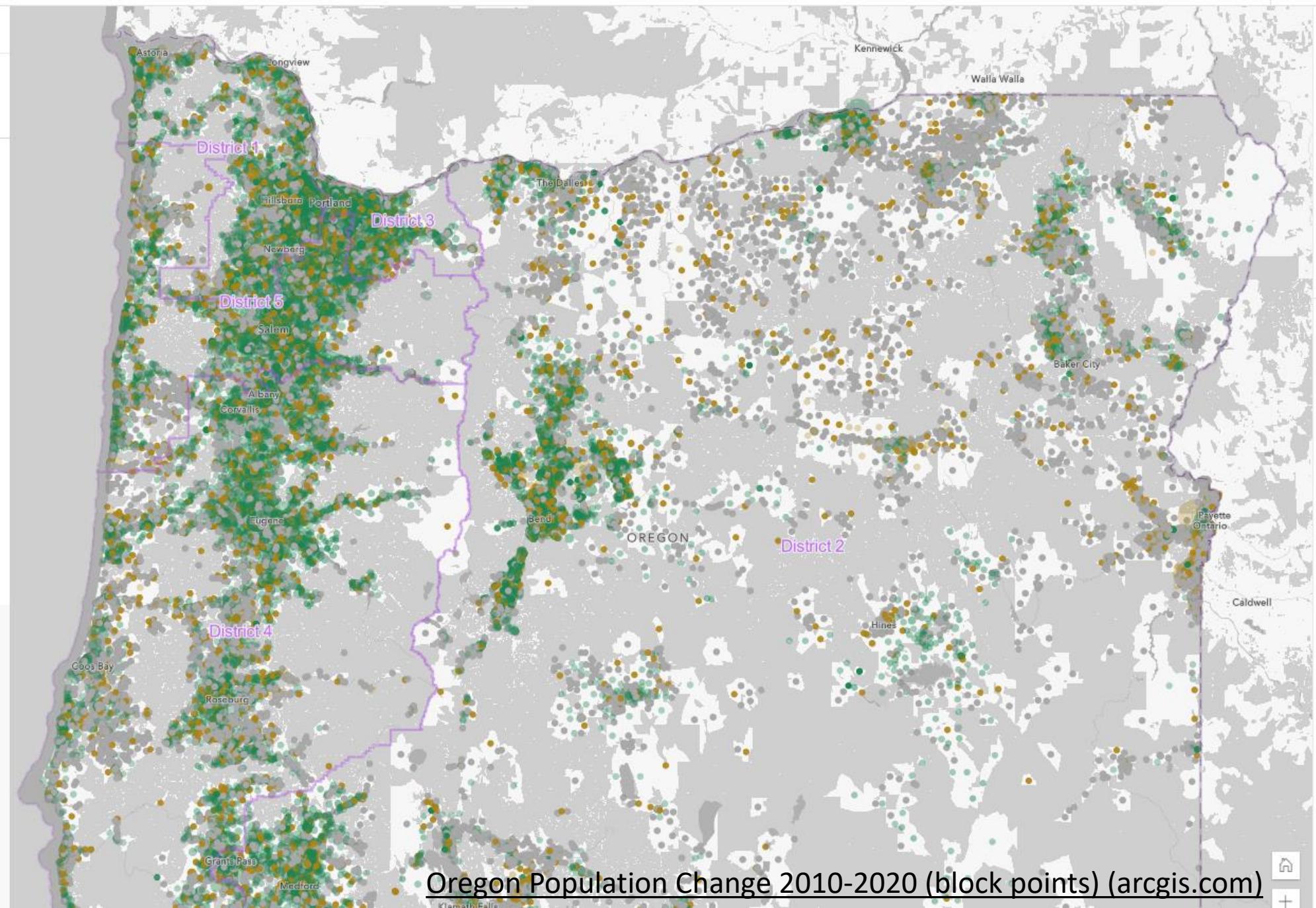
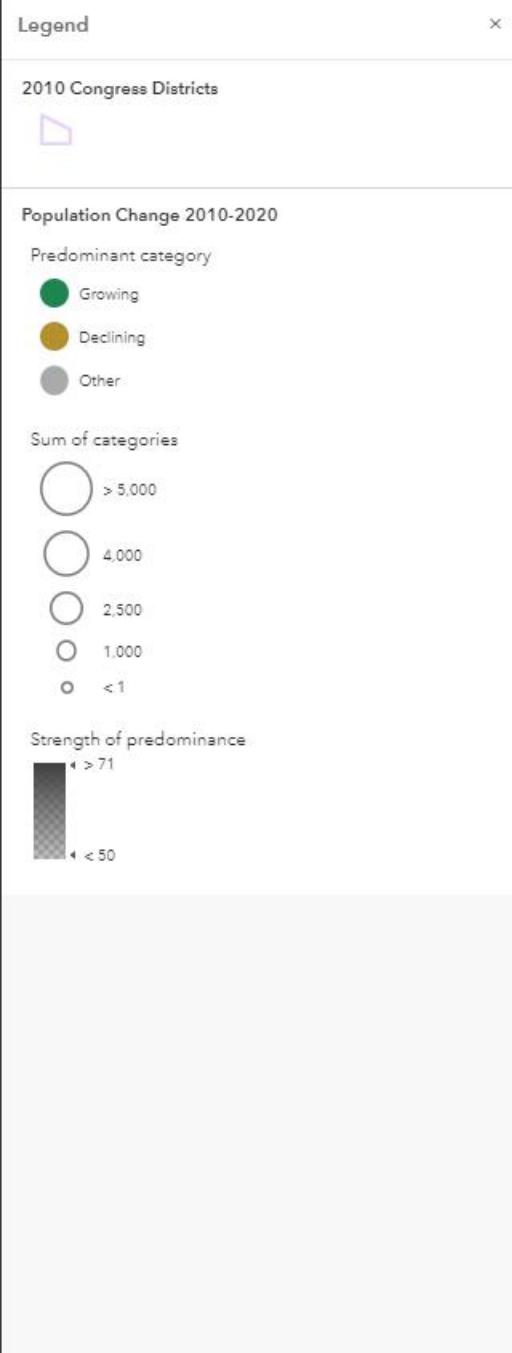
2020 Census P.L. data workflow

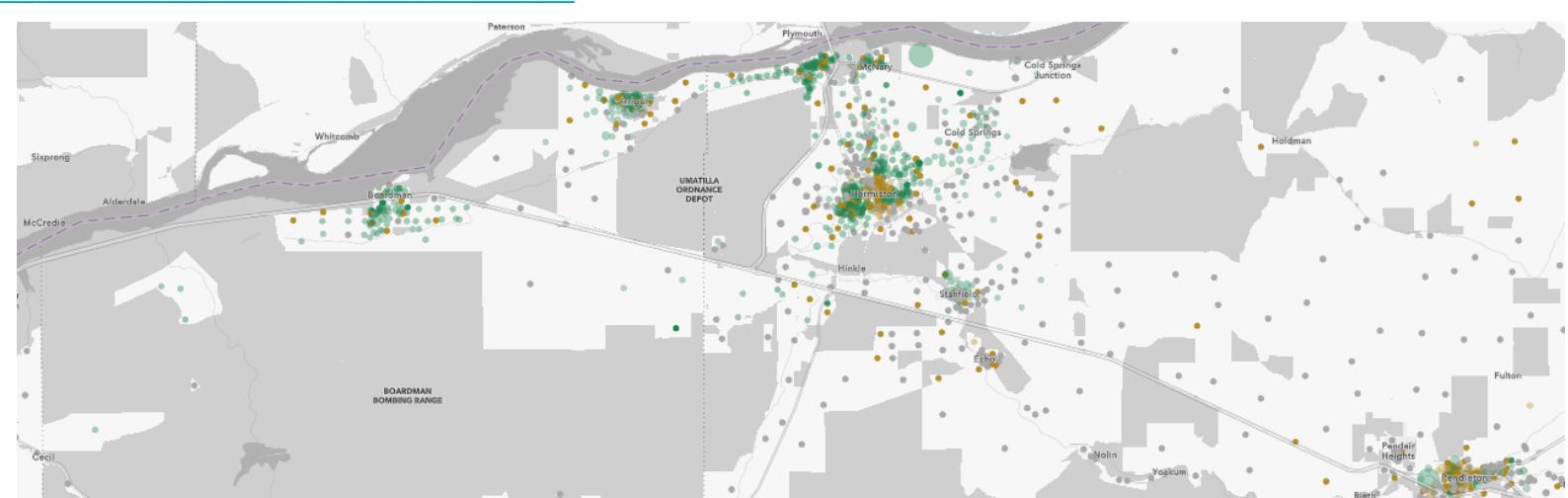
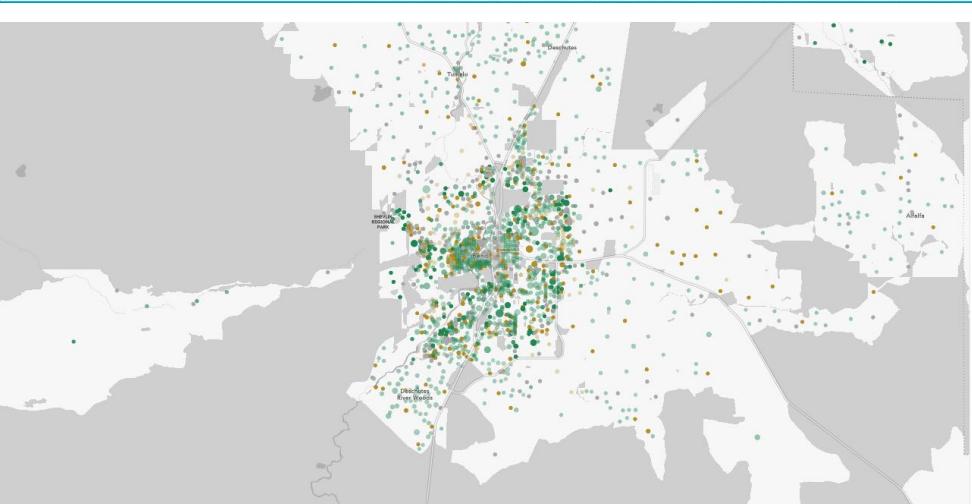
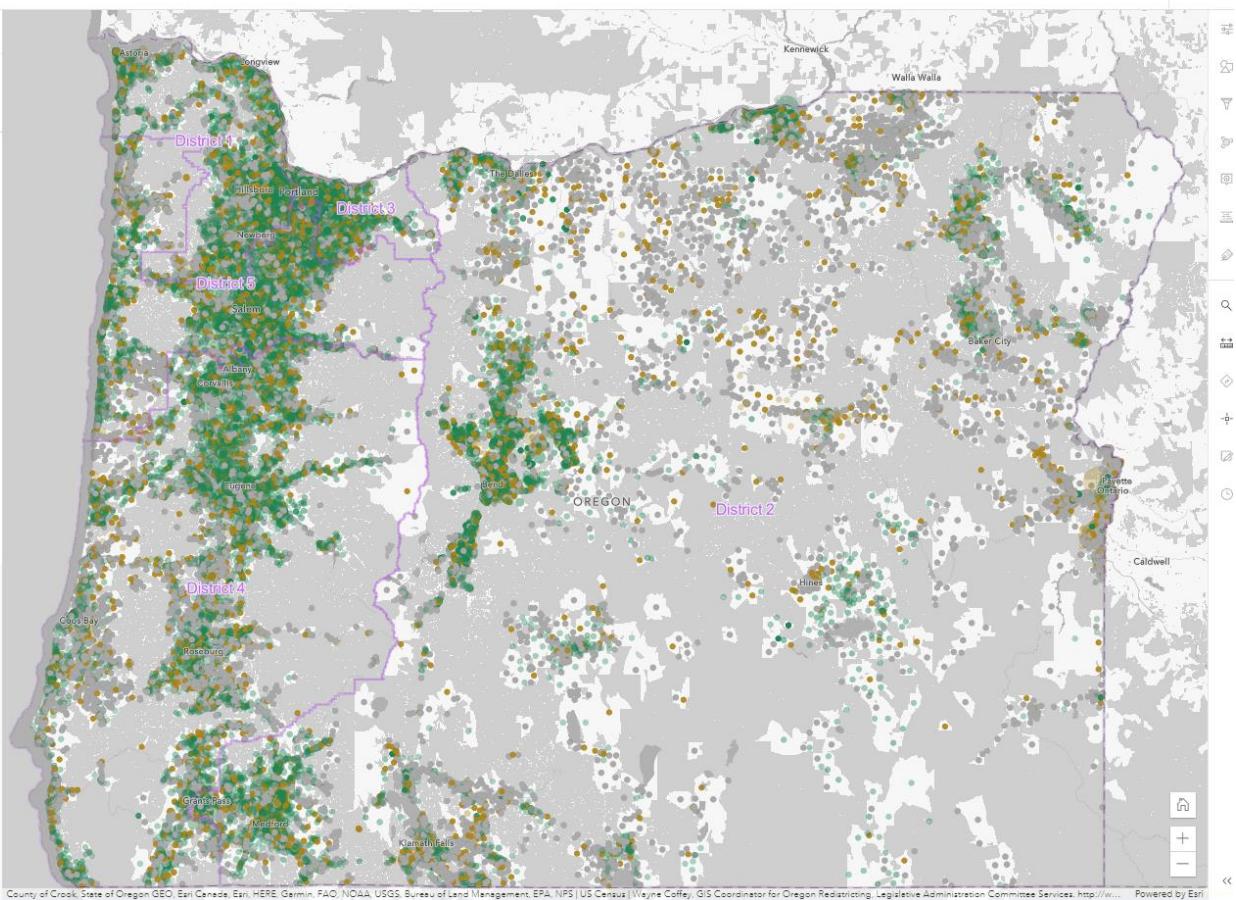
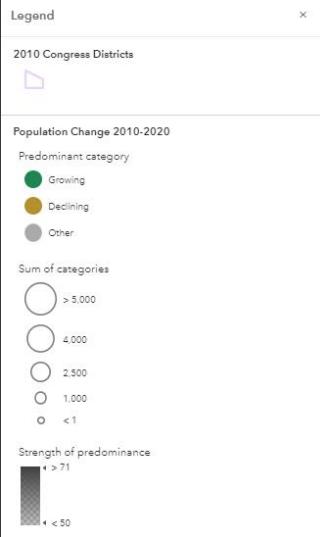


Oregon Senate Districts

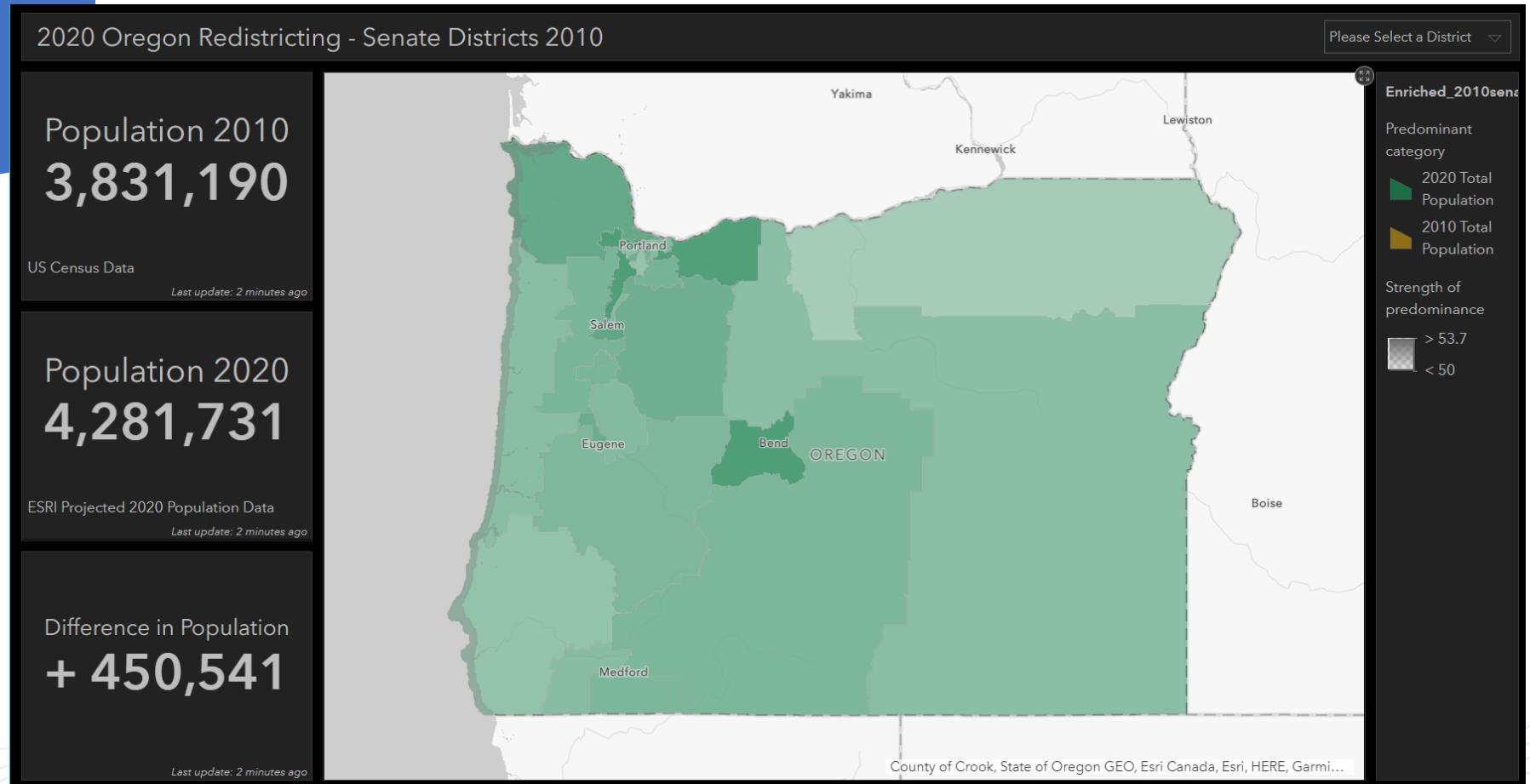


What does 2020 look like?

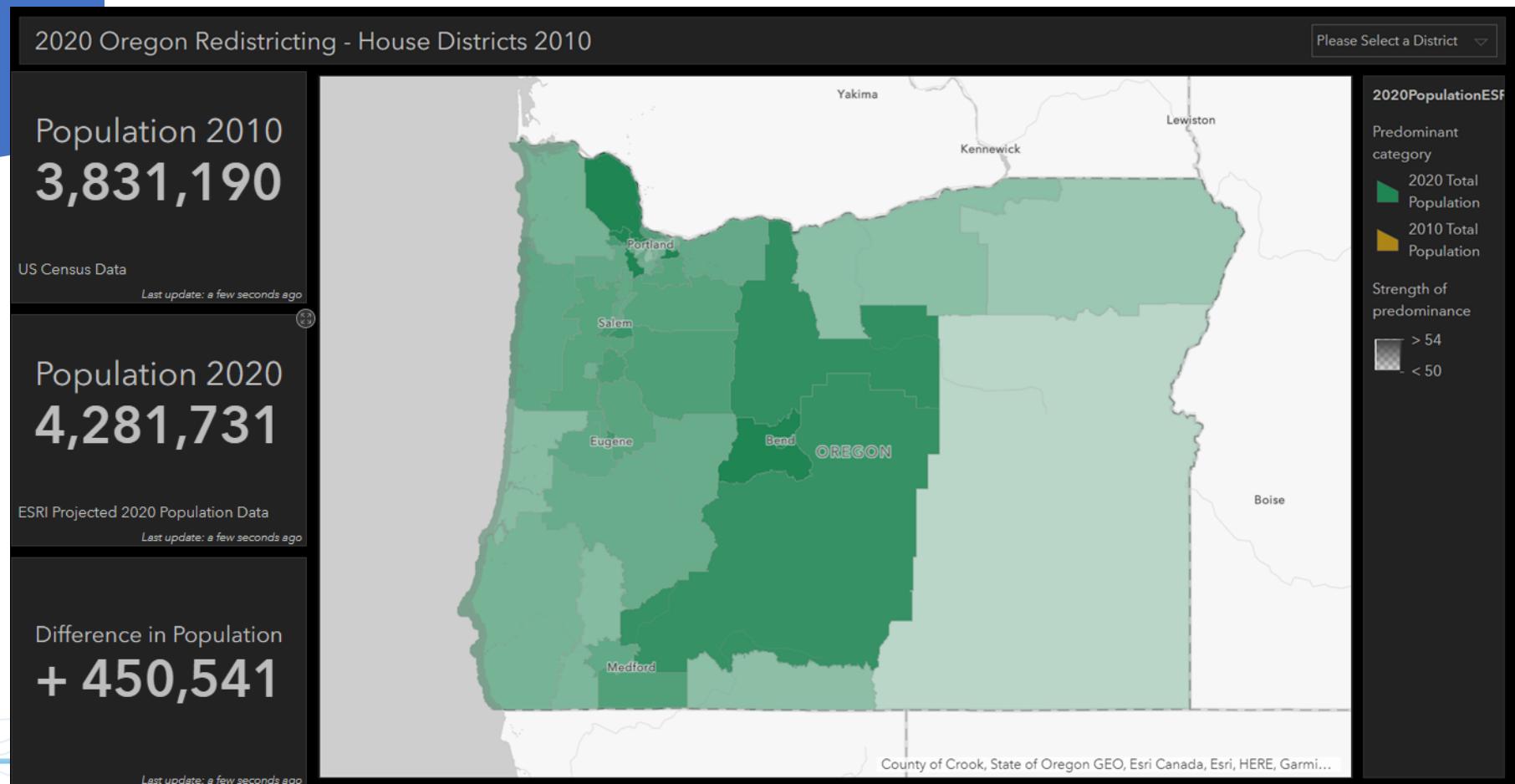




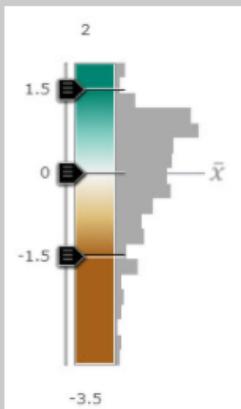
Oregon Senate Districts



Oregon House Districts

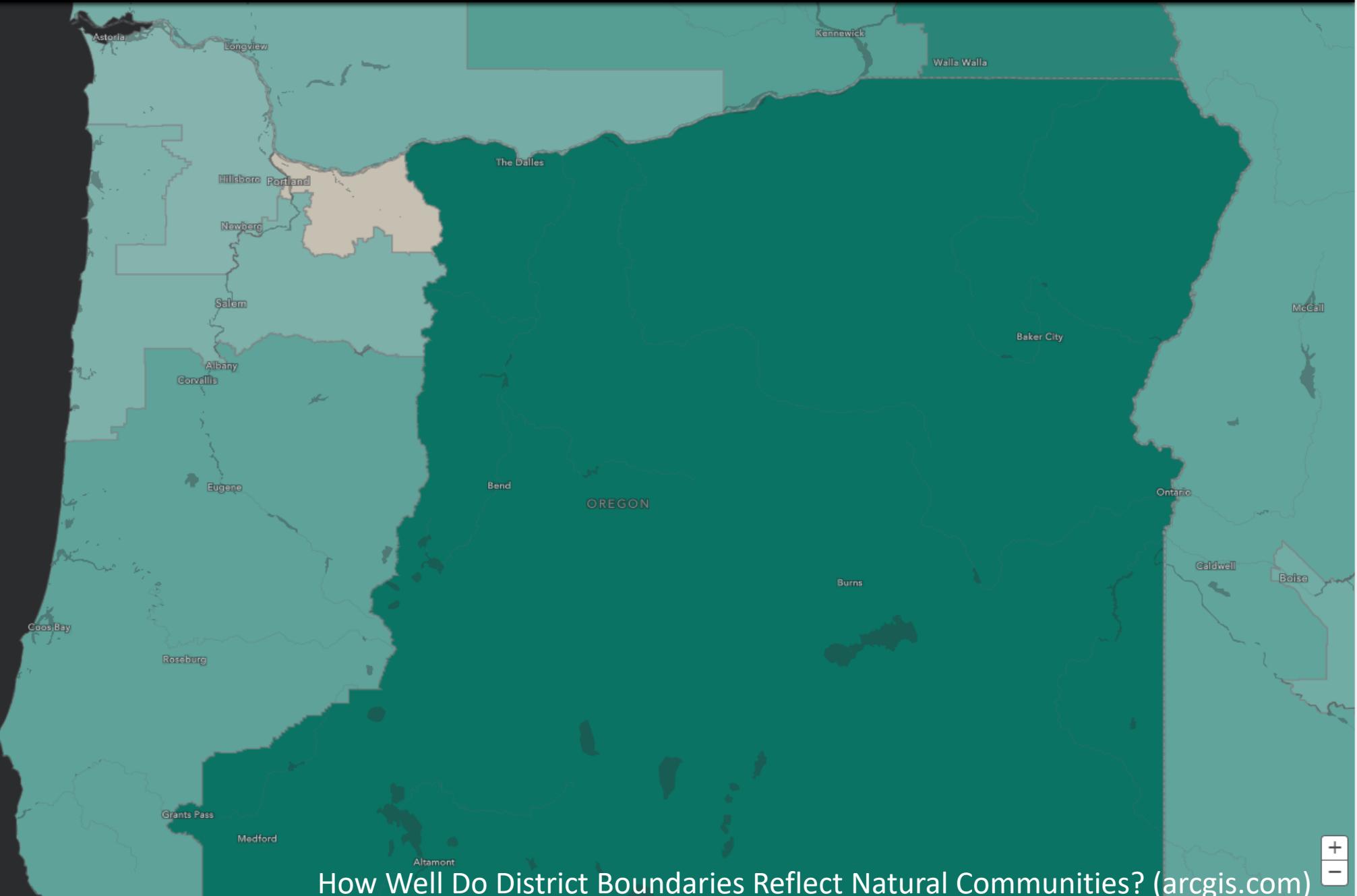


Natural Communities Score



Click on a district in the map to see the "Natural Communities" score along with all the components that went into it.

Observation: urban areas tend to be brown (indicating a low natural communities score) - perhaps urban areas are more divided by infrastructure than the non-urban areas. Infrastructure as a boundary works against a district in this index since both infrastructure variables had negative loadings.



[How Well Do District Boundaries Reflect Natural Communities? \(arcgis.com\)](http://arcgis.com)

Introductions



Richard Leadbeater, Global Manager State Government Industry Solutions

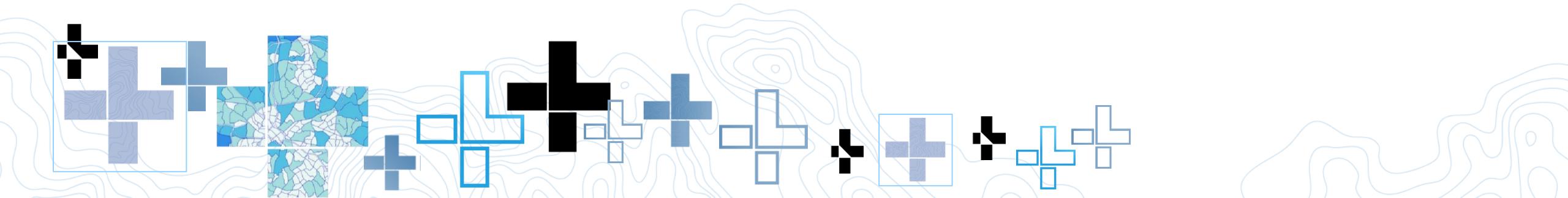
Email: rleadbeater@esri.com
Office: 909-369-4448
Twitter: [@PolicyMapper](https://twitter.com/PolicyMapper)

"My goal is to move the application of GIS and geographic analysis further, from its present use by technology professionals, into the conversations that define government policy and its operations. The data governments generate must be thought of as a resource, a valued resource, that wants exploitation. I believe that data in the 21st century is what timber, iron, and coal were to the 19th century. More importantly, this resource needs proper crafting. Today, we talk about producing and mining data, but the real value is in the creation of finished goods."

Joined Esri in 1997. Mr. Leadbeater's focus is on developing tools and solutions addressing government administrative functions with attention towards the use of GIS in support of policy development, elections, redistricting, and government administrative processes.

Before Esri, Mr. Leadbeater worked as the Geographic Information Project Manager developing and implementing GIS, CADD, and Document Imaging technologies at the Washington Suburban Sanitary Commission. The WSSC is one of the largest public Water and Wastewater Utilities in the United States.

Mr. Leadbeater received a BS in Social Science and Geographic Arts from the University of Maryland in 1983.





THE
SCIENCE
OF
WHERE

Thank you

