THE 2019 WASHINGTON STATE AGLAND DATABASE

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Lastly, we thank the county assessors, their GIS staff and the Washington State Association of County Assessors for their participation in both the Parcel and Forestland Database projects. Without the diligent work of our county assessors, their appraisers and their GIS personnel we could not have developed such a comprehensive platform to quantify and improve understanding of our State's natural resource lands. The data counties assemble and maintain is a critical resource for the State and we appreciate their willingness to share their data and knowledge.

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2 INTRODUCTION AND BACKGROUND

Agricultural land in Washington State is under threat of conversion to more developed land uses. Conversion risk is uneven and depends on factors including land and crop value, proximity to population centers, and zoning regulations. A need exists to quantify the number of parcels, owners, and acres that have recently converted, and characterize parcels by attributes that can predict future conversion risk. This report describes the development of a database of agricultural parcels in Washington State to address this need. The project parallels an ongoing effort to quantify forestland in Washington State.

In 2001, we (then the Rural Technology Initiative at the College of Forest Resources) acquired county tax records to create the first spatially explicit database of family forest parcel information. Few counties had Geographic Information Systems (GIS) at the time, requiring the use of legal descriptions for the tabular tax records to geo-locate each parcel. GIS capability has been developed in nearly every county (except Whitman) since then. In 2005, a partnership of The Family Forest Foundation and the Washington State Farm Forestry Association resulted in Federal funding to develop the first version of the Washington State Forestland Database. Five version have been developed (2007, 2009, 2010, 2012, 2019). The foundation of the Forestland Database is the Washington State Parcel Database, a normalized, spatially explicit, relational database of parcel data for Washington State. The Parcels Working Group was established with members from County, State, and Federal agencies as well as the University of Washington to guide its creation.

This project benefited from the development to the 2019 Forestland Database, which was funded by the Washington State Legislature, through a legislative proviso (ESSB 5330), directing the School of Environmental and Forest Sciences at the University of Washington to complete a trends analysis of small forest landowners and their forestland. Both the Agland and Forestland Databases first require the development of the Parcel Database. The synergistic nature of these projects allowed us to develop the Agland Database for the entire State of Washington rather than just the Puget Sound region. The existence of previous versions of the Washington State Parcel Database allowed change in agricultural lands to be analyzed.

The Washington State Agland Database is an extensive platform for analyzing the changing agricultural land base and implications for the economy, natural resources, and communities of Washington State. Development of the Database consists of five primary components: collection of county GIS parcel data and associated assessor tax rolls from Washington's 39 counties; normalization of acquired data into a single statewide parcel database; analysis and integration of physical and political features; determination of landowner class and sub class; and developing and documenting products for use by others. Combining land use estimations with environmental, economic, regulatory, ownership, and tenure information is critical to understanding behaviors of private individuals and the complex interactions between public and private objectives.

3 METHODS

The Washington State Parcel Database is a standardized, statewide dataset developed at the University of Washington in collaboration with state agencies and participants of the Parcels Working Group (Rogers and Cooke, n.d.). It was designed to support a wide range of research and analysis needs by making available a consistent, detailed, and regularly updated parcel layer. Versions were developed in 2007, 2009, 2010, and 2012, with a partial update in 2016. The Washington State Agland Database is derived from the Parcel Database and integrates ownership, crop, economic, and other attributes for all agricultural parcels in the state.

The methods used to develop the 2019 version of the Washington State Parcel and Agland Databases are described below. A more detailed description of the data normalization and processing steps is available in Rogers and Cooke (Rogers and Cooke 2007). To analyze change in agricultural landownership, we determined the first spatial version of the Agland Database for each county (generally 2007). We then identified and compared agricultural parcels at each point in time.

3.1 PARCEL DATABASE

3.1.1 Data Acquisition

We acquired parcel geometry and attribute data for 2019 from each County Assessor's Office ("County Assessor Data" n.d.). Parcel data was also obtained from the Washington State Departments of Natural Resource ("WA DNR Managed Land Parcels" n.d.; "WA Major Public Lands (Non-DNR)," n.d.), the United States Forest Service, and the United States Bureau of Land Management. Parcel sales data was acquired from each county and from the Washington State Department of Revenue.

3.1.2 Data Normalization

We normalized the data into the Washington State Parcel Database format. Data included site address, owner name, mailing address, property value, land use code, and transaction (e.g., sale, inheritance, etc.) type and date. Multiple owners, land use codes, and transactions could be associated with a parcel. Duplicate tabular data was identified and precluded from the database. Spatial data was normalized by identifying duplicate and multipart polygons.

3.1.3 Name Normalization

We analyzed the Parcel Database to identify individuals owning property across multiple counties. The Levenshtein distance measures similarity between two text strings by calculating the number of characters needed to be changed to make them equal ("Dictionary of Algorithms and Data Structures" n.d.). Owner name and address data was used to compare each pair of owners in the database. We identified a threshold distance value below which owners were likely the same.

3.1.4 Owner Classification

We classified each parcel into five owner classes: Private, Municipal, Tribal, State, and Federal. Classification was primarily based on name. However, data provider, and supplemental data were sometimes necessary to determine owner class.

3.2 AGLAND DATABASE

3.2.1 Parcel Flattening

Parcels from county, state, and federal data providers often overlap. To create a parcel layer with wall-to-wall coverage without overlap for the state, we prioritized parcels in the following order: 1) parcels from county data providers that were identified as Private; 2) parcels from state data providers; 3) county parcels that were classified as Municipal or Tribal; 4) parcels from federal data providers that were identified as Federal; 5) county parcels with any other owner classification; 6) federal parcels with any other owner classification.

3.2.2 Buffering Streams and Waterbodies

Riparian buffers are analyzed to develop the related Washington State Forestland Database. We included them in the Agland Database to quantify proportion of farmland near streams. Riparian buffers are based on the Department of Natural Resources Watercourse and Water Body Hydrography and Forest Practices Wetlands datasets ("DNR Hydrography – Watercourses– Forest Practices Regulation" n.d.; "DNR Hydrography – Water Bodies – Forest Practices Regulation" n.d.; "Wetlands – Forest Practices Regulation" n.d.). Buffer rules for streams are determined by fish habitat suitability, presence/absence of water year-round, soil productivity, and other factors (WAC 222-16-031). Wetland buffers are determined by wetland size and classification (WAC 222-16-035). We modeled these rules to create a statewide riparian buffer layer consisting of core, inner, outer, and wetland zones. Area not in a management zone was considered upland.

3.2.3 Identifying Agland Parcels

The flattened parcel layer was intersected with several datasets to summarize parcel attributes. First, agricultural activity was estimated for each parcel using the 2018 Washington Cropland Data Layer (WSDA Cropland) ("Agricultural Land Use" n.d.). We then used two criteria to identify parcels for the Agland Database: 1) parcels with a land use code of 81, 82, or 83; or 2) parcels with at least 1 acre of agricultural area based on the WSDA Cropland layer.

3.2.4 Attributing Agland Parcels

Parcels were intersected with spatial layers to summarize agricultural, jurisdictional, and economic attributes. First, we calculated total acres and farmed acres (by land use code or WSDA Cropland layer) acres. From the WSDA Cropland layer we summarized acres by crop group and irrigation type. We also summarized crop group using the 2018 National Agricultural Statistics Service Cropland layer (NASS Cropland) ("Washington Cropland Data Layer" n.d.). Using the stream buffer layer described above we calculated acres by riparian zone. We also calculated stream length by stream type (Fish, Non-fish, Shoreline, and Not Typed) and acres of wetland and open water for each parcel. Road length on each parcel was determined using a custom road layer developed from the Washington State Department of Natural Resources Transportation layer ("DNR Proprietary Roads (Statewide)" n.d.) and National Forest Systems Roads layer (("National Forest System Roads" n.d.)). Finally, we determined location attributes including county, Water Resource Inventory Area (WRIA), Watershed Administrative Unit (WAU), congressional district, and legislative district ("WA County Boundaries" n.d.; "Water Resource Inventory Areas for Washington State" n.d.; "Watershed Administrative Units – Forest Practices Regulation" n.d.).

Next, we calculated proximity metrics for each parcel in the Agland Database. Proximity was defined as the Euclidean distance from parcel centroid to closest point for the layer of interest. Attributes included distance to developed parcels (land use code < 70), urban growth area, public road, any road, and Forest Service land.

3.2.5 Market Value and Taxable Value

Total and per acre value for each parcel was determined from county assessor data. Market value based on highest and best use was summarized for land and improvements, and taxable value was summarized for land. The per acre differential between the market and taxable value of the land was also calculated.

3.2.6 Sales and Inheritance

We identified the most recent sale and inheritance transactions for each parcel. Sales data from county assessors and from the Department of Revenue were used to determine these attributes ("Real Estate Excise Tax Affidavit Dataset (Unpublished)" n.d.).

3.2.7 Linking 2007 and 2019 Agland Parcels

To analyze change between the 2007 and 2019 versions of the Agland Database we unioned the parcel layers. Differences in parcel boundaries were due to both real-world changes (land use conversion, segregations, and aggregations) and data fixes (boundary adjustments). The proportion of area overlap was calculated for each parcel in each time period. A threshold value of 30% was identified to determine parcels that converted out of or into the 2019 Agland Database since 2007.

4 RESULTS

Results for the analysis are provided in a set of tables, figures, and maps below. Map 1 provides a geographic overview of agricultural lands in Washington state in 2019. The remaining outputs summarize the number of parcels, owners, and acres by county. Whitman county is in the process of developing a GIS system and parcel layer but is not included in the analysis.

Several types of acres are reported in the results. Parcel Acres refers to the total acreage for a parcel. Farmed Acres is defined as either the total parcel acres if the parcel land use code is 81, 82, or 83; or the acres of field or orchard as identified by the WSDA Cropland layer. Other acreage summaries that are derived from WSDA data, such as crop group or irrigation type, refer only to area identified by the WSDA Cropland layer.

Results describing the state of agricultural land in 2019 is reported first. Changes between 2007 and 2018 are then provided. Differences in the analysis methods are described at the beginning of each section.

4.1 AGLAND IN 2019

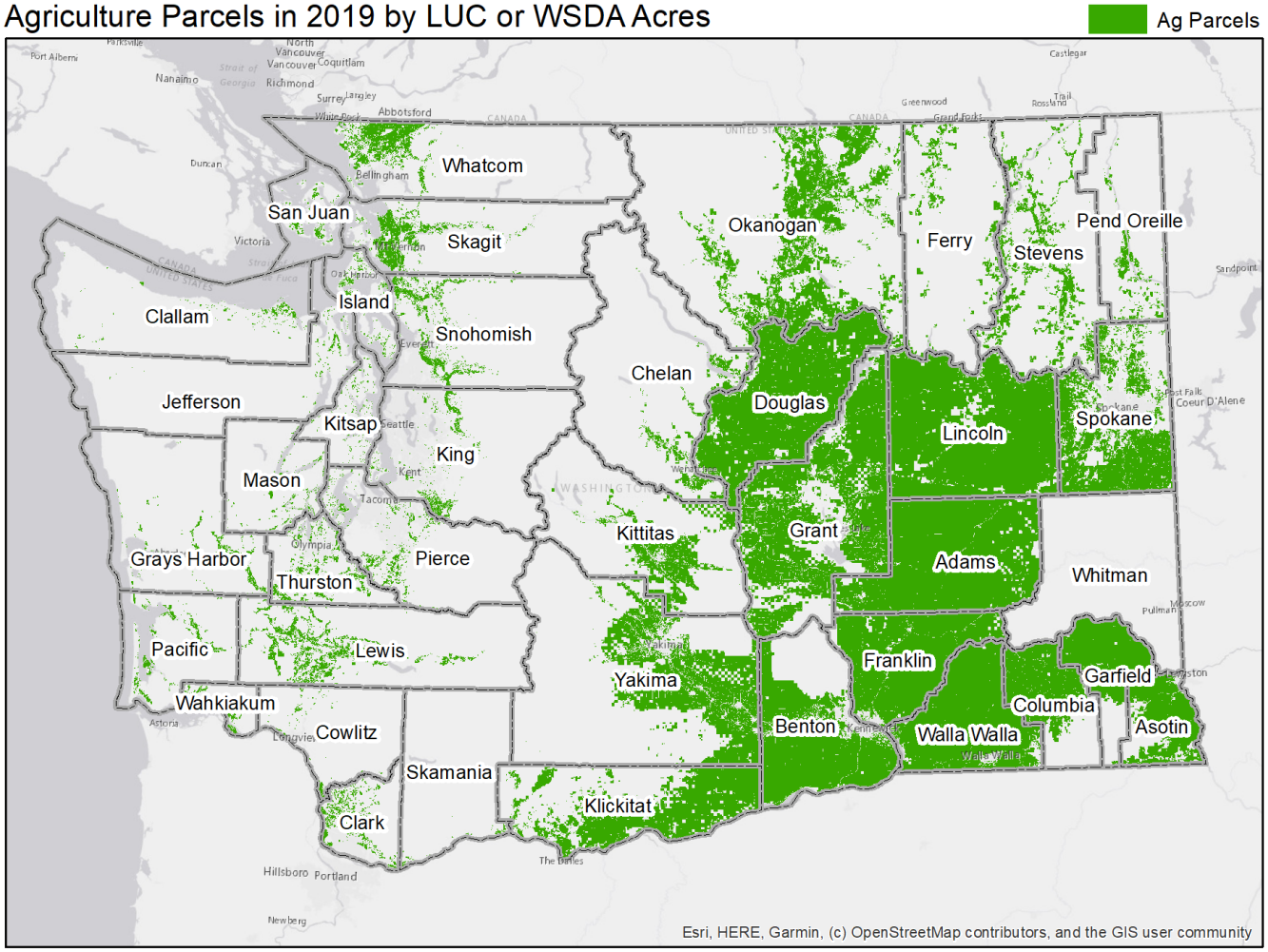
Results from the 2019 Agland Database include all parcels that qualify as agriculture by either land use code or the WSDA Cropland layer. There are 193,000 agricultural parcels covering 12.4 million acres in Washington State in 2019. The total acreage of fields and orchards is 6.7 million acres. The number of unique owners across the state is approximately 92,000 (note, because the same person can own parcels in multiple counties, this number is slightly different when summarized by county first and then summed to a total value for the state). Additional summary values are provided in Table 1.

The largest number of owners are in Yakima, Spokane, and Grant counties, while the most acres occur in Lincoln, Grant, Adams, and Douglas counties (Figure 1). A large number of acres in these counties are held by people owning more than 1000 acres. The exception is Spokane county, where most area is owned by people with 100 to 1000 acres (Figure 2). The market value per acre of most acres in Lincoln, Grant, Adams, and Douglas counties are between $100 and $1000, while most acres in Spokane county are valued at greater than $1000 per acre (Figure 5).

In Western Washington, a relatively large number of owners are located in Snohomish and Whatcom counties. Lewis, Whatcom, Skagit, and Snohomish counties have at least 85,000 parcel acres (Figure 1). Farmland in Western Washington is predominantly held by owners with less than 1000 acres (Figure 2). Most acres in Western Washington have a market value of greater than $1000 per acre (Figure 5).

The number of agricultural parcels sold per year is reported in Figure 7. An increasing trend in sales can be identified in numerous counties. The number of inherited parcels is presented in Figure 8. Additional results are provided in Figure 3, Figure 4, Figure 6, and Figure 9.

Map 2 shows the difference between the market value per acre and taxable value per acre of the land (Tax Benefit) for each parcel. High Tax Benefit values exist near cities including Seattle, Everett, Tacoma, Tri-Cities, Walla Walla, Spokane, and Portland. These values are indicative of development pressure and can be compared to the change maps in Appendix A to see where parcels converted from agricultural land use.



Map 1. Agricultural parcels in Washington state in 2019.

Table 1. Summary statistics for parcels in the 2019 Washington State Agland Database by county.

COUNTY	NUM PARCELS	TOTAL PARCEL ACRES	AVG PARCEL ACRES	AVG TRACT ACRES	AVG NAME ACRES	TOTAL FARMED ACRES	AVG FARMED ACRES	AVG PERCENT FARMED	NUM OWNERS	COUNTY ACRES	PERCENT AG COUNTY
Adams	5,981	1,171,191	195.8	1,212.7	12,150	838,977	140.3	66%	1,848	1,234,956	95%
Asotin	2,597	292,666	112.7	1,974.7	13,661	82,916	31.9	26%	364	409,784	71%
Benton	7,866	723,209	91.9	1,317.6	14,887	472,315	60.0	57%	3,875	1,126,088	64%
Chelan	4,419	95,649	21.6	82.2	5,340	28,148	6.4	48%	2,422	1,917,082	5%
Clallam	1,845	17,327	9.4	37.5	1,396	6,432	3.5	45%	937	1,713,465	1%
Clark	3,065	57,021	18.6	47.6	3,776	28,229	9.2	55%	2,349	419,653	14%
Columbia	2,701	339,027	125.5	561.1	27,349	197,166	73.0	51%	646	559,055	61%
Cowlitz	713	13,808	19.4	56.3	3,843	7,318	10.3	53%	352	746,424	2%
Douglas	8,429	1,077,830	127.9	716.4	23,711	542,931	64.4	50%	2,155	1,183,509	91%
Ferry	1,106	96,230	87.0	742.3	30,824	11,240	10.2	19%	467	1,446,124	7%
Franklin	5,933	728,976	122.9	840.5	15,675	468,666	79.0	58%	2,482	809,505	90%
Garfield	2,089	347,230	166.2	1,287.9	11,910	206,937	99.1	53%	538	459,648	76%
Grant	13,445	1,233,471	91.7	300.6	20,029	781,800	58.1	60%	6,271	1,786,491	69%
Grays Harbor	1,533	41,793	27.3	55.0	14,218	19,228	12.5	52%	891	1,434,123	3%
Island	1,669	22,043	13.2	36.5	2,526	11,915	7.1	52%	1,104	332,541	7%
Jefferson	607	10,684	17.6	35.2	9,410	3,658	6.0	42%	374	1,399,940	1%
King	4,256	52,322	12.3	25.7	3,617	29,593	7.0	57%	2,971	1,476,846	4%
Kitsap	1,973	13,054	6.6	10.8	13,291	4,559	2.3	46%	1,573	362,188	4%
Kittitas	7,495	265,571	35.4	199.5	6,237	91,255	12.2	54%	3,354	1,493,007	18%
Klickitat	4,366	588,913	134.9	1,015.7	8,466	190,671	43.7	38%	1,655	1,218,813	48%
Lewis	7,145	140,783	19.7	56.8	1,407	65,080	9.1	53%	4,162	1,558,495	9%
Lincoln	8,826	1,368,272	155.0	662.1	12,621	823,639	93.3	45%	3,862	1,497,524	91%
Mason	1,943	21,374	11.0	37.6	3,456	9,300	4.8	48%	1,300	672,676	3%
Okanogan	16,328	752,760	46.1	677.5	10,910	102,615	6.3	23%	4,993	3,403,643	22%
Pacific	1,424	32,879	23.1	84.1	6,464	10,626	7.5	48%	670	787,549	4%
Pend Oreille	1,013	57,004	56.3	135.3	2,745	21,713	21.4	44%	567	913,388	6%
Pierce	3,628	52,201	14.4	29.2	2,214	21,428	5.9	47%	2,417	1,155,414	5%
San Juan	926	20,851	22.5	46.6	4,281	9,061	9.8	46%	632	398,352	5%
Skagit	6,207	106,318	17.1	62.9	5,201	66,486	10.7	54%	2,674	1,227,539	9%
Skamania	290	6,550	22.6	36.9	19,126	2,617	9.0	46%	201	1,079,342	1%
Snohomish	5,848	85,932	14.7	47.6	3,520	46,072	7.9	54%	6,440	1,405,964	6%
Spokane	13,885	607,548	43.8	138.5	7,106	351,744	25.3	54%	8,827	1,139,823	53%
Stevens	5,397	254,301	47.1	240.1	6,272	98,605	18.3	45%	2,925	1,627,270	16%
Thurston	3,409	66,954	19.6	55.5	6,328	26,745	7.8	47%	2,225	495,362	14%
Wahkiakum	717	16,731	23.3	95.3	3,501	7,906	11.0	56%	427	183,144	9%
Walla Walla	6,919	767,828	111.0	934.1	8,842	570,912	82.5	63%	2,552	831,169	92%
Whatcom	7,270	132,662	18.2	46.4	6,783	72,610	10.0	43%	5,432	1,605,332	8%
Yakima	20,214	728,402	36.0	207.9	10,634	355,963	17.6	55%	9,828	2,758,697	26%
Total	193,477	12,407,367	56.3	372.4	9,572	6,687,076	28.8	49%	96,762	44,269,923	29%

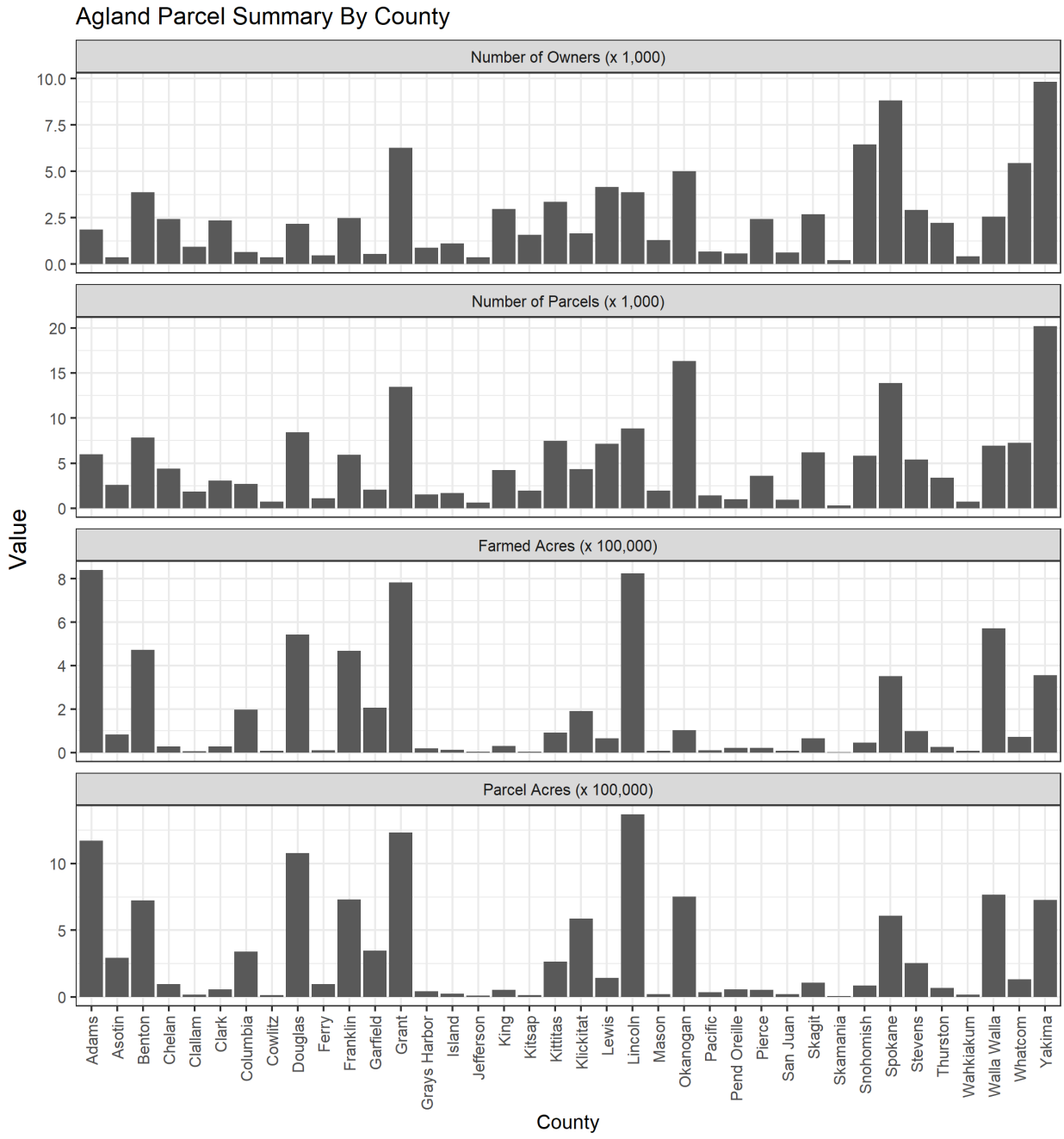


Figure 1. Summary of owners, parcels, and acres included in the 2019 Agland Database by county. Parcel Acres summarizes the total parcel acreage. Farmed Acres summarizes acres that from the WSDA CropLand database.

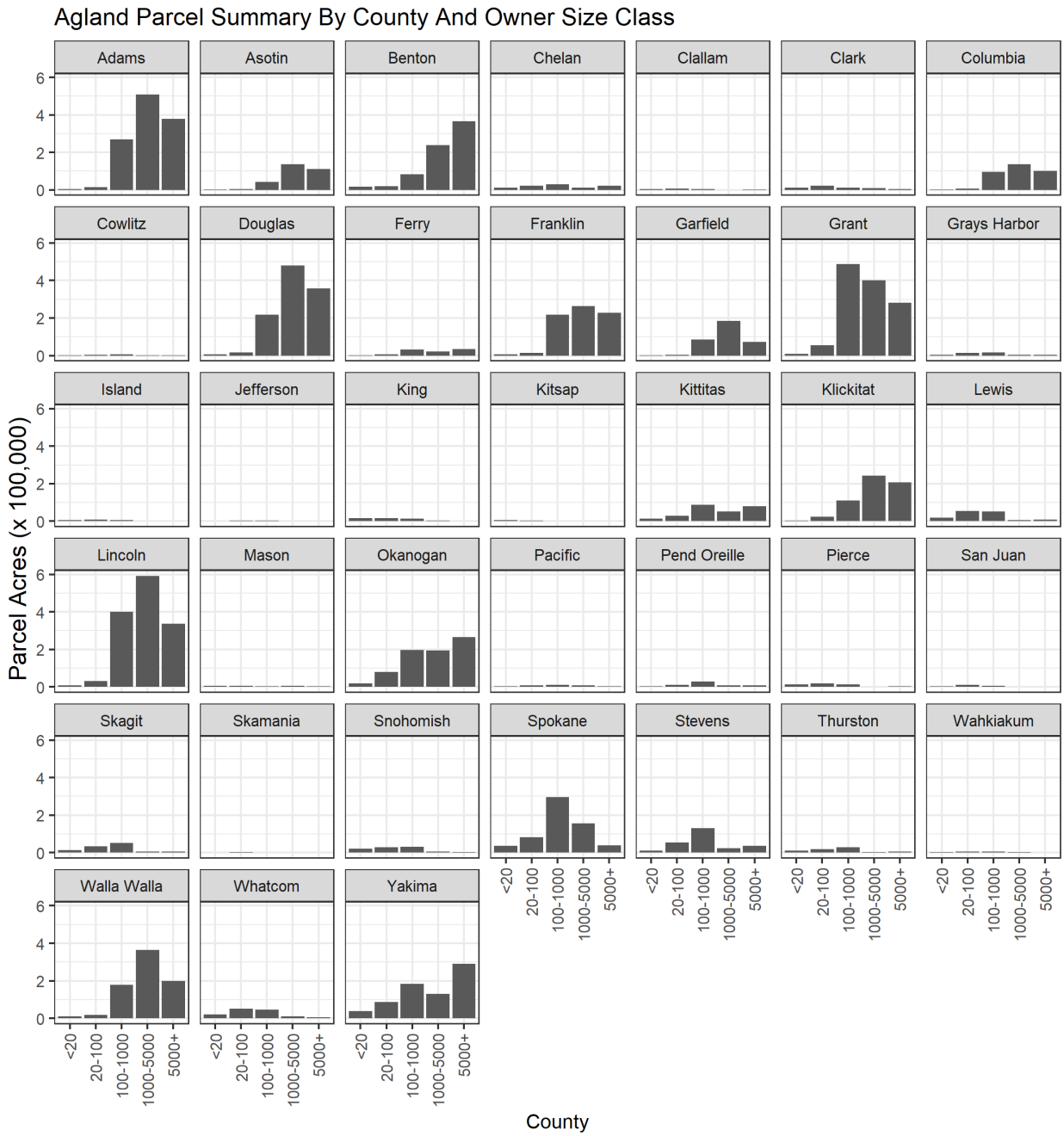


Figure 2. 2019 Agland parcel acres by county and owner size class.

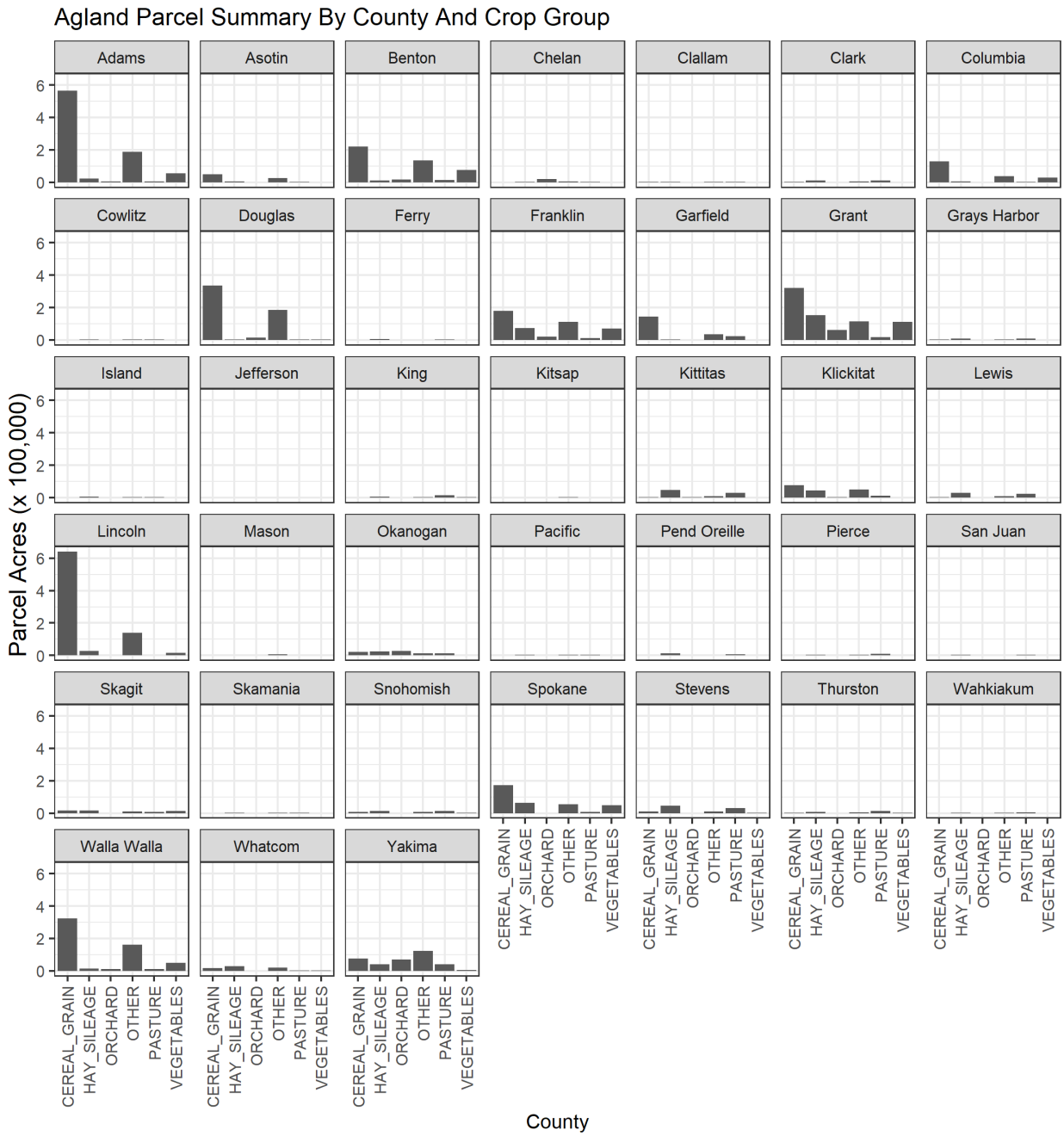


Figure 3. 2019 Agland parcel acres by county and WSDA crop group.

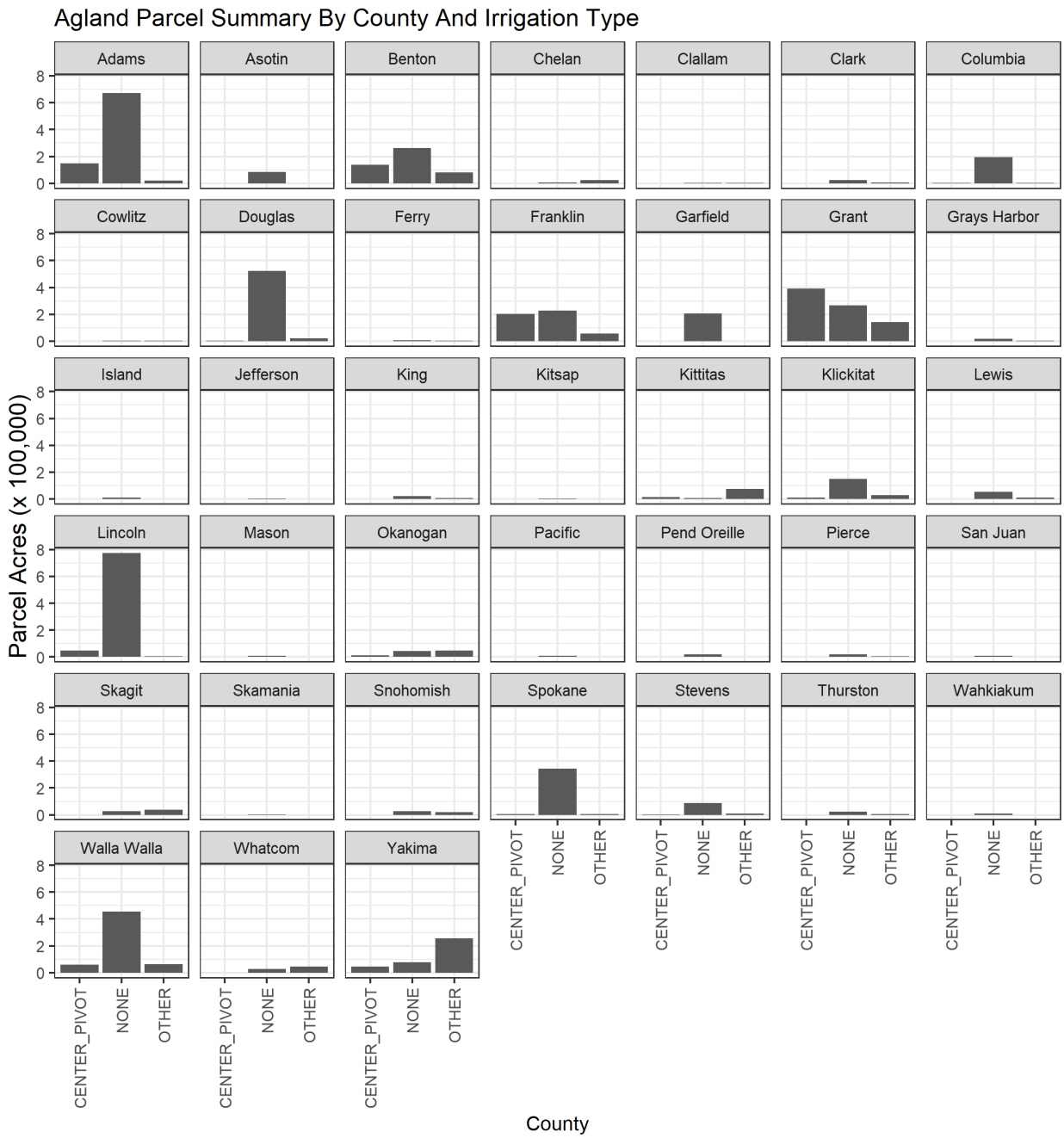


Figure 4. 2019 Agland parcel acres by county and WSDA irrigation type.

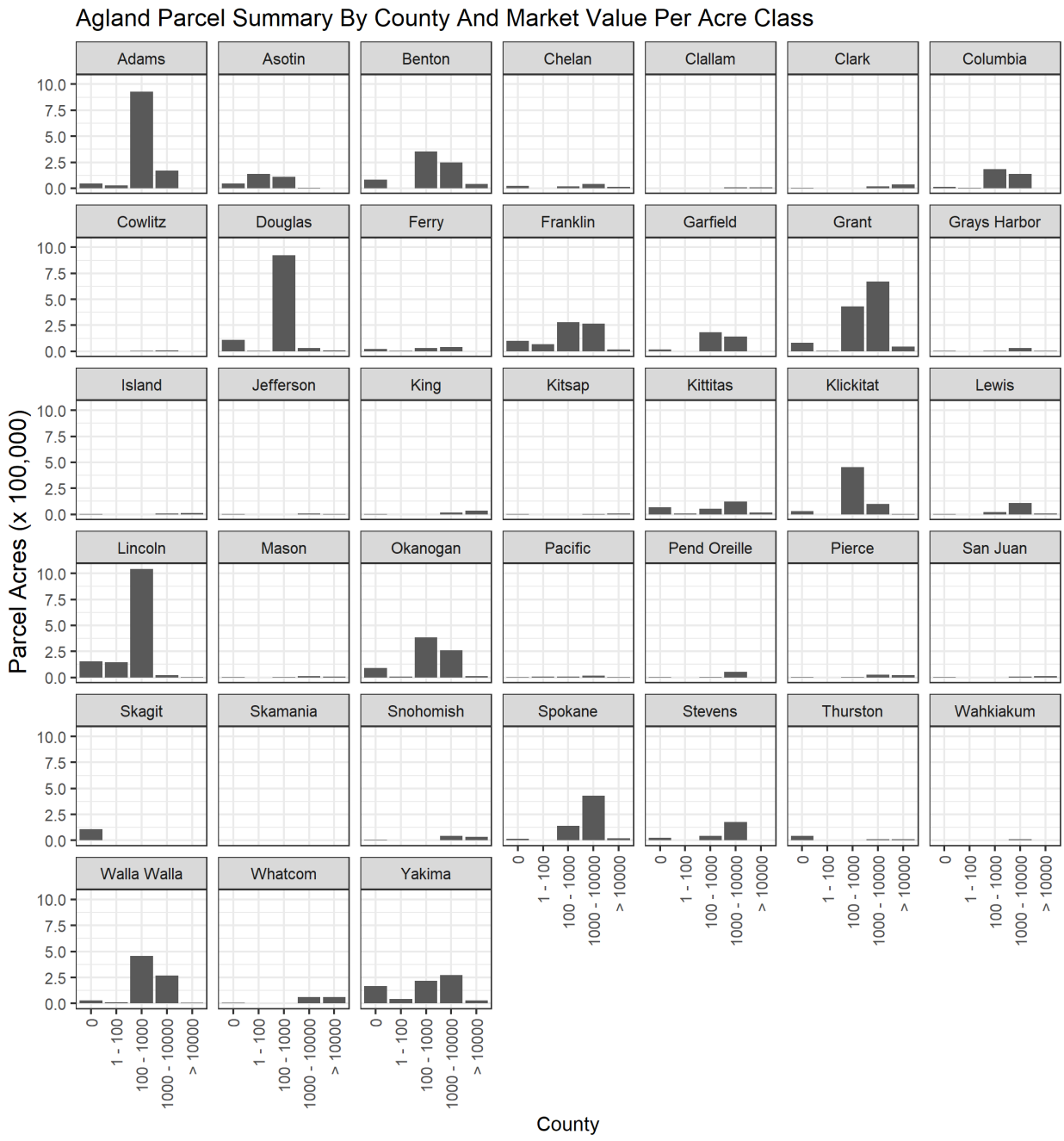


Figure 5. 2019 Agland parcel acres by county and market value ($ per acre) class.

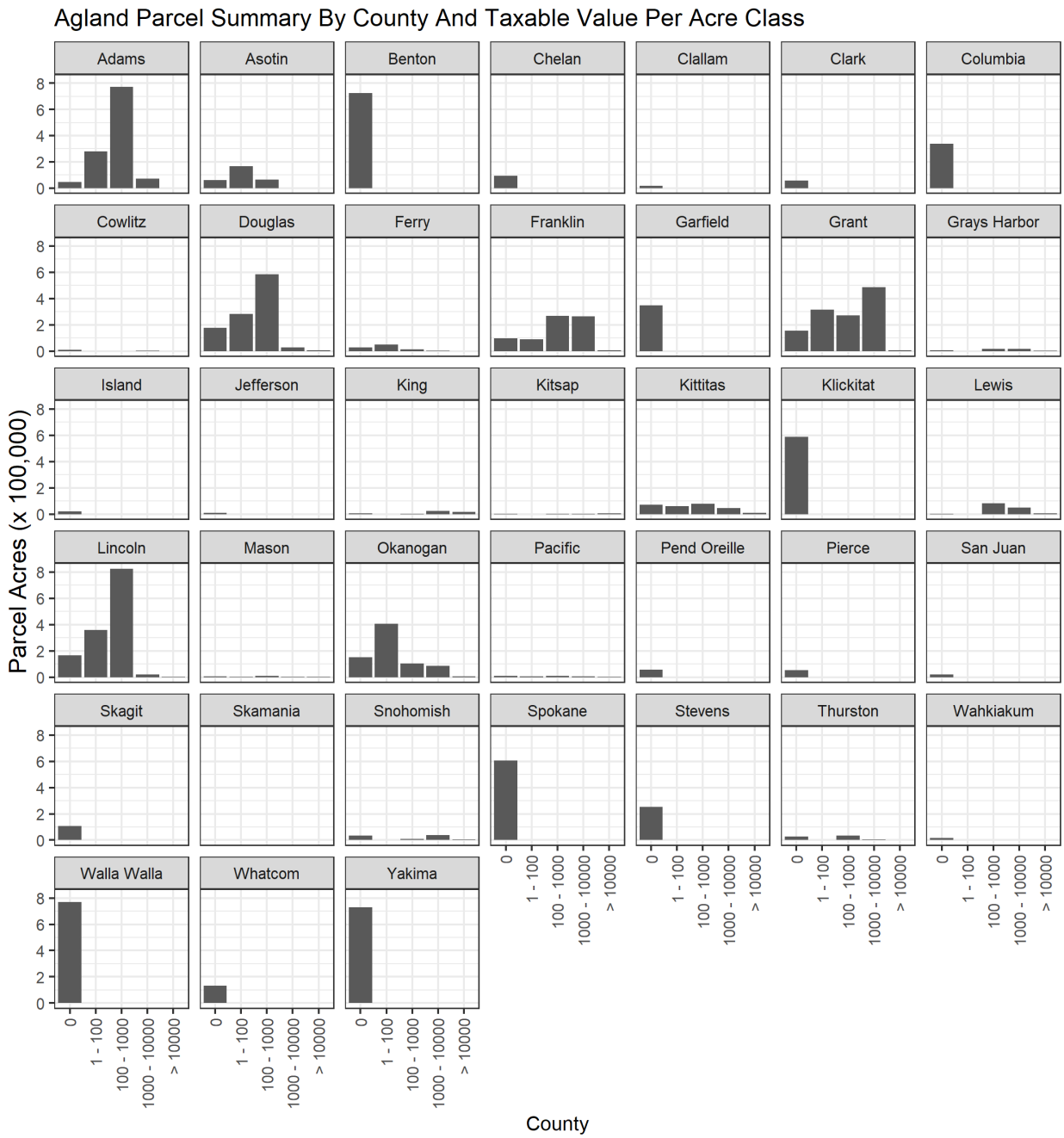


Figure 6. 2019 Agland parcel acres by county and taxable value ($ per acre) class.

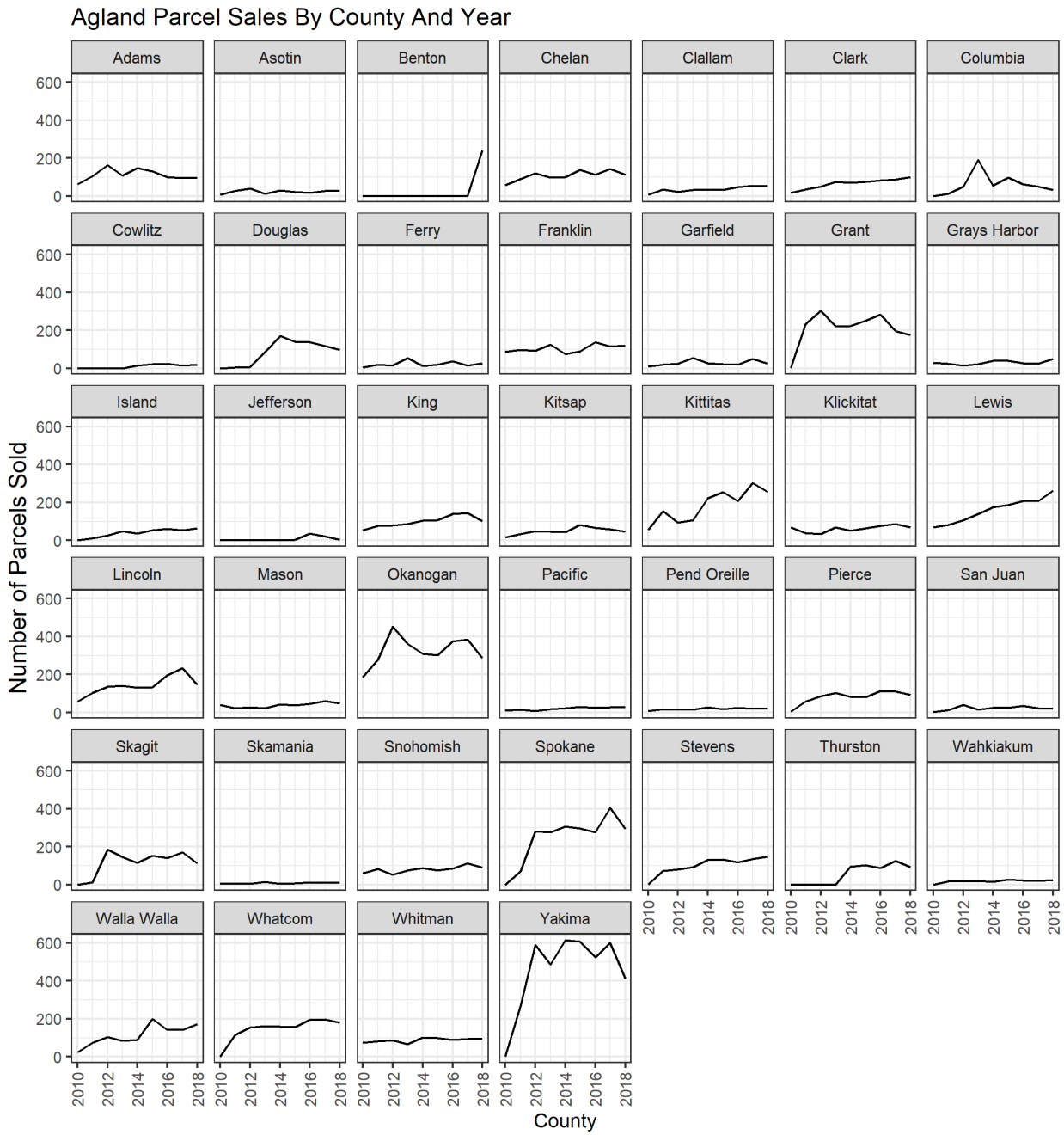


Figure 7. 2019 Agland parcel sales by county and year.

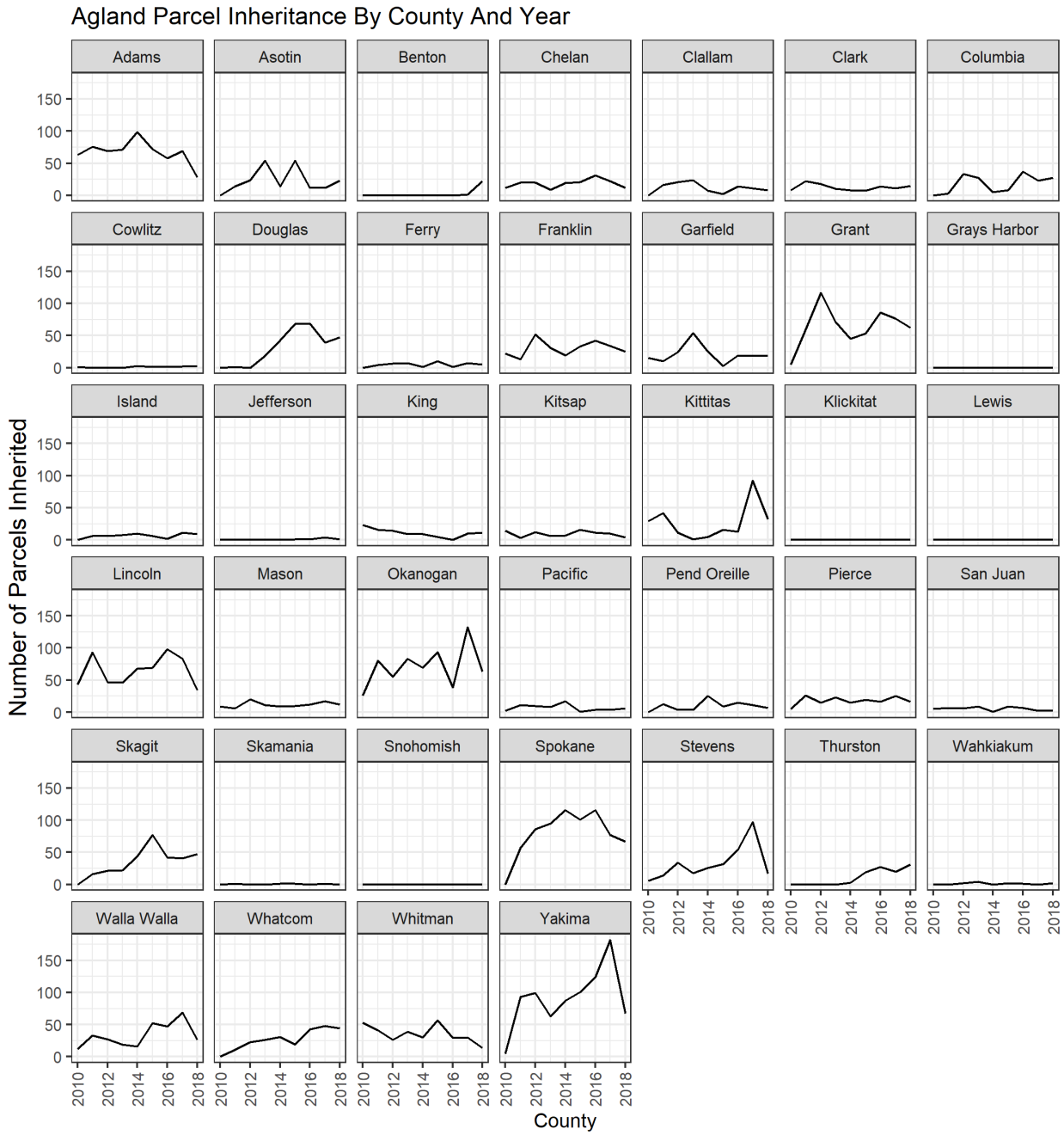


Figure 8. 2019 Agland parcel inheritance by county and year.

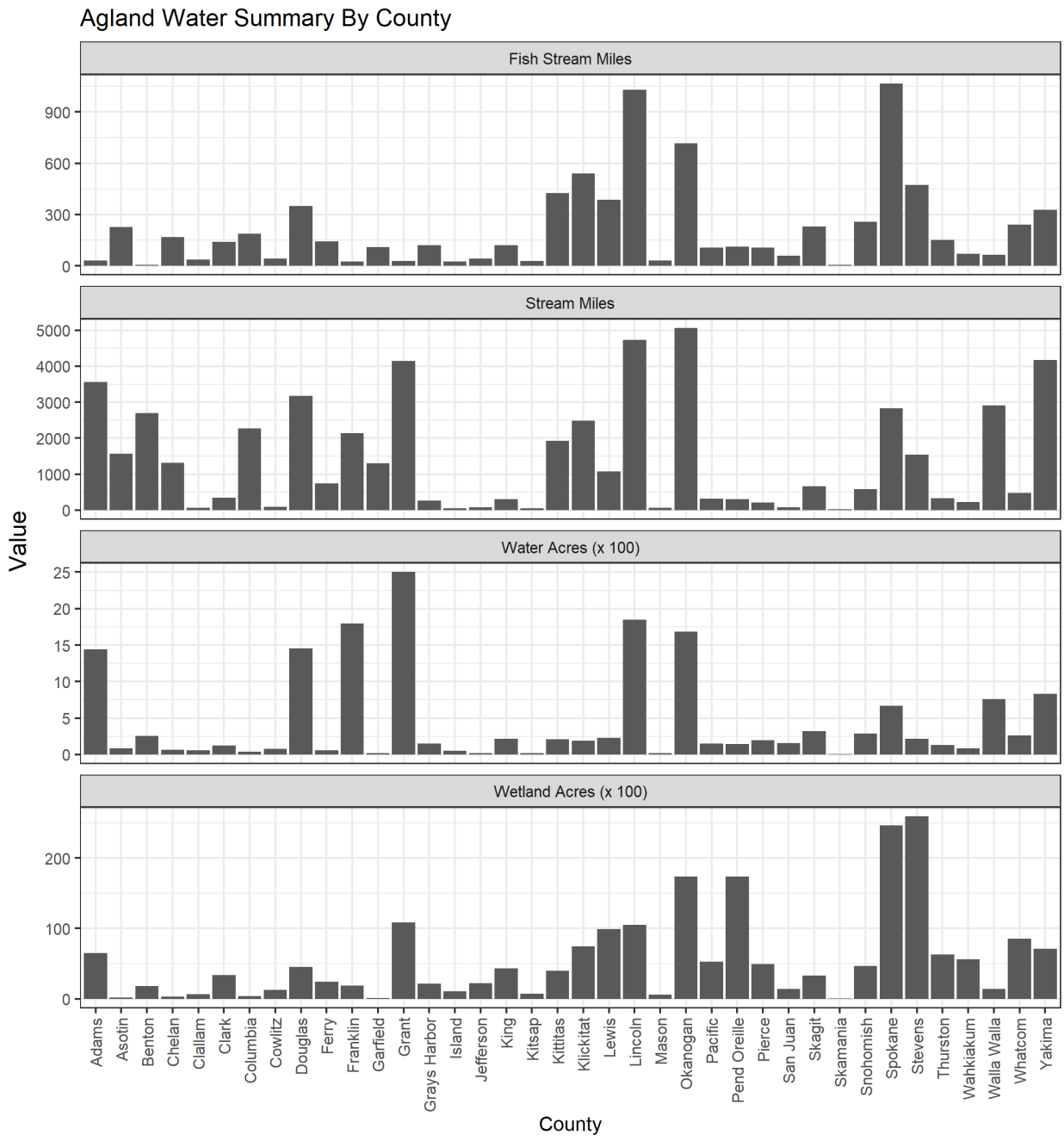
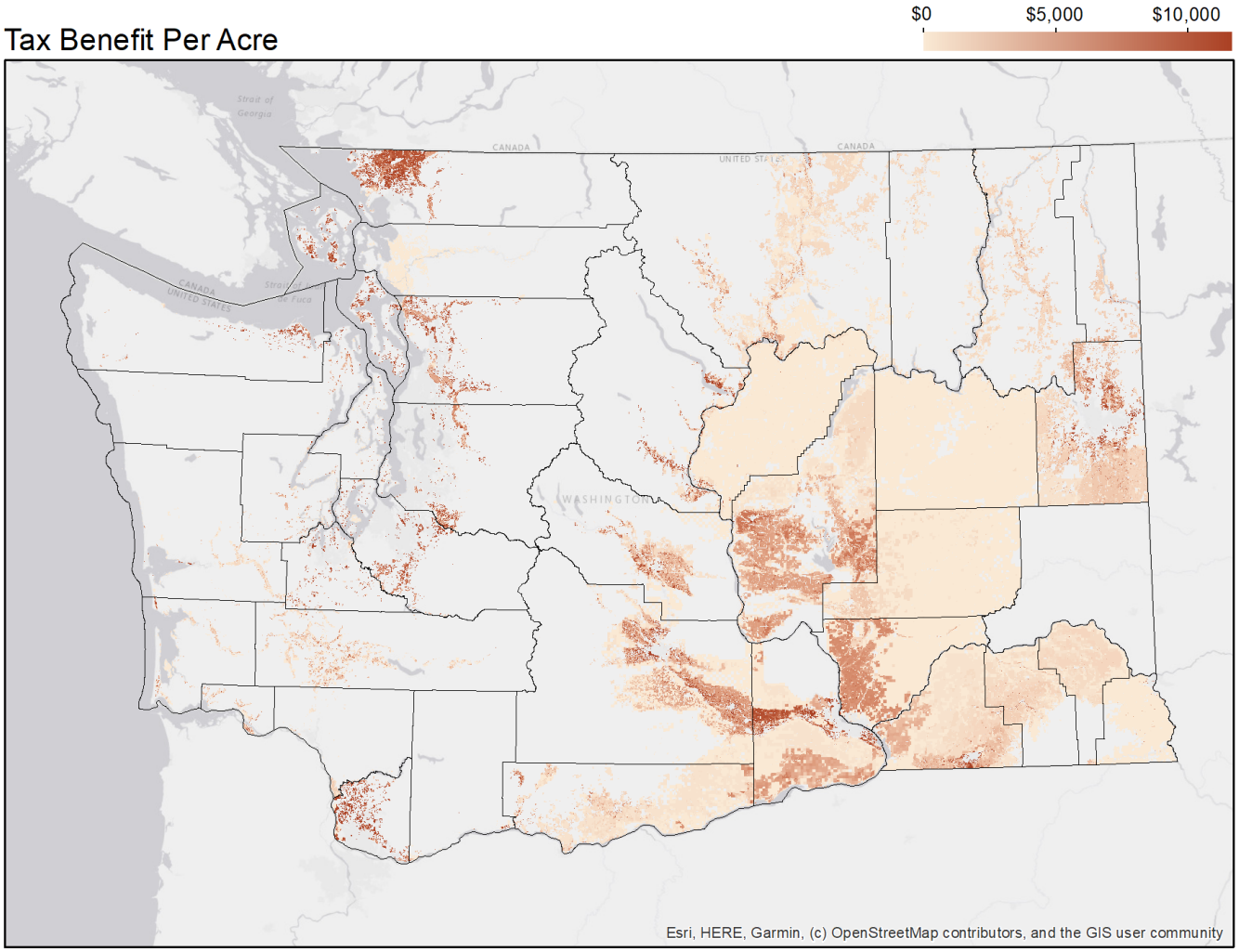


Figure 9. 2019 Agland stream miles, wetland acres, and water acres by county.



Map 2. Tax Benefit Per Acre. Tax Benefit is the difference between market value per acre and taxable value per acre of the land.

4.2 AGLAND CHANGE BETWEEN 2007 AND 2019

Because the WSDA Cropland layer was not available for 2007, the change analysis was restricted to parcels with a land use code of 81, 82, or 83. This represents 10.3 million of 12.4 million parcel acres in 2019 but reduces the number of parcels from 193,000 to 120,000. We also did not normalize names in 2007. To compare between time periods using a consistent methodology, unique owners are identified within but not across counties at each point in time. This results in a slightly less accurate estimate of number of owners. In 2019 there were 43,137 owners with parcels having land use codes of 81, 82, or 83 when using normalized names, compared to 49,449 owners when not using normalized names. For reference, the number of unique owners based on land use code or WSDA Cropland data was 96,762 (Table 1). Finally, because the WSDA Cropland layer was not available for 2007, acreage changes are only reported for parcel acres, not farmed acres or acres by crop group (because NASS datasets are available at both points in time it is possible to develop change metrics by NASS crop type, however, these values were not summarized for this project).

Between 2007 and 2019, agricultural acreage declined by 292,000 acres. The number of parcels with land use code 81, 82, or 83 declined by 7,800 to 120,000 (Table 2). The number of owners declined by 4000 (Table 3). Figure 10 shows the change in number of owners, number of parcels, and parcel acres by county. The largest loss of owners and parcels occurred in Lewis and Yakima counties. Others losing at least 20,000 acres of agriculture include Asotin, Benton, Grant, and Okanogan counties. Changes in land use designation from residential to agriculture in King county resulted in an increase in owners, parcels, and acreage.

Figure 11 and Figure 12 show the change in number of parcels and parcel acres, respectively, by county and owner size class. The results generally show a decrease in the number of parcels in the smallest owner size classes. This trend occurs in counties in both Western and Eastern Washington. A number of Eastern Washington counties show an increase in the number of parcels and acres in the two largest owner size classes. Most new King county agricultural parcels were held by owners owning less than 100 acres.

Table 2. Summary statistics for change in number of parcels and acres between 2007 and 2019 for parcels in the Agland Database with land use code 81, 82, or 83.

COUNTY	NUM PARCELS 2007	NUM PARCELS 2019	CHANGE NUM PARCELS	TOTAL PARCEL ACRES 2007	TOTAL PARCEL ACRES 2019	CHANGE TOTAL PARCEL ACRES	AVG PARCEL ACRES 2007	AVG PARCEL ACRES 2019	CHANGE AVG PARCEL ACRES	AVG TRACT ACRES 2007	AVG TRACT ACRES 2019	CHANGE AVG TRACT ACRES
Adams	5,006	5,194	188	1,115,872	1,121,032	5,160	222.9	215.8	-7.1	1,070.3	1,374.9	304.6
Asotin	2,525	2,383	-142	264,818	244,097	-20,722	104.9	102.4	-2.5	1,582.3	2,027.8	445.5
Benton	4,473	4,333	-140	663,623	642,004	-21,619	148.4	148.2	-0.2	1,070.3	2,326.6	1,256.3
Chelan	1,666	1,459	-207	50,921	45,129	-5,792	30.6	30.9	0.4	83.3	164.9	81.6
Clallam	1,247	1,214	-33	12,051	11,654	-398	9.7	9.6	-0.1	36.9	44.9	8.0
Columbia	2,093	2,069	-24	334,567	320,835	-13,732	159.9	155.1	-4.8	546.7	657.0	110.3
Cowlitz	316	337	21	7,882	7,663	-219	24.9	22.7	-2.2	49.4	75.0	25.6
Douglas	6,833	7,098	265	978,122	960,825	-17,297	143.2	135.4	-7.8	741.6	653.8	-87.8
Ferry	717	763	46	60,106	61,133	1,027	83.8	80.1	-3.7	344.3	392.4	48.1
Franklin	5,614	4,774	-840	695,367	680,925	-14,442	123.9	142.6	18.8	949.0	961.2	12.2
Garfield	1,941	1,903	-38	337,579	329,854	-7,725	173.9	173.3	-0.6	901.3	1,388.4	487.1
Grant	10,031	9,900	-131	1,092,558	1,061,981	-30,577	108.9	107.3	-1.7	320.6	354.0	33.4
Grays Harbor	731	540	-191	22,374	17,995	-4,379	30.6	33.3	2.7	58.7	87.5	28.8
Island	559	501	-58	10,459	9,633	-826	18.7	19.2	0.5	43.2	61.9	18.7
Jefferson	276	339	63	6,510	6,659	149	23.6	19.6	-4.0	46.3	47.2	0.9
King	134	1,673	1,539	2,182	29,412	27,230	16.3	17.6	1.3	18.6	42.6	24.0
Kitsap	213	213	0	2,256	2,077	-179	10.6	9.8	-0.8	25.6	25.4	-0.2
Kittitas	5,349	5,432	83	197,073	178,144	-18,929	36.8	32.8	-4.0	222.3	232.0	9.7
Klickitat	3,130	3,149	19	529,514	522,220	-7,295	169.2	165.8	-3.3	1,087.0	1,333.3	246.3
Lewis	5,605	2,906	-2,699	98,879	72,066	-26,813	17.6	24.8	7.2	47.1	90.4	43.3
Lincoln	7,578	8,185	607	1,211,879	1,211,632	-247	159.9	148.0	-11.9	515.6	666.9	151.3
Mason	324	329	5	6,343	5,759	-584	19.6	17.5	-2.1	47.8	60.6	12.8
Okanogan	14,483	13,854	-629	676,212	642,418	-33,794	46.7	46.4	-0.3	633.9	716.9	83.0
Pacific	764	716	-48	13,201	12,039	-1,162	17.3	16.8	-0.5	40.0	46.0	6.0
Pend Oreille	502	518	16	31,845	31,604	-240	63.4	61.0	-2.4	142.8	167.1	24.3
Pierce	1,527	1,288	-239	28,021	24,550	-3,471	18.4	19.1	0.7	38.1	48.2	10.1
San Juan	464	316	-148	12,209	9,030	-3,179	26.3	28.6	2.3	60.9	71.4	10.5
Skagit	5,464	4,835	-629	97,687	90,334	-7,353	17.9	18.7	0.8	59.9	70.6	10.7
Skamania	57	69	12	1,516	1,539	23	26.6	22.3	-4.3	45.7	45.0	-0.8
Snohomish	2,635	2,334	-301	54,291	45,043	-9,248	20.6	19.3	-1.3	57.8	83.7	25.9
Spokane	8,695	8,506	-189	538,851	522,124	-16,727	62.0	61.4	-0.6	170.0	198.4	28.4
Stevens	1,114	1,379	265	50,769	57,794	7,025	45.6	41.9	-3.7	111.2	207.9	96.7
Thurston	1,310	1,251	-59	36,441	35,292	-1,148	27.8	28.2	0.4	79.1	98.8	19.8
Wahkiakum	259	318	59	7,398	8,359	961	28.6	26.3	-2.3	45.5	55.6	10.1
Walla Walla	5,534	5,285	-249	743,452	725,213	-18,238	134.3	137.2	2.9	1,004.8	1,196.5	191.7
Whatcom	5,629	5,123	-506	111,451	99,882	-11,569	19.8	19.5	-0.3	40.0	50.6	10.7
Yakima	13,568	10,057	-3,511	546,753	510,183	-36,570	40.3	50.7	10.4	252.0	317.2	65.2
Total	128,366	120,543	-7,823	10,651,028	10,358,132	-292,896	65.8	65.1	-0.6	340.3	444.4	104.1

Table 3. Summary statistics for change in number of owners between 2007 and 2019 for parcels in the Agland Database with land use code 81, 82, or 83.

COUNTY	AVG NAME ACRES 2007	AVG NAME ACRES 2019	CHANGE AVG NAME ACRES	NUM OWNERS 2007	NUM OWNERS 2019	CHANGE NUM OWNERS
Adams	3,021	4,044	1,023	1,677	1,674	-3
Asotin	2,826	4,681	1,855	337	332	-5
Benton	2,817	8,081	5,264	1,910	1,575	-335
Chelan	180	361	182	875	673	-202
Clallam	60	378	319	485	528	43
Columbia	3,924	4,526	602	684	500	-184
Cowlitz	89	209	120	168	179	11
Douglas	3,794	4,206	412	1,942	1,929	-13
Ferry	515	1,613	1,098	286	313	27
Franklin	4,376	4,588	212	2,327	2,044	-283
Garfield	1,311	2,855	1,544	764	578	-186
Grant	1,196	3,094	1,899	4,088	4,864	776
Grays Harbor	92	196	103	403	270	-133
Island	55	538	483	338	296	-42
Jefferson	66	73	8	147	181	34
King	27	110	83	112	1,117	1,005
Kitsap	30	30	0	139	132	-7
Kittitas	393	524	130	1,977	1,992	15
Klickitat	2,345	2,680	335	1,026	1,006	-20
Lewis	73	160	88	3,221	1,291	-1,930
Lincoln	16,185	1,830	-14,355	3,479	4,073	594
Mason	70	489	419	176	183	7
Okanogan	2,286	6,041	3,756	4,282	3,921	-361
Pacific	87	138	51	306	272	-34
Pend Oreille	229	519	290	261	271	10
Pierce	48	99	51	988	795	-193
San Juan	82	117	34	286	210	-76
Skagit	120	231	112	2,420	1,983	-437
Skamania	48	60	12	37	42	5
Snohomish	96	216	120	1,562	1,213	-349
Spokane	372	812	439	4,292	4,337	45
Stevens	289	488	199	590	689	99
Thurston	116	572	457	686	680	-6
Wahkiakum	74	172	97	156	191	35
Walla Walla	1,812	2,517	705	1,817	1,690	-127
Whatcom	85	159	74	3,654	3,559	-95
Yakima	851	4,002	3,152	5,534	3,866	-1,668
Total	1,352	1,660	307	53,432	49,449	-3,983

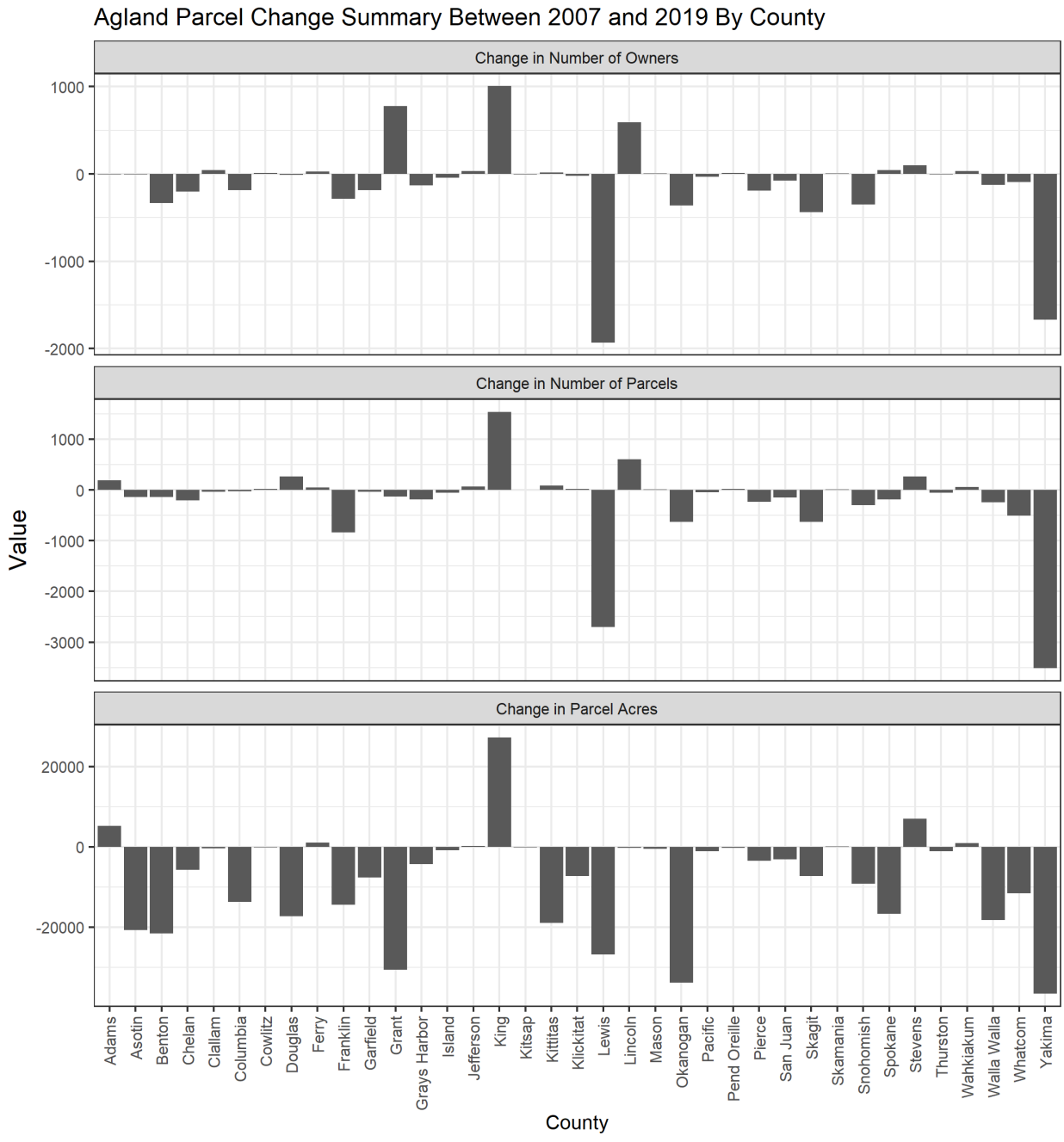


Figure 10. Summary statistics for change in number of owners, number of parcels, and parcel acres by county between 2007 and 2019.

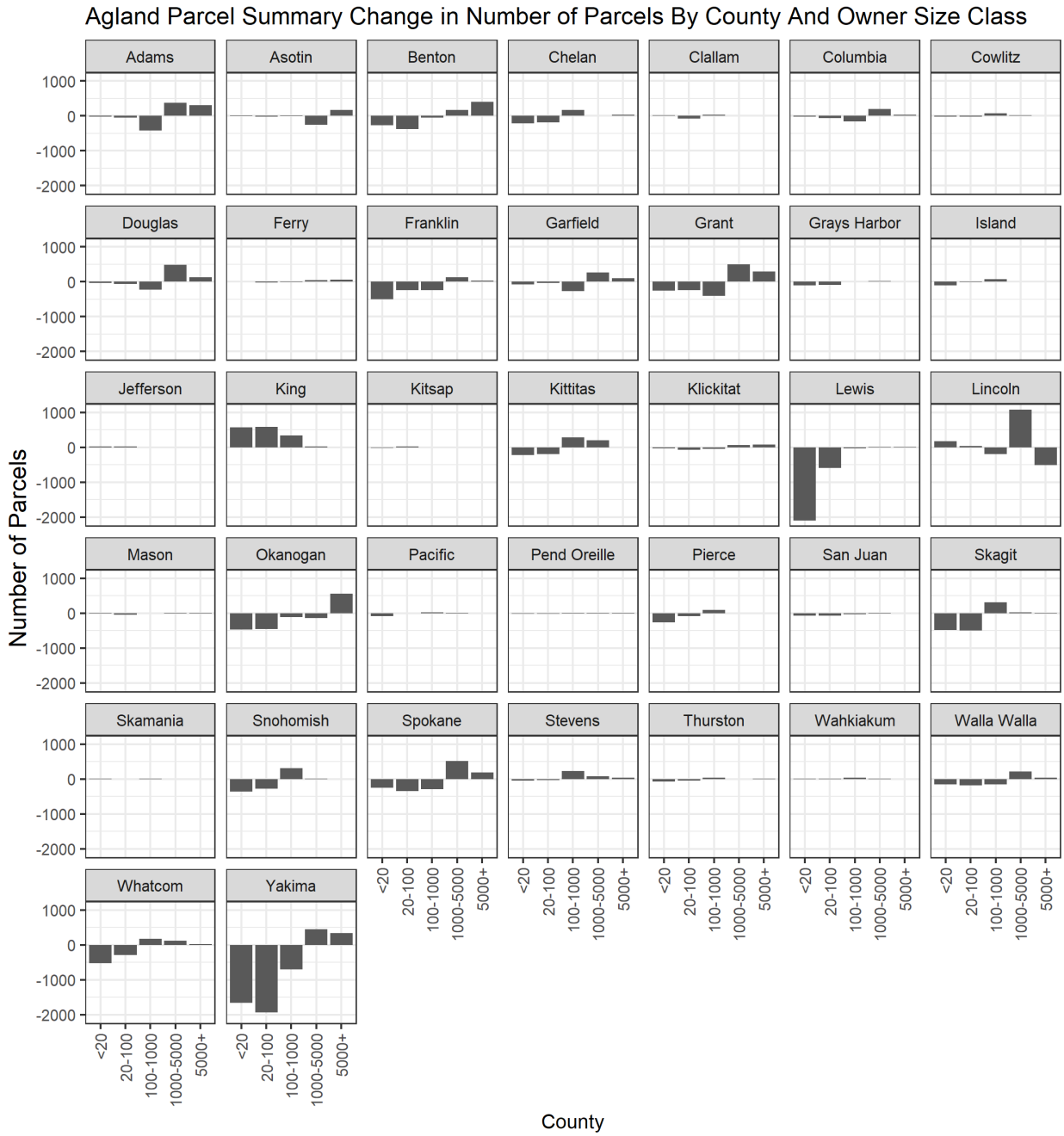


Figure 11. Change in number of parcels by county and size class between 2007 and 2019.

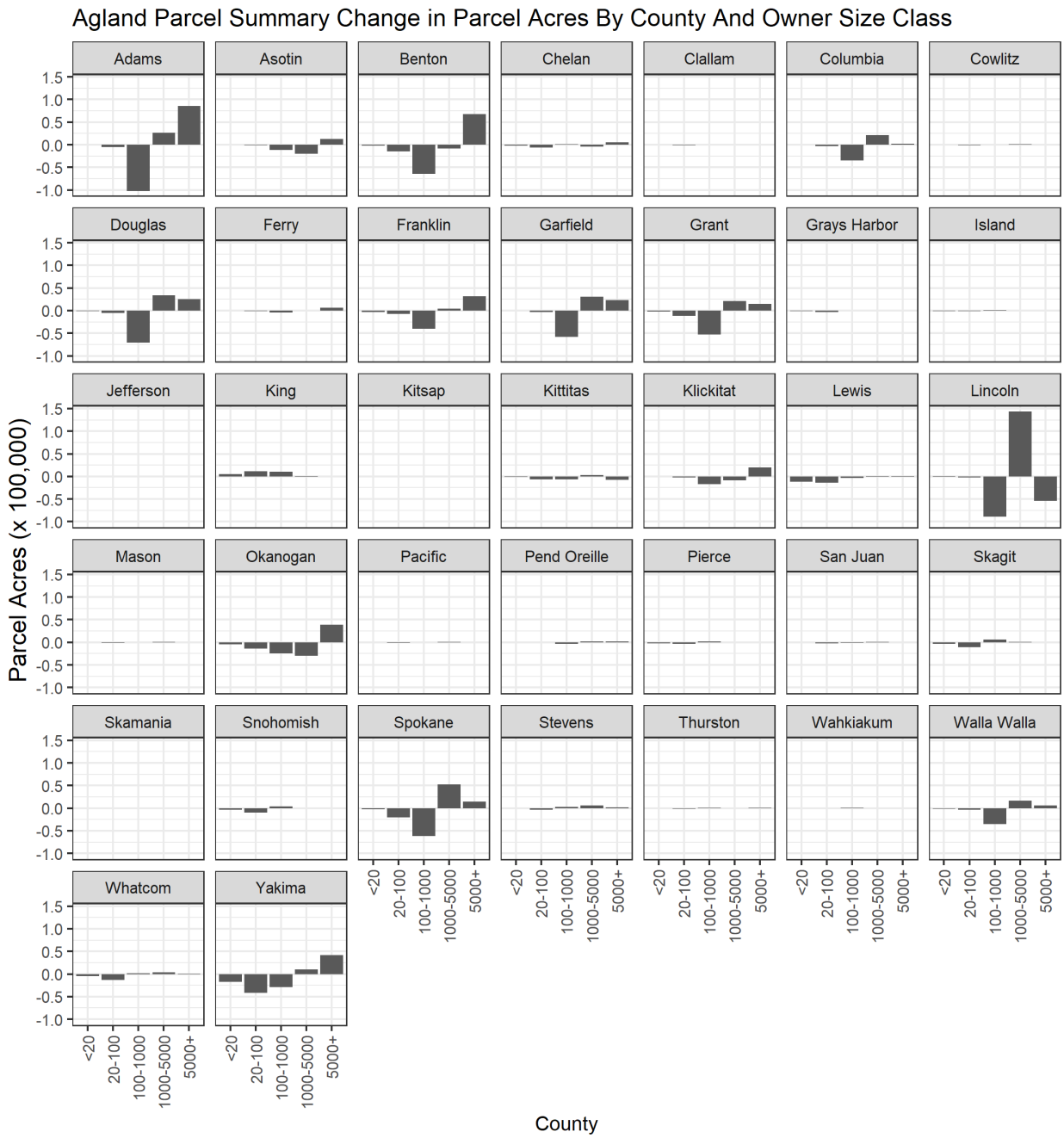


Figure 12. Change in parcels acres by county and size class between 2007 and 2019.

5 DISCUSSION

The objective of this project was to develop a statewide, spatially explicit, high resolution database for agricultural lands in Washington State and analyze change between 2007 and 2019. The project builds off of previous experience developing several versions of the Washington State Forestland Database. The Forestland Database has proven extremely valuable as a platform for modeling forest management behavior, developing resource assessments, and analyzing policy alternatives for both researchers and practitioners. Owner information has also proven used for targeted outreach and surveys. The results of this project suggest similar value is possible for the Agland Database.

The Agland Database identifies about 200,000 parcels and 90,000 owners in Washington State that are associated with agricultural activities. The Database covers over 12 million acres in Washington State. Change results in this report focused on the general decline (by 7,800 parcels, 4,000 owners, and 290,000 acres) in owners, parcels, and acres between 2007 and 2019. The multivariate nature of the Agland Database allows this trend to be analyzed and described by region around the State and by a number of attributes. Figure 10 summarizes where change is greatest by county (the Agland Database also allows results to be summarized by Half State, WRIA, WAU, Congressional District, Legislative District, or Puget Sound Action Area). Figure 7 identifies counties with high and/or increasing parcel sales. Map 2 shows where the differential between market value and taxable value, an indicator of conversion pressure, is highest. Finally, the parcel change maps in Appendix A allow counties with the most change to be visually inspected. A narrative can be developed describing where change has occurred and may occur in the future (and where zoning regulations are or are not preventing change). Some of these changes are highlighted in the Results section above. The data also supports a more formal statistical analysis developing a predictive model for parcel conversion, as was developed for the most recent version of the Forestland Database ("Washington's Small Forest Landowners in 2020. Status, Trends, and Recommendations after 20 Years of Forests & Fish" 2021).

Except for Figure 3 and Figure 4, this report does not discuss crop type or other field attributes. However, estimates of crop type have been integrated into the Agland Database through the WSDA Cropland layer and NASS datasets. Along with road, stream, water, and wetland attributes, the Agland Database supports a variety of site specific economic and environmental analyses. Other potentially useful datasets are available but were not integrated, including climatological ("PRISM Gridded Climate Data," n.d.), soil (Soil Survey Staff, n.d.), and conversion risk assessment ("Farms Under Threat: The State of America's Farmland" n.d.) datasets. The complete list of attributes is provided in Appendix B.

The approach used to develop the Agland Database (normalized data, spatially explicit, high resolution) has repeatedly proven successful (Rogers and Cooke 2007; "Washington's Small Forest Landowners in 2020. Status, Trends, and Recommendations after 20 Years of Forests & Fish" 2021; "Farms Under Threat: The State of America's Farmland" n.d.). The timing and synergistic nature of this project with the project to develop the 2019 Forestland Database (ESSB 5330) allowed us to extend the geographic region to include eastern Washington. The 2019 Agland Database is an asset for the state of Washington that should be leveraged to the fullest extent possible.

6 REFERENCES

"Agricultural Land Use." n.d. Washington State Department of Agriculture. Accessed September 1, 2019. https://agr.wa.gov/departments/land-and-water/natural-resources/agricultural-land-use.

"County Assessor Data." n.d. Various. Accessed September 1, 2019.

"Dictionary of Algorithms and Data Structures." n.d. Accessed December 18, 2020. https://xlinux.nist.gov/dads/.

"DNR Hydrography – Water Bodies – Forest Practices Regulation." n.d. Washington State Department of Natural Resources. Accessed September 1, 2019. https://data-wadnr.opendata.arcgis.com/datasets/dnr-hydrography-water-bodies-forest-practices-regulation.

"DNR Hydrography – Watercourses– Forest Practices Regulation." n.d. Washington State Department of Natural Resources. Accessed September 1, 2019. https://data-wadnr.opendata.arcgis.com/datasets/dnr-hydrography-watercourses-forest-practices-regulation.

"DNR Proprietary Roads (Statewide)." n.d. Washington State Department of Natural Resources. Accessed September 1, 2019. https://data-wadnr.opendata.arcgis.com/datasets/dnr-proprietary-roads-statewide.

"Farms Under Threat: The State of America's Farmland." n.d. *American Farmland Trust* (blog). Accessed February 1, 2021. http://farmland.org/project/farms-under-threat/.

"National Forest System Roads." n.d. Forest Service, United States Department of Agriculture. Accessed September 1, 2019. https://data.fs.usda.gov/geodata/edw/datasets.php?dsetCategory=transportation.

"PRISM Gridded Climate Data." n.d. PRISM Climate Group, Oregon State University. https://prism.oregonstate.edu/.

"Real Estate Excise Tax Affidavit Dataset (Unpublished)." n.d. Washington State Department of Revenue. Accessed April 1, 2020.

Rogers, Luke, and Andrew Cooke. 2007. "The 2007 Washington State Forestland Database Final Report." University of Washington. http://www.ruraltech.org/projects/wrl/fldb/pdf/The_2007_Washington_State_Forestland_Database.pdf.

———. n.d. "Washington State Parcel Database." University of Washington. https://depts.washington.edu/wagis/projects/parcels/.

Soil Survey Staff. n.d. "Web Soil Survey." Natural Resources Conservation Service, United States Department of Agriculture. https://websoilsurvey.nrcs.usda.gov/.

"WA County Boundaries." n.d. Washington State Department of Natural Resources. Accessed September 1, 2019. https://data-wadnr.opendata.arcgis.com/datasets/wa-county-boundaries.

"WA DNR Managed Land Parcels." n.d. Washington State Department of Natural Resources. Accessed September 1, 2019. https://data-wadnr.opendata.arcgis.com/datasets/wa-dnr-managed-land-parcels.

"WA Major Public Lands (Non-DNR)." n.d. Washington State Department of Natural Resources.

"Washington Cropland Data Layer." n.d. National Agricultural Statistics Service, United States Department of Agriculture. Accessed September 1, 2019. https://www.nass.usda.gov/Research_and_Science/Cropland/Release/index.php.

"Washington's Small Forest Landowners in 2020. Status, Trends, and Recommendations after 20 Years of Forests & Fish." 2021. School of Environmental and Forest Sciences, University of

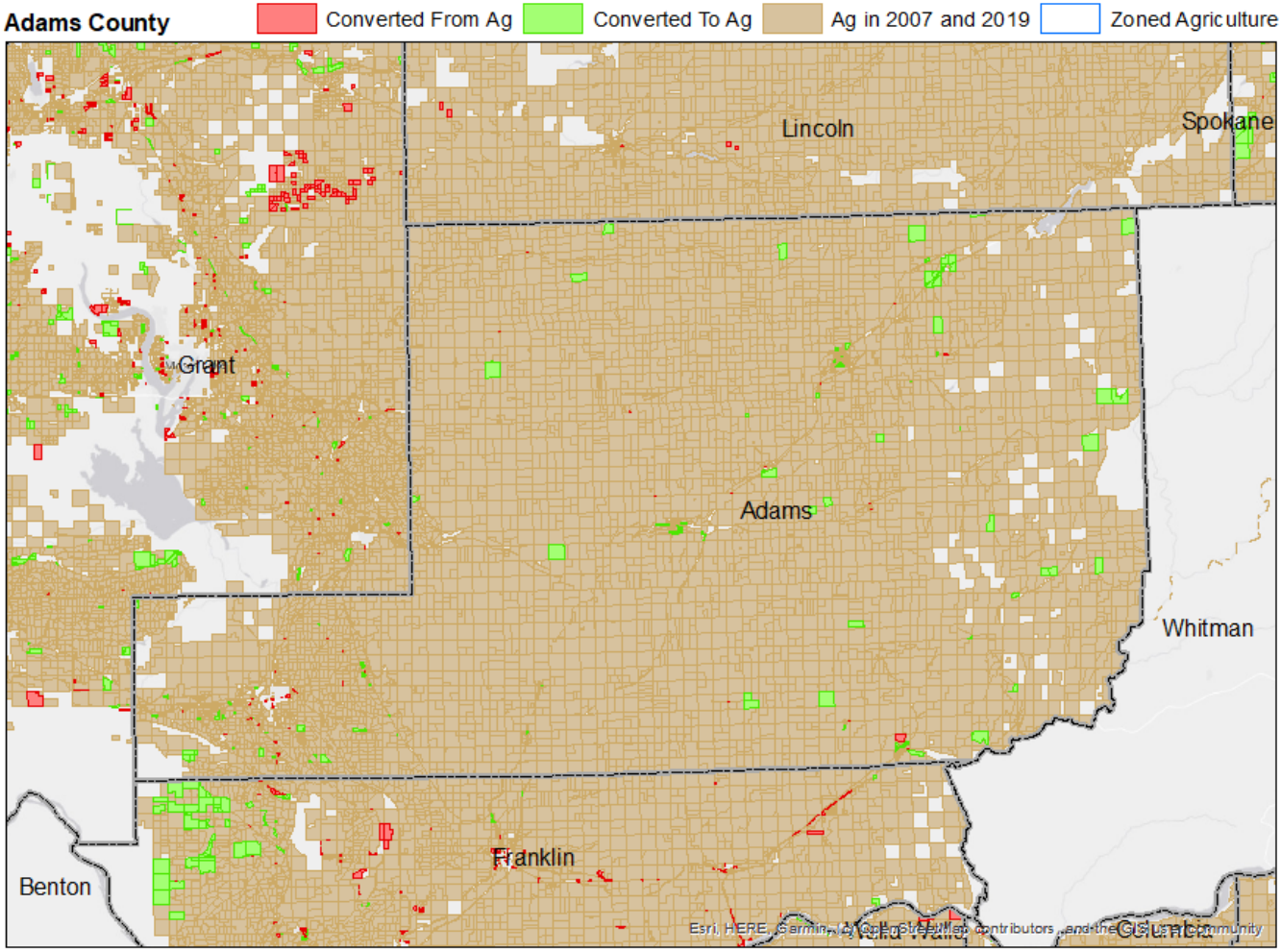
Washington. https://nrsig.org/projects/small-forest-landowner-regulatory-impacts/files/Small-Forestland-Owners-ESSB-5330-Report-2021011.pdf.

"Water Resource Inventory Areas for Washington State." n.d. Washington State Department of Ecology. Accessed September 1, 2019. https://ecology.wa.gov/Research-Data/Data-resources/Geographic-Information-Systems-GIS/Data#w.

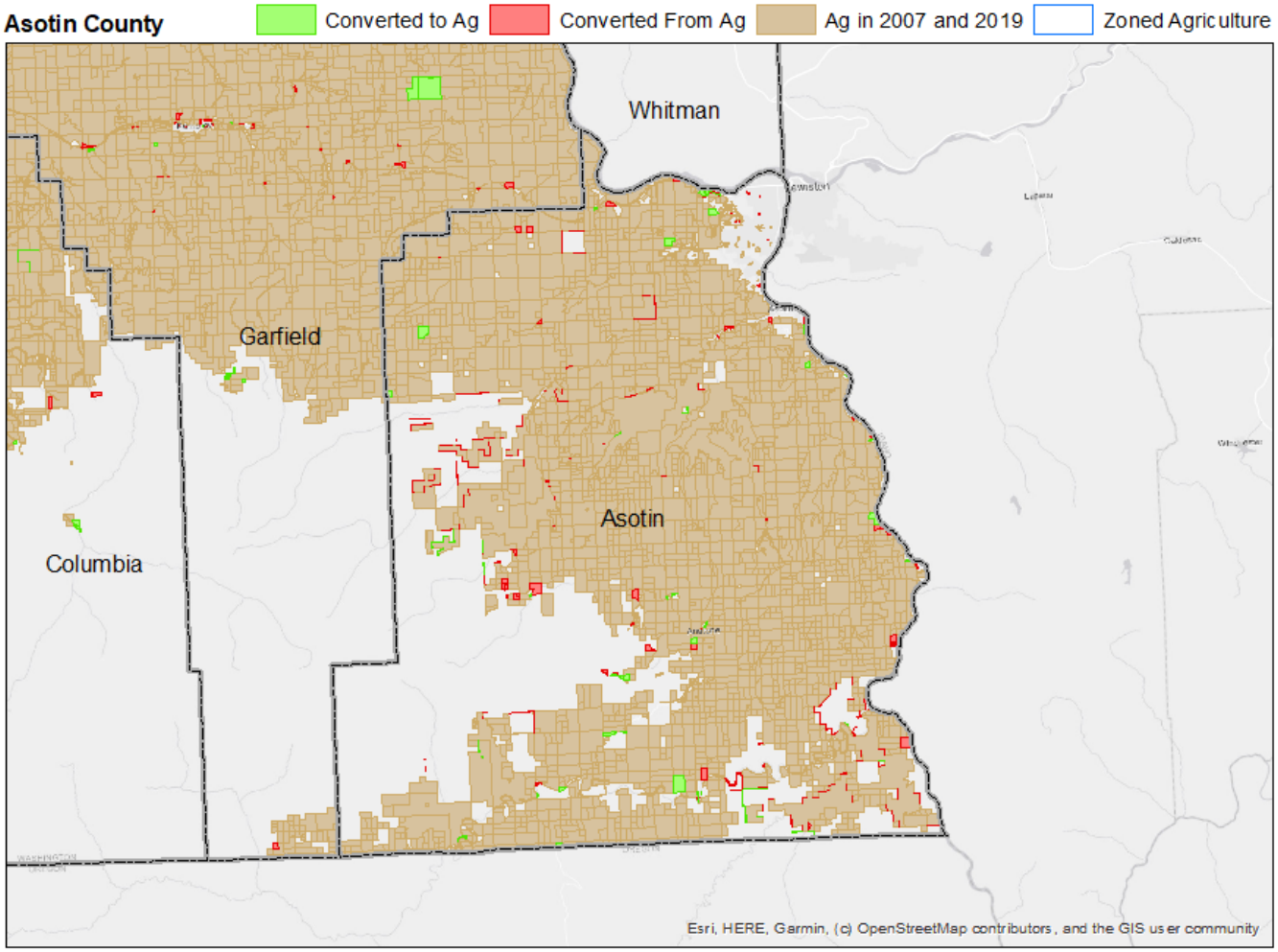
"Watershed Administrative Units – Forest Practices Regulation." n.d. Washington State Department of Natural Resources. Accessed September 1, 2019. https://data-wadnr.opendata.arcgis.com/datasets/watershed-administrative-units-forest-practices-regulation.

"Wetlands – Forest Practices Regulation." n.d. Washington State Department of Natural Resources. Accessed September 1, 2019. https://data-wadnr.opendata.arcgis.com/datasets/wetlands-forests-practices-regulation.

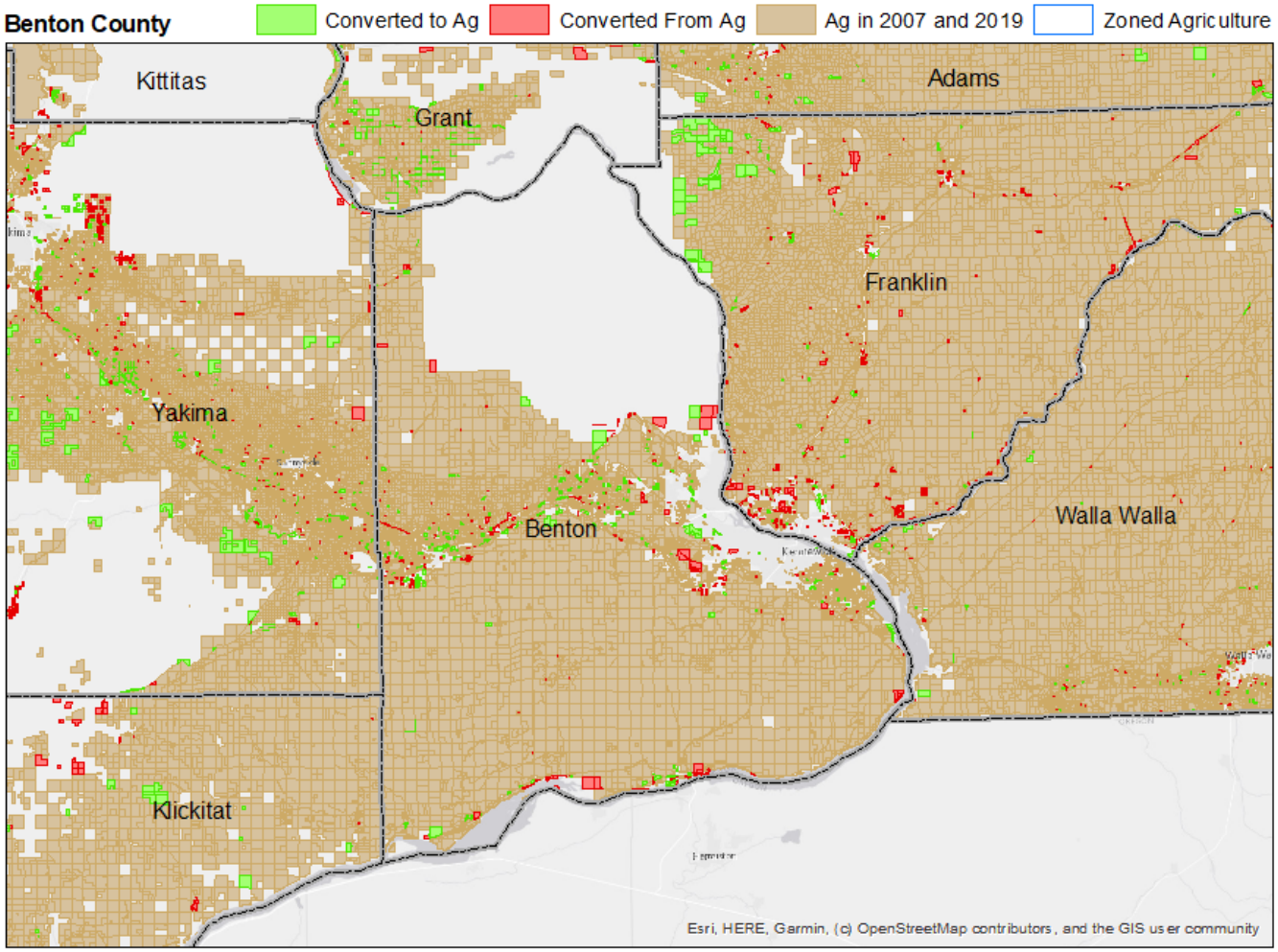
7 APPENDIX A. CHANGE MAPS BY COUNTY



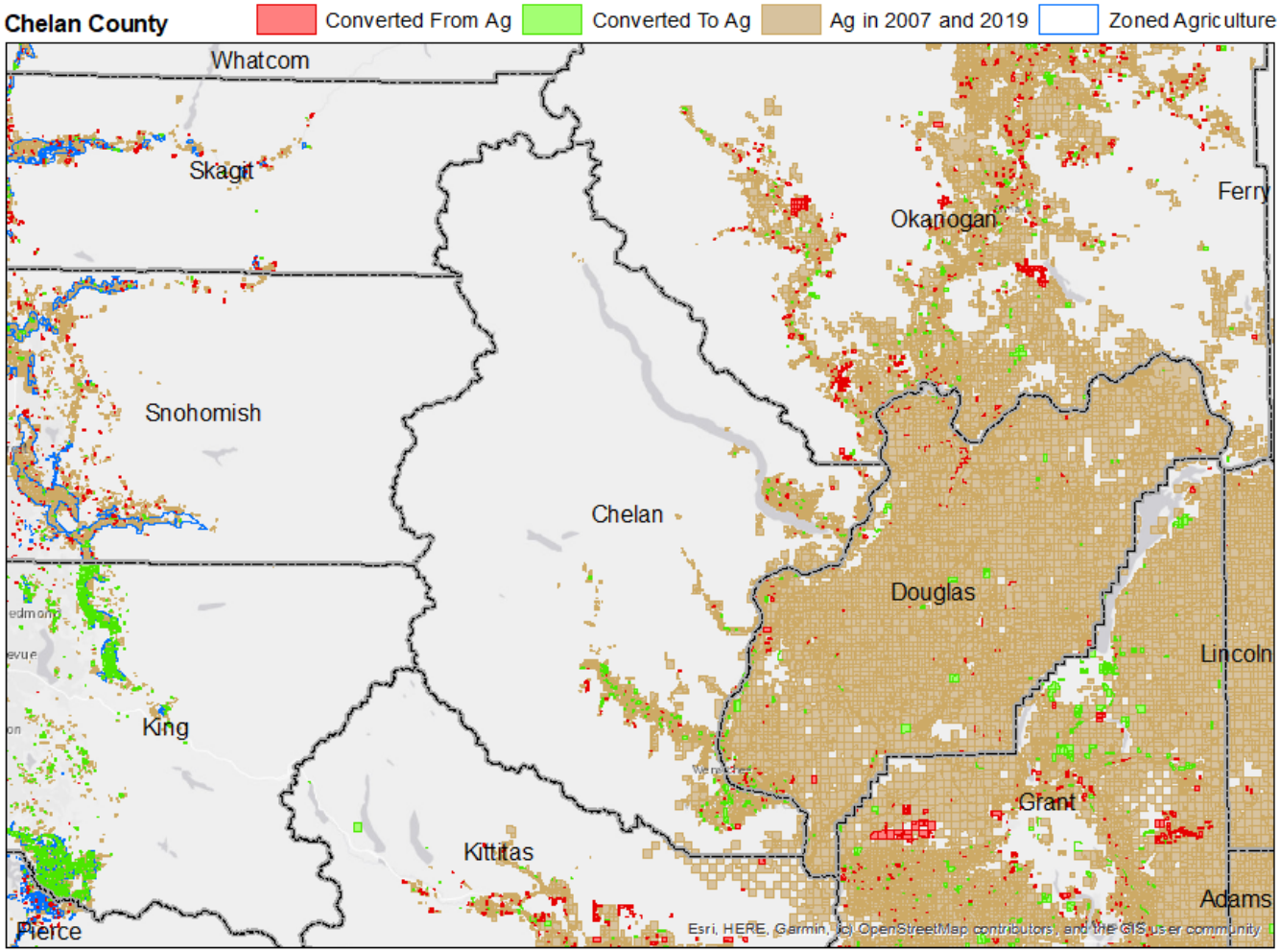
Map 3. Change in agricultural parcels in Adams county between 2007 and 2019.



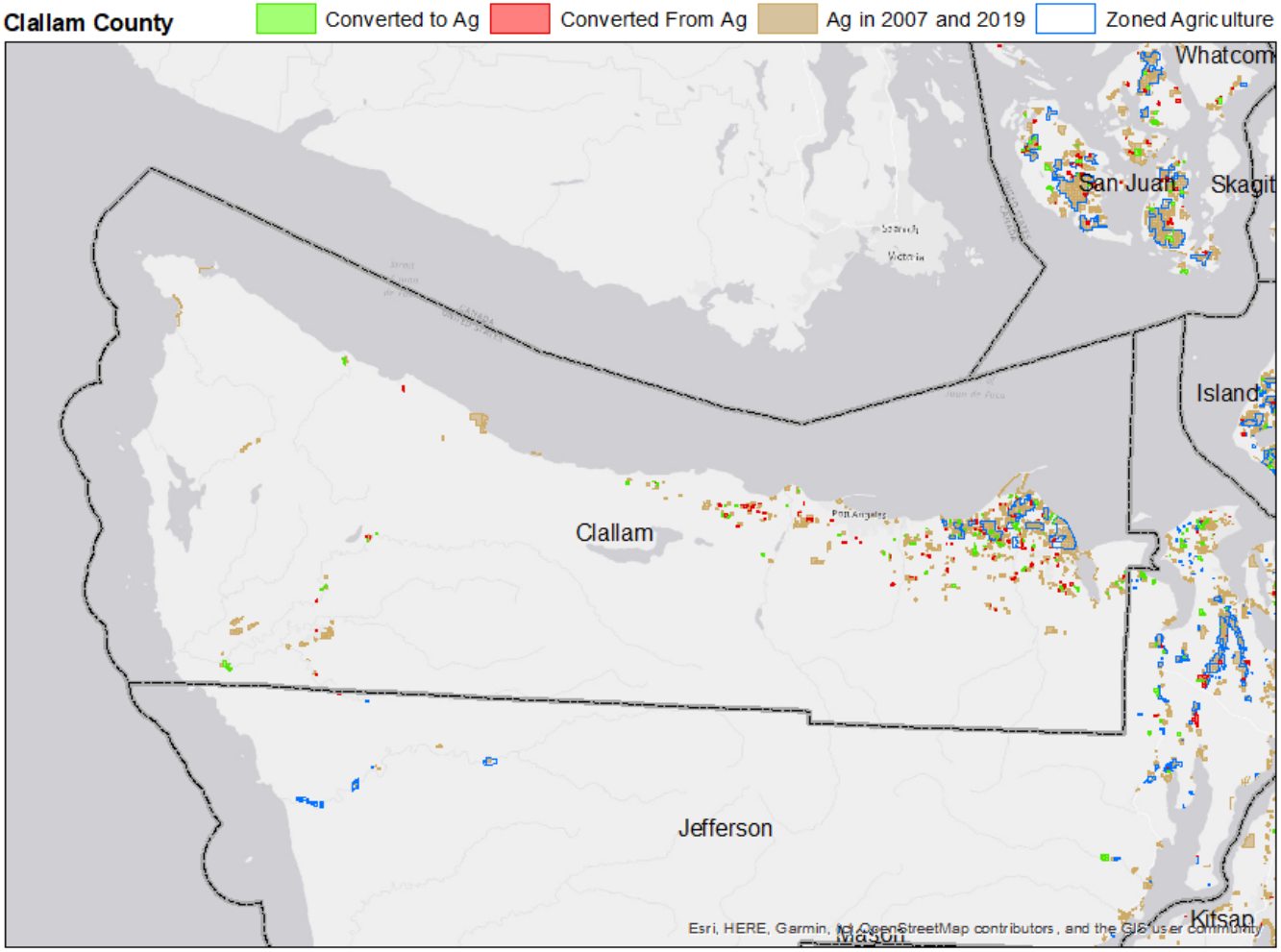
Map 4. Change in agricultural parcels in Asotin county between 2007 and 2019.



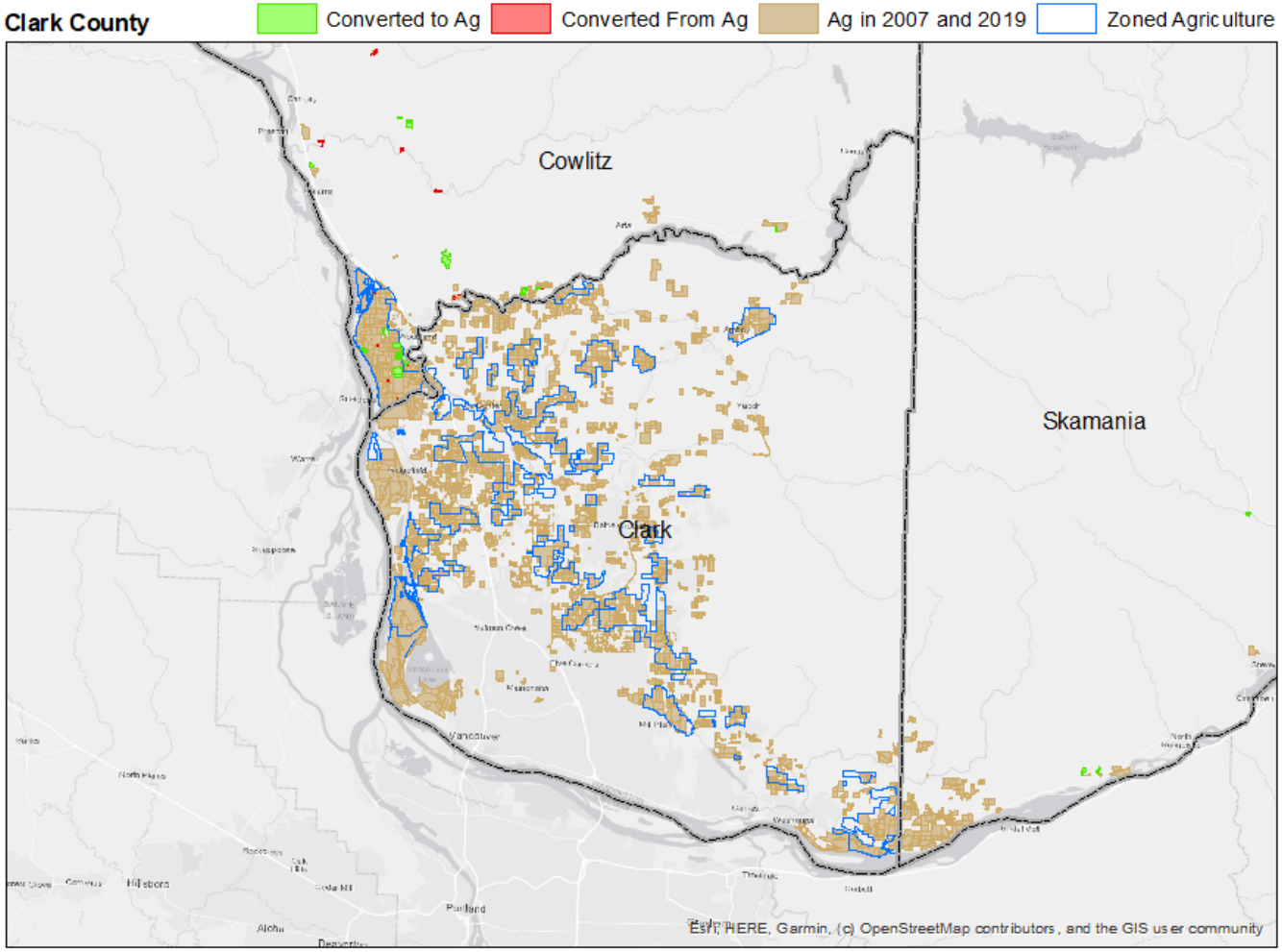
Map 5. Change in agricultural parcels in Benton county between 2007 and 2019.



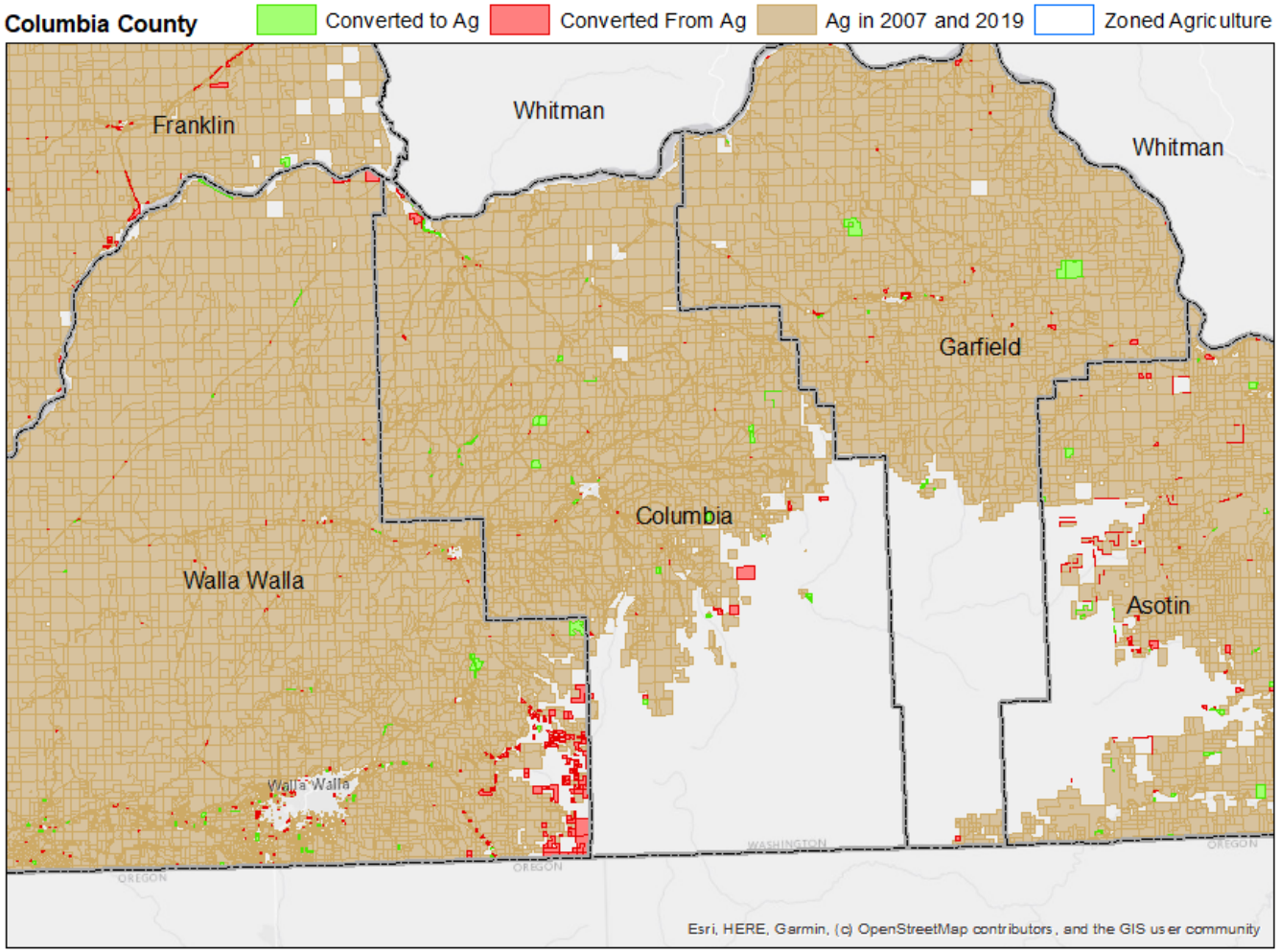
Map 6. Change in agricultural parcels in Chelan county between 2007 and 2019.



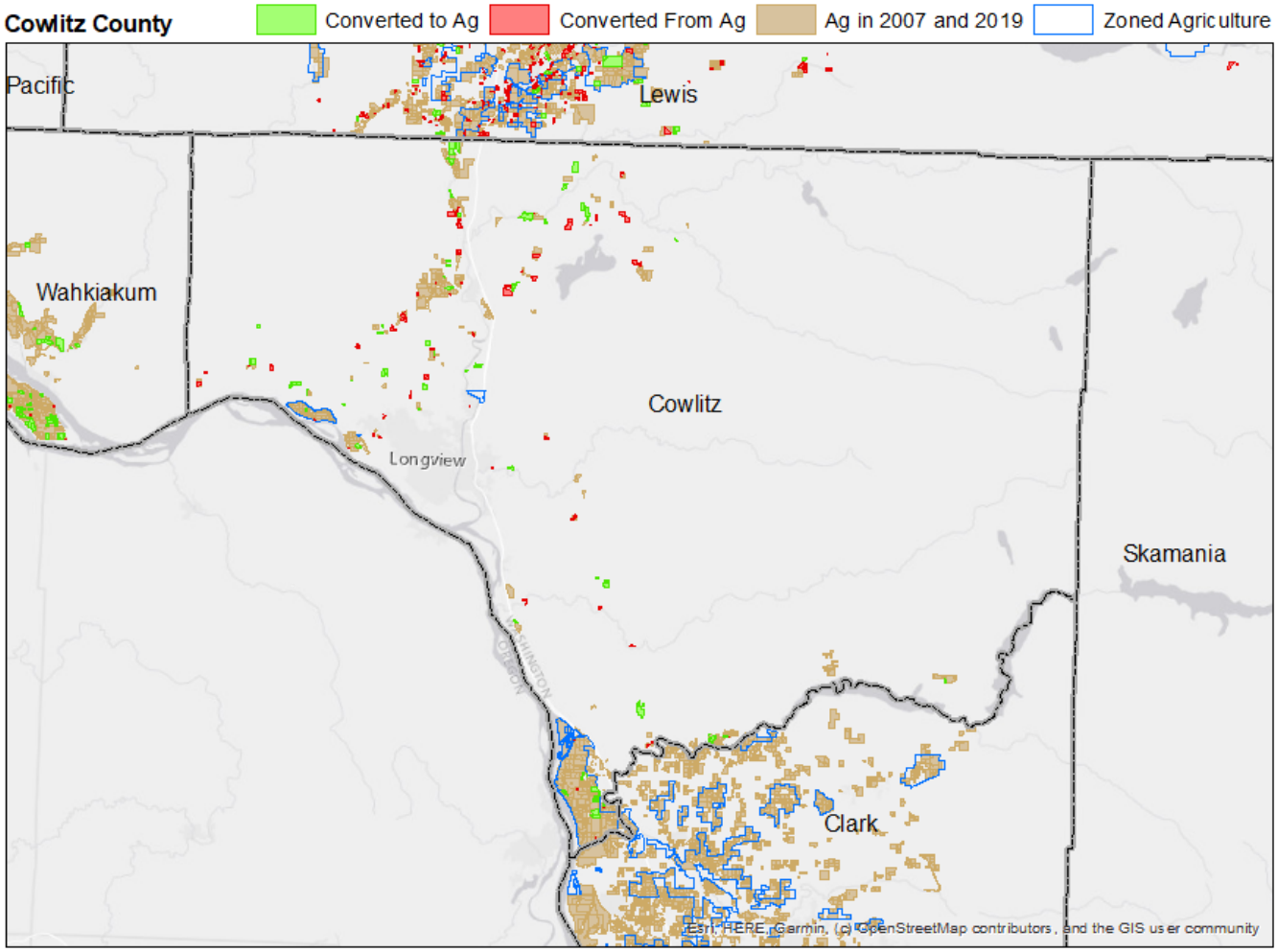
Map 7. Change in agricultural parcels in Clallam county between 2007 and 2019.



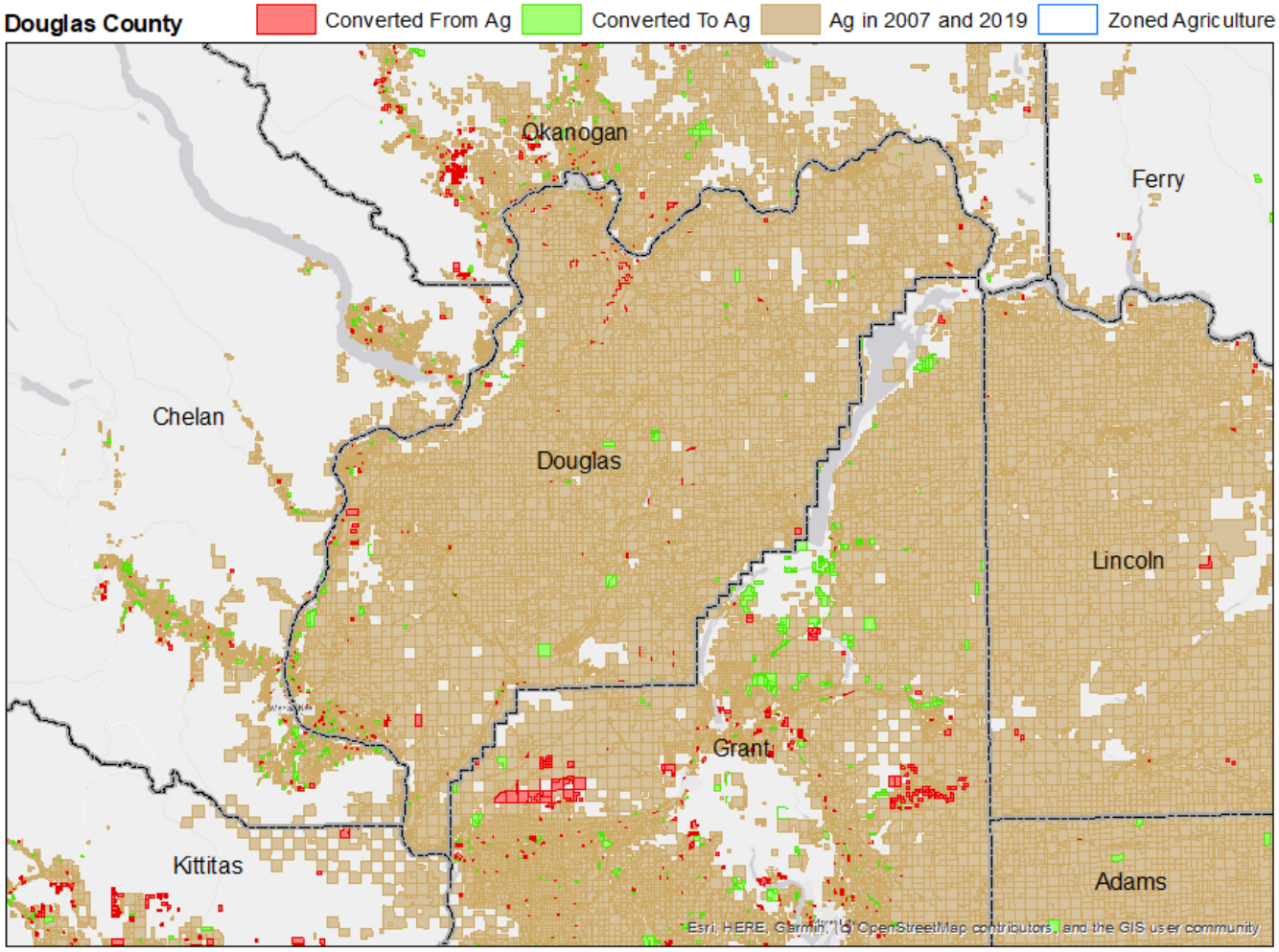
Map 8. Change in agricultural parcels in Clark county between 2007 and 2019.



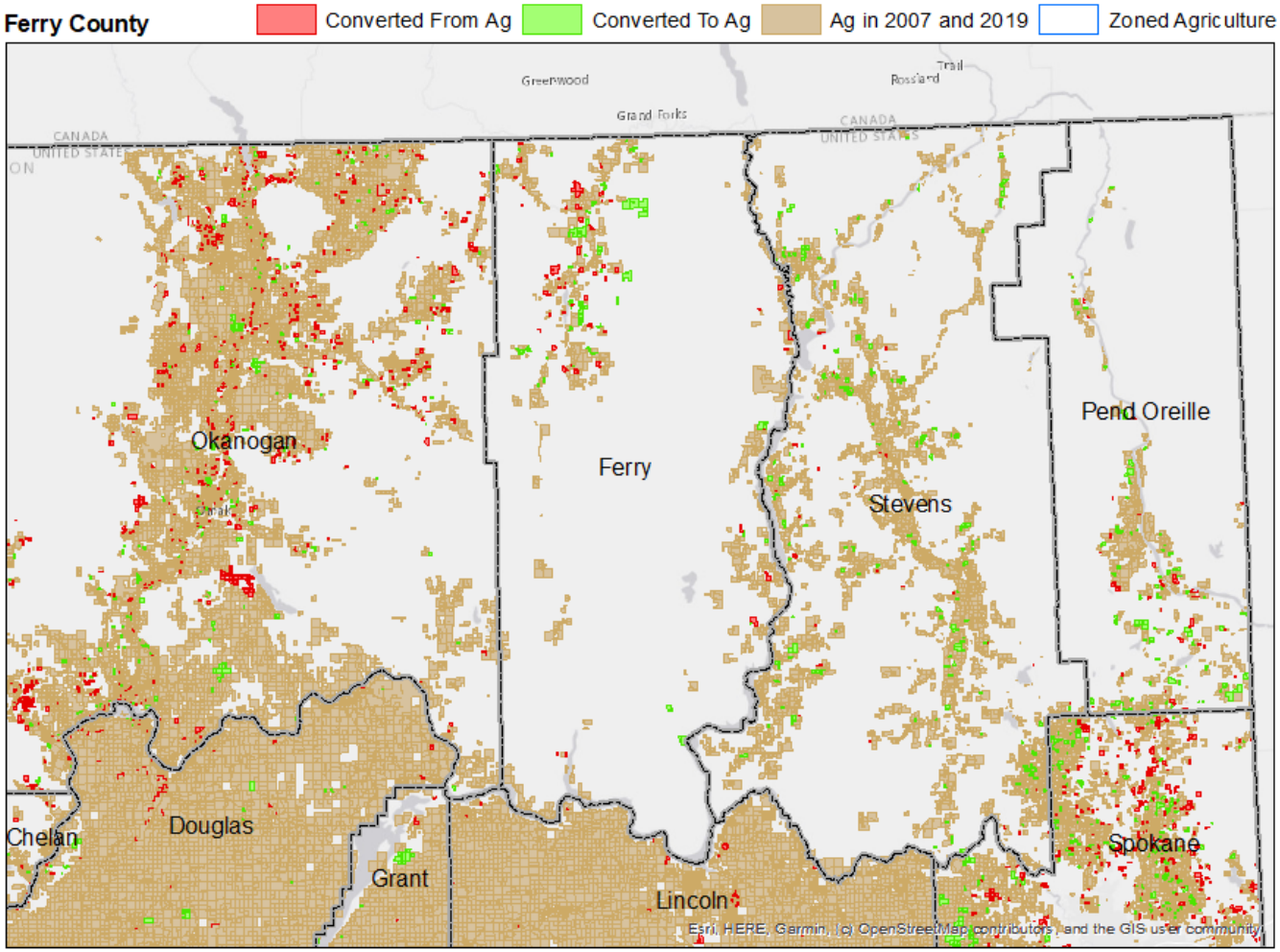
Map 9. Change in agricultural parcels in Columbia county between 2007 and 2019.



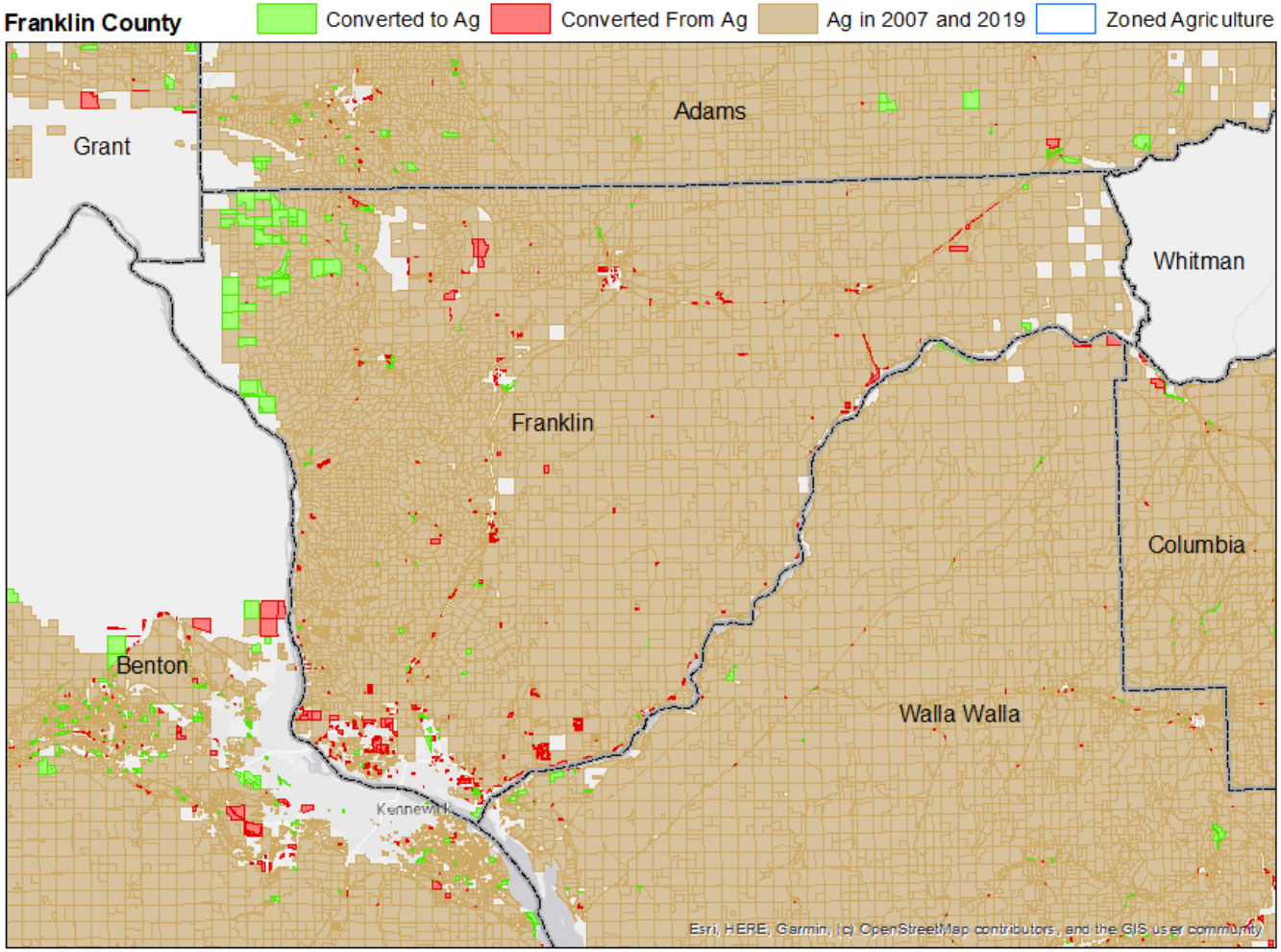
Map 10. Change in agricultural parcels in Cowlitz county between 2007 and 2019.



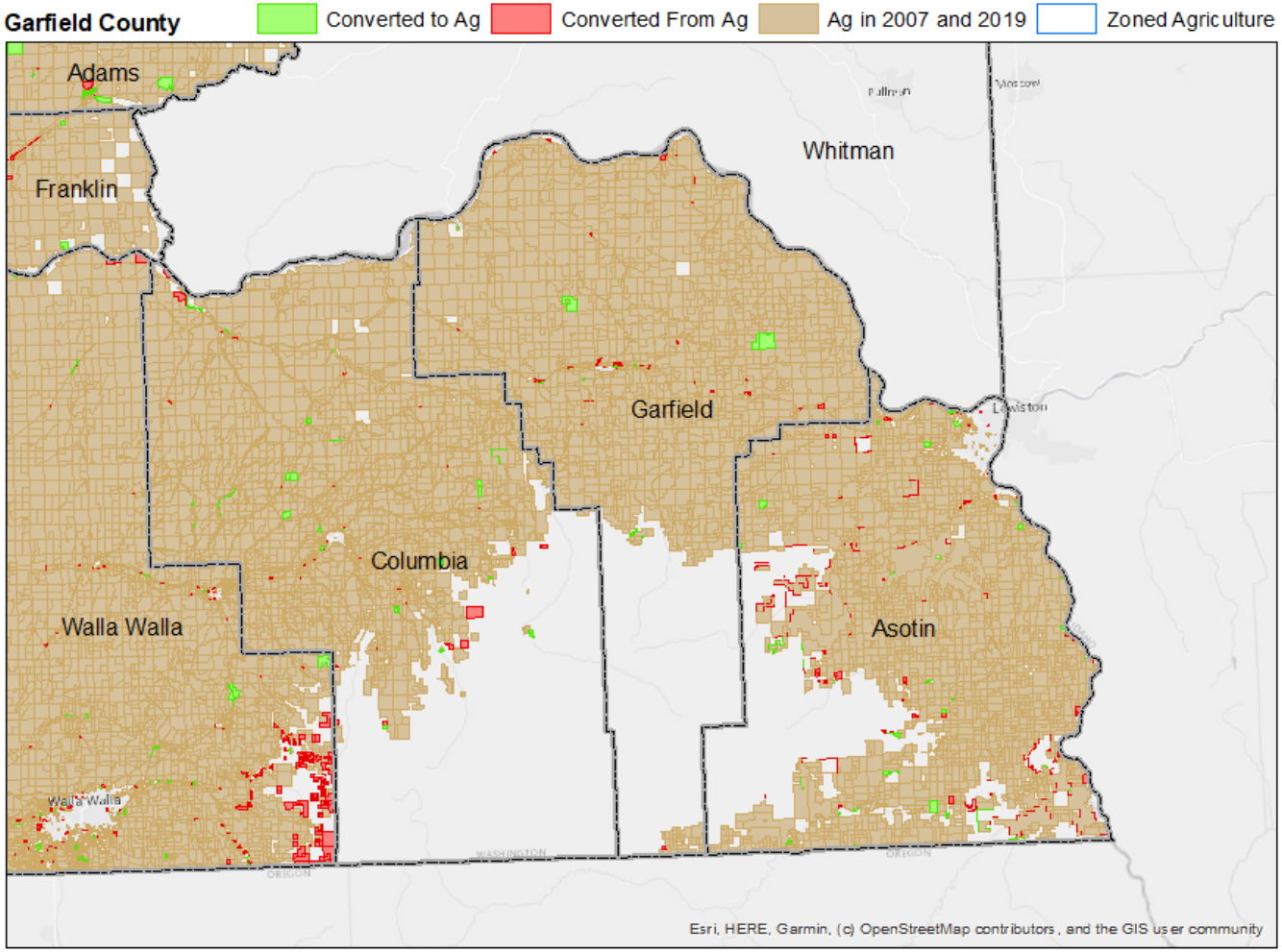
Map 11. Change in agricultural parcels in Douglas county between 2007 and 2019.



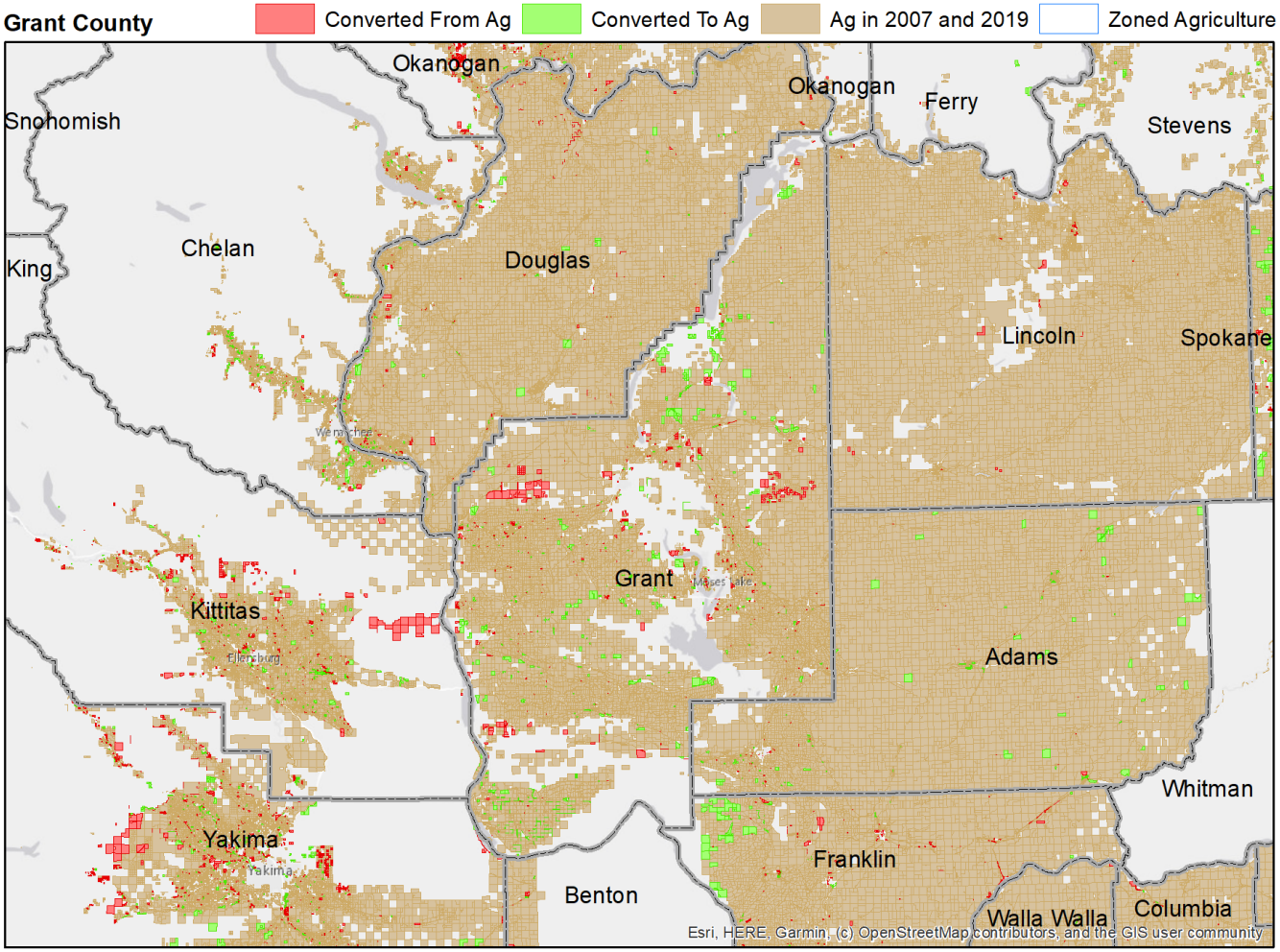
Map 12. Change in agricultural parcels in Ferry county between 2007 and 2019.



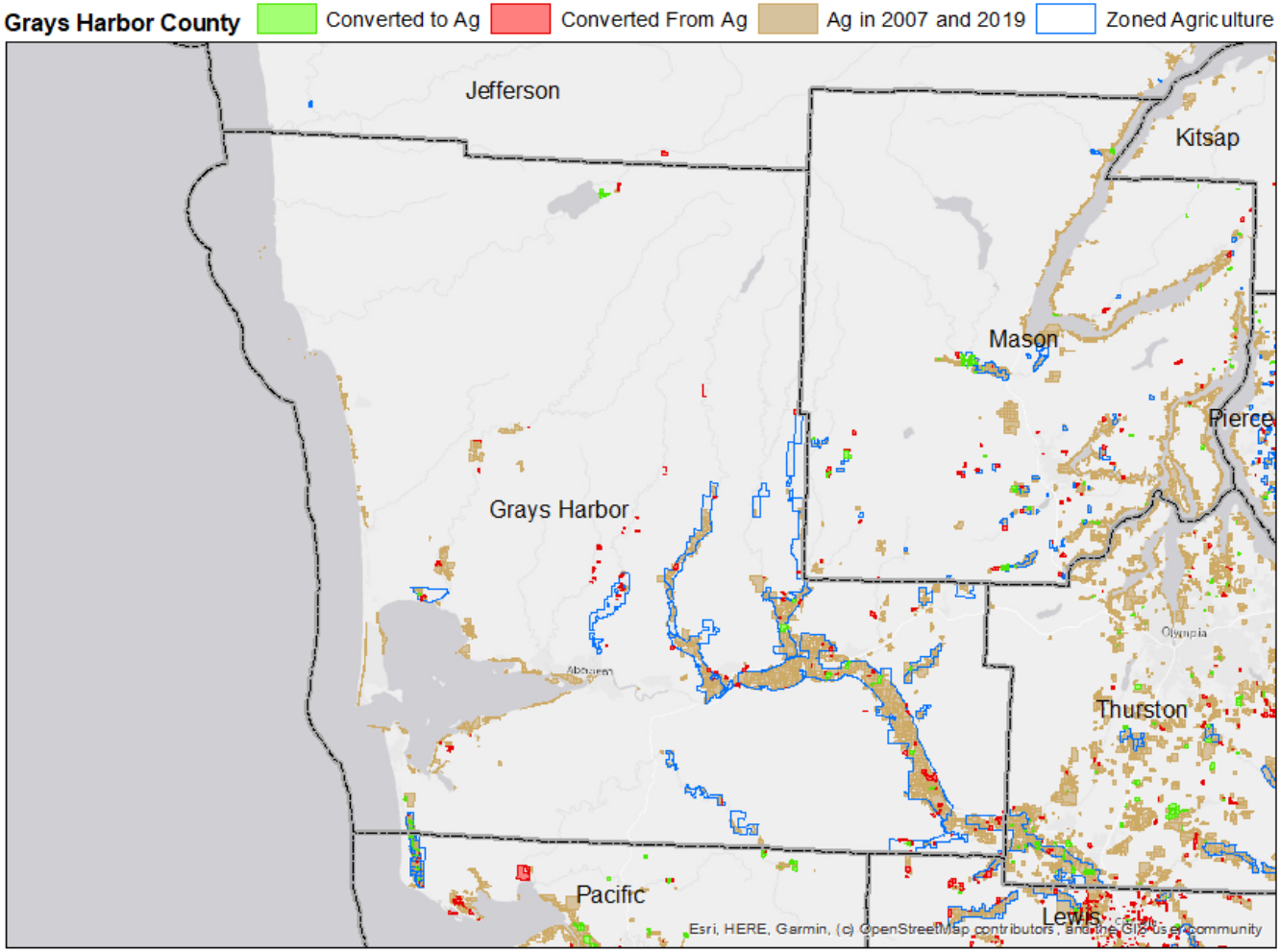
Map 13. Change in agricultural parcels in Franklin county between 2007 and 2019.



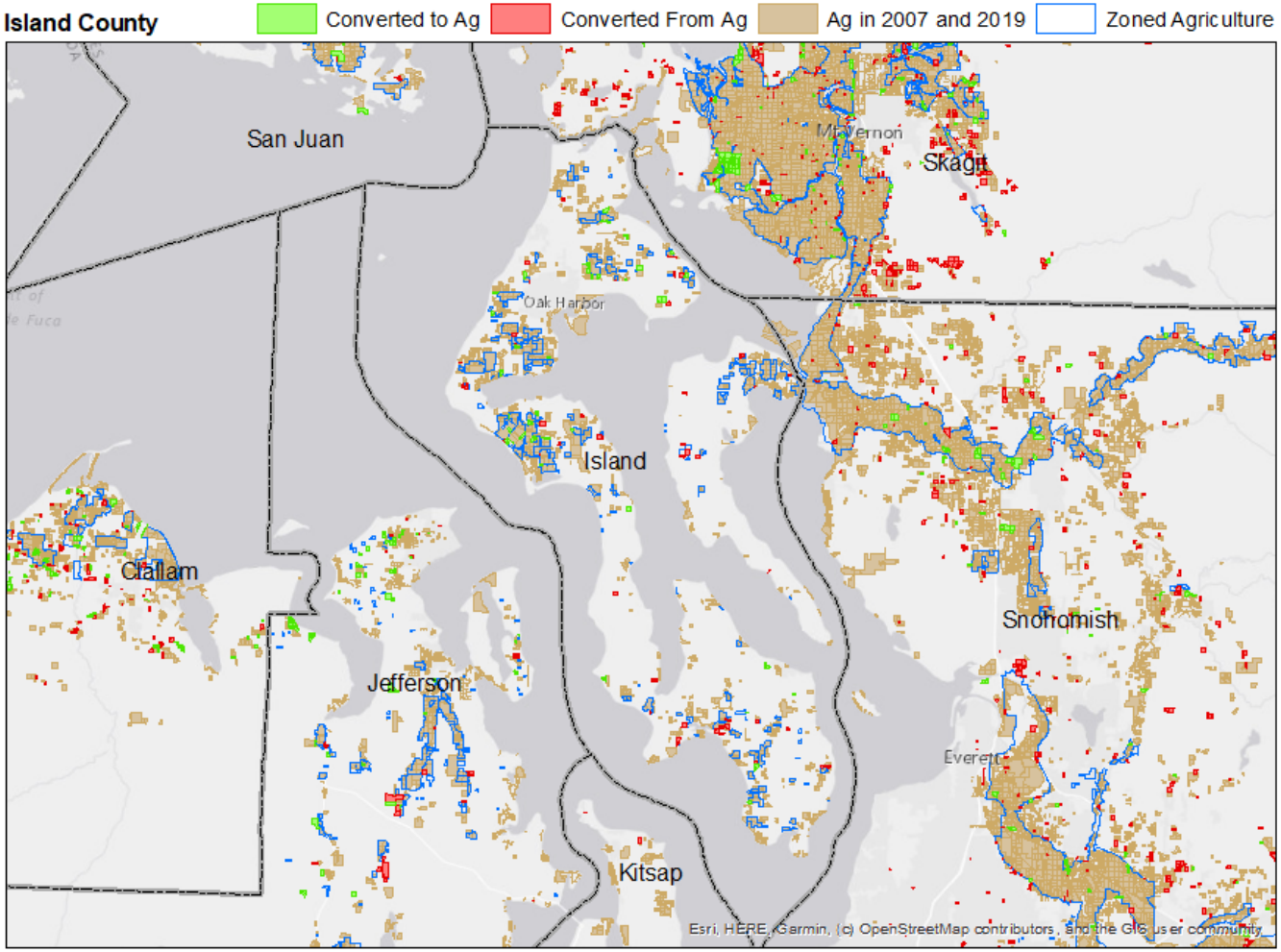
Map 14. Change in agricultural parcels in Garfield county between 2007 and 2019.



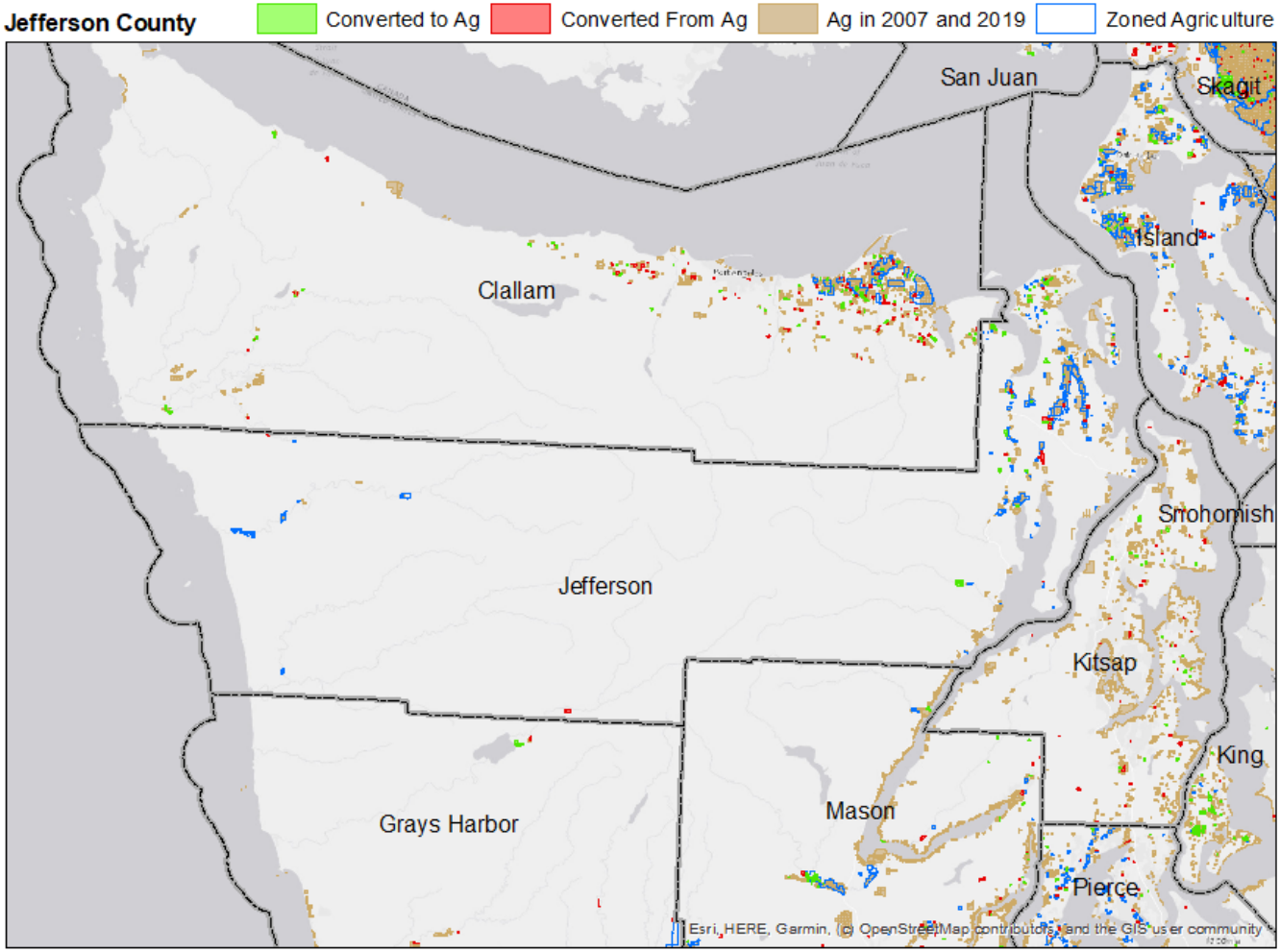
Map 15. Change in agricultural parcels in Grant county between 2007 and 2019.



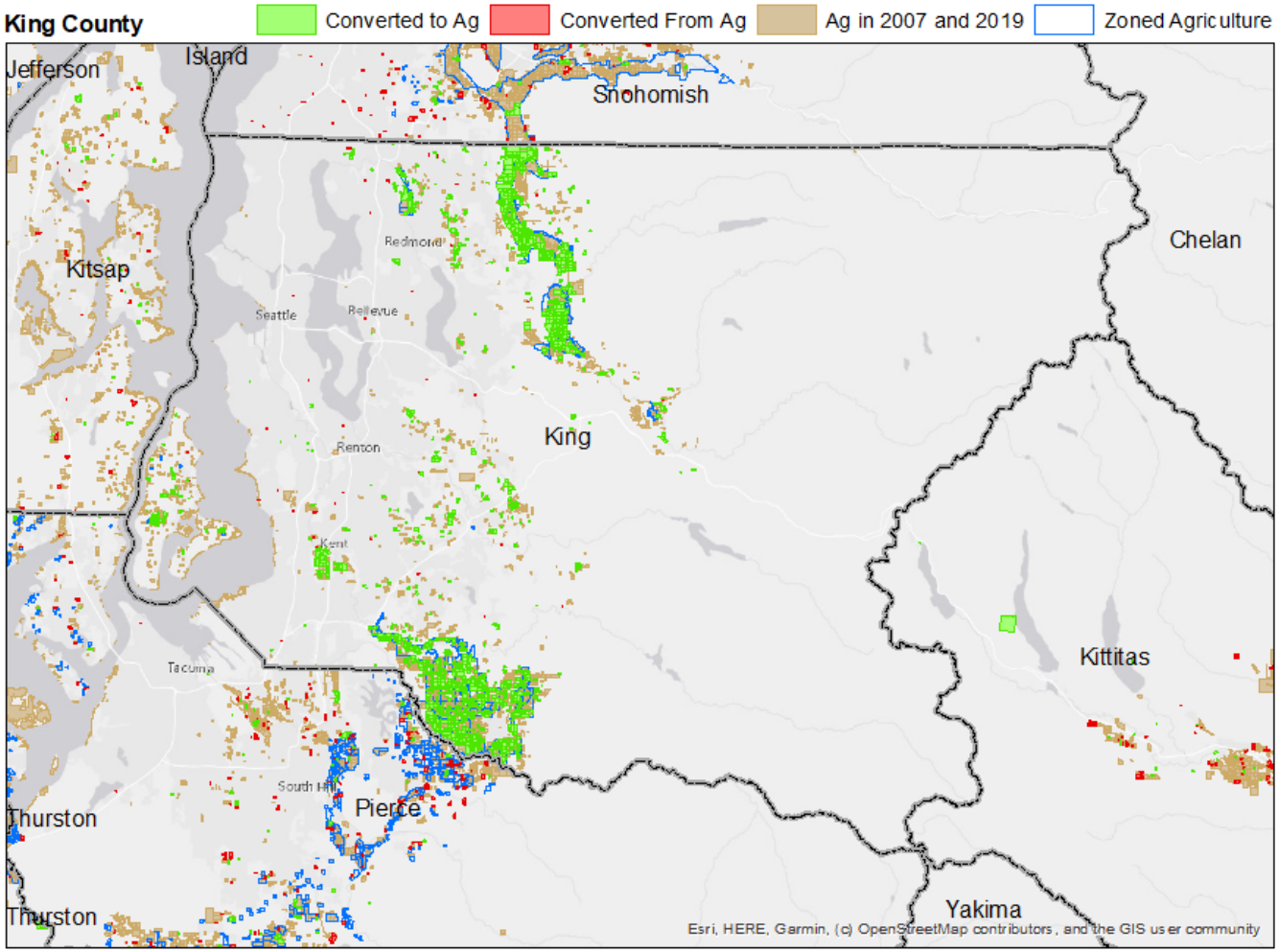
Map 16. Change in agricultural parcels in Grays Harbor county between 2007 and 2019.



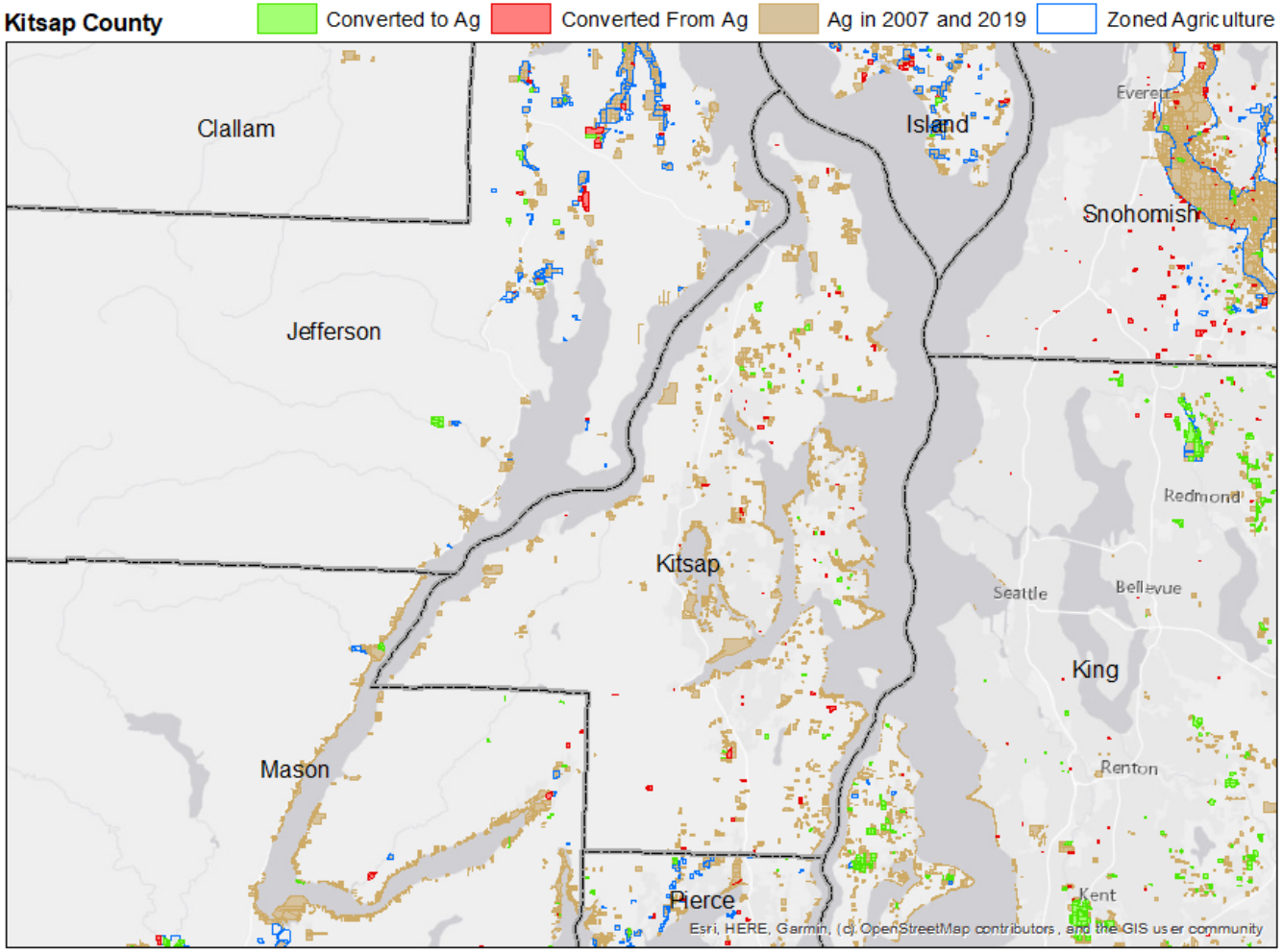
Map 17. Change in agricultural parcels in Island county between 2007 and 2019.



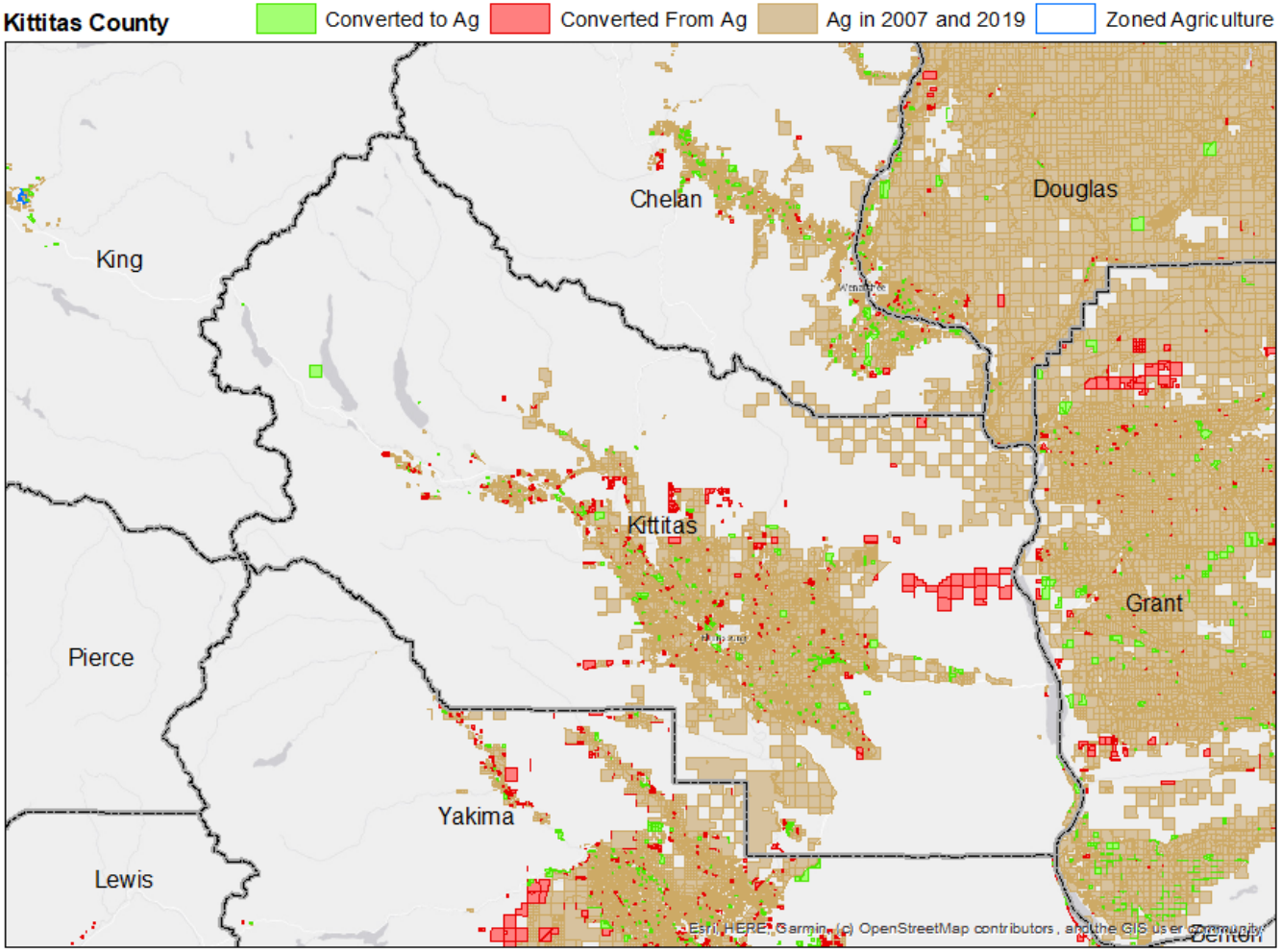
Map 18. Change in agricultural parcels in Jefferson county between 2007 and 2019.



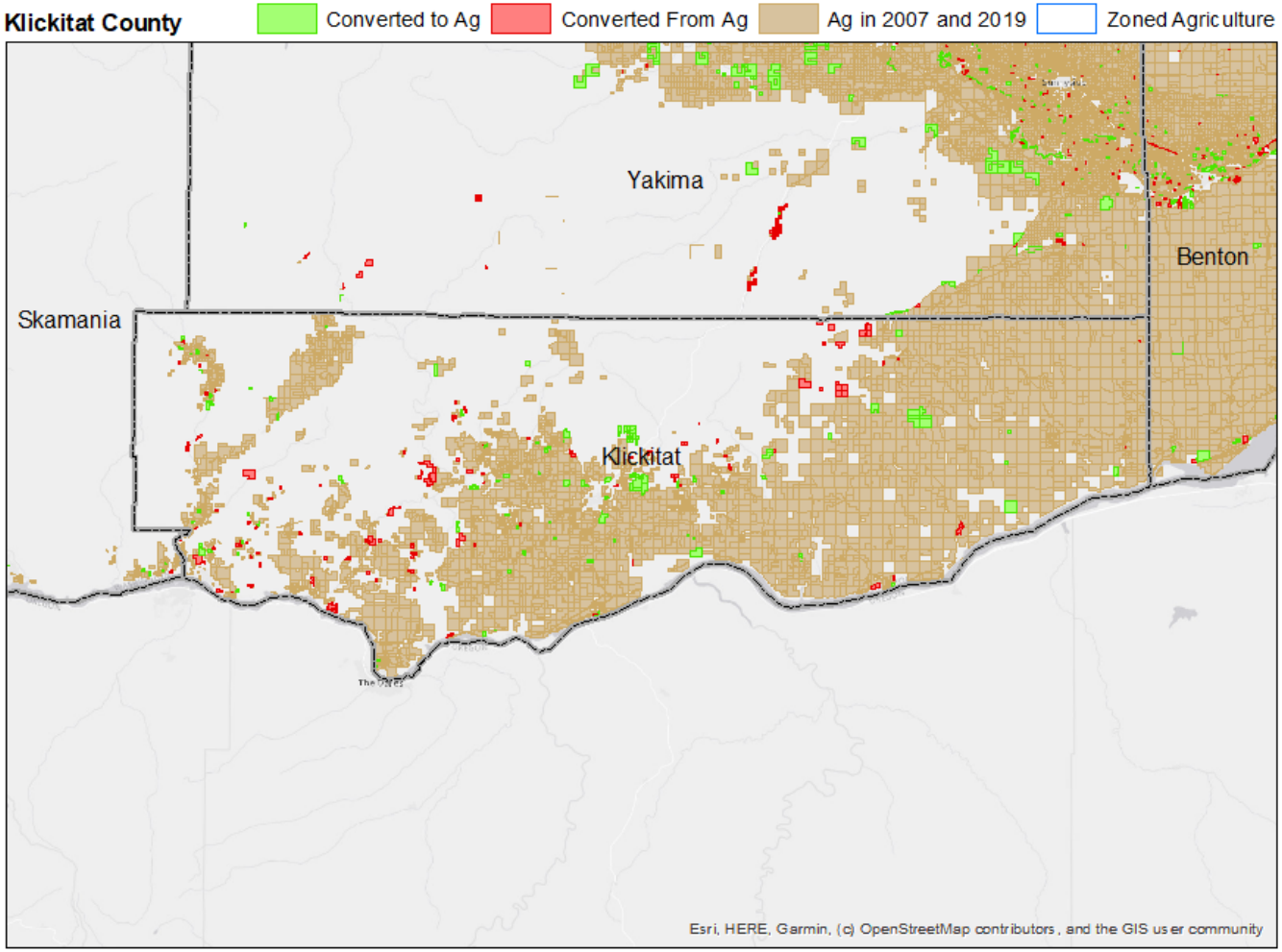
Map 19. Change in agricultural parcels in King county between 2007 and 2019.



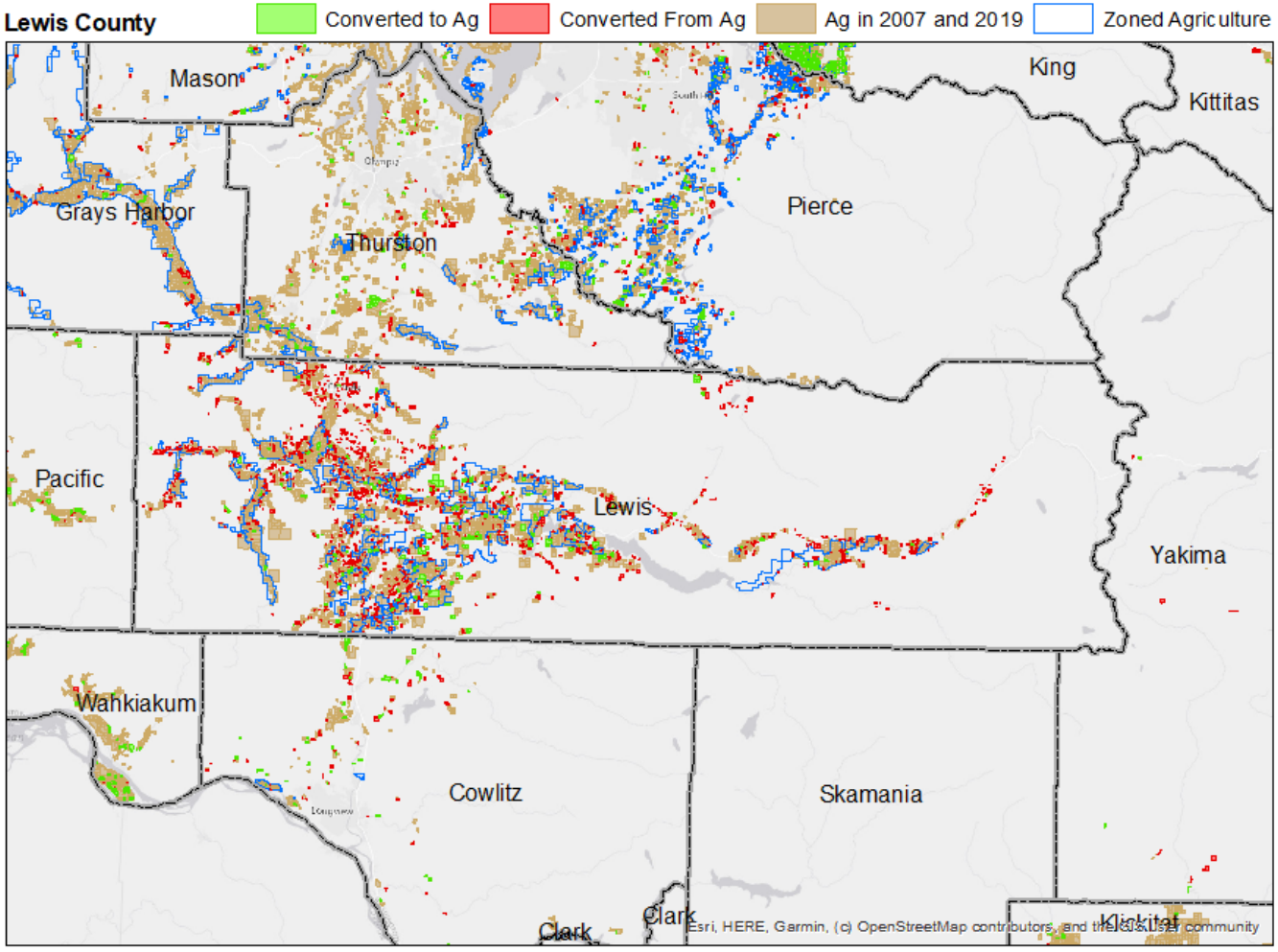
Map 20. Change in agricultural parcels in Kitsap county between 2007 and 2019.



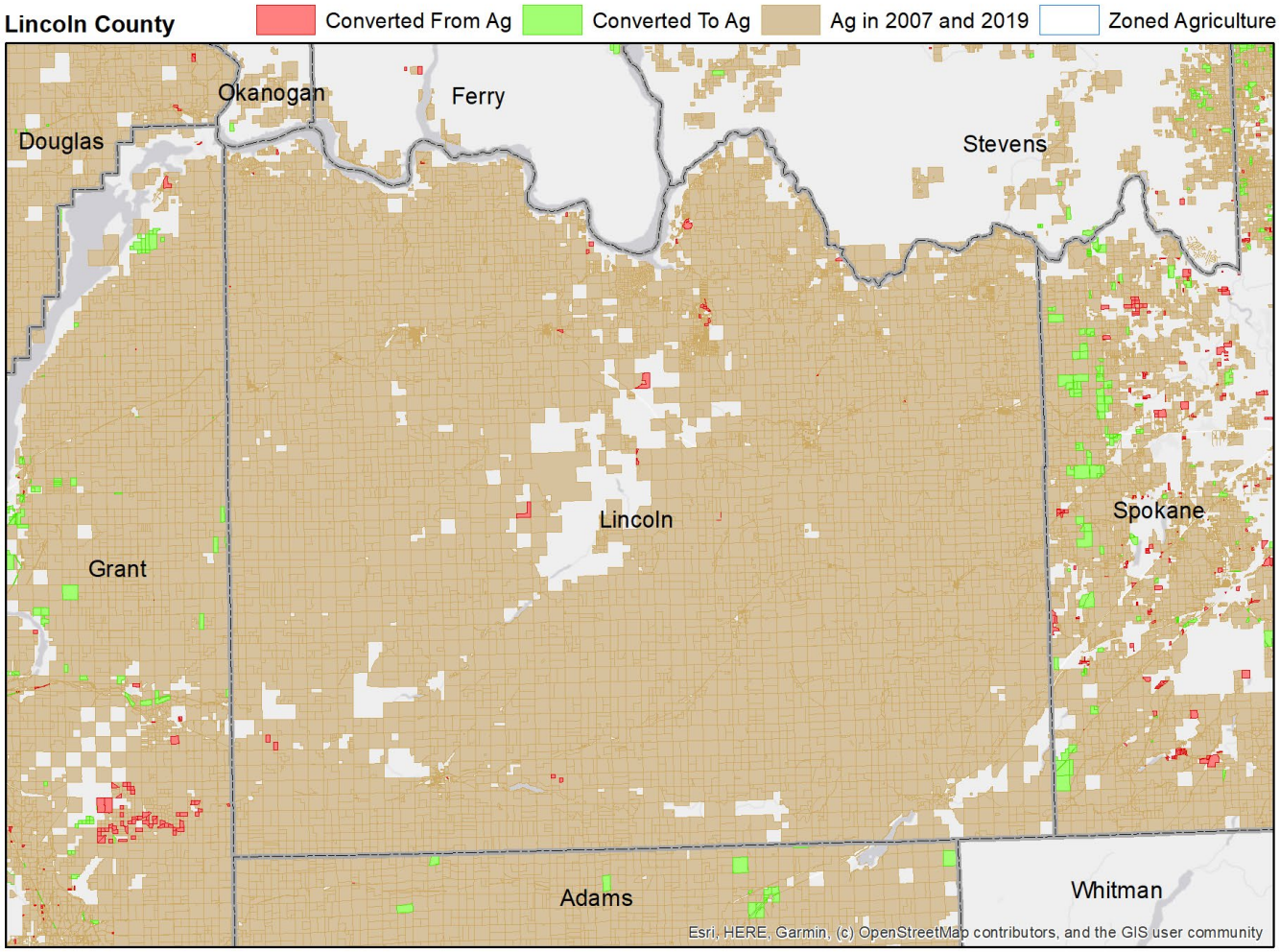
Map 21. Change in agricultural parcels in Kittitas county between 2007 and 2019.



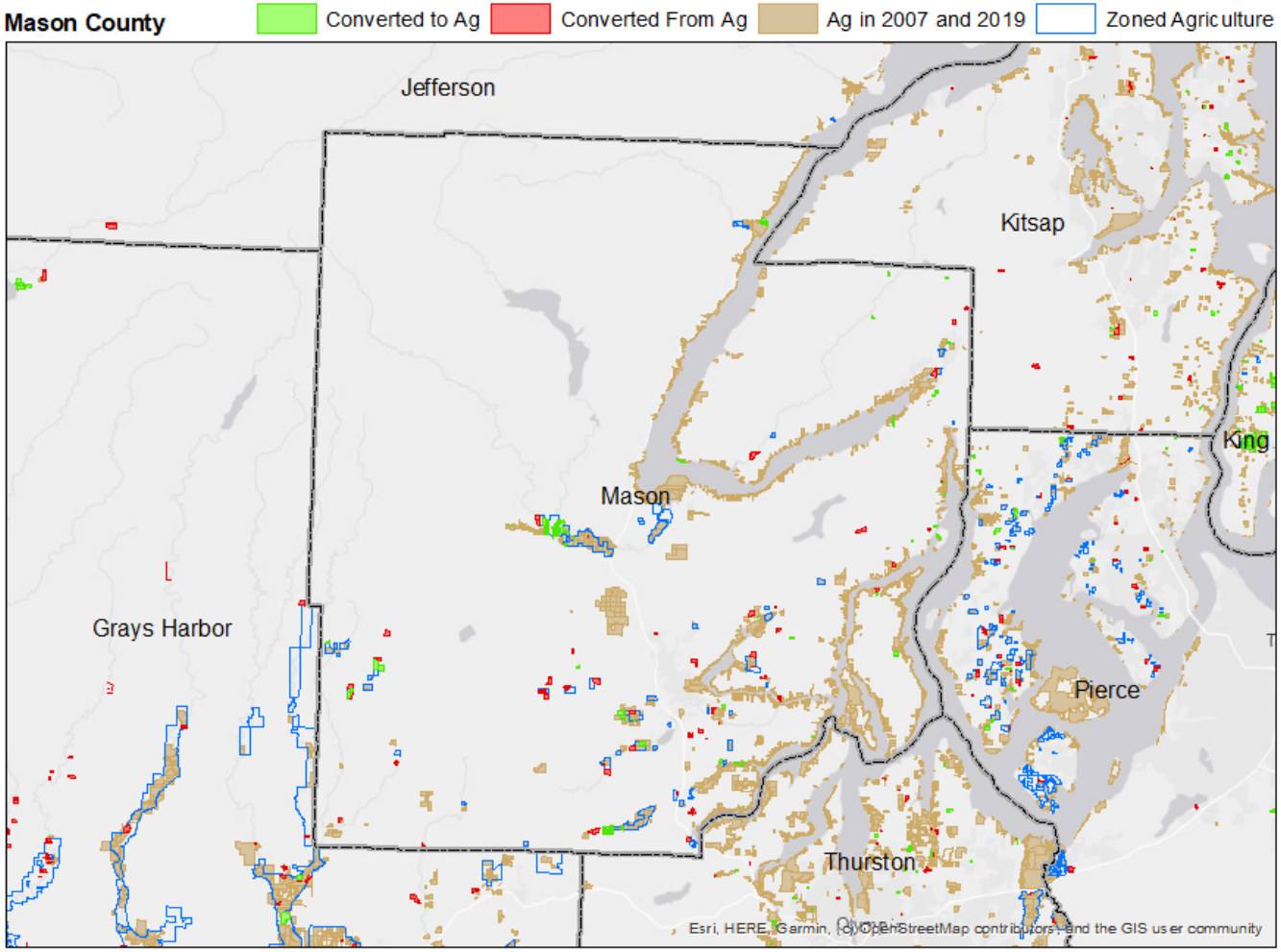
Map 22. Change in agricultural parcels in Klickitat county between 2007 and 2019.



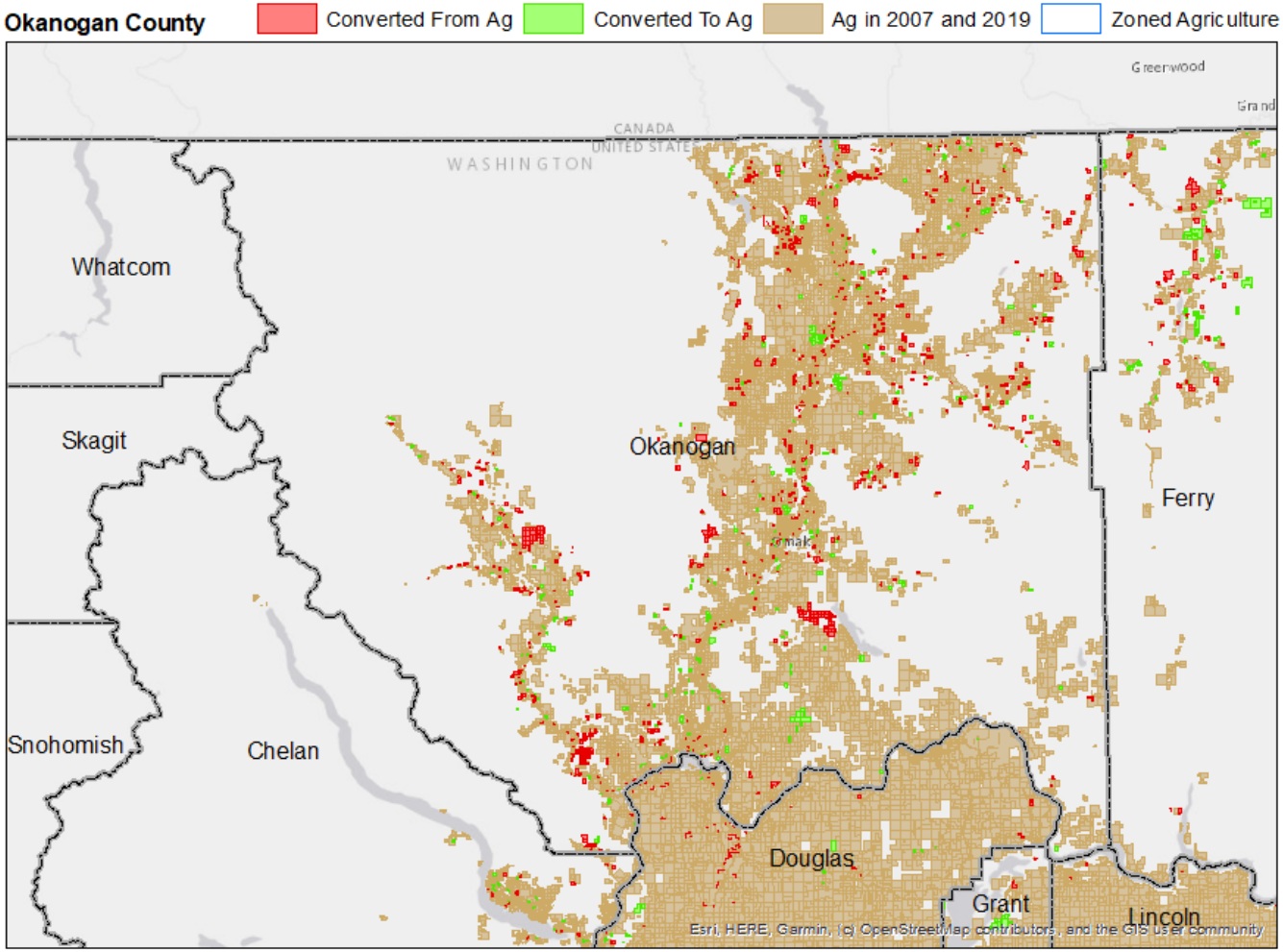
Map 23. Change in agricultural parcels in Lewis county between 2007 and 2019.



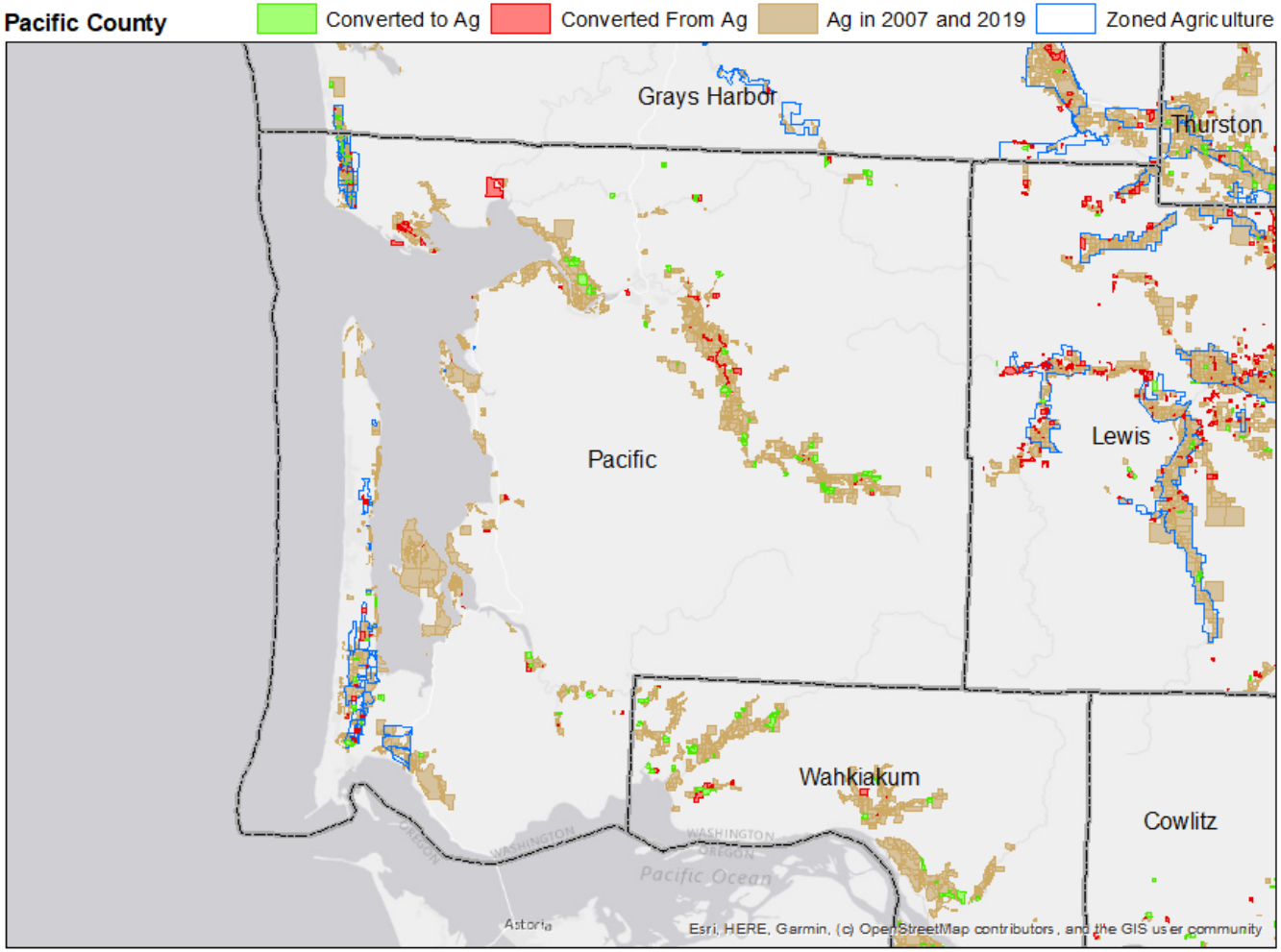
Map 24. Change in agricultural parcels in Lincoln county between 2007 and 2019.



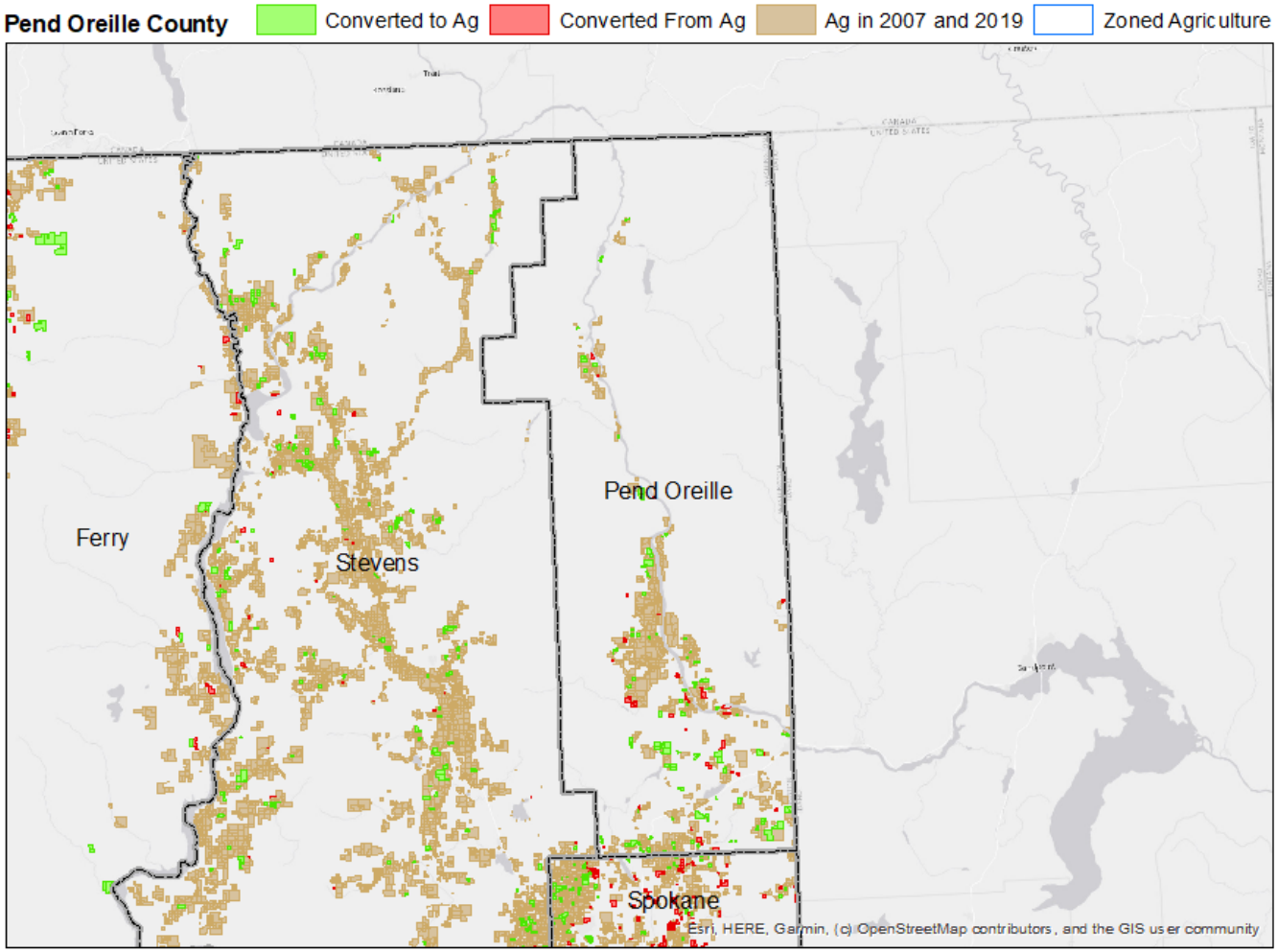
Map 25. Change in agricultural parcels in Mason county between 2007 and 2019.



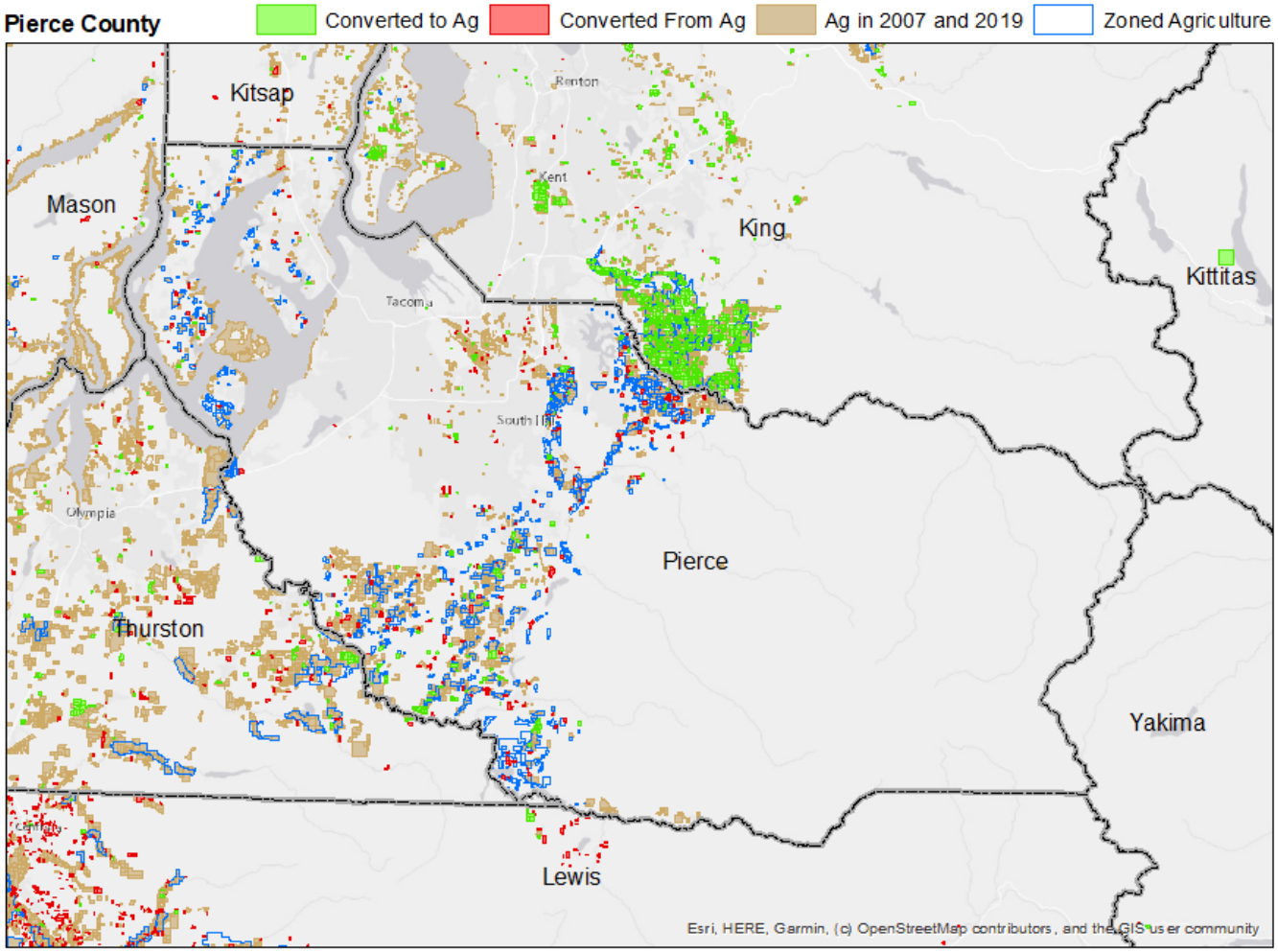
Map 26. Change in agricultural parcels in Okanogan county between 2007 and 2019.



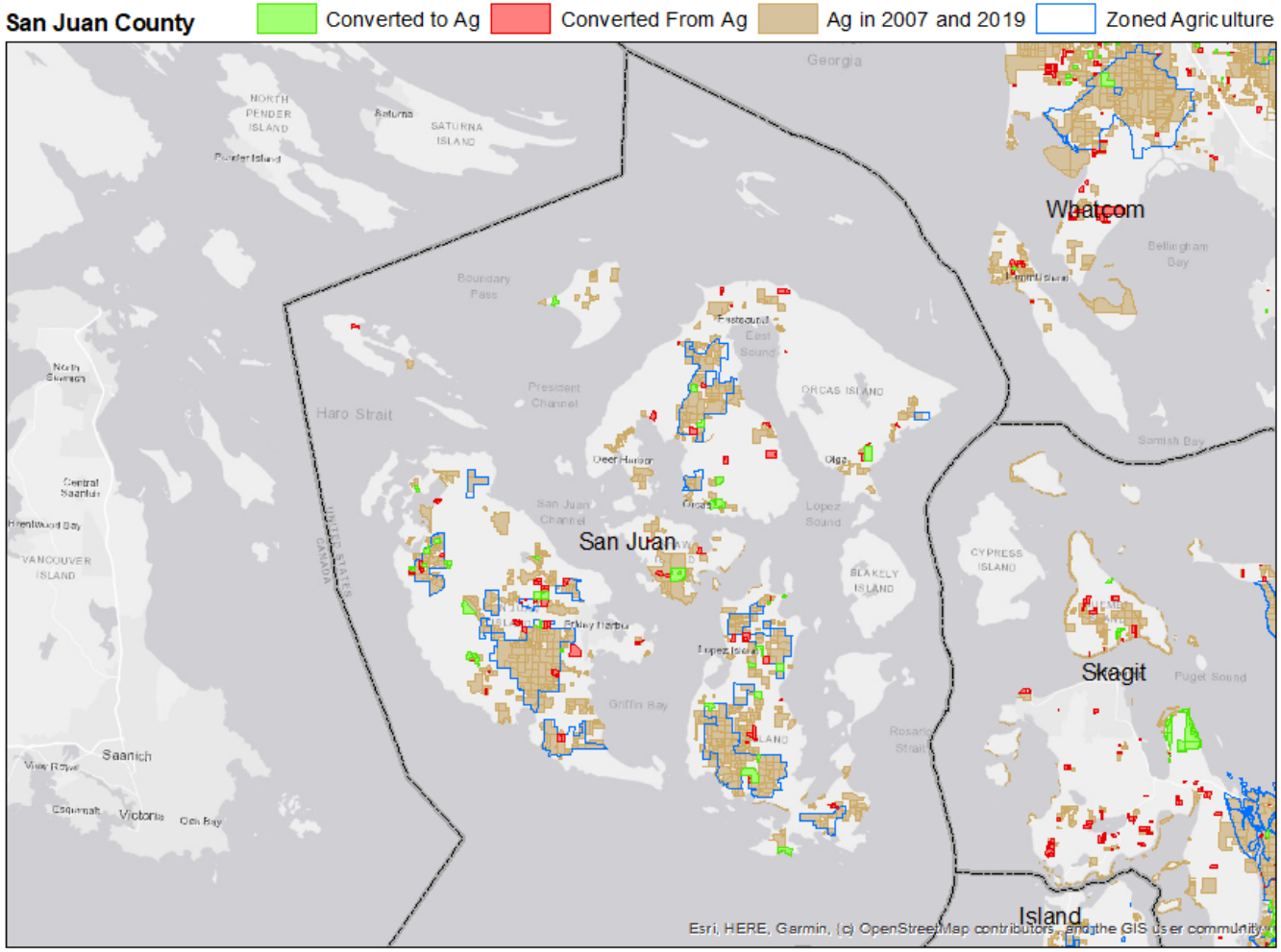
Map 27. Change in agricultural parcels in Pacific county between 2007 and 2019.



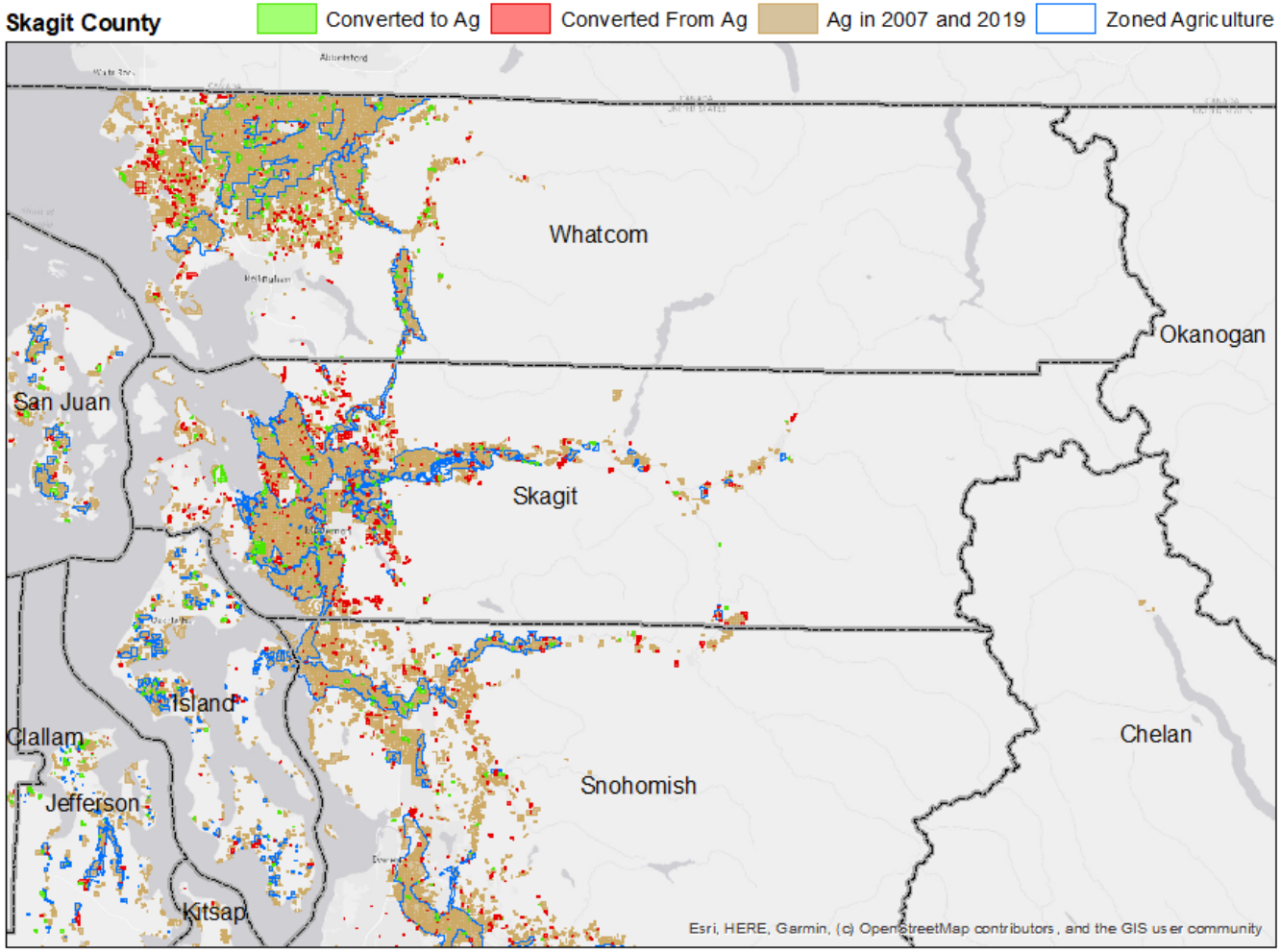
Map 28. Change in agricultural parcels in Pend Oreille county between 2007 and 2019.



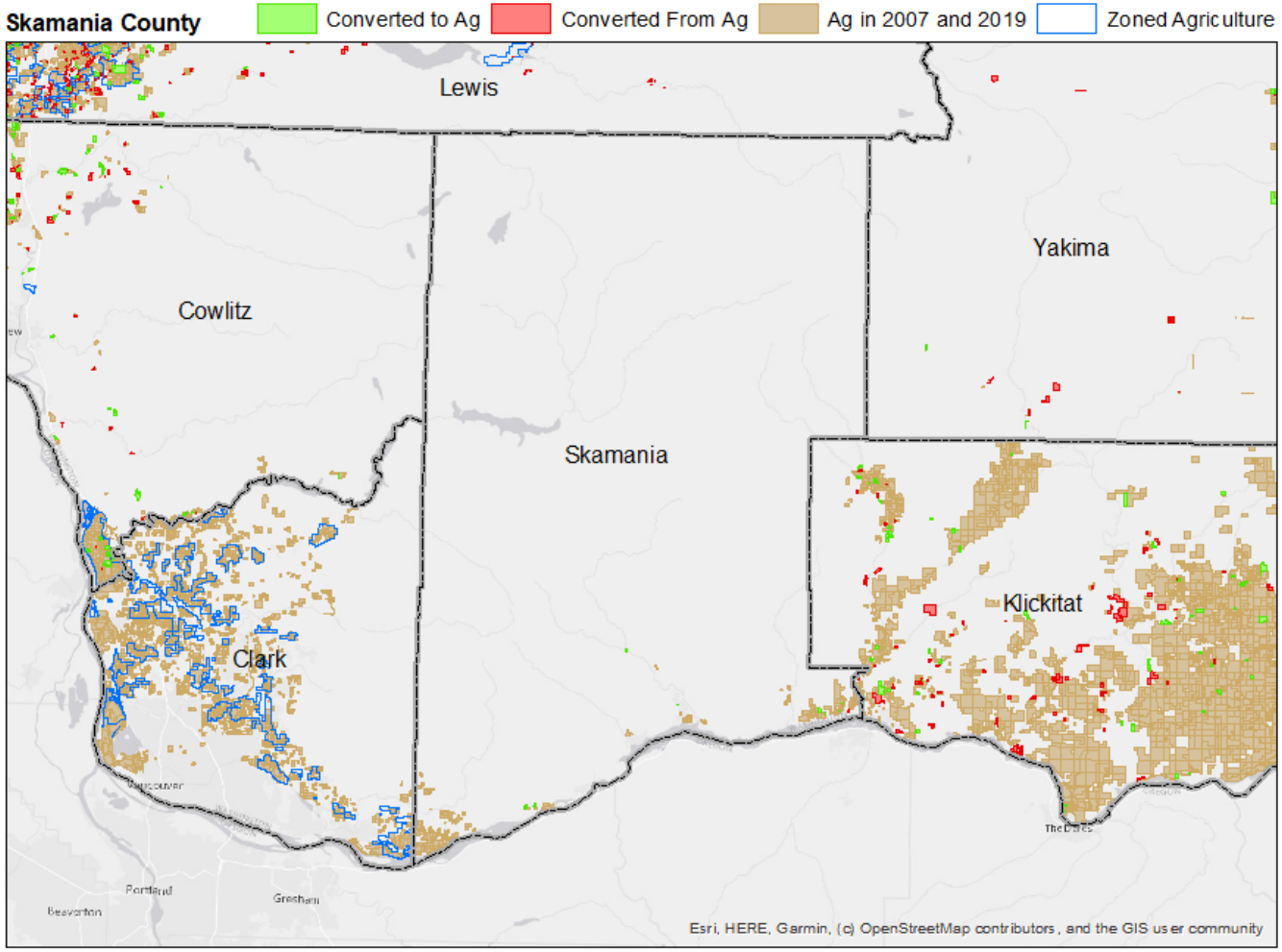
Map 29. Change in agricultural parcels in Pierce county between 2007 and 2019.



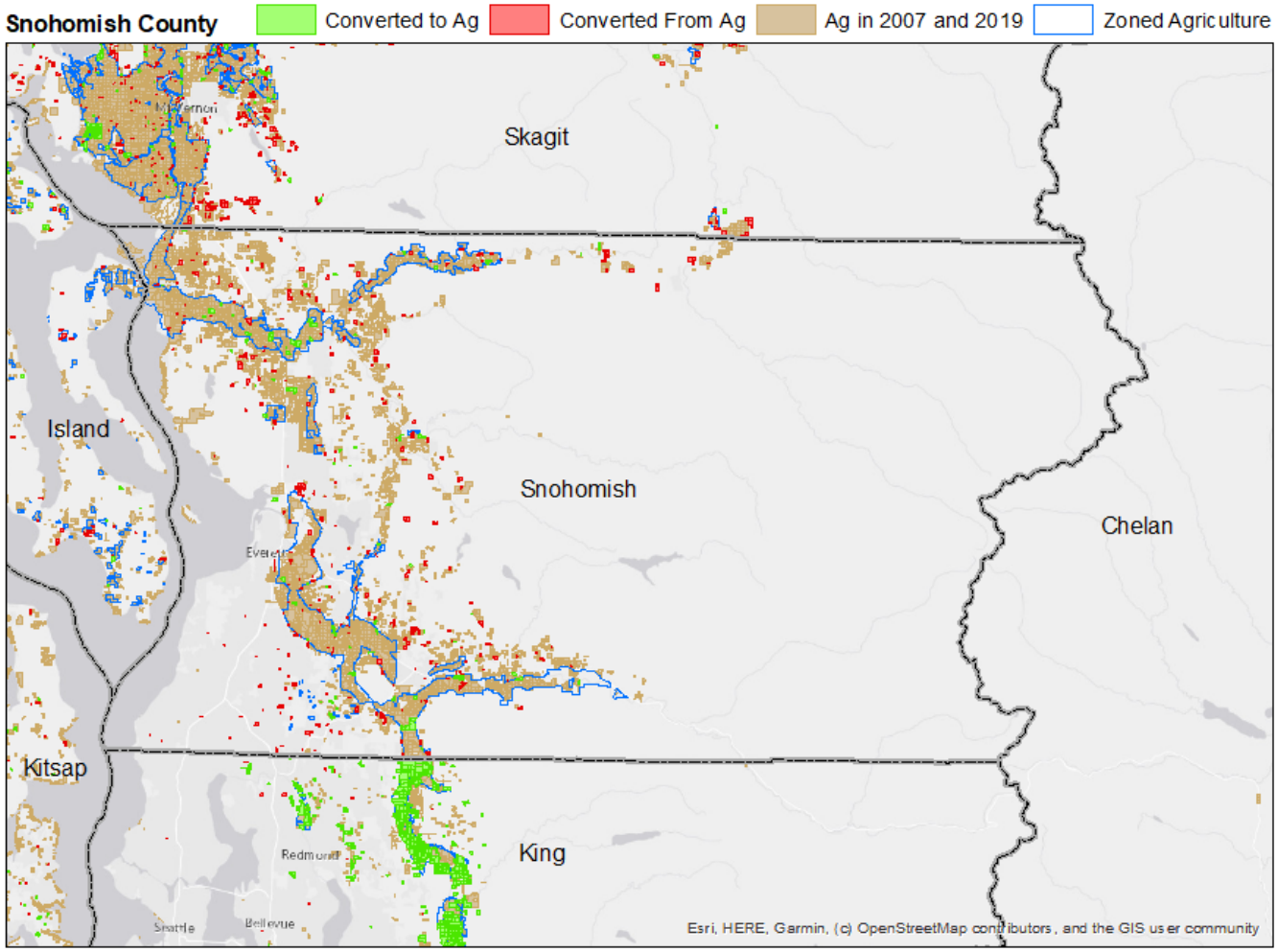
Map 30. Change in agricultural parcels in San Juan county between 2007 and 2019.



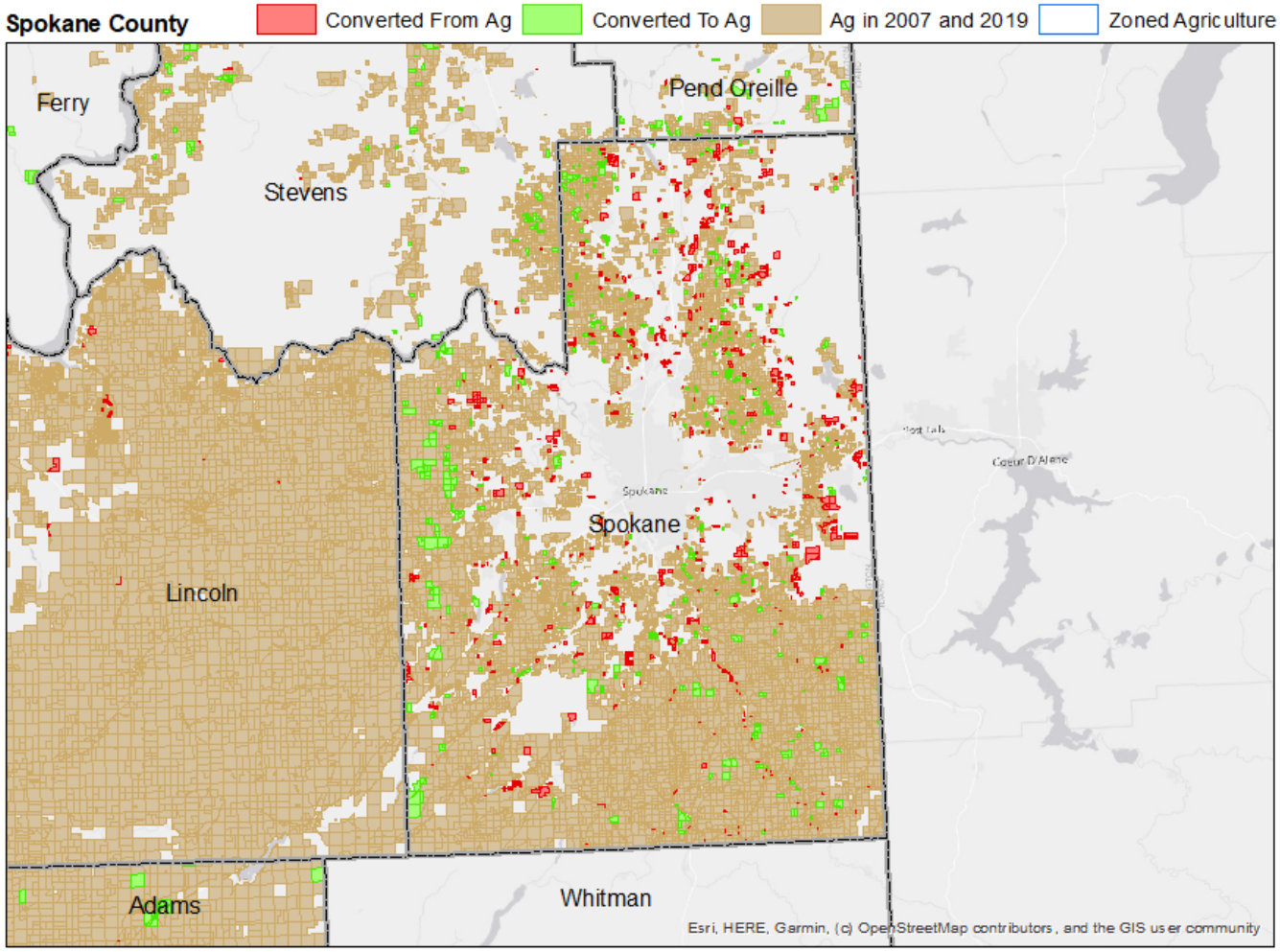
Map 31. Change in agricultural parcels in Skagit county between 2007 and 2019.



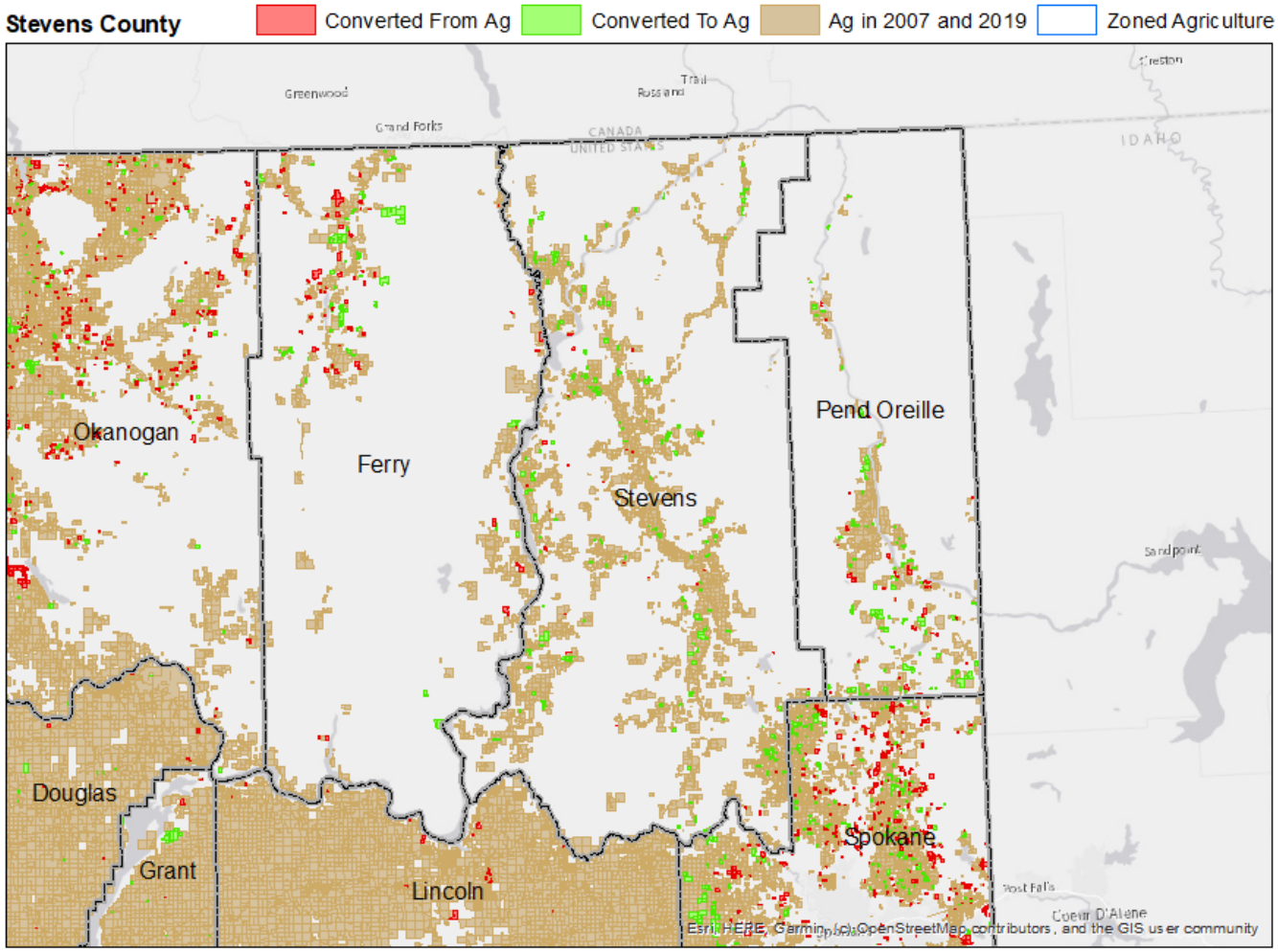
Map 32. Change in agricultural parcels in Skamania county between 2007 and 2019.



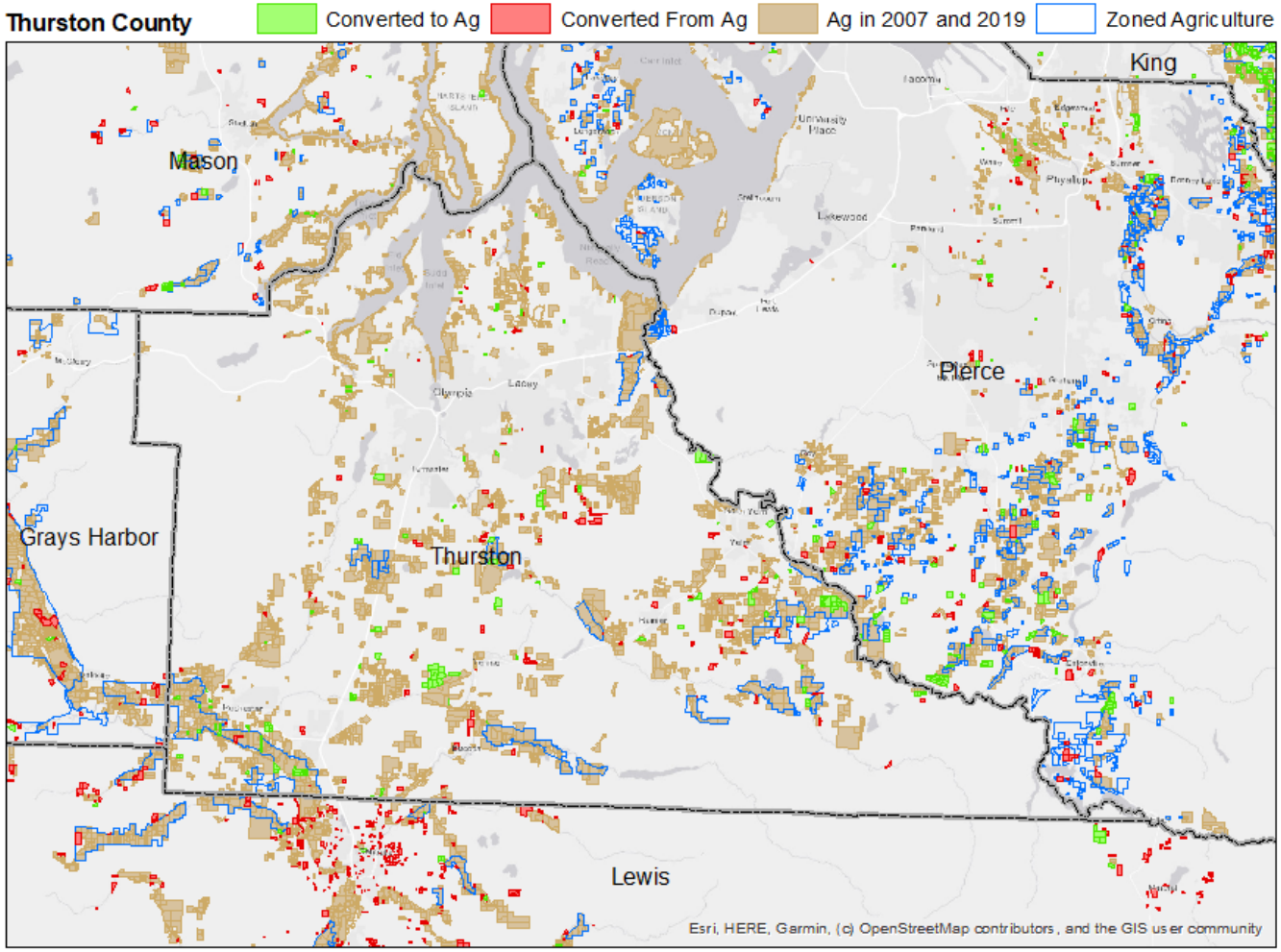
Map 33. Change in agricultural parcels in Snohomish county between 2007 and 2019.



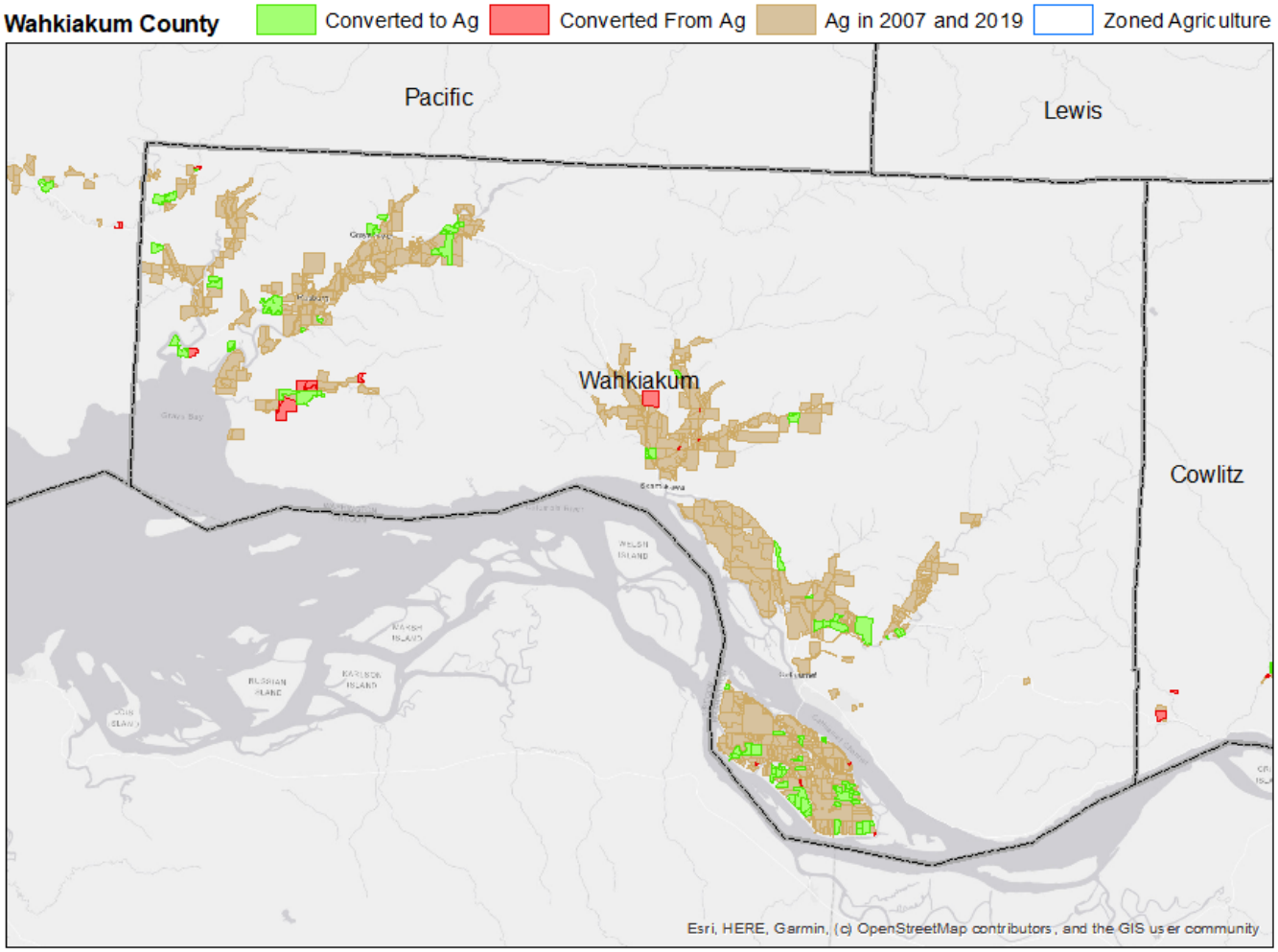
Map 34. Change in agricultural parcels in Spokane county between 2007 and 2019.



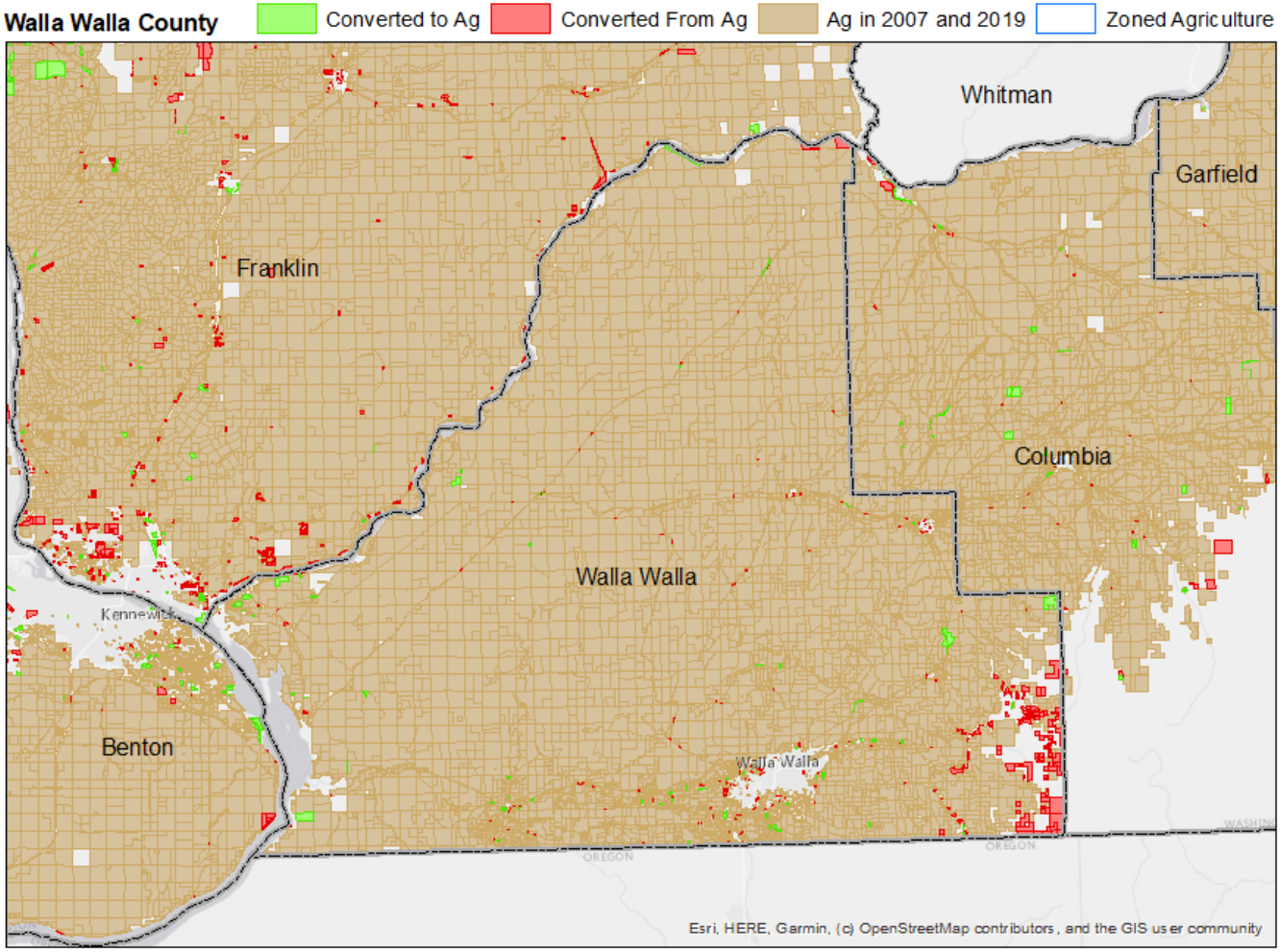
Map 35. Change in agricultural parcels in county between 2007 and 2019.



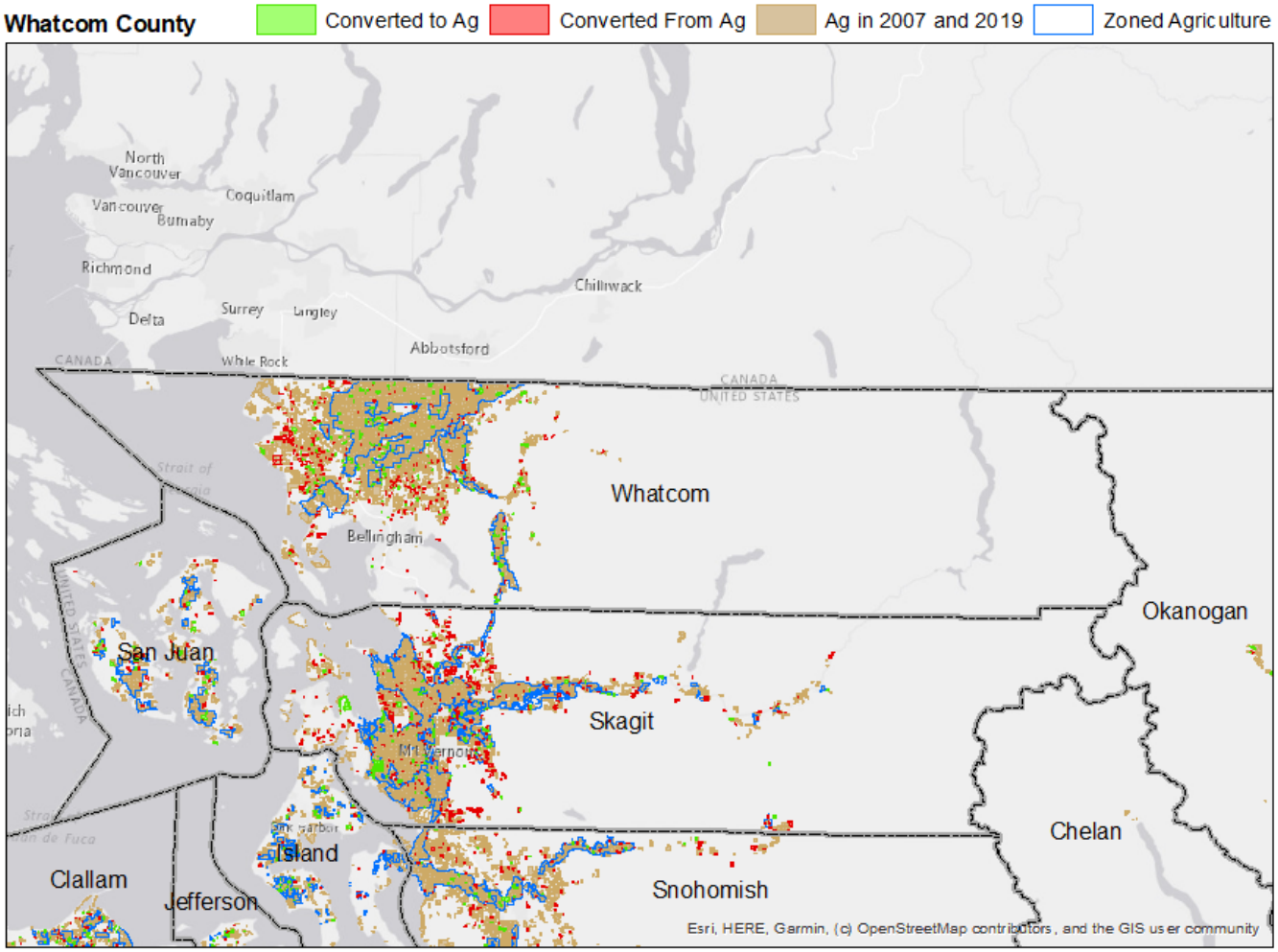
Map 36. Change in agricultural parcels in Thurston county between 2007 and 2019.



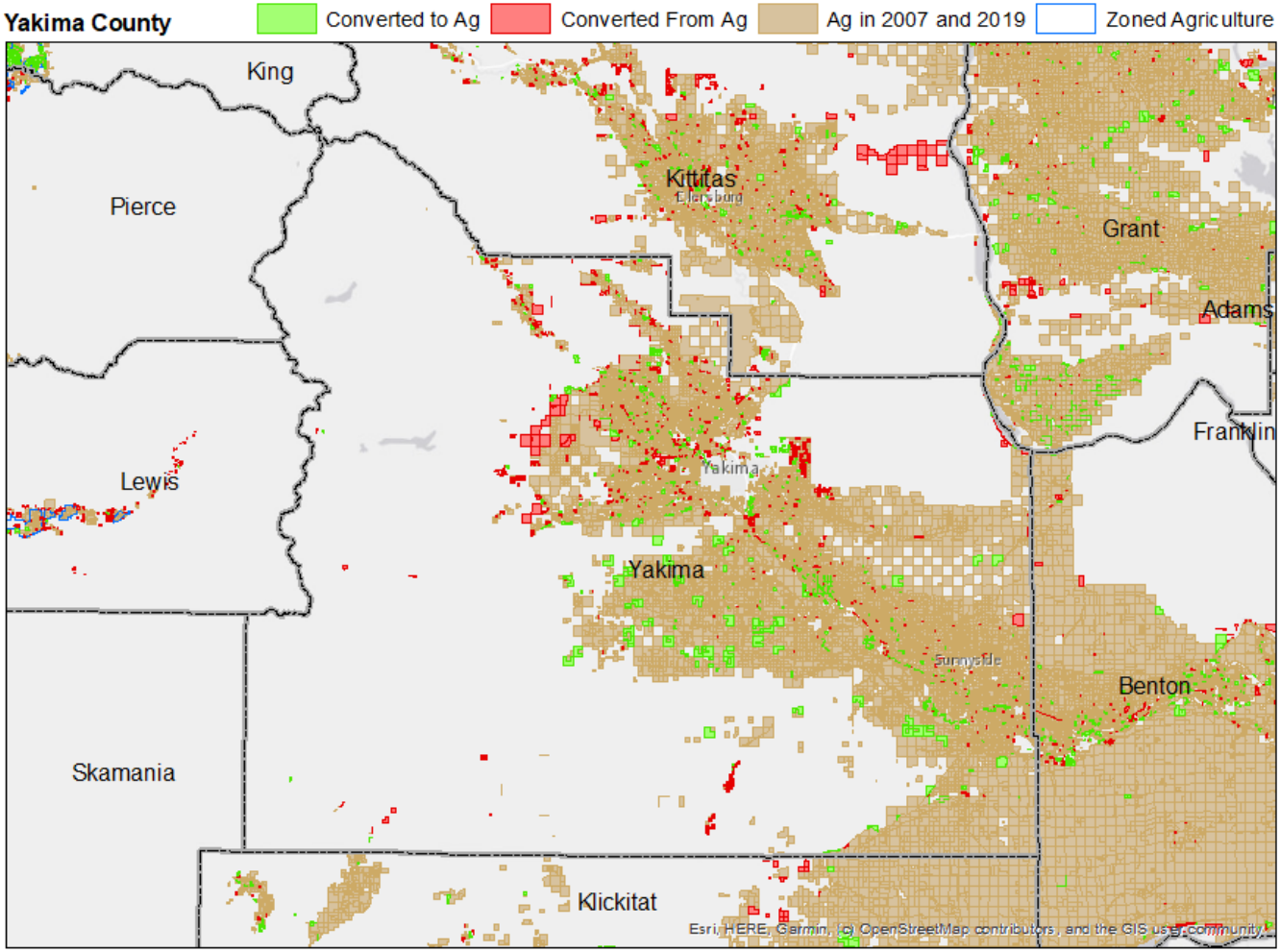
Map 37. Change in agricultural parcels in Wahkiakum county between 2007 and 2019.



Map 38. Change in agricultural parcels in Walla Walla county between 2007 and 2019.



Map 39. Change in agricultural parcels in Whatcom county between 2007 and 2019.



Map 40. Change in agricultural parcels in Yakima county between 2007 and 2019.

8 APPENDIX B. DATA DICTIONARY FOR THE 2019 WASHINGTON STATE AGLAND DATABASE

Parcel datasets including geometry, owner, land use, value, and transactions were acquired from each county assessor. Additional datasets used to develop the Agland table are listed after the attributes. Superscript refers to the relevant dataset(s) for the attribute.

Attributes

PolyID: The unique identifier for each parcel created in the data normalization process.

AglandID: The unique identifier for each parcel in the forestland table.

HalfState: Indicates whether the parcel is located in Eastern or Western Washington.

County: Indicates the county where the parcel is located[1].

OwnerClassName: Indicates whether the parcel is owned by a Private, Municipal, Tribal, State, or Federal entity. This was determined by examining the owner name for each parcel, comparing it to a categorized, exhaustive list of names, and placing the parcel into a category.

OwnerSubClassName: Varies by Owner Class. OwnerSubClassName values include Forestry Department, Conservation, Utility, Real Estate, Non-Industrial, Watershed, BLM, and Other. Not all sub classes are used for each owner class.

For Private owner class, Forestry Department indicates corporate/industrial, Conservation, Utility, and Real Estate are descriptive of their owners, Non-Industrial indicates landowners generally owning less than 5000 acres, and Other includes remaining large private owners (e.g., ranches).

For Municipal owner class, Forestry Department specifies parcels managed by Grays Harbor county for timber production, Watershed includes parcels managed for water (e.g. Cedar River Watershed), and Other identifies remaining parcels (e.g. city and county parks).

For Tribal owner class, Forestry Department indicates whether the parcel is owned by a tribe with an industrial forest management program (e.g. Quinault, Yakima, Spokane, Colville, Muckleshoot), and NIPF indicates other parcels owned by tribes.

For State owner class, Forestry Department indicates whether the parcel is managed by the Department of Natural Resources, and Other indicates another manager (e.g. Department of Fish and Wildlife).

For Federal owner class, Forestry Department indicates whether the parcel is managed by the Forest Service, BLM is descriptive, and Other indicates a parcel is managed by another manager (e.g. Department of Defense).

ParcelAcres: The total acreage calculated by the GIS software for the geometry of each parcel.

FarmedAcres: The total acreage of field or orchard on each parcel. This was calculated in one of two ways:

1. Using the WSDA Crop Agricultural Land Use dataset. The WSDA data was intersected with the parcel geometry to determine the amount of forest within each parcel[6].
2. Using the parcel land use code. It is assumed that if a parcel is in a designated forestland tax program, that the entire acreage is managed as forest even if some portion of the parcel is non-forest in the WSDA dataset. The full parcel acreage is considered to be farmed in this scenario.

PercentFarmed: FarmedAcres divided by ParcelAcres.

TractAcres: Contiguous properties owned by the same owner are called a tract. A tract can be a single parcel. This is the acreage of the tract in which a parcel is a member.

MaxNameAcres: A best attempt to determine ownership acres, the total acreage owned by the owner of each parcel within that parcel's county. Counties may use either taxpayer or owners for each parcel, so this attribute could not be named Ownership Acres. Each parcel may also have more than one owner. For each owner of a parcel, their total acreage owned in the county is calculated, and the largest total acreage for the multiple owners is used.

MaxNameAcresForested: The same as MaxNameAcres, but for acres of farmed, not parcel acres.

LandUseCode: The land use as assessed by each County Assessor. County values were normalized to fit the Washington State 'Standard two-digit land use code' values as defined in WAC 458-53-30. Values range from 1 to 99.

OpenSpace: Whether the parcel is enrolled in the Open Space program (land use code 94). Values 1 or 0.

ZoneName: The land use zone for the parcel. Zone was normalized for western Washington counties only. Values are: Agriculture, Commercial Forest/Conservation, Commercial/Industrial, Public/Tribal/Water, Rural Forest 5, 10, 20, 40, Rural Residential <3, Rural Residential 5, 10, 20, 40, UGA, and Unknown.

HousingDensity: The housing density for the parcel. Housing Density was developed for western Washington counties only. Values are: 0, .17, .23, .34, .5, 1, 2, 2.5, 3, 4.8, 5, 10, 16, 19, 20, 35, 38, 40, 80.

NASSAcres: The total acreage of each parcel that is farmed by NASS[7].

NASSPercentFarmed: NASSAcres divided by ParcelAcres.

WSDAAcres: The total acres of each parcel that is farmed by WSDA[6].

WSDAPercentFarmed: WSDAAcres divided by ParcelAcres.

NASSAcresCerealGrain: The total number of acres by NASS that is in the Cereal/Grain crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

NASSAcresHaySileage: The total number of acres by NASS that is in the Hay/Sileage crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

NASSAcresVegetables: The total number of acres by NASS that is in the Vegetable crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

NASSAcresOrchard: The total number of acres by NASS that is in the Orchard crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

NASSAcresPasture: The total number of acres by NASS that is in the Pasture crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

NASSAcresSeed: The total number of acres by NASS that is in the Seed crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

NASSAcresOilSeed: The total number of acres by NASS that is in the Oil Seed crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

NASSAcresBerry: The total number of acres by NASS that is in the Berry crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

NASSAcresVineyard: The total number of acres by NASS that is in the Vineyard crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

NASSAcresHerb: The total number of acres by NASS that is in the Herb crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

NASSAcresOther: The total number of acres by NASS that is in the Other crop group[7]. NASS crop type was classified into crop groups based on groups in WSDA.

WSDAAcresCerealGrain: The total number of acres by WSDA that is in the Cereal/Grain crop group[6].

WSDAAcresHaySileage: The total number of acres by WSDA that is in the Hay/Sileage crop group[6].

WSDAAcresVegetables: The total number of acres by WSDA that is in the Vegetable crop group[6].

WSDAAcresOrchard: The total number of acres by WSDA that is in the Orchard crop group[6].

WSDAAcresPasture: The total number of acres by WSDA that is in the Pasture crop group[6].

WSDAAcresSeed: The total number of acres by WSDA that is in the Seed crop group[6].

WSDAAcresOilSeed: The total number of acres by WSDA that is in the Oil Seed crop group[6].

WSDAAcresBerry: The total number of acres by WSDA that is in the Berry crop group[6].

WSDAAcresVineyard: The total number of acres by WSDA that is in the Vineyard crop group[6].

WSDAAcresHerb: The total number of acres by WSDA that is in the Herb crop group[6].

WSDAAcresOther: The total number of acres by WSDA that is in the Other crop group[6].

WSDAIrrigationNone: The number of acres in the WSDA Irrigation Type None[6].

WSDAIrrigationCenterPivot: The number of acres in the WSDA Irrigation Type Center Pivot[6].

WSDAIrrigationSprinkler: The number of acres in the WSDA Irrigation Type Sprinkler[6].

WSDAIrrigationDrip: The number of acres in the WSDA Irrigation Type Drip[6].

WSDAIrrigationRill: The number of acres in the WSDA Irrigation Type Rill[6].

WSDAIrrigationBigGun: The number of acres in the WSDA Irrigation Type Big Gun[6].

WSDAIrrigationMicroSprinkler: The number of acres in the WSDA Irrigation Type Micro Sprinkler[6].

WSDAIrrigationWheelLine: The number of acres in the WSDA Irrigation Type Wheel Line[6].

WSDAIrrigationFlood: The number of acres in the WSDA Irrigation Type Flood[6].

WSDAIrrigationHand: The number of acres in the WSDA Irrigation Type Hand[6].

WSDAIrrigationUnknown: The number of acres in the WSDA Irrigation Type Unknown[6].

UplandAcres: The total acreage of each parcel that is not water or Forest Practice buffer.

CoreBufferAcres: The total acreage of each parcel that is in core buffers. This attribute was calculated using the Washington Department of Natural Resources waterbodies[8], watercourses[4], east/west dividing line[11], and Site Class[10] datasets, and using the Forest Practices Riparian Management Zone rules as defined in WAC 222-30.

InnerBufferAcres: The total acreage of each parcel that is in inner buffers. This attribute was calculated using the Washington Department of Natural Resources waterbodies[8], watercourses[4], east/west dividing line[11], and Site Class[10] datasets, and using the Forest Practices Riparian Management Zone rules as defined in WAC 222-30.

OuterBufferAcres: The total acreage of each parcel that is in outer buffers. This attribute was calculated using the Washington Department of Natural Resources waterbodies[8], watercourses[4], east/west dividing line[11], and Site Class[10] datasets, and using the Forest Practices Riparian Management Zone rules as defined in WAC 222-30.

WetlandBufferAcres: The total acreage of each parcel that is in wetland buffers. This attribute was calculated using the Washington Department of Natural Resources wetlands[9] and Site Class[10] datasets, and using the Forest Practices Riparian Management Zone rules as defined in WAC 222-30.

WaterAcres: The total acreage of each parcel that is water (waterbodies or wetlands). This attribute was derived using the Washington Department of Natural Resources waterbodies[8] and wetlands[9] datasets.

StreamTotalFeet: The total length in feet of all watercourses on a parcel. The watercourse data was created by the Washington Department of Natural Resources[4].

Stream_F_Feet: The total length in feet of all type F watercourses on a parcel. The type F designation is a DNR Forest Practices Fish Habitat Water Type Code, implemented for Western Washington March 1, 2005, and for Eastern Washington March 1, 2006. It is used in conjunction with WAC 222-16-030 and 222-16-031 and the Washington Forest Practices Board Manual. The watercourse data was created by the Washington Department of Natural Resources[4].

Stream_S_Feet: The total length in feet of all type S watercourses on a parcel. The type S designation is a DNR Forest Practices Fish Habitat Water Type Code, implemented for Western Washington March 1, 2005, and for Eastern Washington March 1, 2006. It is used in conjunction with WAC 222-16-030 and 222-16-031 and the Washington Forest Practices Board Manual. The watercourse data was created by the Washington Department of Natural Resources[4].

Stream_N_Feet: The total length in feet of all type N watercourses on a parcel. The type N designation is a DNR Forest Practices Fish Habitat Water Type Code, implemented for Western Washington March 1, 2005, and for Eastern Washington March 1, 2006. It is used in conjunction

with WAC 222-16-030 and 222-16-031 and the Washington Forest Practices Board Manual. The watercourse data was created by the Washington Department of Natural Resources[4].

Stream_U_Feet: The total length in feet of all type U watercourses on a parcel. The type U designation is a DNR Forest Practices Fish Habitat Water Type Code, implemented for Western Washington March 1, 2005, and for Eastern Washington March 1, 2006. It is used in conjunction with WAC 222-16-030 and 222-16-031 and the Washington Forest Practices Board Manual. The watercourse data was created by the Washington Department of Natural Resources[4].

Stream_X_Feet: The total length in feet of all type X watercourses on a parcel. The type X designation is a DNR Forest Practices Fish Habitat Water Type Code, implemented for Western Washington March 1, 2005, and for Eastern Washington March 1, 2006. It is used in conjunction with WAC 222-16-030 and 222-16-031 and the Washington Forest Practices Board Manual. The watercourse data was created by the Washington Department of Natural Resources[4].

RoadFeet: The total length in feet of all roads on a parcel. The road data was combined from datesets created by the Washington Department of Natural Resources[5] and USDA Forest Service[15].

CongressionalDistrict: The congressional district name where the parcel is located.

LegislativeDistrict: The legislative district name where the parcel is located.

WRIA: The name of the WRIA (Water Resource Inventory Area) in which each parcel is located. The WRIA dataset was created by the Washington State Department of Ecology[3].

WAU: The name of the WAU (Watershed Administrative Unit) in which each parcel is located. The WAU dataset was created by the Washington Department of Natural Resources[2].

PSAA: The Puget Sound Action Area where the parcel is located[18].

ProximityToDevelopment: The straight-line distance in miles from each parcel to the nearest parcel with a developed Land Use Code (Land Use Code less than 80).

ProximityToUGA: The straight-line distance in miles from each parcel to the nearest urban growth area.

ProximityToPublicRoads: The straight-line distance in miles from each parcel to the nearest major road. Major roads were selected from the Washington Department of Natural Resources transportation dataset[5] that were: primary highway/all-weather/hard surface, secondary highway/ all-weather/ hard surface, light-duty road/ all-weather/ improved surface.

ProximityToAllRoads: The straight-line distance in miles from each parcel to any road. Roads were determined using a combined road network from the Washington State Department of Natural Resources and USDA Forest Service.

ProximityToFS: The straight-line distance in miles from each parcel to the nearest Forest Service parcel.

MostRecentSaleDate: The date of the most recent sale. From county assessor data and WA Department of Revenue dataset[17].

MostRecendInheritedDate: The date of the most recent inherited date. From county assessor data and WA Department of Revenue dataset[17].

MarketValueImprovements: The county assessor assigned total market value for improvements.

MarketValueCrop: The county assessor assigned total market value for improvements. Not all assessors provide the market value of the crop.

MarketValueCropPerAcre: MarketValueCrop divided by FarmedAcres.

MarketValueLand: The county assessor assigned total market value of the land.

MarketValueLandPerAcre: MarketValueLand divided by ParcelAcres.

TaxableValueLand: The county assessor assigned total taxable value for the land.

TaxableValueLandPerAcre: TaxableValueLand divided by ParcelAcres.

TaxBenefitPerAcre: The difference between MarketValueLandPerAcre and TaxableValueLandPerAcres.

MaxNameAcresNNN: Same as MaxNameAcres except it is not based on normalized names. Results in a slightly higher and less accurate estimate but provides consistent methodology to earlier datasets for comparisons across time.

Datasets

1. Washington Department of Natural Resources, County
2. Washington Department of Natural Resources, Watershed Administrative Units (WAU), 2006.
3. Washington Department of Ecology, Water Resource Inventory Areas (WRIA), 2007.
4. Washington Department of Natural Resources, Washington State Watercourse (WC) Hydrography, 2006.
5. Washington Department of Natural Resources, Transportation, 1996.
6. Washington State Department of Agriculture, Crop Agricultural Land Use, 2018.
7. United States Department of Agriculture, National Agricultural Statistics Service (NASS), 2018.
8. Washington Department of Natural Resources, Washington State Waterbodies (WB) Hydrography, 2006.
9. Washington Department of Natural Resources, Forest Practices Wetlands, 2019.

10. Washington Department of Natural Resources, Site Class, 2001.
11. Washington Department of Natural Resources, East/West Dividing Line, 2002.
12. Washington State Department of Community, Trade & Economic Development / Washington Department of Ecology, Urban Growth Area Boundaries, 2008.
13. Washington Department of Natural Resources, Cadastre DNR Managed Land Parcels, 2007.
14. Washington Department of Natural Resources, NDMPL (Washington State Non-DNR Major Public Lands), 2007.
15. USDA Forest Service, Transportation, 2019.
16. Puget Sound Partnership Action Areas, 2010.
17. Washington Department of Revenue, Transactions, 2019.

9 APPENDIX C. LINKS TO ONLINE PRODUCTS

Excel spreadsheet with 2019 summary statistics: *WA_Agland_Statistics_2019.xlsx*

Excel spreadsheet with 2007 to 2019 change statistics: *WA_Agland_Statistics_2019_Trends.xlsx*