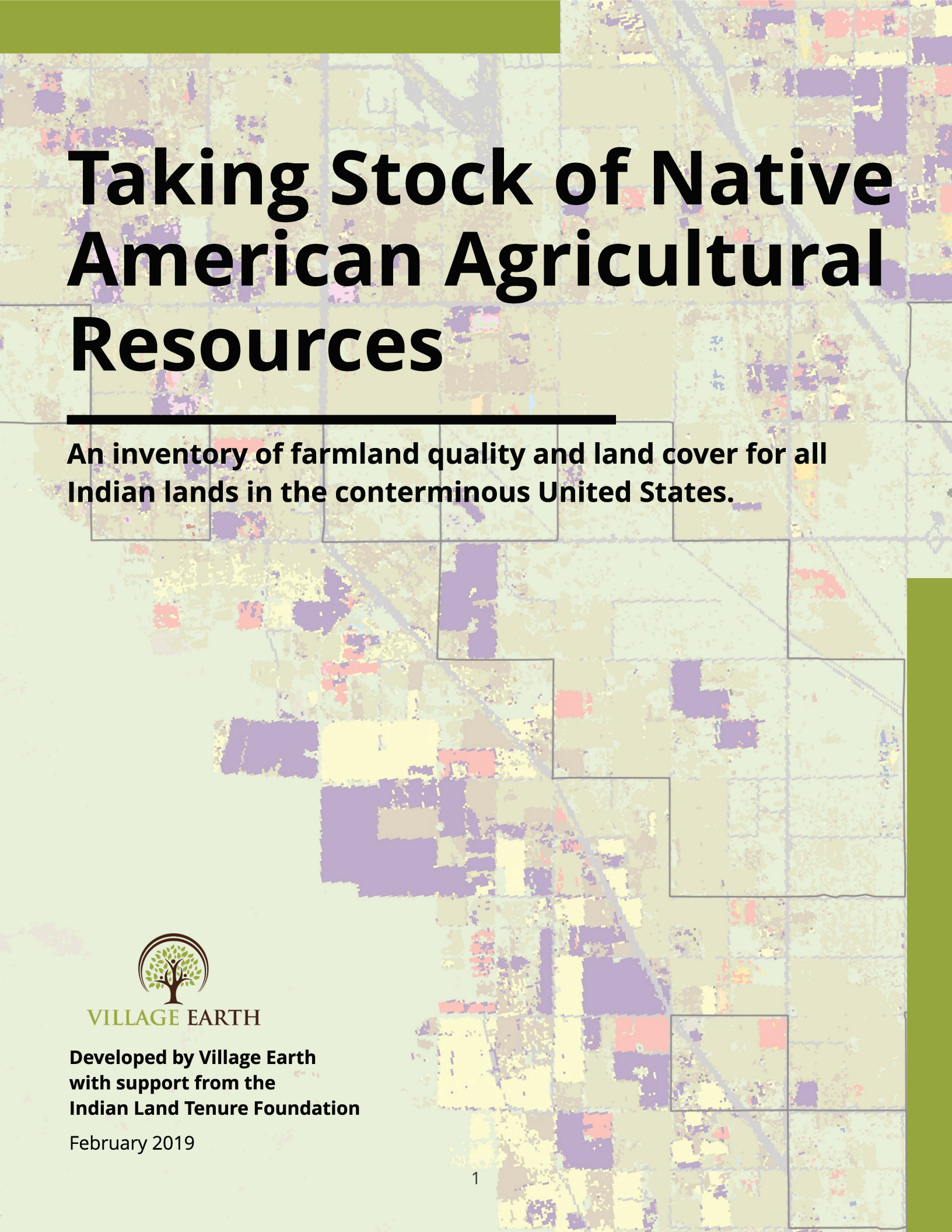
Taking Stock of Native American Agricultural Resources

An inventory of farmland quality and land cover for all Indian lands in the conterminous United States.



VILLAGE EARTH

Developed by Village Earth with support from the Indian Land Tenure Foundation

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Executive Summary

Today, the US Department of Interior's Bureau of Indian Affairs (BIA) holds 56.2 million acres of lands in trust for various Indian tribes and individuals. Approximately 46 million acres (81%) of this land is used for farming and grazing by livestock and game animals, yet despite these vast resources, for at least the last 100 years, Native Americans have not been the primary beneficiaries of agriculture on their lands. According to the 2012 USDA Census of Agriculture Native Americans farmers and ranchers only captured 10% of the Agriculture revenue generated on their lands. While Native Americans struggle with disproportionate levels of poverty, food scarcity, and food-related illnesses the majority of their lands are being leased by the Federal Government to non-Natives. In response, many Native communities have launched various initiatives to increase their utilization and control over their agricultural resources. However, a fundamental obstacle for these initiatives has been the lack of agriculture and land use information for their lands.[1] In fact, the Bureau of Indian Affairs does not make available to the public even basic statistics about its agricultural leasing programs or land ownership data on Indian lands. Furthermore, the Federal government produces a great deal of agriculture information at the county and state levels they often neglect to collect and/or format this data for American Indian lands, which can and often does overlap state and county boundaries. For example, the federal government has been collecting Agriculture Census data for every county in the United States since 1840 but it was only in 2012 when they started to collect data in earnest for a select number of American Indian Reservations. While this demonstrates progress, there are still numerous datasets that need to be formatted to calculate data for American Indian Lands. Two of the the largest and most important datasets yet to be formatted for American Indian lands are the USDA's Cropland Data Layer (CDL) and the NRC's Soil Survey Geographic Database (SSURGO).

This report details the creation of the first ever database of prime farmland and crop-specific land covers for all contemporary and ceded Indian lands (after 1887) within the conterminous United States. This data was acquired from the NRCS's 2018 Soil Survey Geographic Database (SSURGO) and the USDA's 2017 Cropland Data Layer (CDL). Using SSURGO data we compiled the total acreage for twelve farmland quality classifications for all recognized Indian areas within the conterminous United States as well as for Indian lands ceded after 1887. From the CDL we compiled total acreage for 110 crop-specific land covers for all recognized Indian lands within the conterminous United States as well as for Indian lands ceded after 1887.

The database created for this project and summary data provided in this report will serve as a valuable resource for Indian nations to better understand and manage their lands in relation to a vast array of topics and issues including but not limited to climate change, conservation, food sovereignty, agricultural development, and historic land claims. Furthermore, this database, because it is drawn

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1. Federal Data Collection in American Indian/Alaska Native Communities. National Congress of American Indians Policy Research Center. ttps://www.fws.gov/nativeamerican/pdf/tek-federal-data.pdf & McKean, J. R., Taylor, R. G., & Liu, W. L. (1995). Inadequate agricultural database for American Indians? Society & Natural Resources, 8(4), 361–366. doi: 10.1080/08941929509380928

from national datasets, makes it possible to compare and contrast results for specific Indian lands and other-sub geographies as well as making it possible to find correlations with data from other national datasets including the Agriculture Census for American Indian Reservations, the decennial Census, or ACS data. Additionally, the Cropland Data Layer, since it is derived from satellite data and updated yearly, provides a valuable comparison to the Census of Agriculture for American Indian Reservations which is compiled every four years from self-reported data.

This project was developed by Village Earth, a Fort Collins, Colorado based 501(c)(3) nonprofit organization with support from the Indian Land Tenure Foundation. While we are making these summary results available to the public through this report, it is also our intention to make the entire database available online to the general public in a format where the data can be queried for specific tribal lands updating the data as they become available on a yearly basis. In the meantime, we can run tailored queries of the database for Native American planners, researchers and activists upon request by contacting us directly at info@villageearth.org.

Respectfully,

David Bartecchi
Executive Director

About the Data

The Tribal Land Cover Database (TLCD) created for this project contains data derived from the NRCS's 2018 national SSURGO dataset and the USDA's Cropland Data Layer. Both datasets have been formatted to include only data within current American Indian areas for the conterminous United States. Boundary data was acquired from the US Census Bureau's Tiger Database (2018) reported by the federally recognized tribal governments through the Census Bureau's Boundary and Annexation Survey (BAS) and includes a total of 549 areas associated with 398 unique American Indian groups. [2]

The boundary data (Image 1 below) includes all Indian Lands defined by CFR 25 CFR § 502.12 which includes both lands held in trust by the United States Government and fee lands within the boundaries of American Indian Lands encompassing a total of 109,465,623 acres of land. Additionally,

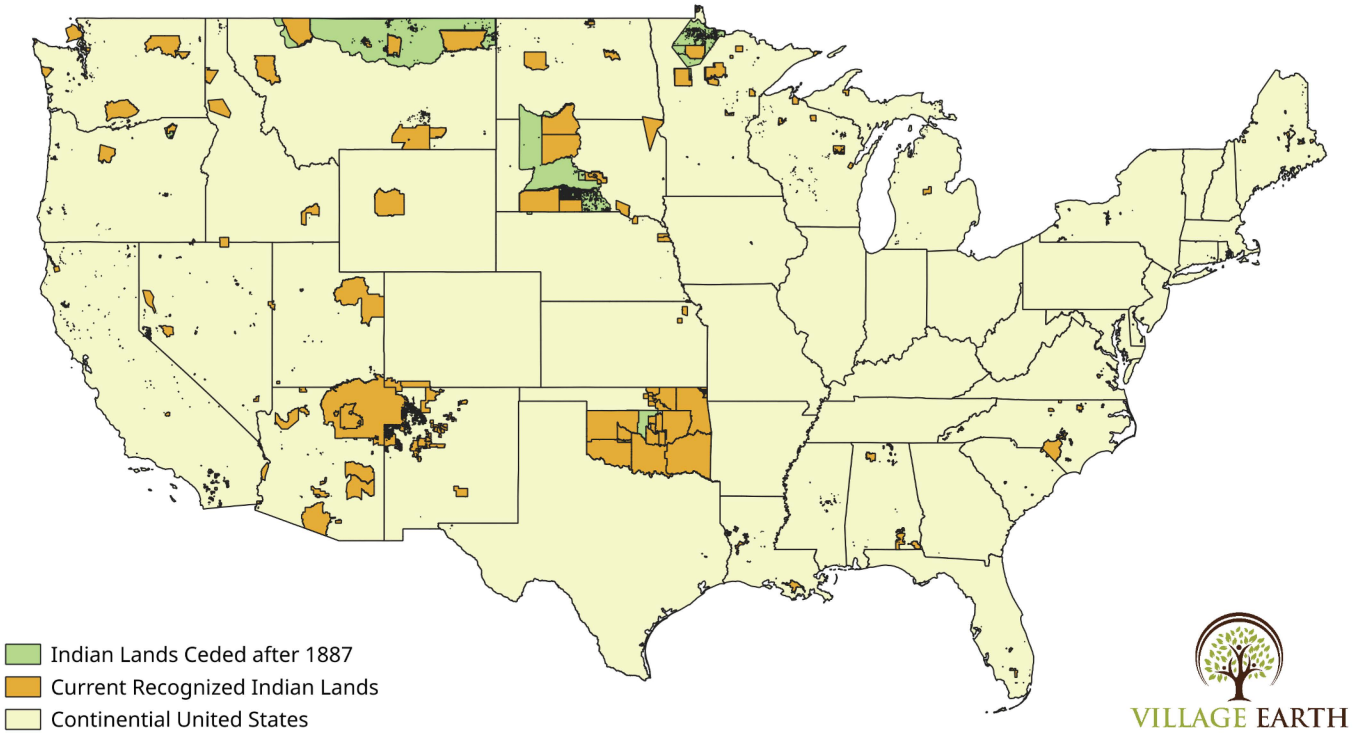

Image 1: Map of Current Recognized Indian Lands and Indian Lands Ceded after 1887.

2. "TIGER/Line Shapefile, 2016, nation, U.S., Current American Indian/Alaska Native/Native Hawaiian Areas National (AIANNH) National - Data.gov." 28 Dec. 2018

the SSURGO and CDL data has also been formatted to the geographic boundaries of Indian land cessions that took place after 1887. This data was obtained from the USDA Forest Service Geospatial Service and Technology Center and was based on maps from "Indian Land Cessions in the United States," compiled by Charles C. Royce and published as the second part of the two-part Eighteenth Annual Report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution,

"The SSURGO database provides the most detailed level of information and was designed primarily for farm and ranch, landowner/user, township, county, or parish natural resource planning and management."

1896-1897.[3] The dataset was filtered for just those cessions that occurred after 1887, the year of the passing of the General Allotment Act. The data was also clipped to remove areas that overlapped existing American Indian areas (described above) making it possible to compare and contrast data for the two areas. Since this data was digitized from printed maps its accuracy or completeness is unknown.

About the Soil Survey Geographic Database (SSURGO) Data

According to the NRCS[4], “The SSURGO database provides the most detailed level of information and was designed primarily for farm and ranch, landowner/user, township, county, or parish natural resource planning and management. Using the soil attributes, this database serves as an excellent source for determining erodible areas and developing erosion control practices; reviewing site development proposals and land use potential; making land use assessments and chemical fate assessments; and identifying potential wetlands and sand and gravel aquifer areas." The NRCS’s SSURGO data is used in numerous land valuation, carbon and hydrologic assessment models including the proprietary AcreValue™ valuation estimation tool[5], NRCS’s Rapid Carbon Assessment RaCa[6], the EPA’s Automated Geospatial Watershed Assessment (AGWA), and the Soil and Water Assessment Tool (SWAT)[7], to name a few.

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3. "Tribal Lands Ceded to the United States (Feature Layer) - Data.gov." 28 Dec. 2018, catalog.data.gov/dataset/tribal-lands-ceded-to-the-united-states-feature-layer-7b7be.

4. "Description of SSURGO Database | NRCS Soils." 28 Dec. 2018, www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053627.

5. "Frequently Asked Questions | AcreValue." 28 Dec. 2018, www.acrevalue.com/faq.

6. "Rapid Carbon Assessment (RaCA) | NRCS Soils." 28 Dec. 2018, www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_054164.

7. Hui Xu, Daniel G. Brown, Michael R. Moore, William S. Currie, Optimizing Spatial Land Management to Balance Water Quality and Economic Returns in a Lake Erie Watershed, Ecological Economics, Volume 145, 2018, Pages 104-114, ISSN

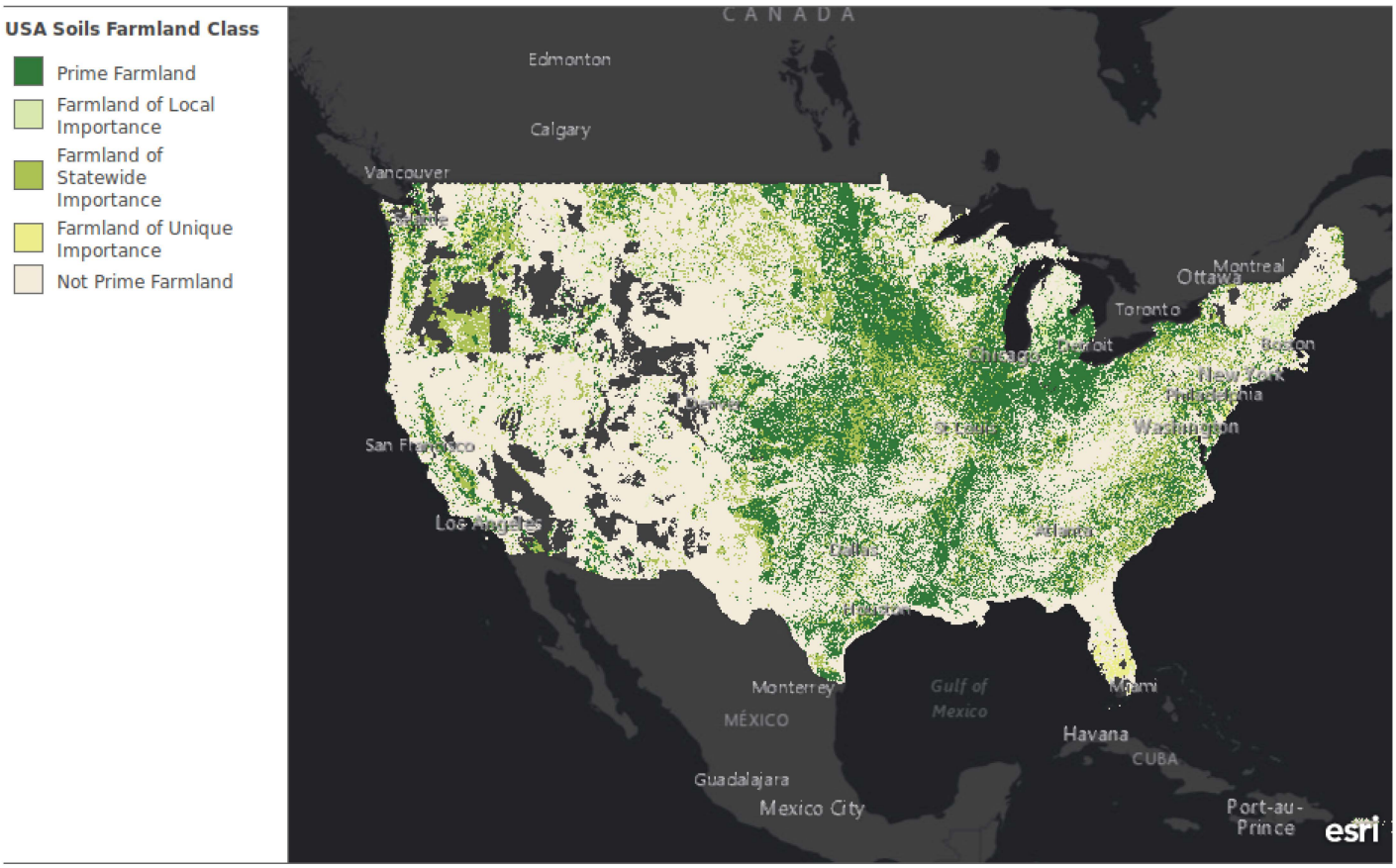

Image 2: Map of National SSURGO coverage symbolized with five of the twelve land quality classifications. Source: ArcGIS Online

Using NRCS's mapping standards, "soil maps in the SSURGO database are created using field methods. Surveyors observe soils along delineation boundaries and determine map unit composition by field traverses and transects. Aerial photographs are interpreted and used as the field map base. Maps are made at scales ranging from 1:12,000 to 1:63,360. Typically scales are 1:15,840, 1:20,000, or 1:24,000. The maps, along with comprehensive descriptions, produce an attribute and spatial database for NRCS publications." [8]

The SSURGO data is available as either a raster (at 10m, 30m, and 90m resolutions) or vector layer. The TLCDB utilizes the vector layer to ensure the highest accuracy when performing calculations for specific map units. To facilitate analysis of the SSURGO data Village Earth utilized the GSSURGO dataset or "Gridded" SSURGO which is a packaged data product developed by NRCS which utilizes the proprietary ESRI file geodatabase format and can be downloaded at the State level.

8. Description of Gridded Soil Survey Geographic (gSSURGO) Database | NRCS Soils." 28 Dec. 2018, www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053628.

About the Cropland Data Layer

According to the the USDA[9] the Cropland Data Layer is a "raster, geo-referenced, crop-specific land cover data layer created annually for the continental United States. The CDL is created using moderate resolution satellite imagery and extensive agricultural ground truthing. The purpose of the Cropland Data Layer program is to use satellite imagery to provide acreage estimates to the Agricultural Statistics Board for major commodities and to produce digital, crop-specific, categorized geo-referenced output products." The CDL data has been collected since 1997 making it an excellent tool for analyzing long-term land cover trends.

> ***"the CDL covers the conterminous 48 states with field-level resolution and crop classification accuracies typically upwards of 90% for major commodities like corn, cotton, rice, soybeans, and wheat."***

The 2017 data includes 130 categories ranging from specific types of crops, pasturelands, developed lands, wetlands, etc. Lark et al. (2017) Citing NRCS (2016) metadata[9] states "the CDL covers the conterminous 48 states with field-level resolution and crop classification accuracies typically upwards of 90% for major commodities like corn, cotton, rice, soybeans, and wheat." [10] The Cropland Data Layer has been used in hundreds of studies on a range of topics from agriculture productivity, crop variability, impacts of climate change, climate resiliency studies, estimates of carrying capacity, etc.

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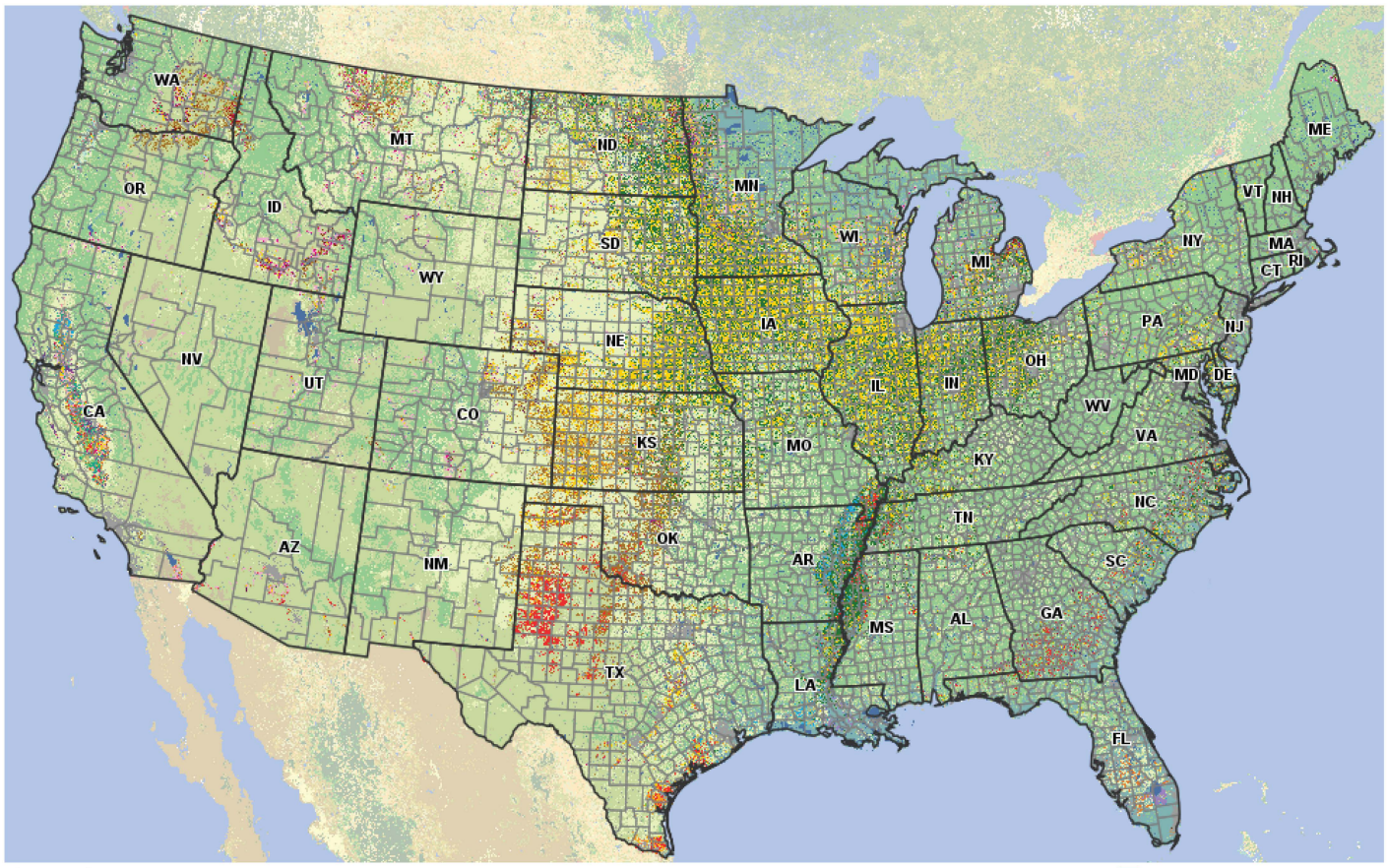
9. "USDA - National Agricultural Statistics Service - Research & Science - Cropland Data Layer - Metadata." 28 Dec. 2018, www.nass.usda.gov/Research_and_Science/Cropland/metadata/meta.php.

10.Tyler J. Lark, Richard M. Mueller, David M. Johnson, Holly K. Gibbs, Measuring land-use and land-cover change using the U.S. department of agriculture's cropland data layer: Cautions and recommendations, International Journal of Applied Earth Observation and Geoinformation, Volume 62, 201, Pages 224-235, ISSN 0303-2434, https://doi.org/10.1016/j.jag.2017.06.007.



Legend

- Corn
- Cotton
- Rice
- Sorghum
- Soybeans
- Sunflower
- Peanuts
- Tobacco
- Sweet Corn
- Pop or Orn Corn
- Mint
- Barley
- Durum Wheat
- Spring Wheat
- Winter Wheat
- Other Small Grains
- Dbl Crop WinWht/Soybeans
- Rye
- Oats
- Millet
- Speltz
- Canola
- Flaxseed
- Safflower
- Rape Seed
- Mustard
- Alfalfa
- Other Hay/Non Alfalfa
- Camelina
- Buckwheat
- Sugarbeets
- Dry Beans
- Potatoes
- Other Crops
- Sugarcane
- Sweet Potatoes
- Misc Vegs & Fruits
- Watermelons
- Onions
- Cucumbers
- Chick Peas
- Lentils
- Peas
- Tomatoes
- Caneberries
- Hops
- Herbs
- Clover/Wildflowers
- Sod/Grass Seed
- Switchgrass
- Fallow/Idle Cropland
- Pasture/Grass
- Forest
- Shrubland
- Barren
- Cherries
- Peaches
- Apples
- Grapes
- Christmas Trees
- Other Tree Crops
- Citrus
- Pecans
- Almonds
- Walnuts
- Pears
- Clouds/No Data
- Developed
- Water
- Wetlands
- Nonag/Undefined
- Aquaculture
- Open Water
- Perennial Ice/Snow
- Developed/Open Space
- Developed/Low Intensity
- Developed/Medium Intensity
- Developed/High Intensity
- Barren
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrubland
- Grassland Herbaceous
- Pasture/Hay
- Woody Wetlands
- Herbaceous Wetlands
- Pistachios
- Triticale
- Carrots
- Asparagus
- Garlic
- Cantaloupes
- Prunes
- Olives
- Oranges
- Honeydew Melons
- Broccoli
- Peppers
- Pomegranates
- Nectarines
- Greens
- Plums
- Strawberries
- Squash
- Apricots
- Vetch
- Dbl Crop WinWht/Corn
- Dbl Crop Oats/Corn
- Lettuce
- Pumpkins
- Dbl Crop Lettuce/Durum Wht
- Dbl Crop Lettuce/Cantaloupe
- Dbl Crop Lettuce/Cotton
- Dbl Crop Lettuce/Barley
- Dbl Crop Durum Wht/Sorghum
- Dbl Crop Barley/Sorghum
- Dbl Crop WinWht/Sorghum
- Dbl Crop Barley/Corn
- Dbl Crop WinWht/Cotton
- Dbl Crop Soybeans/Cotton
- Dbl Crop Soybeans/Oats
- Dbl Crop Corn/Soybeans
- Blueberries
- Cabbage
- Cauliflower
- Celery
- Radishes
- Turnips
- Eggplants
- Gourds
- Cranberries
- Dbl Crop Barley/Soybeans

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Image 3: Map of National Cropland Data Layer coverage with legend of 130 land cover categories. source: https://nassgeodata.gmu.edu/CropScape/ (Legend composite by Village Earth)

Methods

Creating the TLCD involved three general steps: 1. Isolating the boundary data for American Indian areas and ceded Indian lands within the conterminous United States; 2. Isolating the SSURGO and CDL to include only data within the boundaries created in step 1.; and lastly, 3. calculating to acreage for each category within those layers. The following section will describe the steps involved in this process to ensure transparency in the methods and reproducibility of this dataset.

Isolating the boundary data

The TIGER/Line Shapefile for American Indian areas in the United States includes both American Indians and Alaskan Natives, a total of 845 unique features or land areas. From this we removed all features/areas outside of the conterminous United States leaving a total of 549 features/areas.

The land cession data obtained from the US Forest Service includes a total of 741 unique features (land areas of cessioned land) that included land cessions from 1784-1894. For this project, we were only concerned with cessions that occurred after 1887 so any features dated before this time were removed from the layer leaving a total of 29 cession boundaries. Since many of the remaining areas overlapped with existing Indian areas (that were likely established after the cession of those lands) they were “clipped” from those boundaries to avoid overlapping data.

Isolating the SSURGO and CDL Data and Calculating Acreage

The first step to calculate total acreage for the specific indian areas involved isolating SSURGO and CDL data to within the boundary data. The SSURGO data is available at the State level as a packaged geodatabase that includes dozens of files with both polygons that define the boundaries of specific soil types as well as corresponding tabular data containing the various soil attributes that can be joined to the polygon data using the shared MUKEY field. Using the American Indian areas boundary data and ceded land boundary data as mask layers, we clipped-out all data outside of these areas. Finally, since many American Indian areas overlap State boundaries, we merged the SSURGO data to create a seamless national SSURGO layer for American Indian areas and another layer for ceded Indian Lands. Since this operation changed the dimensions of numerous soil units we used QGIS’s field calculator to re-calculate total acreage for each soil unit into a new field called “GIS_ACRES”. Lastly, summary statistics for each category were calculated using the QGIS “Group Stats” plugin.

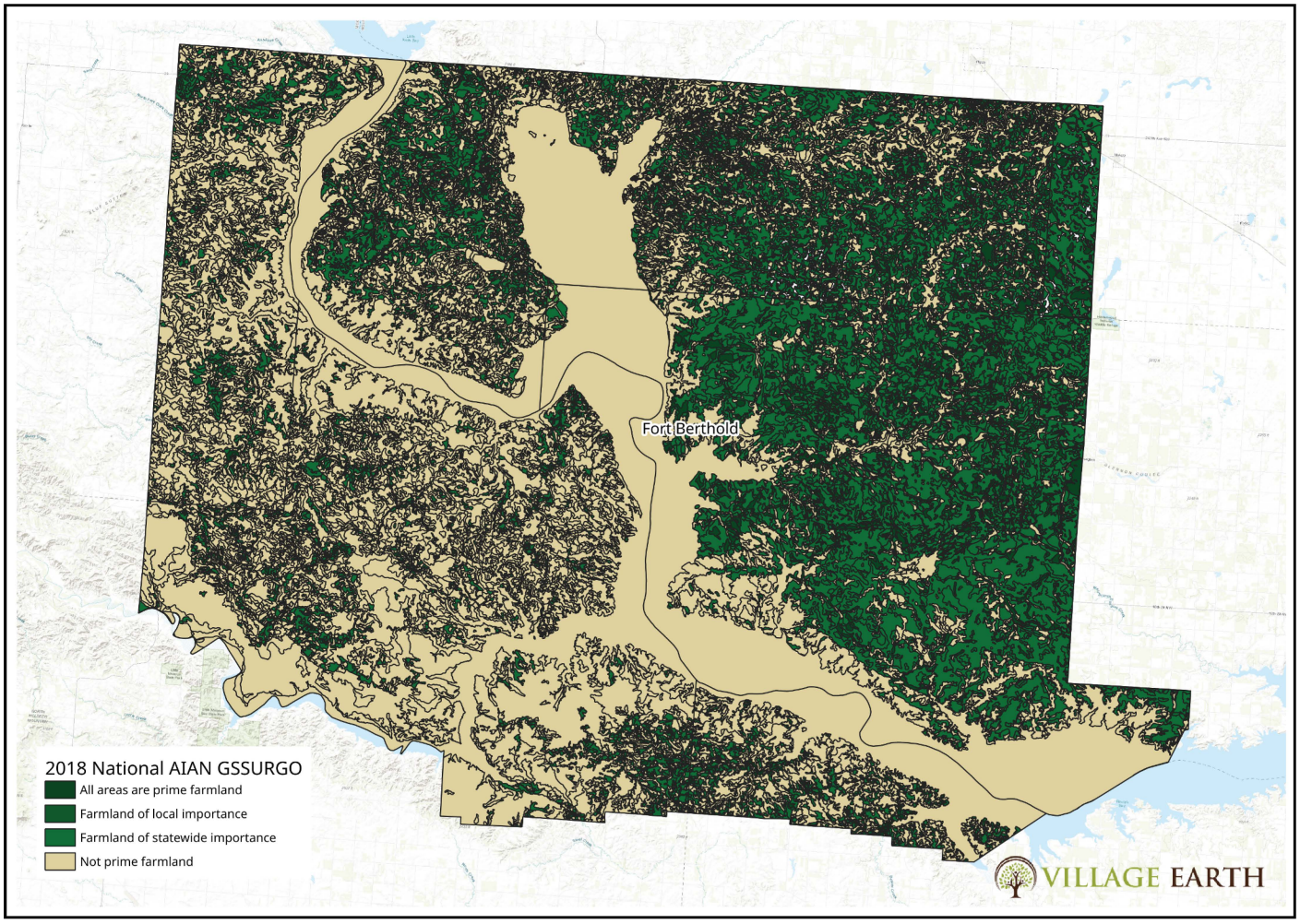


Image 4: SSURGO Data clipped to the boundaries of the Fort Berthold Reservation in North Dakota.

For the CDL data, we found that the national raster dataset was too large to clip all American Indian layers and Cession layers at once and so decided to use the USDA's Cropscape web mapping service to perform the necessary calculations. Cropscape allows you to upload a zipped ESRI Shapefile that defines a specific area of interest (AOI) but has a limit of 2,000,000 square kilometers per area and will not categorize results for different American Indian Areas contained within a single file. This required us to create separate zipped shapefiles for each American Indian Area which we used in Cropscape to generate summary statistics for each area in tabular format which were then entered into a database.

The cession boundary data, even when divided into separate cession areas, was too large to upload into Cropscape, so to calculate it we clipped the data in QGIS using GDAL "Clip raster by mask layer" tool and then calculated total number of pixels for each category using the QGIS GRASS r.report tool. Summary statistics were calculated using a pivot table in the open source LibreOffice Calc spreadsheet software.

2017 USDA Cropland Data Layer for the Fort Berthold Reservation, ND

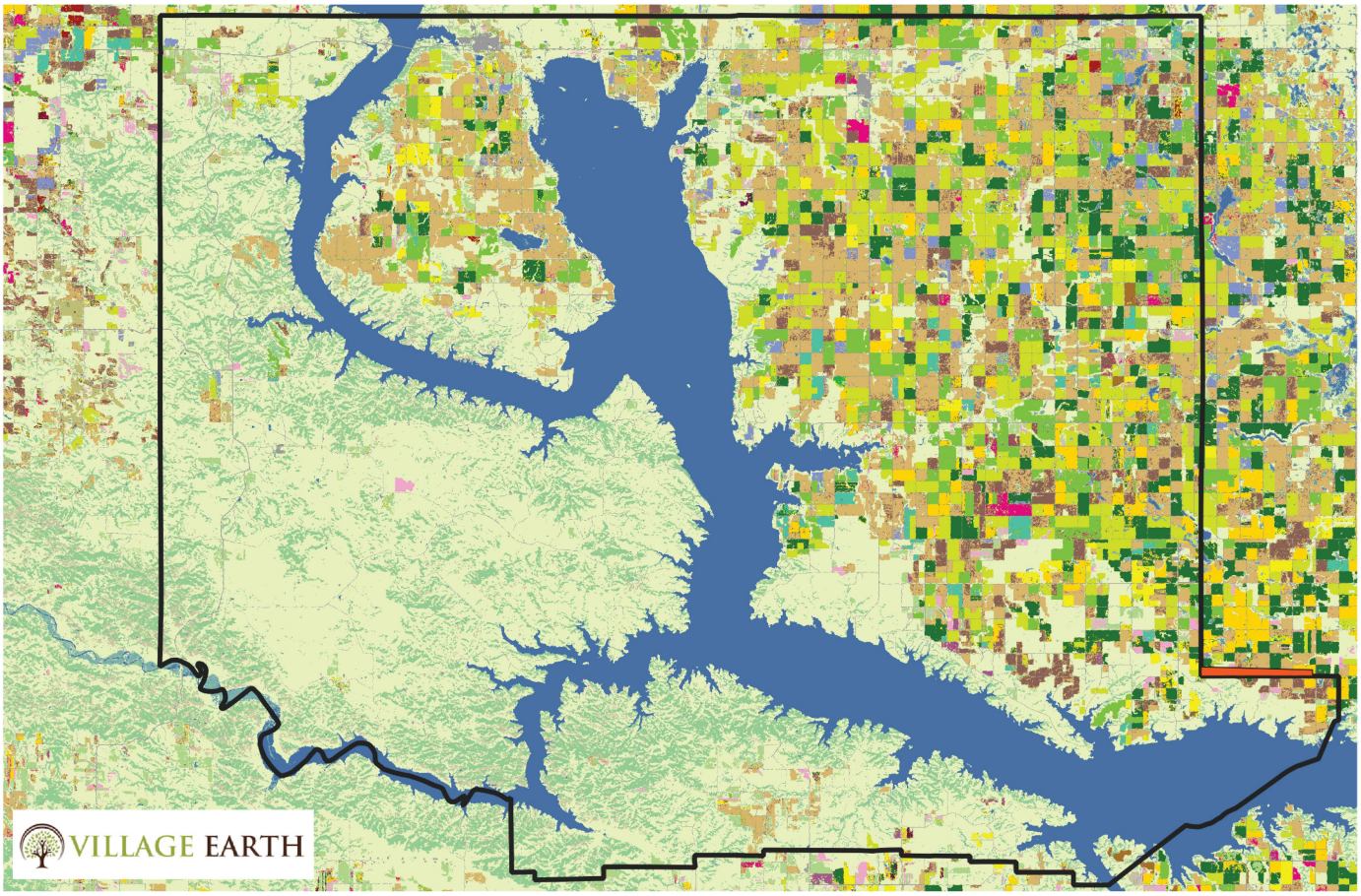


Image 5: USDA cropland data layer for Fort Berthold Reservation in North Dakota.

Results

SSURGO Prime Farmland Classification for American Indian Areas and Ceded Areas

This summary only includes national totals and does not include totals for each specific American Indian area. While its is possible to extract data for each area from the TLCD it would amount to hundreds of pages of data and beyond the scope of this report. Our intention however, is to make this data available in a searchable online database.

"In total, the TLCD contains 1,291,560 unique soil units from the SSURGO database encompassing an area of 111,582,173 acres."

In total, the TLCD contains 1,291,560 unique soil units from the SSURGO database encompassing an area of 111,582,173 acres. The average size of a soil unit in the TLCD is 86.39 acres with a median size of 17.35 acres. The SSURGO database classifies soils by twelve different categories including All areas of Prime Farmland, Farmland of Local Importance, Farmland of Statewide Importance, as well as lands that could be improved if drained, if irrigated, if protected from flooding, etc. Prime farmland is defined by the NRCS[12] as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.”

12."Prime Farmland." 28 Dec. 2018, www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcs143_014052.

Total Acres of Prime Farmland on American Indian Lands

According to the TLCDB, there is a a total of 16,172,399 acres of Prime Farmland on American Indian areas this represents 14.49% of all the other categories of soils. In addition, they possess a total of 5,260,942 acres (4.71%) of “Farmland of Statewide Importance” and 391,138 acres (.36%) of “Farmland of Local Importance.” By far, the largest category of soil type on American Indian Lands are soils classified as “Not Prime Farmland” which encompasses a total of 8,1039,982 acres or 74.49% of all Indian lands.

"there is a a total of 16,172,399 acres of Prime Farmland on American Indian areas this represents 14.49% of all the other categories of soils."

By comparison, lands ceded after 1887 include a total 782,841 acres of Prime Farmland constituting 2.52% of all the categories of soils for lands ceded after 1887. Thus, relatively speaking, the current Indian areas have a higher proportion of soils classified as Prime Farmland than the lands ceded after 1887. However, this is not a surprising outcome since the great majority of lands ceded after 1887 were in South Dakota and Montana where there is a high proportion of arid grasslands best suited for grazing. The acreage totals for the various SSURGO farmland classification for all current Indian areas and all Indian lands ceded after 1887 can be found below.

SSURGO Farmland Classification for AIAN Lands in Lower 48 States and Indian Lands Ceded after 1887.

Farmland Classification	All American Indian Acres	Percent of All American Indian	Lands Indian Ceded after 1887	Percent of Indian Lands
All areas are prime farmland	16,172,399.15	14.49%	782,841.02	2.52%
Farmland of local importance	391,137.55	0.35%	26.91	0.00%
Farmland of statewide importance	5,260,942.14	4.71%	5,903,308.61	18.97%
Farmland of statewide importance, if drained	266,971.86	0.24%		0.00%
Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season	299.49	0.00%		0.00%
Farmland of statewide importance, if irrigated	143,853.81	0.13%		0.00%
Farmland of statewide importance, if irrigated and drained	20,047.74	0.02%		0.00%
Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season	12,766.81	0.01%		0.00%
Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium	1,653.99	0.00%		0.00%
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season	74.90	0.00%		0.00%
Farmland of unique importance	514,012.73	0.46%		0.00%
Not prime farmland	78,722,185.66	70.55%	20,364,877.71	65.44%
Prime farmland if drained	904,582.32	0.81%	632,034.83	2.03%
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	33,379.37	0.03%		0.00%
Prime farmland if irrigated	3,175,123.03	2.85%	3,348,374.41	10.76%
Prime farmland if irrigated and drained	19,006.13	0.02%		0.00%
Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season	468,071.90	0.42%		0.00%
Prime farmland if irrigated and reclaimed of excess salts and sodium	56,758.22	0.05%		0.00%
Prime farmland if irrigated and the product of I (soil erodibility) x C	58,143.73	0.05%	49,220.98	0.16%
Prime farmland if protected from flooding or not frequently	4,721.85	0.00%		100%
Not Classified	5,356,040.61	4.80%	40,563.76	0.13%

Indian Areas in the United States with the most acres of Prime Farmland

Rank	Tribe Name	Acres of prime farmland
1	Cheyenne-Arapaho	2,375,248.60
2	Kiowa-Comanche-Apache-Fort Sill Apache	1,982,309.75
3	Chickasaw	1,971,284.09
4	Choctaw	1,887,542.26
5	Cherokee	1,886,371.25
6	Creek	1,265,077.35
7	Osage	416,069.45
8	Lake Traverse	378,600.85
9	Caddo-Wichita-Delaware	340,542.00
10	Citizen Potawatomi Nation-Absentee Shawnee	336,467.77
11	Lumbee	267,581.89
12	MaChis Lower Creek	183,149.45
13	Kaw	182,263.66
14	White Earth	175,456.88
15	Sac and Fox	140,424.76
16	Leech Lake	135,810.03
17	United Houma Nation	128,641.13
18	Pawnee	125,425.52
19	Echota Cherokee	123,945.36
20	Cher-O-Creek	109,878.37

Cropland Data Layer for American Indian Areas and Ceded Areas

This summary only includes national totals and does not include totals for each specific American Indian area. While its is possible to extract data for each area from the TLCD it would amount to thousands of pages of data and beyond the scope of this report. Our intention however, is to make this data available in a searchable online database.

"shrublands and pasture land are the highest categories, representing over 57% of all American Indian Lands. Forests represent the third largest category representing 21.6%, and Cropland" represents the 4th largest category at 12.84%.

The Cropland Data Layer (CDL) classifies lands into 130 categories when filtered to include only American Indian Areas only 110 categories were represented. In an effort to simplify this dataset, we further grouped the data into eight categories Cropland, Developed, Forest, Open Water, Pasture, Perennial Ice/Snow, Shrubland and Wetlands. These categories are listed in the following tables. Based on these categories, shrublands and pasture land are the largest categories, representing over 57% of all American Indian Lands. Forests represent the third largest category representing 22%, and Cropland represents the fourth largest category at 13%. The data along with national and ceded land totals can be found in the table below.

General Cat	Sum - National	Sum - Percent of National Total	Sum - AIANN	Sum - Percent of AIAN Total	Sum - Ceded 1887	Sum - Percent of Ceded Total
Cropland	373,771,019	19.42%	13,934,968	12.84%	8,939,745	29.35%
Developed	110,285,203	5.73%	3,367,588	3.10%	800,243	2.63%
Forest	515,687,721	26.79%	23,442,762	21.60%	1,233,420	4.05%
Open Water	34,749,642	1.81%	2,465,106	2.27%	422,822	1.39%
Pasture	324,555,238	16.86%	28,788,736	26.52%	15,604,737	51.23%
Perennial Ice/Snow	361,599	0.02%	2,951	0.00%	2,900	0.01%
Shrubland	464,505,072	24.13%	33,479,272	30.84%	1,290,754	4.24%
Wetlands	100,850,804	5.24%	3,065,172	2.82%	2,162,591	7.10%
Total Result	1,924,766,297		108,546,555		30,457,212	

Totals for the 110 land cover categories along with national totals and ceded land totals are listed below. The most common category was shrubland which encompasses a total of 33,479,272 acres of land and represents 31% of all American Indian Lands. This is slightly higher than the national total of 24% of all lands in the conterminous US. The next largest category was grass/pasture which encompasses a total of 28,788,451 acres representing 27% of all American Indian areas. This is also higher than the national total of 16.86%. National totals for all 110 categories is located in the Appendix.

Discussion

The TLCD compiles, for the first time, NRCS SSURGO and USDA Cropland Data Layer data for all American Indian Lands for the conterminous United States making these datasets accessible to tribal planners, Native American farmers and ranchers and civil society organizations. While this report only provides national totals for each dataset, it is Village Earth's intention to make the complete TLCD available on the Internet. In the meantime, specific datasets can be requested directly from Village Earth by contacting David Bartecchi david@villageearth.org.

As mentioned early in this report, both the SSURGO and CDL data is updated and made available on a yearly basis. It is Village Earth's intention to update the TLCD while also archiving the old datasets making it possible to compare datasets from year-to-year, however both the online availability and year-to-year updates are dependent upon available funding. Additionally, Village Earth would like to provide national calculations for these datasets filtered to just Tribal lands but this requires the Department of Interior to make available boundary files that distinguish between Tribal Trust Lands and Fee Lands within Federally Recognized American Indian Areas.

Appendix: Cropland Data Layer Totals for American Indian Areas and Ceded Indian Lands

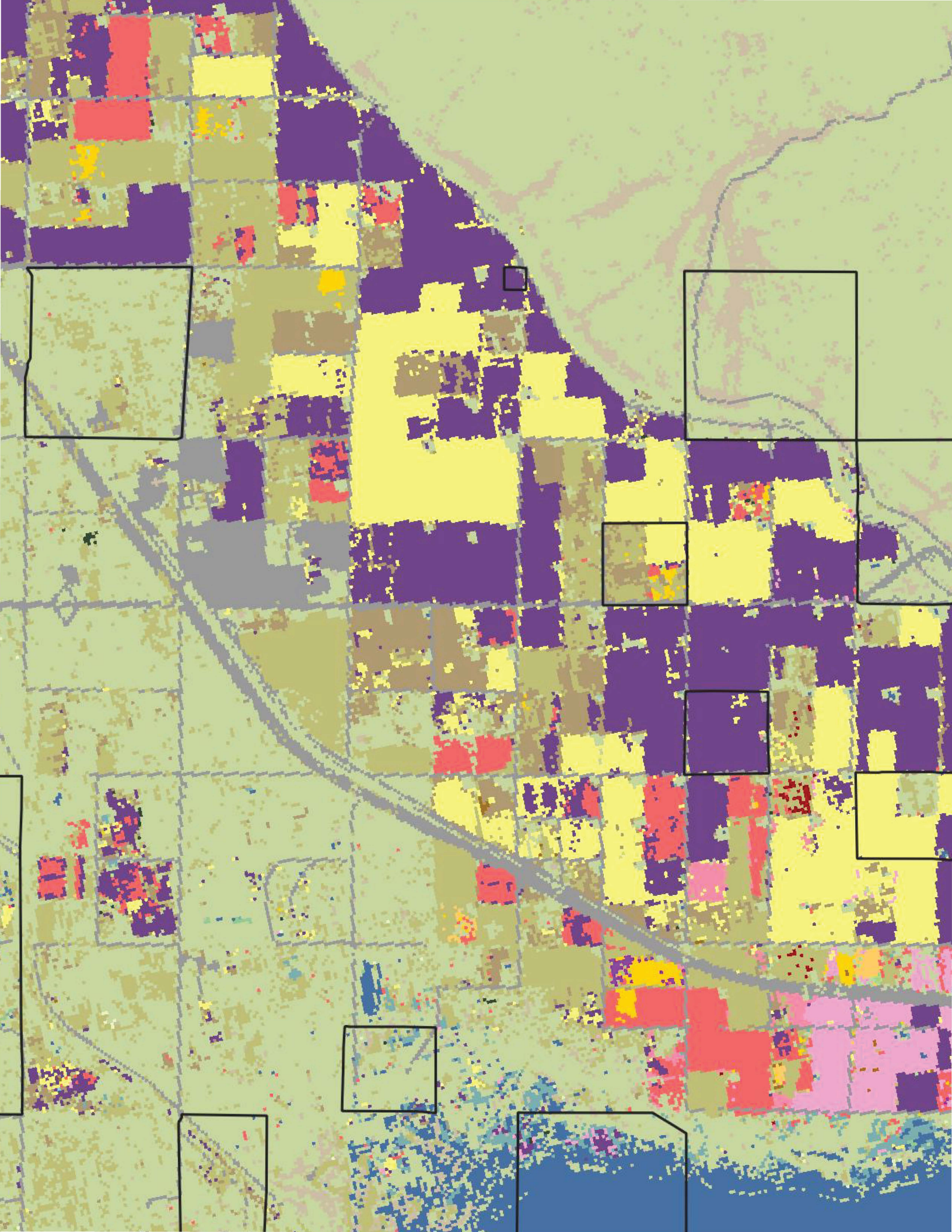
ID	Category	General Cat	National	Percent of National Total	AIANN	Percent of AIAN Total	Ceded 1887	Percent of Ceded Total
152	Shrubland	Shrubland	464,505,072	24.13%	33,479,272	30.84%	1,290,754	4.24%
176	Grass/Pasture	Pasture	324,547,508	16.86%	28,788,451	26.52%	15,604,733	51.23%
142	Evergreen Forest	Forest	242,094,665	12.58%	12,361,239	11.39%	644,852	2.12%
141	Deciduous Forest	Forest	245,494,485	12.75%	10,584,765	9.75%	576,153	1.89%
24	Winter Wheat	Cropland	30,221,943	1.57%	3,644,946	3.36%	1,133,016	3.72%
111	Open Water	Open Water	34,749,642	1.81%	2,465,106	2.27%	422,822	1.39%
121	Developed/Open Space	Developed	63,508,399	3.30%	2,417,463	2.23%	558,880	1.83%
190	Woody Wetlands	Wetlands	78,143,984	4.06%	2,325,456	2.14%	1,408,728	4.63%
131	Barren	Cropland	21,726,180	1.13%	1,439,664	1.33%	237,207	0.78%
5	Soybeans	Cropland	90,524,623	4.70%	1,303,447	1.20%	372,791	1.22%
1	Corn	Cropland	91,140,819	4.74%	1,151,944	1.06%	457,676	1.50%
37	Other Hay/Non Alfalfa	Cropland	30,153,025	1.57%	1,073,913	0.99%	1,231,395	4.04%
36	Alfalfa	Cropland	19,500,100	1.01%	1,029,798	0.95%	641,081	2.10%
23	Spring Wheat	Cropland	12,730,113	0.66%	973,085	0.90%	1,889,899	6.21%
195	Herbaceous Wetlands	Wetlands	22,706,820	1.18%	739,716	0.68%	753,863	2.48%
61	Fallow/Idle Cropland	Cropland	21,342,065	1.11%	660,445	0.61%	658,602	2.16%
122	Developed/Low Intensity	Developed	28,746,094	1.49%	649,326	0.60%	137,082	0.45%
143	Mixed Forest	Forest	28,098,571	1.46%	496,758	0.46%	12,415	0.04%
2	Cotton	Cropland	12,723,405	0.66%	496,260	0.46%	236	0.00%

ID	Category	General Cat	National	Percent of National Total	AIANN	Percent of AIAN Total	Ceded 1887	Percent of Ceded Total
123	Developed/ Medium Intensity	Developed	13,450,029	0.70%	219,663	0.20%	73,664	0.24%
22	Durum Wheat	Cropland	2,009,389	0.10%	203,995	0.19%	565,930	1.86%
53	Peas	Cropland	1,256,335	0.07%	182,141	0.17%	266,732	0.88%
6	Sunflowers	Cropland	1,284,460	0.07%	167,079	0.15%	184,258	0.60%
26	Dbl Crop WinWht/Soybeans	Cropland	3,252,686	0.17%	165,537	0.15%	2,200	0.01%
31	Canola	Cropland	1,951,553	0.10%	155,837	0.14%	80,959	0.27%
52	Lentils	Cropland	1,094,298	0.06%	142,672	0.13%	446,968	1.47%
238	Dbl Crop WinWht/ Cotton	Cropland	231,223	0.01%	130,030	0.12%	1	0.00%
21	Barley	Cropland	2,219,917	0.12%	124,624	0.11%	222,313	0.73%
27	Rye	Cropland	754,393	0.04%	111,852	0.10%	7,324	0.02%
4	Sorghum	Cropland	6,155,033	0.32%	111,084	0.10%	176,415	0.58%
42	Dry Beans	Cropland	2,150,888	0.11%	107,409	0.10%	93,579	0.31%
124	Developed/High Intensity	Developed	4,580,680	0.24%	81,136	0.07%	30,617	0.10%
28	Oats	Cropland	1,637,982	0.09%	80,561	0.07%	63,254	0.21%
59	Sod/Grass Seed	Cropland	1,207,668	0.06%	74,472	0.07%	22,815	0.07%
29	Millet	Cropland	763,118	0.04%	68,664	0.06%	63,819	0.21%
10	Peanuts	Cropland	1,559,283	0.08%	45,444	0.04%	0	0.00%
205	Triticale	Cropland	399,925	0.02%	30,979	0.03%	6,366	0.02%
43	Potatoes	Cropland	865,373	0.04%	30,133	0.03%	218	0.00%

ID	Category	General Cat	National	Percent of National Total	AIANN	Percent of AIAN Total	Ceded 1887	Percent of Ceded Total
68	Apples	Cropland	427,905	0.02%	28,750	0.03%	7	0.00%
56	Hops	Cropland	64,426	0.00%	25,700	0.02%	0	0.00%
45	Sugarcane	Cropland	1,067,646	0.06%	21,468	0.02%	0	0.00%
236	Dbl Crop WinWht/Sorghum	Cropland	187,750	0.01%	18,679	0.02%	244	0.00%
32	Flaxseed	Cropland	204,996	0.01%	14,411	0.01%	22,396	0.07%
57	Herbs	Cropland	111,630	0.01%	13,473	0.01%	629	0.00%
41	Sugarbeets	Cropland	1,082,758	0.06%	11,460	0.01%	1,986	0.01%
69	Grapes	Cropland	1,140,394	0.06%	9,956	0.01%	6	0.00%
33	Safflower	Cropland	180,141	0.01%	7,268	0.01%	14,710	0.05%
74	Pecans	Cropland	750,457	0.04%	6,707	0.01%	2	0.00%
13	Pop or Orn Corn	Cropland	185,301	0.01%	5,716	0.01%	2	0.00%
35	Mustard	Cropland	78,662	0.00%	5,530	0.01%	41,422	0.14%
222	Squash	Cropland	34,694	0.00%	4,531	0.00%	0	0.00%
231	Dbl Crop Lettuce/Cantaloupe	Cropland	3,958	0.00%	3,958	0.00%	0	0.00%
242	Blueberries	Cropland	223,310	0.01%	3,041	0.00%	0	0.00%
50	Cucumbers	Cropland	64,645	0.00%	3,036	0.00%	0	0.00%
112	Perennial Ice/Snow	Perennial Ice/Snow	361,599	0.02%	2,951	0.00%	2,900	0.01%
66	Cherries	Cropland	193,817	0.01%	2,842	0.00%	0	0.00%
25	Other Small Grains	Cropland	28,979	0.00%	2,662	0.00%	19,128	0.06%

ID	Category	General Cat	National	Percent of National Total	AIANN	Percent of AIAN Total	Ceded 1887	Percent of Ceded Total
46	Sweet Potatoes	Cropland	144,946	0.01%	2,500	0.00%	0	0.00%
49	Onions	Cropland	176,875	0.01%	2,355	0.00%	1	0.00%
225	Dbl Crop WinWht/Corn	Cropland	365,996	0.02%	2,289	0.00%	8	0.00%
212	Oranges	Cropland	1,005,671	0.05%	2,267	0.00%	0	0.00%
214	Broccoli	Cropland	18,490	0.00%	2,147	0.00%	0	0.00%
219	Greens	Cropland	43,719	0.00%	2,086	0.00%	0	0.00%
72	Citrus	Cropland	127,247	0.01%	1,860	0.00%	0	0.00%
58	Clover/Wildflowers	Cropland	208,355	0.01%	1,835	0.00%	2,288	0.01%
44	Other Crops	Cropland	71,255	0.00%	1,756	0.00%	7,853	0.03%
227	Lettuce	Cropland	53,571	0.00%	1,577	0.00%	0	0.00%
239	Dbl Crop Soybeans/Oats	Cropland	6	0.00%	1,491	0.00%	0	0.00%
209	Cantaloupes	Cropland	44,307	0.00%	1,469	0.00%	0	0.00%
229	Pumpkins	Cropland	36,985	0.00%	1,351	0.00%	0	0.00%
77	Pears	Cropland	41,609	0.00%	1,302	0.00%	0	0.00%
34	Rape Seed	Cropland	4,737	0.00%	1,221	0.00%	289	0.00%
11	Tobacco	Cropland	97,794	0.01%	1,117	0.00%	0	0.00%
71	Other Tree Crops	Cropland	134,998	0.01%	1,029	0.00%	0	0.00%
254	Dbl Crop Barley/Soybeans	Cropland	50,637	0.00%	977	0.00%	2	0.00%
211	Olives	Cropland	40,520	0.00%	884	0.00%	0	0.00%

ID	Category	General Cat	National	Percent of National Total	AIANN	Percent of AIAN Total	Ceded 1887	Percent of Ceded Total
48	Watermelons	Cropland	61,747	0.00%	837	0.00%	0	0.00%
92	Aquaculture	Cropland	260,145	0.01%	743	0.00%	0	0.00%
14	Mint	Cropland	11,151	0.00%	682	0.00%	0	0.00%
206	Carrots	Cropland	61,542	0.00%	665	0.00%	0	0.00%
39	Buckwheat	Cropland	14,628	0.00%	652	0.00%	449	0.00%
208	Garlic	Cropland	23,336	0.00%	645	0.00%	0	0.00%
226	Dbl Crop Oats/Corn	Cropland	77,669	0.00%	436	0.00%	0	0.00%
216	Peppers	Cropland	22,963	0.00%	429	0.00%	0	0.00%
55	Caneberries	Cropland	19,279	0.00%	316	0.00%	0	0.00%
213	Honeydew Melons	Cropland	9,224	0.00%	301	0.00%	0	0.00%
60	Switchgrass	Pasture	7,729	0.00%	285	0.00%	4	0.00%
241	Dbl Crop Corn/Soybeans	Cropland	6,727	0.00%	260	0.00%	0	0.00%
70	Christmas Trees	Cropland	97,364	0.01%	242	0.00%	0	0.00%
237	Dbl Crop Barley/Corn	Cropland	22,648	0.00%	225	0.00%	1	0.00%
47	Misc Vegs & Fruits	Cropland	4,096	0.00%	173	0.00%	4	0.00%
232	Dbl Crop Lettuce/Cotton	Cropland	9,412	0.00%	169	0.00%	0	0.00%
76	Walnuts	Cropland	601,032	0.03%	167	0.00%	0	0.00%
12	Sweet Corn	Cropland	13,223	0.00%	161	0.00%	0	0.00%
243	Cabbage	Cropland	24,829	0.00%	160	0.00%	0	0.00%

ID	Category	General Cat	National	Percent of National Total	AIANN	Percent of AIAN Total	Ceded 1887	Percent of Ceded Total
30	Speltz	Cropland	3,740	0.00%	154	0.00%	479	0.00%
75	Almonds	Cropland	1,425,526	0.07%	145	0.00%	0	0.00%
67	Peaches	Cropland	51,809	0.00%	126	0.00%	0	0.00%
3	Rice	Cropland	2,557,320	0.13%	105	0.00%	0	0.00%
244	Cauliflower	Cropland	3,741	0.00%	81	0.00%	0	0.00%
204	Pistachios	Cropland	467,692	0.02%	78	0.00%	0	0.00%
220	Plums	Cropland	60,363	0.00%	75	0.00%	0	0.00%
245	Celery	Cropland	1,696	0.00%	48	0.00%	0	0.00%
38	Camelina	Cropland	243	0.00%	37	0.00%	126	0.00%
54	Tomatoes	Cropland	156,951	0.01%	36	0.00%	0	0.00%
223	Apricots	Cropland	402	0.00%	35	0.00%	0	0.00%
247	Turnips	Cropland	1,983	0.00%	24	0.00%	0	0.00%
233	Dbl Crop Lettuce/Cantaloupe	Cropland	222	0.00%	15	0.00%	0	0.00%
207	Asparagus	Cropland	2,474	0.00%	13	0.00%	0	0.00%
221	Strawberries	Cropland	27,895	0.00%	11	0.00%	0	0.00%
217	Pomegranates	Cropland	39,190	0.00%	7	0.00%	0	0.00%
246	Radishes	Cropland	12,656	0.00%	3	0.00%	488	0.00%
51	Chick Peas	Cropland	96	0.00%	0	0.00%	0	0.00%
218	Nectarines	Cropland	3,202	0.00%	0	0.00%	0	0.00%

ID	Category	General Cat	National	Percent of National Total	AIANN	Percent of AIAN Total	Ceded 1887	Percent of Ceded Total
224	Vetch	Cropland	15,695	0.00%	0	0.00%	2,157	0.01%
240	Dbl Crop Soybeans/Oats	Cropland	22,472	0.00%	0	0.00%	14	0.00%
248	Eggplants	Cropland	483	0.00%	0	0.00%	0	0.00%
249	Gourds	Cropland	18	0.00%	0	0.00%	0	0.00%
250	Cranberries	Cropland	19,147	0.00%	0	0.00%	0	0.00%