Final Report

Version 3 Statewide Parcel Map Database Project

November 10, 2017

**Appendix B Updated: August 16, 2018

CONTENTS

OVERVIEW

The **Version 3 Statewide Parcel Map Database Project** (V3 Project) was a joint effort between the Wisconsin Department of Administration (DOA) Division of Intergovernmental Relations and the Wisconsin State Cartographer's Office (SCO). This document describes the V3 Project, which ran from January 2016 to October 2017 as part of the Statewide Parcel Map Initiative established by Act 20 of 2013.

Project Objectives Achieved

- Create an updated statewide parcel database and map layer by integrating county-level datasets
- Provide for download of parcel database and display map layer online
- Continue implementation of standard for parcel data known as the "Searchable Format," which is tied to Wisconsin Land Information Program grant funding for local governments
- Assess and communicate county progress in achieving the Searchable Format
- Integrate and display zoning information maintained by counties

The V3 Project successfully aggregated all known digital parcel datasets within the state, resulting in a statewide GIS parcel layer of 3.48 million parcels. The statewide data was standardized to meet the Searchable Format and made publicly available online on July 31, 2017. The V3 Project represents another successful step in the Statewide Parcel Map Initiative, an effort important for improving the quality of Wisconsin's real estate information, economic development, emergency planning and response, and other necessary citizen services.

PROJECT BACKGROUND
The V3 Project was another phase in the incremental approach toward the Parcel Initiative—improving the statewide parcel map with each iteration. The V3 Project builds upon the experience of the V1, V2, and LinkWISCONSIN Projects. V3 was the second round of implementing standards for data submissions—the Searchable Format—which the legislature directed the Department of Administration to create in coordination with counties as part of Act 20. In the Searchable Format, county data submittal is ready for immediate aggregation into the statewide parcel layer. Counties are to achieve the Searchable Format by March 31, 2018.

TECHNICAL APPROACH
The technical approach by SCO staff involved several steps, including geoprocessing tool development, preparation and ingest, local-level processing, aggregation, state-level processing, and quality assurance/quality control. To support counties in achieving the Searchable Format, SCO developed a suite of several publicly available geoprocessing tools. Data was distributed in several formats via a custom website and a web-based mapping application. The V3 web app allows someone without GIS software to view the statewide parcel map. It reflects functional updates from V2, with added value through custom coding.

V3 Statewide Parcel Layer - 2017
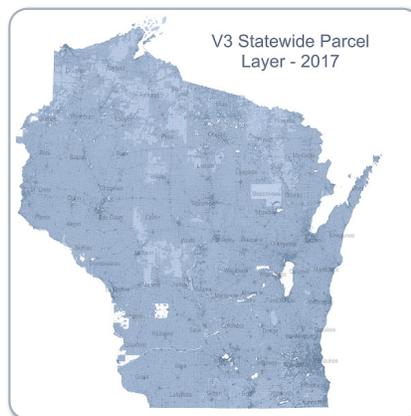
BENCHMARK PROGRESS ASSESSMENT
The final V3 layer represents a tax parcel increase of roughly 32,965 records over the V2 statewide layer. Five counties have yet to complete their digital parcel mapping. Notes from assessment were communicated to counties through individualized documents called V3 Observation Reports, which describe what must still be done for a county to meet the Searchable Format (equivalent to achieving Benchmarks 1 and 2). The vast majority of counties came *close* to meeting the Searchable Format in their V3 parcel data submissions, but very few met the Searchable Format exactly.

ASSESSMENT OF THE FOUR A'S
Many goals in the spirit of the Four A's—*automated*, *asynchronous*,

authoritative aggregation—have been achieved up through the V3 Project, however, until data submitted is in a condition that requires no manipulation by the technical team, implementation of a fully automated workflow is not possible. The recommendation is to monitor progress of short-term goals relating to the Four A's over the next two cycles of the Project and use that as a barometer for determining steps that could be taken in the future.

EVALUATION OF ZONING LAYER
The five separate statewide zoning layers with county-maintained data have been utilized by the public, but have not garnered much user feedback. The zoning layers are still consumed enough to be an asset to the community and should be produced in the future driven by user feedback.

RECOMMENDATIONS
Recommendations to improve and achieve better efficiency, accuracy, and final products include keeping the schema the same—with only minor documentation changes and clarifications—and developing improved submission tools. These recommendations are designed to be minimally-disruptive for counties, yet ultimately lead to a statewide parcel layer that continues to improve with each annual iteration.

1 PROJECT BACKGROUND

1.1 Background

The **Version 3 Statewide Parcel Map Database Project** (V3 Project) was a joint effort between the Wisconsin Department of Administration (DOA) Division of Intergovernmental Relations and the State Cartographer's Office (SCO) that ran between January 1, 2017 and October 31, 2017.

Wisconsin Act 20, the biennial state budget for 2013-2015, created statutory directives through s. 59.72 and s. 16.967 for the state and local governments to coordinate on the development of a statewide digital parcel map, which is referred to as the Statewide Parcel Map Initiative, or Parcel Initiative. One of the statutory requirements was for DOA to determine a "**Searchable Format**" for parcel data and for all county data to be posted online in this standard. V3 is the second round of requesting that counties submit local data in the Searchable Format.

The V3 Project followed successful collaboration between DOA and SCO on similar efforts. In the past, DOA and SCO have partnered on a project to create statewide parcel and address point layers for the LinkWISCONSIN Address Point and Parcel Mapping Project (2013-2014) , the Version 1 (V1) Project (2014-2015), and the Version 2 (V2) Project (2015-2016).[1]

The V3 Project took the approach of DOA toward the Parcel Initiative of improving the statewide parcel map with each annual iteration through a process that allows for much involvement and collaboration with data contributors, who are primarily county land information offices, and data users—a wide array of persons from state agencies, private companies, and other entities and individuals. At the end of 2016, pursuant to s. 16.967(6)(b), DOA submitted a report to the legislature on the positive progress in developing the statewide digital parcel map, which can be viewed online at docs.legis.wisconsin.gov.

1.1.1 V3 Project Goals

As part of the implementation planning for the statewide digital parcel map, the goals of the V3 Project were established in a memorandum of understanding between DOA and SCO:

- **Tracking progress.** The statewide parcel layer is built in an iterative fashion. V3 and V4 will track progress made with investments to local governments, specifically on benchmarks for parcel dataset development instituted with the 2016 WLIP grant application.

- **Four A's – Authoritative Automated Asynchronous Aggregation.** A goal is to achieve these "four A's" so county data stewards can submit datasets at any time or interval by automatically merging the local data with the most current statewide database.

- **Moving to a contributor model of aggregation.** A goal is to move toward a more efficient, automated process for data aggregation (a "contributor model"), rather than an aggregator model requires which requires more state resources be dedicated to the aggregation process. The contributor model should require fewer staff resources and thereby reduce state costs for sustaining the statewide digital parcel map.

- **Outreach and technical assistance to counties.** This may take the form of further development of existing technical tools or the creation of new tools for counties and municipalities to use. It could also involve site visits and direct assistance.

- **Incremental improvement.** Improvement of the statewide parcel layer itself, as well as workflow and methods for each step in the aggregation process, with each new version of the layer. As with the database, the hosting and display should keep pace with current technology and be continually improved to meet users' needs.

- **Lean government principles.** The V3 & V4 Projects should seek to create and realize efficiencies in general, and to integrate or collaborate with other state GIS services where possible, like the Legislative Technology Services Bureau.

- **Responsiveness to public needs and economic development goals.** Evaluate parcel layer user suggestions and implement improvements where feasible.

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[1] See the *V2 Final Report* (November 2016); *V1 Interim Report* (June 2016); *V1 Final Report* (November 2015); and the *Final Report: LinkWISCONSIN Address Point and Parcel Mapping Project* (September 2014).

1.1.2 Project Timeline and Milestones

V3 Statewide Parcel Map Database Project Milestones	
Date	**Version 3 Project Milestone**
January 1, 2017	V3 Project start
March 31, 2017	V3 Data submissions due
July 31, 2017	V3 Parcel map database available online
August 31, 2017	V3 Parcel app available
November 16, 2017	V3 Final report released

1.1.3 Project Team

V3 Statewide Parcel Map Database Project Team	
Howard Veregin, Project Co-Lead	Wisconsin State Cartographer's Office
Peter Herreid, Project Co-Lead	Wisconsin Department of Administration
Codie See, Project Coordinator	Wisconsin State Cartographer's Office
David Vogel, GIS Specialist	Wisconsin State Cartographer's Office
Chris Scheele	Wisconsin State Cartographer's Office
Ryan Halton	Wisconsin State Cartographer's Office
Jim Giglierano	Wisconsin Department of Administration
Davita Veselenak	Wisconsin Department of Administration

1.1.4 Outreach

V3 Conference Presentations and Outreach To-Date	
WLIA Annual Conference February 2017	V3 Parcel Data Submission Q&A Session; LIO 101: Running a Successful Land Information Office
Article, Directions Magazine March 2017	How Wisconsin Created a Sustainable Statewide Digital Parcel Database
68th Wisconsin Society of Land Surveyors Annual Institute January 2017	County PLSS Remonumentation and the Statewide Parcel Map
WLIA Spring Regional Conference June 2017	DOA Session: WLIP Program Plan Implementation

1.2 Documentation and Communication of Standards

The V3 Submission Documentation set forth the required data submission standards for the V3 Project. There are four benchmarks listed by the WLIP Strategic Initiative grant application:

- Benchmark 1 – Parcel and Zoning Data Submission
- Benchmark 2 – Extended Parcel Attribute Set Submission
- Benchmark 3 – Completion of County Parcel Fabric
- Benchmark 4 – Completion and Integration of PLSS

Together, Benchmark 1 and 2 make up the Searchable Format. The Searchable Format is detailed in the V3 Submission Documentation.
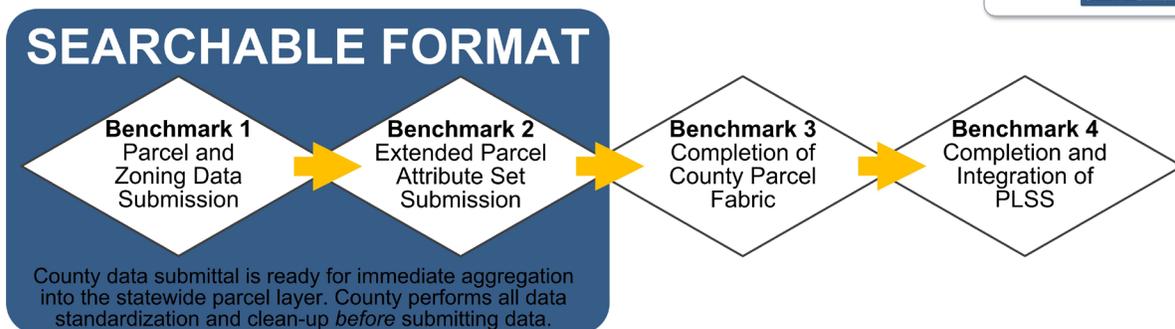

Figure 1. V3 Submission Documentation (upper right) and Searchable Format with Benchmarks (lower)

1.2.1 New for V3

The data counties were asked to submit for V3 was remarkably similar to the V2 data, as the V3 schema was not different in any substantive way. However, there were some clarifications and a few other changes for V3. The changes for V3 were highlighted at the beginning of the V3 Submission Documentation.

- **Validation and Submission Tool.** The State Cartographer's Office built a new Validation and Submission Tool that counties were asked to run in order to validate their data against the schema. Searchable Format submitters could run the tool in TEST mode to pinpoint errors. Both Export and Searchable Format submitters ran the tool in FINAL mode in order to create the mandatory Submission Form.

- **".ini" Submission Form.** For V3, the Submission Form (an ".ini" file) was produced by running the Validation and Submission Tool in FINAL mode.

- **Streamlined documentation.** The V3 documentation contained all of the same information as V2, but in fewer pages.

- **Clarified attribute definitions and examples.** The V3 schema remained essentially the same as the V2 schema, but with clarifications to some attribute definitions and additional examples.

- **Expanded domains for PREFIX.** Either standard abbreviations OR fully spelled out highway domains were accepted for V3.
  - CTH, or COUNTY HIGHWAY, or COUNTY ROAD
  - STH, or STATE HIGHWAY, or STATE ROAD
  - USH, or US HIGHWAY

- **Access URL.** While not an added attribute to the parcel layer schema, an "Access URL" document was produced as a result of county-submitted data access points associated with the statewide parcel layer data submission. This document can be accessed at www.doa.wi.gov/WLIP. That document provides access URLs, which are web links (URL) to a valid webpage to view and/or download the most current parcel data from steward.

- **Submission of other GIS layers.** DOA combined the V3 data request with a request that has been separate in the past—that of Jaime Martindale, the Map & Geospatial Data Librarian at the UW-Madison Robinson Map Library. Therefore, a few other layers were requested, in addition to parcels with tax roll attributes and county-maintained zoning.

1.3 Call for Data

The official V3 data request was submitted to each county land information officer on January 31, 2017 via email, and appears as Figure 4. It included a link to the *V3 Submission Documentation*, which serves as a manual detailing the requirements of the Searchable Format.

Dear Land Information Officer,

On behalf of the Department of Administration, I am writing to request a subset of your GIS data. The data acquired through this request will be used to develop a statewide parcel layer for the next version of the Statewide Parcel Map Database Project, Version 3.

This is an important request, as a successful data submittal is necessary in order to execute your county's 2017 Strategic Initiative grant agreement and receive the first payment.

We encourage you to submit data standardized to meet the Searchable Format standard, which all counties must achieve no later than March of 2018.

V3 Submission Documentation & V3 Webpage
The V3 checklist summarizes the data we are asking you to submit. The digital PDF checklist contains hyperlinks to attribute definitions and links to the full schema. Although the schema remains the same, a page titled New for V3 summarizes what's new. You'll want to read the V3 Submission Documentation in full, in order to understand the details of the V3 request.

In addition, the V3 webpage contains all the necessary submission information, and links to several tools to help you format your data.

Note that additional layers are being requested this year in order to aid in analysis of the statewide layer, as well as part of a collaborative effort with the UW-Madison Robinson Map Library. See Appendix E of the Submission Documentation for details.

Validation and Submission Tool
A change for this year is that there is a tool you must use before you submit your data called the Validation and Submission Tool. The tool can check your data for deviations from the schema, and it is also required to create the mandatory Submission Form.

Submit Data Through WISE-Decade
After prepping your data and running the tool to create your Submission Form, submit your data to the WISE-Decade platform. Log in with the user information you received on December 29, 2015 from the Legislative Technology Services Bureau.

Please submit your data by **March 31, 2017**.

Feedback and Help
We expect that you may have questions about making your data align with the statewide schema. Your peer counties are a great resource, as is the FAQs section on the V3 webpage.

For technical questions, you can contact Codie See at csee@wisc.edu or 608-890-3793. Feel free to contact me with general questions as well.

We know that it could take a considerable amount of work to get your data into the statewide schema. Strategic Initiative grants were designed to aid in this task. We sincerely appreciate your efforts to help make V3 a success.

Thank you,

Peter Herreid
Grant Administrator
Wisconsin Land Information Program
608-267-3369

Figure 2. V3 Call for Data

2 TECHNICAL APPROACH

This chapter describes the strategy or a high-level version of the approach employed by the technical team in processing and aggregating local-level data for inclusion in the V3 final deliverable and statewide parcel map.

2.1 Tool Development

2.1.1 New Validation and Submission Tool

New for V3 was a tool built by the State Cartographer's Office that counties were required to use before submitting data. The Validation and Submission Tool checked data for deviations from the schema, and was also required to create the mandatory Submission Form.

Searchable Format submitters could run the tool in TEST mode to pinpoint errors. Both Export and Searchable Format submitters had to run the tool in FINAL mode in order to create the ".ini" Submission Form, which replaced the Excel Submission Form from V2.

For more details or to download the tool, see the Validation and Submission Tool Guide.

2.1.2 Geoprocessing Tool Development

To support counties in achieving efficient and accurate adherence to the standards in the *V3 Submission Documentation*, the SCO developed a suite of publicly available geoprocessing tools using the ArcGIS ArcPy Module, Python 2.7, and open source libraries. In total, seven tools were created, and made publicly available through the V3 data submission webpage.
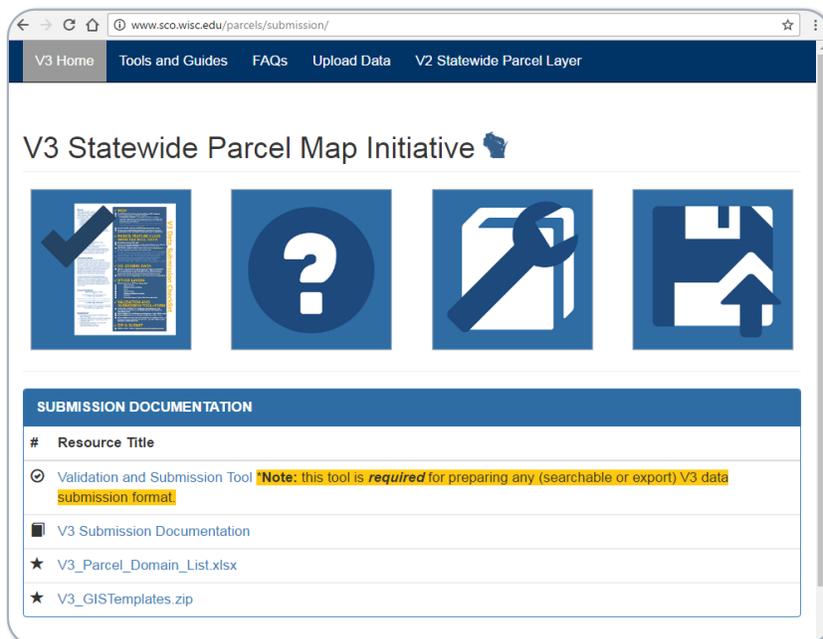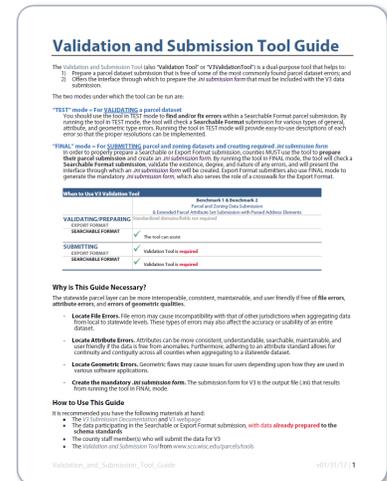
Figure 3. V3 Data Submission Webpage with Links to Schema and Tools

The tools were supported under ArcGIS version 10.1 through version 10.4, the dominant GIS platforms for local governments at the time of the V3 Project. Each of these tools were designed to enable efficient solutions to the most common and time-consuming problems related to preparing parcel and tax roll data to be submitted in the statewide schema. Accompanying the tools were user guides that documented how to prepare the data, run the tool, and troubleshoot if necessary.

- **Address Parsing Tool.** Allows the user to parse site addresses from one long string into sub-address elements. Data submitters might use this tool if the county's parcel SITEADDRESS data is not available as fully parsed address elements and they would like to use the data to help meet the Searchable Format.

- **DOR XML Parse Tool.** Allows the user to translate Department of Revenue Tax Roll XML into a GIS table. For tax roll data in XML format that is to be used for parcel submission.

- **Data Standardize Tool.** Allows the user to standardize a file geodatabase feature class data via the creation of a lookup table through a two-tool sequence. The first tool is used to create a summary table of a field. This table is edited and subsequently used as input to the secondary tool. The output of the second tool includes all original field domains as well as newly standardized domains in a new field.

- **Condo Stack Tool.** Allows the user to model condominiums by stacking condo parcel geometries by owner. A data submitter might use this tool to model condo parcel geometries to match tax roll records with a 1:1 relationship.

- **Class of Property Dissolve Toolset.** Allows the user to format class of property data to V3 schema definitions. This suite of tools may be helpful if a submitter wishes to reformat their class of property information so as to meet the requirements of the V3 schema definitions of PROPCLASS and AUXCLASS. This tool also handles various common formats that class of property exists as and may be helpful if the submitters data exists in one of these formats.

- **Null Fields and Set to UPPERCASE Tool.** Allows the user to format all attributes within a feature class to <Null> and UPPERCASE. This tool may be helpful to a submitter if they wish to format their blank fields or fields annotated with a specific string to a true SQL <Null> or if they wish to set all fields to UPPERCASE alpha characters.

- **Field Mapping Workflow Documentation.** Allows a user to map parcel or zoning attributes to the V3 Parcel Schema. This is not a tool but rather a guide that may be useful to a submitter if they have PARCEL or ZONING data formatted to the schema specifications of the V3 Project but the fields do not have the appropriate FIELD NAME, ALIAS NAME, DATA TYPE, or PRECISION.

- **Summary Table Guide.** Not a tool but a guide for GIS software summary tables, to examine data in preparation for submitting searchable format data. This guide is of particular use for cleaning, validating, and standardizing data.

- **FEMA Floodplain Guide.** Not a tool but a guide that describes how to prepare FEMA floodplain data for submission.

2.1.3 Preparation and Ingest

In the data request, land information officers were asked to submit data to the Legislative Technology Services Bureau (LTSB) of the Wisconsin State Legislature, through their WISE-Decade platform. WISE-Decade is LTSB's suite of mapping tools designed to assist counties and municipalities with legislative and legal requirements as required by state statute. Some file uploads were also accommodated using UW-Madison's enterprise Box.com account through an upload widget.

There were some problems with upload via the LTSB upload widget. For at least seven and as many as ten counties, upload failed and an alternate method of upload was used (Vilas, Oconto, Buffalo, Dodge, Ashland, Trempealeau, Crawford counties; with Calumet, Clark, and Sauk also utilizing the upload alternative). For two counties, upload via LTSB was successful, but did not trigger an automated email alerting the technical team that data had been submitted (Jefferson and Price).

The ingest phase began after the call for data. An automated email notification was sent to the project team any time a data submission to the WISE-Decade platform occurred. Once notified, the technical team would download the data via FTP login through Windows Explorer. After download, the data underwent a brief inspection, was documented as submitted, and then classified within the project's file directory. Depending on the amount of data submitted at any given time, the new data would either be assessed immediately or be queued for assessment according to the date the data was received.

Also upon receipt of data, the county data directory was backed-up locally, while additional data backups were routinely made to an external drive throughout the development phases.

For other GIS layers, the Robinson Map Library (RML) also completed an intake assessment. Including the V3 parcels and zoning data files, RML collected and **added 457 new datasets to GeoData@Wisconsin**. For just the other layers, 323 layers were added (comprised of rights-of-way; roads/streets/centerlines; hydrography; address points; buildings/building footprints; land use and parks/open space; trails; other recreation data). By the end of September 2017, RML staff and students had completed ingest and written metadata for all of the data layers and made them available for download on GeoData@Wisconsin.

2.1.4 Intake Assessment

Once data was copied to local directories, the required .ini Submission Form was automatically ingested into the technical team's master intake spreadsheet. This .ini file played an important role in cataloging the data submitted. Information obtained from the .ini file included feature class names, condo modeling format, submitter name and email address, attribute field mappings (if required based on the Export submission format), generic error counts, completeness relative to V2 data, and a section that allowed contributors to explain unsolvable errors, missing data, and other issues present within the data submitted.

Next, the team recorded general notes related to attribute quality and completeness, geometric location, and other issues observed. The focus of this assessment was to determine if data met the submission requirements and establish what processing steps would need to be performed to get the data into the Searchable Format for aggregation, as the majority of counties did not submit data that exactly matched the Searchable Format.

If, upon internal team discussion, it was determined that data was missing or incomplete, the county was re-approached and asked to resubmit corrected data or provide justification for the missing data. Roughly 29 counties had to be re-approached to obtain data missing from initial submission, to get clarification on peculiar data observations, and for the correction of erroneous data. In total, more than 83 emails were sent to resolve these issues. In a few cases, up to four follow-up emails were required to an individual county before their data submission could be deemed complete and proceed past the initial assessment phase.

After it was determined that the data submitted could be efficiently manipulated and processed, detailed processing steps were written. These steps provided the technical team with the information needed to massage the data into the final format and prepare it for the aggregation phase.

2.1.5 Geometric Gap Analysis

To identify gaps in the statewide parcel coverage where digital parcels do not exist, a manual inspection was performed on every parcel dataset submitted. If a parcel dataset was missing parcels in places where they were expected to appear, the county was reapproached for another data submission.

Inspecting the completeness of parcel geometries across a given county is necessary because parcel gaps are sometimes bounded by the borders of incorporated (city/village) jurisdictions, while in other cases they are more widespread and include unincorporated areas (towns). It is the responsibility of the county to integrate all available parcel datasets into their parcel data submission, even if the municipal jurisdiction (city, village) is the data steward for the parcel dataset.

In a contributor improvement over V2, for V3, there was no missing data in the form of gaps where parcel data is maintained by a municipality but not aggregated to county-level parcels.

The geometric incompleteness of the V3 statewide parcel layer and the **5 counties** who **have yet to complete county-wide digital parcel mapping** are summarized in the table below.

Notably, since V2, three counties completed digital parcel mapping—Langlade, Polk, and Sawyer Counties!

V3 Gaps Summary		
County	**Number of Municipalities with Gaps**	**Municipalities with Gaps in Parcel Coverage**
Buffalo	11	**Entirety of:** Fountain City (C) **Part of:** Alma (C), Alma (T), Belvidere (T), Buffalo (C), Buffalo (T), Cochrane (V), Cross (T), Dover (T), Gilmanton (T), Glencoe (T), Lincoln (T), Milton (T), Modina (T), Mondovi (C), Mondovi (T), Montana (T), Naples (T), Nelson (T), Nelson (V), Waumandee (T); plus several small parcel gaps in various townships
Burnett	6	**Part of:** Swiss (T), Oakland (T), Union (T), West Marshland (T), Grantsburg (T), Anderson (T)
Crawford	9	**Entirety of:** Bridgeport (T), Prairie du Chien (T), Wauzeka (T), Wauzeka (V), Eastman (V), Lynxville (V), Gays Mills (V), Mount Sterling (V) **Part of:** Eastman (T)
Marquette	4	**Entirety of:** Oxford (V), Montello (C) **Part of:** Oxford (T), Westfield (V)
Vernon	18	**Entirety of:** Sterling (T), Franklin (T), Genoa (V), Coon Valley (V) **Part of:** Viola (V), La Farge (V), Union (T), Greenwood (T), Jefferson (T), Harmony (T), Genoa (T), Chaseburg (V), Stoddard (V), Bergen (T), Clinton (T), Ontario (V), Forest (T), Hillsboro (T)

2.1.6 Aggregation

The process of aggregating individual county datasets began upon the completion of all required processing tasks for each county. After verifying these tasks were complete and ensuring that data was in the Searchable Format, the finalized feature class for each individual county was identified and the full path was documented to allow the technical team to run a batch processing tool for aggregation. Zoning aggregation followed the same processes of verifying processing task completion, identifying finalized feature class, and documenting the full path for batch aggregation.

Next, a new statewide working database was created that contained a merged feature class consisting of all 72 individual county parcel datasets called "V300_StatewideParcels_2017," as well as a merged feature class for each of the five zoning layers—"V300_GeneralZoning," "V300_FloodplainsZoning," "V300_FarmlandZoning," "V300_ShorelandZoning," and "V300_AirportZoning".

State-level processing was performed on the V300_StatewideParcels_2017 feature class. This processing included steps such as: casting select fields from string to double, construction of the STATEID attribute for all records, creation of LATITUDE and LONGITUDE fields (populated with values for the inside centroid of each parcel polygon), and general data cleaning tasks (e.g., removal of leading/trailing whitespace, converting empty strings to <Null>, setting all attributes to UPPERCASE).

2.1.7 Quality Assurance/Quality Control

Beginning with the V2 call for data, data submitted has been required to meet certain documented standards. These attribute field standards, attribute domain standards, and geometric representation standards were assessed as part of the QA/QC phase. Maintaining high quality datasets from one version to the next is of paramount importance to the Parcel Initiative. A variety of QA/QC methods were used throughout the project, including manually-focused techniques, as well as more automated techniques that allowed for visualization across the entire state.

Manual cleanup techniques and tasks were performed across many of the datasets submitted. These included: address element standardization, mailing address cleanup, address number cleanup, miscellaneous street name element parsing, excess field removal, etc. Often, the tasks were completed during the processing phase, prior to aggregation into the statewide feature class.

The automated QA/QC techniques were most often performed after the statewide feature class had been aggregated. With 3.48 million parcels, it was not feasible to manually inspect every record. For this reason, summary tables and a variety of maps were created during this process.

Summary tables were created as a byproduct of the state-level processing and provided a discrete set of domains that existed for a particular attribute field. These tables are particularly valuable for fields such as PREFIX, STREETTYPE, SUFFIX, and PROPCLASS, which have specific attribute domain standards. These tables, used in conjunction with the Data Standardize Tool, allowed for corrections to be made efficiently and accurately. Maps were produced, typically using a choropleth scheme, allowing the visualization of spatial trends within individual municipalities, counties, and statewide. These trends could be hard to observe from the tabular data alone. Maps provided another valuable tool for discovering errors and issues that existed in the data and allowed for corrections to be made.

2.1.8 Final Deliverables

The final parcel layer totaled 3.48 million parcels and is shown in Map 1 on the following page.

V3 Statewide Parcel Layer - 2017
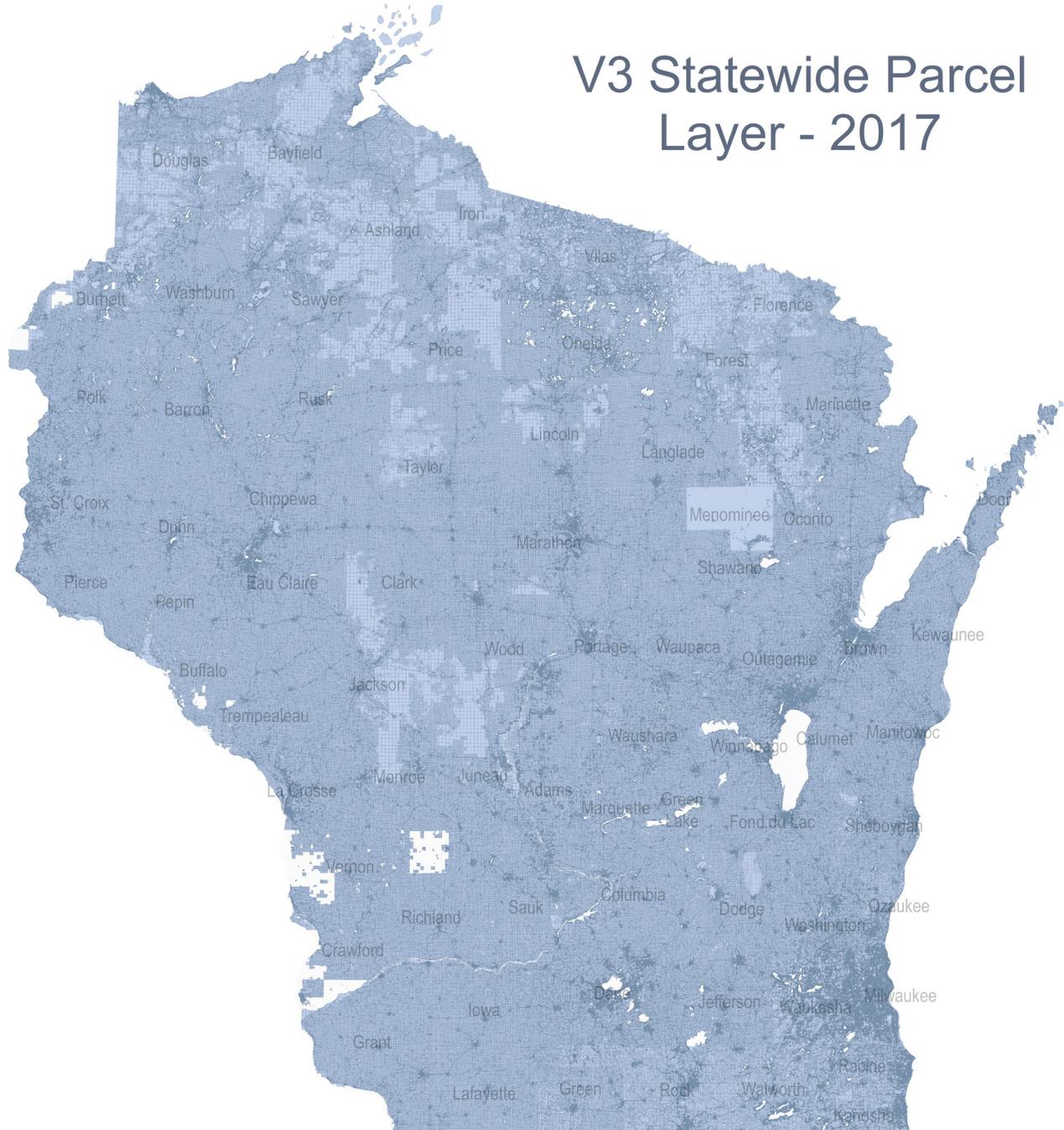
Map 1. Version 3 Statewide Parcel Layer Completed in July 2017

Geometric Coverage

Continued progress is being made in completing the digitization of parcels across the Wisconsin landscape, as indicated by the statistics below.

V1 and V2 Versus V3 Spatial Coverage					
	V1	V2	V3	Additional Coverage in V3	Percent Additional Coverage in V3
Number of features	3,434,149	3,466,359	**3,486,200**	**19,841 features**	**0.6%**
Coverage (in square miles)	53,656	55,280	**56,060**	**780 square miles**	**1.4 %**

Note. The coverage in square miles calculation does not represent a true 1:1 comparison between the actual area of the state in square miles and total parcel coverage in square miles. In instances where condo parcels are stacked, the square mileage value is inflated.

2.1.9 Final Zoning Deliverables

The zoning deliverable consists of the following five zoning layers: County General Zoning, Airport Zoning, Farmland Zoning, Floodplain Zoning, and Shoreland Zoning. Figure 4 illustrates the geographic coverage of the final zoning layer. Note that all five layers share the same attribute schema, which has been designed to be flexible in accommodating varying zoning types, zoning classes and their respective jurisdictions and definitions. The statewide zoning layer downloads are available as five separate feature classes within an Esri file geodatabase.

Zoning Type

Zoning type, in contrast to zoning class, is a more general categorization of zoning ordinance. While membership within a given zoning type may vary by classification breadth, jurisdiction, and definition, V3 targeted the aggregation of the five county-maintained zoning types. While the types listed are relatively homogenous in definition, there is a degree of translation when aggregating domain-specific county data to a statewide level.

Zoning Class

Zoning class, in contrast to zoning type, is a more granular classification of zoning ordinance and is categorically nested within zoning types. As with zoning type, membership within a given zoning class may vary by classification breadth, jurisdiction, and class definition. The technical team did not attempt to standardize or crosswalk zoning classes at the statewide scale, as this could denature the specificity of an individual jurisdiction's corresponding classification. For this reason, the definition of each zoning class was left specific to the county in which it resides.
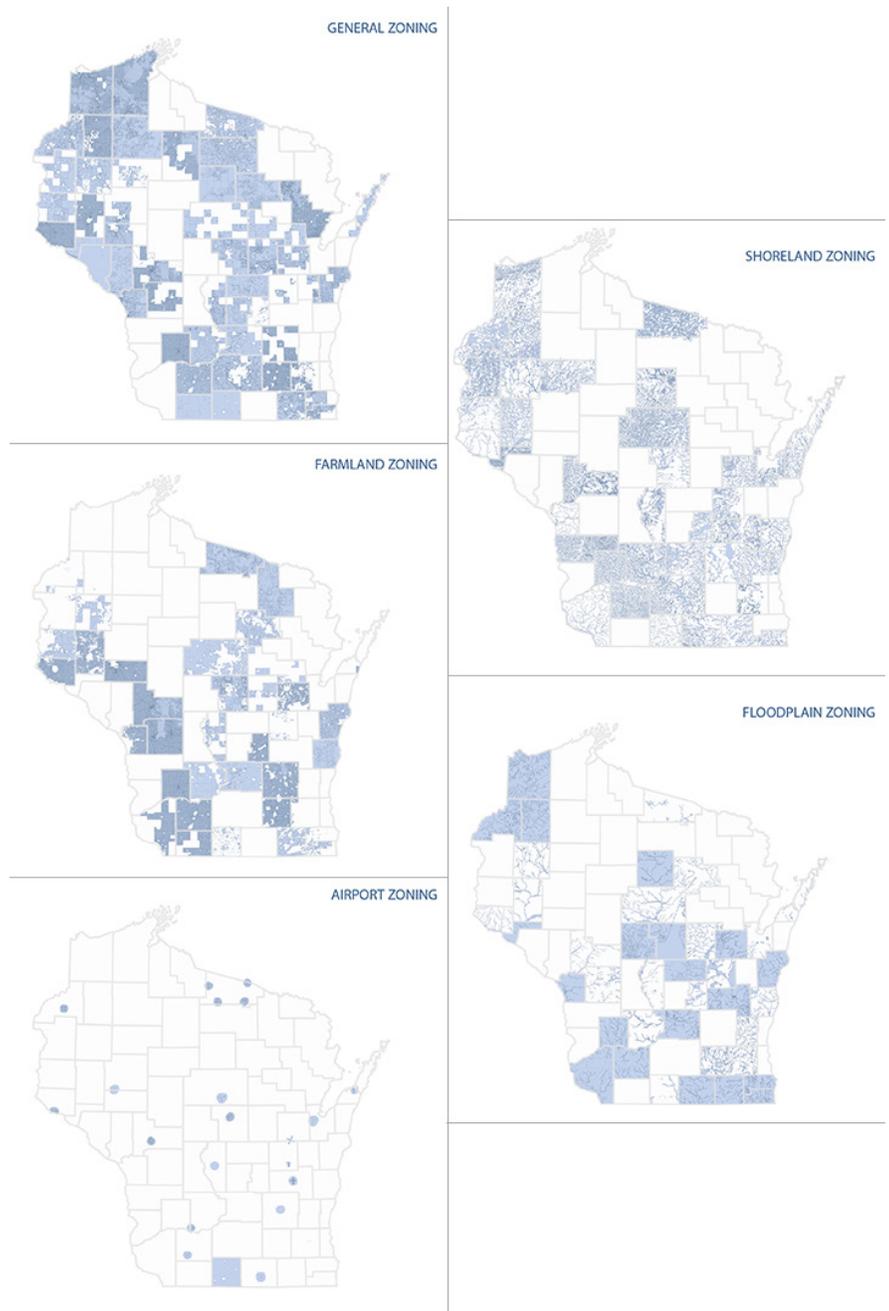

Figure 4. Final Zoning Deliverables – Coverage Areas

2.1.10   Collection and Display of Public Lands Information Maintained by Counties

Although the V3 layer does not present a designation of "public lands" as a discrete attribute, it is possible to derive publicly owned lands from the V3 statewide parcel layer. During the V3 schema drafting and preparation phase, the identification of publicly owned lands was discussed and resulted in some new directives for the submission of data. Specifically, counties were asked to standardize public owner names to the extent possible, and to not redact public owner names, as provided within the fields OWNERNME1 and OWNERNME2.

The intention of these instructions added for V3 was to facilitate a more comprehensive identification of publicly owned land through more standardized owner names, and population of the owner name field in spite of redaction policies. These guidelines were designed to ultimately facilitate better methods for isolating public land parcels based on the OWNERNME1 field. In addition, the PROPCLASS and AUXCLASS attributes are another method that could be used to identify publicly owned lands.

Due to a number of complicating factors, publicly owned lands are not consistently attributed across the state. They are stewarded by federal, state, county, and municipal governments, and thus owner name and property class are attributes not comprehensively maintained within county datasets. Moreover, in county datasets most owner name fields—whether in the tax roll or the parcel dataset—are duplications of the owner name on the property deed. This linkage back to deed documents explains why owner names can be inconsistent and unstandardized. Counties do not have one uniform method for identifying and classifying public lands records. Detailed records for publicly owned parcels are often held by non-county entities, as is the case with Wisconsin DNR, where there is a GIS layer of DNR-owned parcels in a Public Access Lands Map and mapping application.

As part of the V3 project, a workflow was created to isolate publicly owned lands from the statewide parcel map, as one possible example of how one might isolate public parcels. To identify publicly owned lands, a subset of counties—specifically Wisconsin's 15 coastal counties—were selected and a pilot workflow was developed.

Ultimately, the technical team determined that models executed with Python coding would be a solid approach for isolating publicly owned parcels statewide. However, variations in the native data would complicate the effectiveness of these models to 100% accurately characterize parcels. Therefore, a different method of isolating publicly owned parcels is offered here.

Example Workflow for Isolating Publicly Owned Lands

In order to add a separate field to designate public parcel ownership, one concrete method is to add a text field (e.g., "OSHIP_TYPE") to the attribute table of the statewide parcel file geodatabase. In an editor session of ArcMap, multiple *Select by Attributes* queries can be initiated to isolate different types of ownership. This might begin with those parcels whose OWNERNME1 and/or AUXCLASS information is populated, and move to those parcels missing AUXCLASS/PROPCLASS information. This workflow is only an example and one of many possible solutions for identifying publicly owned parcels.

Example Workflow for Isolating Publicly Owned Lands

Select * FROM V3.0.1_Wisconsin_Parcels_2017 WHERE:

1) OWNERNME1 IS NULL
   - Label "Null" (include quotes) in "**OSHIP_TYPE**" field
     (in order to separate out records that lack any identifying information)
2) AUXCLASS = 'X1' ▶ Label "Federal" in text box of Field Calculator in "OSHIP_TYPE" header
3) AUXCLASS = 'X2' ▶ Label "State"
4) AUXCLASS = 'X3' ▶ Label "County"
5) AUXCLASS = 'X4' ▶ Label "Municipal"
6) OWNERNME1 LIKE '%TRUST%' AND PROPCLASS LIKE '1%' AND OSHIP_TYPE IS NULL ▶ Label "Private Trust"
   - Repeat, with synonyms for TRUST, such as '%TRST%' and '%TST%' (also in steps 7-9 below)
7) OWNERNME1 LIKE '%TRUST%' AND PROPCLASS LIKE '2%' AND OSHIP_TYPE IS NULL ▶ Label "Private Trust"
8) OWNERNME1 LIKE '%TRUST%' AND OSHIP_TYPE IS NULL ▶ Label "Trust"
9) OWNERNME2 LIKE '%TRUST%' AND PROPCLASS LIKE '1%' AND OSHIP_TYPE IS NULL ▶ Label "Private Trust"
10) OWNERNME1 LIKE '%LLC%' AND OSHIP_TYPE IS NULL ▶ Label "LLC"
11) OWNERNME1 LIKE '%CHURCH%' OR '%HOSPITAL%' OR '%CEMETARY%' ▶ Label "Other"
12) OWNERNME1 LIKE '**A**%' AND PROPCLASS LIKE '1%' AND OSHIP_TYPE IS NULL ▶ Label "Private"
    - Continue through alphabet, A through Z. Carefully visually identify those attributes that are not clearly people's names through reselect and deselect methods. Label according to the classification above.
13) OWNERNME1 LIKE 'A%' AND OSHIP_TYPE IS NULL ▶ Label "Private" – in most cases, but manually check
14) OSHIP_TYPE IS NULL ▶ Find remaining parcels and appropriately classify
15) OSHIP_TYPE = 'State' OR OSHIP_TYPE = 'County' OR OSHIP_TYPE = 'Federal' OR OSHIP_TYPE = 'Municipal' OR OSHIP_TYPE = 'Native Am'
16) Create shapefile from selection and name the file

2.2 Data Distribution

2.2.1 Database Download Webpage

The data was distributed via two primary means: a website with download links and a web-based mapping application. The V3 database was formally released to the general public on July 31, 2017, through the DOA land information email listserv and the V3 data page.
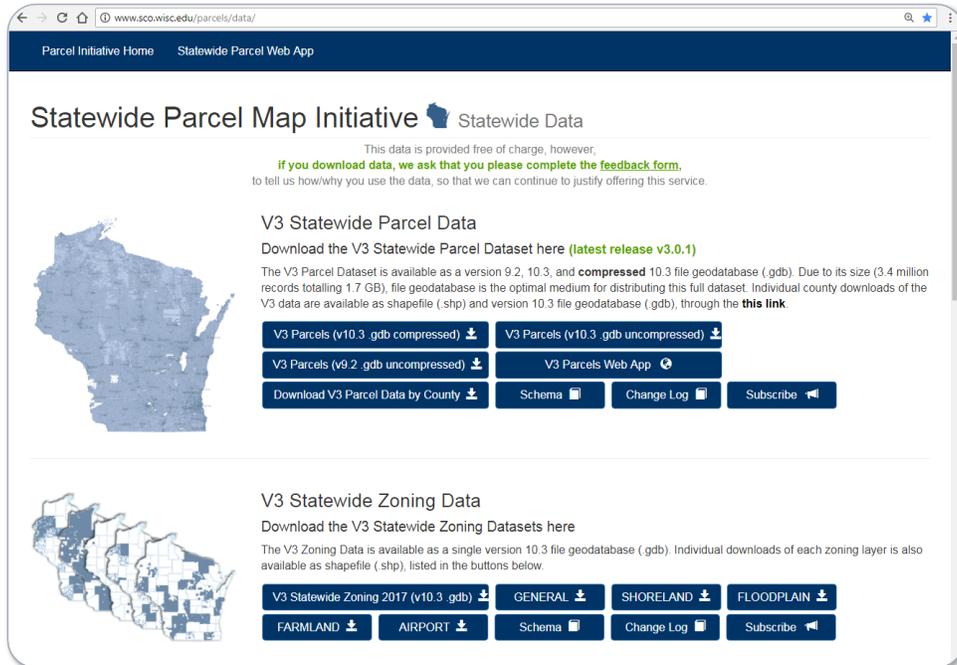

Figure 5. V3 Data Page

The custom webpage for data distribution was built and hosted by SCO, with the aim of flexibility. The site supports desktop, mobile, and tablet devices.

2.2.2 Web Application

Development of the V3 web application followed suit with the technology used in developing the V1 and V2 web applications—Web AppBuilder, the ArcGIS API for JavaScript, and feature services hosted by Wisconsin's LTSB. The V3 app design reflected the same elements as those existing in the V2 app with the addition of some enhancements. These enhancements were added to the app through custom code to target functionality not supported through Web AppBuilder.

As a GIS layer and application covering the entire state of Wisconsin, functionality for displaying and querying parcel data at statewide and regional levels—in addition to county and neighborhood levels—was important. The sheer amount of data in the parcel and zoning layers requires a unique strategy be employed to provide users with a fluid and seamless experience at all scale levels. Two particularly important strategies were implemented in order to target querying and pan/zooming functionality of the map:

- **Pan/Zooming.** The parcel layer was "cached" or "tiled" from zoom levels 0 (world view) to level 16 (neighborhood view). Starting at level 17, the feature services provided by LTSB begin being used instead of the tiled service. This threshold was found to be optimal in providing the user with the speediest map panning and zooming experience, as it reduced the amount of loading time across all scale levels while not compromising detail at street and neighborhood levels.

- **Querying.** Scale-dependent logic was also used to implement efficient attribute querying in the web app. The time it takes to perform a query can be substantially reduced if the query is isolated to the geographic area that the user is viewing on the map. With this in mind, the app will automatically default to use the user's map extent to isolate the query once the user reaches zoom level 11 (roughly a county-wide view). The user has the option to turn this feature off if they still want to search for the attribute statewide.

V3 App Improvements

For the V3 application, the project team worked to improve upon what was created for the V2 app. Below are a list of application additions and improvements.

- **Inclusion of "Locate Me" button.** Users of previous versions of the parcel application enjoyed the functionality of a "Locate Me" feature, allowing an individual to geolocate or "find" themselves on the application map. This feature was particularly beneficial for use in the field or away from a desktop environment. Use case examples include hunters determining land owners to contact in an instance of gaining permission to track a wounded deer during hunting season, potential home buyers using the feature when out looking at possible real estate purchases, and general recreation enthusiasts who seek to ensure they were within the bounds of DNR property while out hiking and biking—to name a few. This feature was not available for an extended period of time within the V2 application, due to the requirement that the application be hosted on a server with an SSL certificate (HTTPS). This requirement provides "bidirectional encryption of communications between a client and server, which protects against eavesdropping and tampering with or forging the contents of the communication." It also ensures the contents of the communication between the user and application cannot be read or forged by any third party. The team was able to resolve this issue in early 2017, resulting in the re-inclusion of the Locate Me feature again for the V3 version of the parcel application.

- **Inclusion of a standardized site address field for searching.** The V3 parcel application includes a more streamlined search of the SITEADRESS field. The project team created a "standardized" site address field to simplify the searches that users could perform over this field. The SITEADRESS field is maintained "as-is" provided by the data contributor. As a result of this unstandardized format, searching often required multiple iterations of searches to find an address that a user was looking for. Variations in attributes such as PREFIX (County Highway, Co Rd, CTH, etc.) and STREETTYPE (St, Str, Street, etc.) often times caused users to search multiple versions of an address to find the correct syntax used by a county. This new standardized field ideally helps remove some of the guess and check iterations a user would need to perform. This field standardization for improved searching focused primarily on the PREFIX field, standardized into a select number of domains (USH, N USH, STH, E STH, CTH, W CTH, etc.), as well as the STREETTYPE field, in which all street types are fully spelled out (e.g., ST = STREET, AV = AVENUE, etc.). Based on internal testing, this standardized field appeared to yield positive address searching results and will ideally make for a better end-user experience.

- **Updates to supporting text/links.** All of the supporting text and links associated with the parcel application including, the V3 Statewide Parcel Map splash screen, *About* section, *Search Tips*, and data download links were updated to reflect more thorough definitions, updated information about the statewide parcel layer and more concise search tips to aid end users in navigating the application. Updates were also made to the user feedback form (shown in Figure 6) and land information county contacts page, which directs users to Wisconsin's county-maintained land information websites.

Figure 6. V3 Feedback Form

- **Removal of V1 parcel data feature layer.** At the time of the release of the V3 statewide layer, the V3 parcel application included the V1 parcel layer tiles and feature service. Expecting the V1 feature layer to be retired by LTSB in order to save resources, it will be removed from the application. However, users can still download a historic copy of the data at sco.wisc.edu/parcels/data and from the Robinson Map Library.
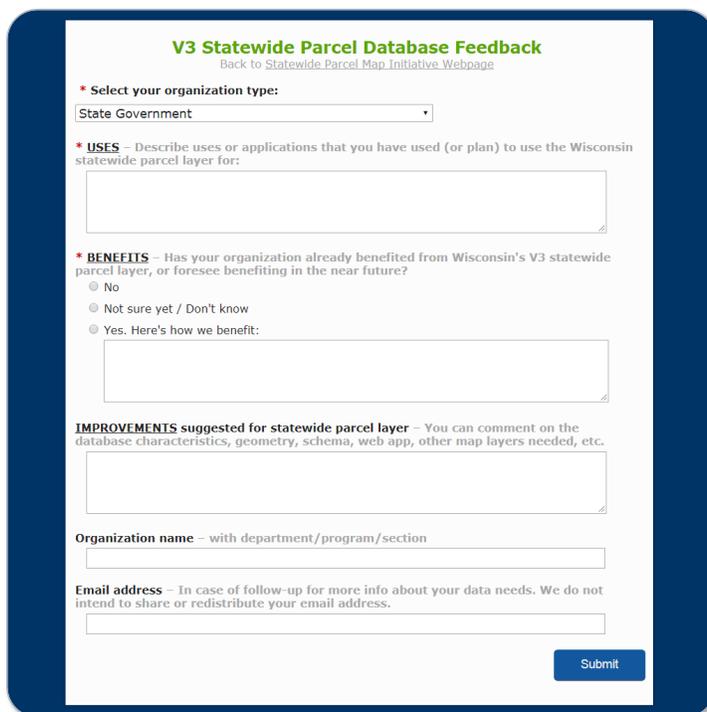
2.2.3 Data Access and Download Statistics

Across the various formats that were offered, the statewide parcel layer and zoning layers have received large numbers of downloads and access via web mapping services.

It is notable that V2 received a total of **over 4,000 downloads** and nearly **1.8 million hits on web services** in the year following the V2 release date.

Statewide Parcel Layer Download and Access Statistics		
V1 Parcels	**Downloads**	**Hits on Services or App Views/Requests**
V1 Parcels (during V1 year)	**3,625 Total**	unknown
[*No zoning or individual county data was produced for V1]		
V2 Parcels and V2 Zoning		
V1 Parcels (during V2 year)	131	451,374
V2 Parcels (during V2 year; all formats)	859	1,341,401
V2 Individual County Parcels, all 72 counties combined (all formats)	3,248	NA
	4,238 Total	**1,792,775 Total**
V2 Zoning		
Wisconsin_Zoning_2016 - All 5 zoning layers in one database	128-174	NA
Airport	19-36	3,524
Farmland	39-56	3,837
Floodplain	26-44	4,448
General	61-80	8,138
Shoreland	27-47	4,469
	300-437 Total	**24,416 Total**
V3 Parcels and V3 Zoning		
V3 Parcels (during first **month** after release; all formats)	149	unknown
V3 Individual County Parcels, all 72 counties combined (all formats)	285	unknown
	434 Total	
V3 Zoning (during first **month** after release)		
Wisconsin_Zoning_2017 - All 5 zoning layers in one database	25	unknown
Airport	4	unknown
Farmland	4	unknown
Floodplain	4	unknown
General	2	unknown
Shoreland	3	unknown
	46 Total	

Table Notes.
- Data that is not available is denoted with "unknown."
- The source for V2 data is Google Analytic events (through July 31, 2017), as well as Box access statistics.
- Numbers are approximate.
  - For V2 download figures, an error in the Google Analytics code for the first month caused issues with segmenting the numbers. Downloads from this period are supplemented with Box stats to arrive at the above totals.
  - For V2 hits figures, LTSB's server was switched during the early portion of V2, therefore, figures for V2 hits are approximate, and may not include hits prior to the server change.
- V2 zoning figures appear as a range (e.g., 128-174) due to differences in Google Analytics versus Box access statistics.
- "Hits" numbers are subject to variation in definition. Here, hits may be "transactions." For ArcGIS server, a transaction is defined as any time the server or services is hit or pinged. Therefore, the number of hits is not an indicator of the number of unique users. A transaction is counted each time that a user makes a request to the service and data is returned.
  - For example, each of these actions within the parcel web app would be counted as a transaction: (a) searching the web app on owner name, parcel ID or site address; (b) panning the map to an uncashed area when viewing the map at neighborhood level (large scale); and (c) clicking on the map to procure the parcel attribute information of an area.

3 BENCHMARK PROGRESS ASSESSMENT

3.1 Observation Reports

The notes from the V3 Statewide Parcel Map Database Project intake process and Benchmark 1 and 2 (Searchable Format) assessment were communicated to counties through documents called the V3 Observation Reports. The reports were individualized for each county, and contained observations related to the data submitted, with focus on how local data compared to the statewide schema. The V3 Observation Reports showed precisely how local data compared to the benchmarks for parcel data laid out in the WLIP grant application and the V3 Submission Documentation, evaluating how close counties came to the Searchable Format for submission of parcel data.

SCO staff documented what must be done yet to achieve the Searchable Format and thus meet Benchmarks 1 and 2 by March 31, 2018, the tentative V4 call for data deadline. The intention was that the action items from the V3 Observation Report be used as a checklist to help develop and groom the county's data to meet the Searchable Format in the future.

Figure 7 shows an example of a V3 Observation Report.

Figure 7. V3 Observation Report Example

3.1.1 OWNERNME1 – Redaction of Owner Names

For the owner name attribute, some counties redacted owner names. Partial owner name redaction was conducted by nine counties for V3, although some counties redacted only a very small number of records. An additional two counties—Kenosha and Outagamie—withheld all owner names, consistent with a local county board resolution.

For V2, five counties implemented partial redaction, and Kenosha and Outagamie completely redacted. This was an improvement compared to the V1 database, in which 22 counties did not permit owner name display in the V1 statewide layer.

V3 Owner Name Redaction		
County	**Scope**	**Percent Redacted**
Kenosha	**Entire county dataset**	**100.00**
Outagamie	**Entire county dataset**	**100.00**
Barron (new for V3)	Partial	0.82
Columbia	Partial	0.13
Dane	Partial	6.61
Jackson (new for V3)	Partial	0.71
Oneida	Partial	0.01
Sauk	Partial	0.08
Sheboygan (new for V3)	Partial	0.11
Vilas	Partial	0.19
Waukesha (new for V3)	Partial	0.01
City of Appleton*	Entire city dataset	100.00

Within Outagamie/Winnebago/Calumet Counties

3.2 Benchmark 1 and 2 Progress Assessment

Benchmarks 1-4 were defined in detail within the V1 Interim Report:

- Benchmark 1 – Parcel and Zoning Data Submission
- Benchmark 2 – Extended Parcel Attribute Set Submission
- Benchmark 3 – Completion of County Parcel Fabric
- Benchmark 4 – Completion and Integration of PLSS

Benchmark 1 and 2 are explored below for the purpose of assessing progress between V2 and V3. For both of these benchmarks, progress between the V2 and V3 projects is captured in comparing the individual V2 Observation Reports and V3 Observation Reports, which are referenced throughout this chapter.

3.2.1 Benchmark 1 and 2 – Parcel and Zoning Data Submission and Extended Parcel Attribute Set Submission

Benchmark 1 and 2 were satisfied by submitting parcel, tax roll, and relevant zoning information using the required standards detailed in the V3 Submission Documentation. Because Benchmark 1 and 2 are closely related and go hand-in-hand, they are often discussed together. The main difference is that for Benchmark 2, counties must submit parsed address components with their parcel data.

For parcel and tax roll data submitted for V1, V2, and V3, there were two submission format options—the Export Format and the Searchable Format.

The "Searchable Format" is a format that directly meets the data model requirements of the final statewide parcel layer. This format is not expected to change in the foreseeable future and is intended that only essential modifications be made for future iterations of the parcel layer. The Searchable Format is the format that all counties will be expected to use for future versions of the project.

The "Export Format" is a format for data exchange. Data received in this format is processed by the parcel aggregation team to meet the data model requirements of the final statewide parcel layer. This format was acceptable for counties to use for submitting parcel and tax roll data for the V1, V2 ,and V3 projects, but **the Export Format is scheduled to be phased out for the V4 Project**, when it will no longer be acceptable. The Export format is not compatible with the intended asynchronous update model and is a major obstacle to achieving the objective of automation and efficiency in statewide parcel aggregation. It was originally devised to accommodate variations in local data and allow counties time to gradually adjust to the submission requirements of the Searchable Format.

Zoning data must also be submitted in the Searchable Format. Like the Searchable Format for parcels, this format for zoning is not expected to change and is intended that only essential modifications be made for future iterations.

Parcel Data Evaluated Against Benchmark 1 and 2

Assessing progress in county achievement of the Searchable Format—equivalent to attaining Benchmark 1 and 2—for parcel data can be performed by referencing the V2 Observation Reports and V3 Observation Reports. The reports track all substantial manipulation that needed to be performed on each county parcel data submission, on a per attribute basis. The table below summarizes the progress between V2 and V3, **for parcel data**.

Benchmark 1 and 2 Progress Assessment – For PARCEL Data			
Parcel Attributes	V2 Attribute Errors	V3 Attribute Errors	Difference Between V2 and V3
PARCELID	3	0	3 less
TAXPARCELID	1	30	29 more
PARCELDATE	40	8	32 less
TAXROLLYEAR	7	1	6 less
OWNERNME1	1	1	0
OWNERNME2	0	6	6 more
PSTLADRESS	31	42	11 more
SITEADRESS	19	3	16 less
ADDNUMPREFIX	12	4	8 less
ADDNUM	35	8	27 less
ADDNUMSUFFIX	17	10	7 less
PREFIX	19	5	14 less
STREETNAME	34	21	13 less
STREETTYPE	37	5	32 less
SUFFIX	15	3	12 less
LANDMARKNAME	8	0	8 less
UNITTYPE	16	1	15 less
UNITID	22	4	18 less
PLACENAME	11	1	10 less
ZIPCODE	59	1	58 less
ZIP4	8	1	7 less
STATE	11	1	10 less
SCHOOLDIST	8	11	3 more
SCHOOLDISTNO	19	1	18 less
IMPROVED	18	0	18 less
CNTASSDVALUE	7	0	7 less
LNDVALUE	3	0	3 less
IMPVALUE	3	0	3 less
FORESTVALUE	4	0	4 less
ESTFMKVALUE	7	2	5 less
NETPRPTA	7	2	5 less
GRSPRPTA	6	1	5 less
PROPCLASS	4	4	0
AUXCLASS	20	3	17 less
ASSDACRES	2	0	2 less
DEEDACRES	2	0	2 less
GISACRES	1	1	0 less
CONAME	7	2	5 less
PARCELFIPS	6	3	3 less
PARCELSRC	7	3	4 less
PROJECTION	19	5	14 less
NET TOTAL	**556**	**194**	**362 less ▶**
			▶**~65% improvement**

The vast majority of counties came close to meeting the Searchable Format in their V3 parcel data submissions. However, as far as "perfect" Searchable Format submissions for parcel data, only Barron County met the standard for parcel *and* zoning data exactly. A handful of other counties met the Searchable Format for parcel data alone:

- **Met Searchable Format for V3 parcel data submission** (3 counties) – Barron, Brown, Vilas.

- **Missed Searchable Format for V3 parcel data submission by one attribute** (8 counties) – Bayfield, Calumet, Dodge, Door, Dunn, Kewaunee, Polk, Sauk.

Zoning Data Evaluated Against Benchmark 1 and 2

For zoning data, the results indicate that several counties had an issue with achieving the Searchable Format for V3 zoning data.

The table below summarizes the progress between V2 and V3, **for zoning data**.

Benchmark 1 and 2 Progress Assessment – For ZONING Data			
Zoning Type	**V2 Layers with Error**	**V3 Layers with Error**	**Difference Between V2 and V3**
County General	19	28	9 more
Farmland Preservation	30	26	4 less
Shoreland	46	42	4 less
Floodplain	38	36	2 less
Airport Protection	30	16	14 less
NET TOTAL	**179**	**164**	**15 less ▶**
			▶ **~9% improvement**

Although zoning realized a mere 9% overall improvement between V2 and V3, it should be noted that higher scrutiny was applied to the V3 zoning data submissions.

3.3 Benchmark 3 and 4 Progress Assessment

Data for Benchmark 3 and 4 completion is collected via the WLIP grant application and summarized below.

Benchmark 3 Progress		
As of 2016	Counties with Incomplete Parcel Fabric	Estimated Year of Parcel Fabric Completion
	Buffalo	2017
	Burnett	2022
	Crawford	2018
	Marquette	2017
	Vernon	2020

Benchmark 4 Progress		
As of 2016	Counties with Incomplete PLSS	Estimated Year of PLSS Network Completion
	Adams	2017
	Ashland	2025
	Bayfield	2041
	Brown	2018
	Buffalo	2027
	Burnett	2024
	Chippewa	2020
	Clark	2020
	Columbia	2020
	Crawford	2020
	Dane	2024
	Door	2018
	Douglas	2030
	Dunn	2025
	Eau Claire	2025
	Florence	2018
	Fond du Lac	2018
	Forest	2040
	Grant	2050
	Green	2030
	Green Lake	2020
	Iowa	2025
	Iron	2020
	Jackson	2021
	Kenosha	2017
	Kewaunee	2017
	Lafayette	2035
	Langlade	2026
	Marathon	2019
	Marinette	2030
	Marquette	2025
	Menominee	2018
	Monroe	2020
	Oconto	2031
	Oneida	2025
	Outagamie	2020
	Ozaukee	2019
	Pierce	2017
	Polk	2017
	Portage	2022
	Price	2030
	Racine	2018
	Richland	2018
	Rock	2019
	Rusk	2030
	Sauk	2031
	Sawyer	2030
	St. Croix	2017
	Taylor	2021
	Vernon	2020
	Vilas	2025
	Walworth	2020
	Washburn	2017
	Waupaca	2021
	Waushara	2020
	Wood	2017

4 ASSESSMENT OF THE FOUR A'S

4.1 Assessment and Implementation Outline for the Four A's

Automated, *Asynchronous*, *Authoritative*, and *Aggregation* comprise the Four A's—a theoretical method for achieving the overall goal of creating and maintaining a high quality, current, complete dataset.

Continuing to make strides in aggregating a complete, clean, and standardized dataset has been a goal with each iteration of the Parcel Initiative. The technical implementation of this automated aggregation method, while challenging in some respects, can be achieved.

As elaborated below, a primary concern of the technical team at the State Cartographer's Office revolves around the exclusion of a thorough assessment phase in automated asynchronous aggregation. The exclusion of a phase in which datasets are thoroughly and manually assessed may result in the decrease of data quality standards, reducing the usefulness and faith end users have in the product.

Moving forward with the Parcel Initiative warrants an examination of the goals ("targets") and current status for each of the Four A's.

- **Automated.** Achievement of a "push-button" functionality that supports real-time submission and processing of data from the county with limited or no intervention from parcel staff.
    - **Status as of V3**: This is technically feasible to achieve, but requires that data submissions conform rigorously to the Searchable Format for data. While most counties come close to achieving this goal, manual intervention is still required in most cases to ensure that data conform to required standards.

- **Asynchronous.** Allow for data contributors to submit data more than just annually and have submitted data integrated into the statewide layer in real time or close to real time.
    - **Status as of V3**: This is technically feasible, but would require that (a) data submissions adhere perfectly to the Searchable Format, and (b) counties submit parcel data more than once per year.

- **Authoritative.** Authoritative data come directly from the creator or authoritative source.[2]
    - **Status as of V3**: Counties are the authority for the parcel and tax roll data submitted annually for the purpose of the Parcel Initiative (although data may be aggregated from municipal stewards). The statewide parcel layer is better described as a *trusted source* than an *authoritative source* of county data. A trusted source is:
        - A service provider or agency that publishes data from a number of authorized service provider or agency that publishes data from a number of authoritative sources. These publications are often compilations and subsets of the data from more than one authoritative source. These data are trusted because there is an official process for compiling the data from authoritative sources and the limitations, currency, and attributes are known and documented (Stage, 2009, p. 14).
    - In contrast, an authoritative source is an entity authorized by a legal authority to develop or manage data for a specific business purpose. The statewide parcel layer thus is the product of a trusted source, because DOA/SCO collect and integrate the data from authoritative sources on an annual basis.

- **Aggregation.** A final product, in the form of a file geodatabase, in which all data meets the data quality and submission standards set forth in the schema documentation.
    - **Status as of V3**: This component has been achieved since the first iteration of the Parcel Initiative. Including the V3 parcel layer, the project has achieved three cycles of compiling a complete (as data availability has allowed) statewide digital parcel layer for dissemination to the public. These layers have met, at their given release dates, the data quality standards set forth in the schema documentation.

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[2] FGDC Subcommittee for Cadastral Data. Authority and authoritative sources: Clarification of terms and concepts for cadastral data. (2008, August). Retrieved from http://nationalcad.org/download/Authority-and-Authoritative-Sources-Final.pdf.

Stage, David. (2009, February). Authority And Authoritative Data: A Clarification Of Terms And Concepts. *Fair & Equitable*, p. 13-16. Retrieved from www.iaao.org/uploads/stage.pdf.

4.2 Costs and Benefits for Pursuing the Four A's

The question of whether the Four A's should be pursued is complex. In the simplest terms, until data submitted is in a format and condition that requires no manipulation or processing by the technical team, implementation of a fully automated workflow is not possible.

Furthermore, any attempt to achieve automation by lowering the data quality bar would be unwise, due to the resulting effects on the quality and usability of the final statewide layer. The statewide parcel layer provides many benefits to the end user, but those benefits can only be realized if the integrity and high-quality standards laid out in the schema are adhered to, achieved, and maintained in all parcel layer versions moving forward.

This is not to say that in some form, each of the Four A's could *not* be pursued to an extent—in some ways this is already occurring. It is also worth noting that all of the components of the Four A's are intertwined, so the ability to fully implement one can be contingent on another component being fully implemented.

4.2.1 Automated

The concept of a totally automated process for collecting authoritative data, processing that data, and aggregating it into a final standardized format is the ultimate goal. The feasibility of this goal, while maintaining the high-quality data standards, is where complexity becomes apparent. In a perfect world, all data submitted would be in the precise required format—free of errors and omissions. Based on the three previous cycles of data submission for the Parcel Initiative, the authoritative data submitters are moving toward meeting these high-quality data standards, but have not yet fully achieved the goal across the entire state.

Pros and Cons – Automated
- ➕ Allows for fast aggregation of data
- ➕ Minimizes the amount of staff time required for the project
- ➕ Ability to maintain the Parcel Initiative in perpetuity, while not requiring extensive funding in future years
- ➖ Reduces the ability for parcel staff to discover data deficiencies, missing data and get clarification on questionable data submitted
- ➖ Strong potential for data quality to suffer (missing, inaccurate, non-standardized), leading to a decreased use of the data by end users

4.2.2 Asynchronous

Enabling counties to submit data more frequently than just annually is the focus of this component of the Four A's. Again, this would be technically feasible to achieve. The cost of implementing this should be weighed against the utility of and benefits to end users of mid-tax-year updates to parcel geometries. Because the Department of Revenue tax roll cycle is annual, it does not always align with county parcel update schedules—which can occur at virtually any interval. The annual parcel aggregation contains tax roll information from the previous tax year. To aggregate a statewide layer more than once a year would mean that some parcel polygons would have incomplete attribution. Newly created parcels—such as splits, sub-divisions, and the like—would not contain pertinent tax roll information since the parcel would not have a tax roll record to join to.

Prior to implementing a fully asynchronous update strategy, it would be useful to determine the value this product would have to the end user and how often authoritative data submitters would provide data on top of the required annual submission.

Pros and Cons – Asynchronous
- ➕ Currency: Provide more recent/up-to-date geometries to end users
- ➕ Reduce calls to counties for "most-recent" cut of data (assuming counties submit to project more often)
- ➖ Additional parcel geometries without tax roll information (because they are new splits, sub-divisions, etc.)
- ➖ If not automated, need to assess/inspect datasets prior to integration into statewide layer (more staff hours)
- ➖ Not worth developing functionality if only for handful of counties.

4.2.3 Authoritative

Authoritative data come directly from the creator or authoritative source. For the purposes of the Parcel Initiative, counties are considered the authoritative source for all of the county's parcel and tax roll data and thus should be the data submitters for this project. This eliminates the need for the team to approach other data maintainers (municipalities) to obtain informational gaps left in a submitted county dataset. For the most part, this has already been achieved. Comprehensive data was received from all 72 counties for V3 and no municipalities needed to be approached to obtain data to fill any holes. However, because the data is not automatically uploaded by the counties and is instead collected by DOA and SCO and then integrated and uploaded, the statewide parcel layer is the product of a *trusted source*.

Pros and Cons – Authoritative

- ➕ Reduces the need for county staff to deal with frequent requests for parcel data from outside user groups, as a statewide parcel layer is now available to them
- ➕ Counties are the authority with which the WLIP grant administrator deals with, and are the entities most directly involved with the Wisconsin Land Information Program
- ➖ It can be problematic for counties to obtain data, which can be managed by individual municipalities, when it is not initially provided
- ➖ The historic nature of cadastral data can lead to errors existent on parcels entered into the system 10, 20 or even 30 years ago

4.2.4 Aggregation

The aggregation of all the data received for this project into a file geodatabase for dissemination was one of the cornerstone components of this project. Beyond simple aggregation is the standardization component, wherein there is a requirement that data contain a certain set of attributes adhering to a number of data quality standards. This component of the Four A's has been achieved since the first iteration of the statewide parcel project. Since the V1 Project, the Parcel Initiative team has made available for download a file geodatabase containing the full statewide parcel feature class. In addition to the file geodatabase, beginning with the V2 Project, individual downloads of county data were made available in a variety of formats. On top of the download options available, the team has also produced the statewide parcel map webmapping application which allows users to search and explore the statewide parcel data online.

Pros and Cons – Aggregation

- ➕ One-stop shop for a standardized, statewide parcel layer including pertinent tax roll information
- ➖ May not be available as soon as some would desire (byproduct of processing and aggregating 72 counties worth of data)—the usual release is around July 31st each year
- ➖ Highlights issues of county boundaries lacking continuity in some cases across the state

Final conclusions relating to the Four A's are presented in the final chapter of this document.

5 EVALUATION OF ZONING LAYER

5.1 History of the Parcel Initiative's Zoning Layers

5.1.1 Act 20 Requirements for Zoning

As defined by Act 20 and s. 59.72(2)(a), information related to individual land parcels should include "any zoning information maintained by the county." This has been interpreted by DOA to mean zoning ordinances administered by the county.

The five separate county-administered zoning types were determined and defined as follows:

- **General.** County General Zoning, as defined by s. 59.64(4)
- **Airport.** Airport Protection Zoning, as defined by s. 114.136
- **Farmland.** Farmland Preservation Zoning, as defined by s. 59.64(4), 61.35, 62.23(7), 60.61, and/or 60.62
- **Floodplain.** Floodplain Zoning, as defined by s. 87.30
- **Shoreland.** Shoreland Zoning, as defined by s. 59.692, 61.351, and or 62.231

For both technical and policy-related reasons, most jurisdictions maintain zoning as distinct layers from that of tax parcels in their land information systems. As a result, the technical team determined the best way to maintain this data on a statewide level was also as GIS layers separate from parcels. Zoning classes and class domains vary by jurisdiction and are commonly incompatible amongst adjacent jurisdictions. For these reasons, zoning information was aggregated as several separate GIS layers and supported with a flexible attribute schema.

5.1.2 V1 and V2 Parcel Project Zoning

Under the V1 Project, the project team requested zoning information from all counties. However, only a handful of datasets were submitted by counties. Due to the sparsely contributed data, the project team did not aggregate any zoning data. Instead, the data was used for research, to write better documentation, and to give more clear directives to counties for V2. The attribute schema for V2 and V3 zoning data was in part conceptualized through assessments of zoning data submitted for V1.

The V2 Project established the Parcel Initiative's first formal aggregation and release of statewide zoning layers to the public. These five separate zoning layers were aggregated to best meet the statutory requirements of Act 20, using a data model that targeted flexibility and maintaining the authoritative nature of the county data.

5.1.3 V3 Parcel Project Zoning

The V3 Project was the second formal aggregation and release of statewide zoning layers. These five separate zoning layers were aggregated using a data model that was consistent with that of the V2 Project. Within the V3 zoning layers, geometric improvements exist for all five layers—both in quantity of features and total area of land covered. The feature count of the V3 layers can be compared against the feature count of the V2 layers, as below.

V3 Zoning Layer Coverage			
	V2 Zoning Feature Count	**V3 Zoning Feature Count**	**Difference Between V2 and V3**
Shoreland	36,360	47,068	10,708
General	410,532	402,407	-8,125
Floodplain	23,002	40,566	17,564
Farmland	214,366	257,689	43,323
Airport	4,300	5,002	702
NET TOTAL	**688,560**	**752,732**	**+ 64,172 ▶**
			▶ **9% increase**

5.2 Evaluation of V2 and V3 Zoning Layer

The use cases of the statewide zoning layers are not as well defined as that of the parcel layer, primarily due to a lack of feedback from the community regarding the layers. This may be on account of the lower level of use of the zoning layers in comparison to parcels, as well as the duration of time that zoning has been publicly available.

5.2.1 Zoning Data Download and Web App User Survey

Digital surveys were created for each of the three parcel project distributions and were advertised on the data distribution site and the web app. Each of the surveys were open for the public to complete through the duration of the three parcel projects. The surveys ask for user feedback regarding uses, benefits, and improvements to the parcel and zoning layers, as well as optional end-user information. More than 125 feedback responses have been submitted since the initial distribution of the V1 parcel data. Of these responses to-date, nine make mention of the zoning layers.

V1 Survey Responses on Zoning

- *1) We have not used the statewide parcel layer for County Planning and Zoning applications yet. I am not sure of a task that would require us to use the statewide layer at the County level Planning and Zoning functions at this time. We use the County GIS system for all of our needs at this time.*
  - ~ County planning and zoning department
- *2) We use our own current GIS data.*
  - ~ County zoning department

V2 Survey Responses on Zoning

- *3) The State & Local Finance division of the Department of Revenue employs real estate appraisers in two bureaus, the Manufacturing & Utility Assessment Bureau and the Revenue Equalization Bureau. Both have a continuing need for updated statewide maps which include parcel lines, property assessment and taxation, zoning data, Tax Incremental Finance district, school and special district boundary lines as well as wetland, leaf-on and leaf-off ortho and streetmap layers. It looks like much of this is already online. To be most useful, all data including parcel lines would need to be updated annually at least, biannually if possible.*
  - ~ Manufacturing & Utility Assessment Bureau of the Dept. of Revenue State and Local Finance Division
- *4) We use parcel and zoning data to supplement environmental permitting submittals. Quicker project turnarounds, easier project scoping, and more coherent deliverables.*
  - ~ Private Resource Solutions Engineering Firm

V3 Survey Responses on Zoning

- *5) When I don't know the county in which a property is located, I can run one search of your map to obtain results from all 72 counties. Without this map, I must search each county individually. This saves time calling individual treasurers and asking them to search their databases by name. I expect I will also use the zoning layer and find other uses in the future.*
  - ~ No identification provided
- *6) The web services form LTSB, particularly the 5 zoning themes, could be significantly improved ! Distinguish the voids by symbology. Not shoreland ? Blank ! Not farmland ? Blank ! Not airport ? Blank ! Not floodplain ? Blank ! General Zoning could be rendered in any reasonable, conventional color scheme. Also, PDfs of each theme on the documentation page, each showing which counties have any zoning themes, would be most useful. Exactly what is shown in the stacked thumbnails ! Couldn't find such, nor even a table, in the documentation.*
  - ~ Nonprofit land trust protection
- *7) Parcel and zoning data will be used to complete environmental review for utility projects.*
  - ~ Engineering services firm
- *8) --What is the currency of the parcel data?*
  --What is "airport zoning"—do you mean height limitation zoning or airport overlay zoning?—please distinguish
  --Airport airspace rights are as critical as land rights; please depict airport easements along with airport fee simple ownership.
  - ~ WisDOT/Bureau of Aeronautics/Airport Land Program
- *9) I am with a broadband company whose footprint extends into Wisconsin . . . . We often find ourselves looking at the parcel data when discussing design options. Any information related to zoning is typically valuable to us. The zoning information allows us to parse the data in a variety of ways that we find useful.*
  - ~ Hiawatha Broadband Communications Inc.

5.2.2 Interpretation of Zoning Feedback

When interpreting the feedback presented above, a few key observations can be gleaned.

- **Lack of constructive feedback regarding zoning.** The above feedback is sparse when compared to that of parcels. While these results can be explained by the fact that zoning is generally a less sought-after type of GIS layer, it is valuable to pursue more feedback. It is recommendable for future surveys to include a question explicitly requests feedback on the zoning layers, or a zoning-specific survey.

- **Lack of public understanding of the zoning layers.** Feedback items #*6* and *8* above express a lack of understanding of the zoning types and the nature of these types of zoning data in the context of the project. Better documentation could be written to articulate these principles in the future. There appears to be an expectation from the public that zoning follow a more consistent and contiguous data model

similar to that used in the statewide parcel layer. The data model used for the zoning layers is deliberately general and flexible so as to be able to accommodate the varying types of zoning information across the state, but users might not be cognizant of this.

- **Lack of use cases indicate value of statewide zoning.** The above survey has yielded only three explicit use cases of the statewide zoning layers—environmental permitting submittals, environmental review, and broadband design (items #*4*, *7*, *10*). It would be appropriate to take this lack of feedback into consideration when allocating effort and resources for future projects.

5.2.3 Zoning Data Download Analytics

Web analytics have been placed on all data downloads of the statewide zoning layers since their first release in August of 2016. From August to the end of July 2017, there have been a total ranging between 300 and 437 downloads of any the five zoning types.

Zoning Data Downloads	
V2 **Zoning Layer**	**Downloads**
V2 Zoning	
Wisconsin_Zoning_2016 - All 5 zoning layers in one database	128-174
Airport	19-36
Farmland	39-56
Floodplain	26-44
General	61-80
Shoreland	27- 47
	300-437 Total

Of these downloads, 98.8% are downloads originating from within the US. Other countries from which a download has occurred include Singapore, South Korea, and United Kingdom. Of the US downloads, 76.2% are from Wisconsin. The top download counts within Wisconsin jurisdictions include 28% originating from Madison, 4% originating from Eau Claire, and 4% originating from Stevens Point. The remaining 64% of Wisconsin downloads are distributed across the state, as depicted in Figure 8.
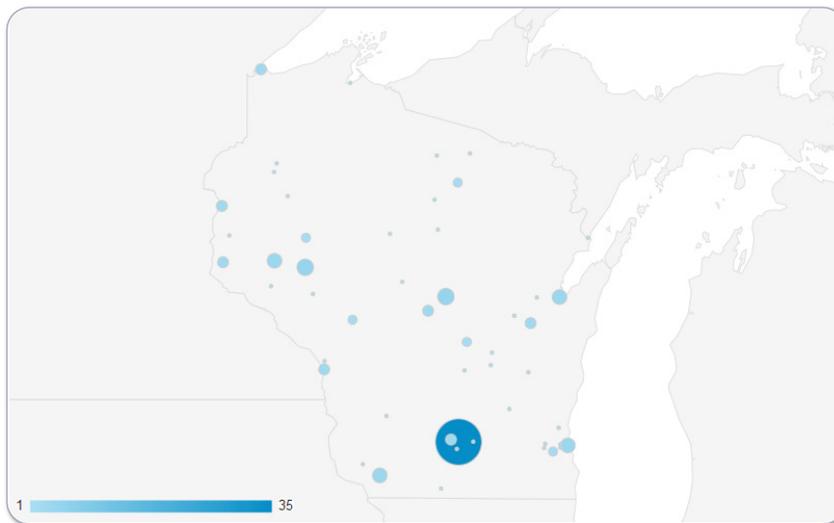
Figure 8. V2 Zoning Download Origins

Zoning Data Web Service Analytics

As reported in the previous chapter, analytics have also been procured from all feature services published by Wisconsin's LTSB and consumed by the statewide parcel web app. These analytics indicate that all five zoning layers collectively amounted to **25,000 zoning transactions** between September 2016 and August 11, 2017. For context, the V1 parcel feature service and the V2 parcel feature service received 451,374 and 1,341,401 transactions respectively for the same duration of time.

For conclusions regarding zoning layer's utility and zoning recommendations, see the final chapter of this document.

6 RECOMMENDATIONS

Several opportunities for improvement became apparent during the V3 Project. These opportunities were logged in the project team's documentation and were revisited for sake of proposing recommendations for the V4 Project or subsequent projects. While some of the recommendations are simple changes that have little effect on the project workflow, data contributors, or public consumers, others have certain and significant impact and should be weighted accordingly.

6.1 Recommendations Related to the Four A's

1. **Determine the "line" at which data is deemed acceptable/unacceptable**
   - The concept of what is deemed to be an acceptable submission versus one that requires further county attention has been difficult to define in the past. Working internally among the SCO staff and DOA staff to flesh out and explicitly define this line would be beneficial for ensuring that counties understand importance of fully preparing data to meet the required standards. This might help to reduce the need for re-approaches/resubmits.

2. **Strengthen the Validation and Submission Tool that data submitters are required to run on their data prior to submission**
   - The Validation and Submission Tool played an important role in the V3 data collection process, encouraging the data submitters to clean up, standardize and prepare their data in the Searchable Format. The .ini file created from running this tool was also used in the internal ingest process.
   - Further improvement and expansion of the tool to increase attribute assessment and scrutiny would be a viable way to place more onus on the counties correcting and standardizing their data. Including a number of standardization requirements that would need to be complete before the final .ini file would be created by the tool for submission. Such improvements would also help to reduce the need for re-approaches/resubmits. Ultimately, however, the onus must be placed on the data contributors to ensure that their data conforms to necessary standards if the advantages of a more automated approach are to be realized.

3. **Examine the Call for Data and Observation Report workflow to meet March 31, 2018 deadline**
   - Beginning with V1, the Parcel Initiative has included "quantitative assessment of each county parcel dataset according to metrics identified to assess quality and completeness." The individual county reports with feedback known as Observation Reports have been compiled with notes from the ingest process translated into a spreadsheet or CSV format. With a March 31, 2018 deadline for all counties to categorically achieve the Searchable Format, for V4, the turnaround time for feedback reporting will be much shorter, so it is recommended to find a way to make the reporting process more expeditious.
   - Counties will need to meet the Searchable Format (or come very close) in order to execute their 2018 WLIP Strategic Initiative grant. In some rare cases in which a county does not meet the Searchable Format requirements with their V4 submission, the county may need to alter its 2018 grant agreement to address deficiencies in its parcel layer or native data. Therefore, it is important to process the data and provide feedback as to whether the county met the Searchable Format soon after the data is submitted. There should be a process and template set up before the call for data, so that each county will receive its observation report within a month of submitting the data.
   - To add time to the timeframe for observation report writing, the call for data could be moved from January 31 to January 4.
   - **Recommendation:** Considerably accelerate the process of writing the V4 Observation Reports, and move up the call for data to January 4th.

4. **Examine the project workflow to streamline SCO-side processing and produce tools for rapid aggregation and production of three distributable databases and county downloads**
   - Scrutinizing the current processes used internally for assessing, processing, and preparing data for aggregation is worth considering. The current process is very effective in producing a high-quality end product but is not as efficient as an automated process. As the quality of data submitted by contributors becomes better, reducing the number of processing steps and streamlining the process make sense. The ability to do this hinges on the increased quality of data submitted and a reduction in the number of processing steps that need to be performed on a given dataset in order to raise it to the Searchable Format. Alternatively, the data quality standard could be lowered but that result would be much less desirable and consequential for the end user.
   - The development of internal tools or models for aggregating and creating the distributable databases and county downloads could be useful for speeding up the production process. As the project iterations continue, these tools would be a step toward the automated goal of the project.

5. **Monitor the progress of short-term goals relating to the Four A's over the next two cycles of the project and use that as a barometer for determining other steps that could be taken in the future**
   - In general terms, the above short-term goals will help move the Parcel Initiative forward and closer to the opportunity to more fully implement and achieve the Four A's. It is difficult to determine at this stage of the Four A's whether they should be implemented to the fullest extent, but working toward the ability to implement them seems like the best way to ensure the longevity of the Parcel Initiative.
   - Sustainable, high-quality data submissions that adhere to the submission standards laid out for the Parcel Initiative in the form of the Searchable Format will provide the best opportunity to achieve the most automated workflows for processing, aggregating, and disseminating statewide parcel data for years to come.
   - **Recommendation:** The project team and the data contributors are progressing toward a point at which this type of aggregation workflow is a feasible reality. However, the act of creating and deploying this aggregation strategy should be chosen deliberately and only after consideration of a number of factors. Therefore, implementation should be tabled for at least the next two cycles, albeit with the four A's remaining a long-term, guiding goal.

6.2 Statewide Schema Evaluation and Recommendations

The statewide parcel schema detailed in the V3 Submission Documentation has remained consistent over the past two iterations of the Parcel Initiative. The only changes to the attribute schema have been in the form of tweaks and clarifications to attribute definitions and acceptable domains.

In terms of specific schema changes, the only addition of fields was the inclusion of LATITUDE and LONGITUDE, which were introduced in V2. These two attributes were calculated from the parcel centroid of the parcel geometry object and did not affect the submitter's requirements.

The stability of the attribute schema has been a great value to the Parcel Initiative for several reasons, including but not limited to the following:

- **Familiarity with schema.** Consistency in the requested attribution is beneficial for consistent understanding of the elements across versions of the project. Data submitters do not need to re-learn the elements and how their native data fits them each time a data request is made.

- **Facilitates automated data extraction routines.** Consistency also helps facilitate automated extraction routines on the end of the data contributor. Revising the attribute schema would necessitate at least some manipulation of county and municipal level scripts for preparing the data.

- **Facilitates automated aggregation routines.** This concept is also very true of the assessment, aggregation, and QA/QC routines of the Parcel Initiative technical team, as consistency helps facilitate automation and efficiency.

- **End user benefits.** The end user may build their utilities of the parcel layer around the existing attribute schema and thus find value in attribute consistency.

- **Allows progress to be measured.** Facilitates consistent comparison and measures of progress.

6.2.1 General Schema Recommendations

The progress from V2 to V3—a roughly 65% reduction in processing steps, according to the data presented in the V3 Observation Reports—can be attributed to many factors. They include the introduction of the Validation and Submission Tool, and improved workflows on the end of local governments. All these factors are underlined by the benefit of not altering the schema excessively.

6. **Changes to the schema should be avoided and only essential modifications should be made.**
   - The stability of the statewide schema should be justification for thinking critically about further implications before making changes to the attribute schema, if a change is proposed. At the close of V3, there are no new elements proposed for inclusion within the attribute schema and no significant changes proposed to existing elements.
   - However, there are several slight modifications proposed for the schema. These modifications are detailed in the recommendations below and are limited in nature. These changes would add flexibility to the schema and modeling or would provide more direction on documentation and clarify definitions. These changes should only add clarity to the submitters understanding of the standard and not provide obstacles to achieving a perfect Searchable Format submission.
   - Recognize that any schema change may entail work to update the Validation and Submission Tool and the suite of other geoprocessing tools.

7. **Continue to enforce and verify the redaction policy**
   - For V3, most counties who redacted owner names also submitted written redaction policies with documentation of approval at some level of local government, such as the county board. However, of the 11 counties who claimed a redaction policy within the Submission Form, some did not provide detail sufficient to evaluate that policy.
     - Sheboygan claimed their policy is "not on web."
     - Sauk noted on their Submission Form: *The county does NOT have a formal written policy in place, however there has been a practice followed since owner names have been publically available through our online application. It started out with a few employees such as judges and detectives and has slowly increased as the word has spread over the years. Entered as NOT AVAILABLE. There are currently 41 names on the list.*
   - **Recommendation:** Continue to require documentation of redaction policies, and verify the presence of a policy for each county that enacts redaction on public data is data that is not subject to valid privacy, security, or privilege limitations.

6.2.2 Specific Data Model Recommendations

8. **Handle Oneida condition of stacked parcel geometries by PROPCLASS and AUXLASS**
   - It was found that Oneida County stacks parcel geometries by property class when parcel contains PROPCLASS and AUXLASS values concurrently. Upon being tipped off on this condition by Oneida's Submission Form, the project team discussed this issue with Oneida in a conference call. The call helped the technical team understand the issue defined above to be true.
   - **Recommendation:** It was determined unfeasible for Oneida to achieve one of the four geometric models defined in V3 submission documentation in the amount of time before submission. The solution for Oneida in V3 was to accept the parcel features as-is. The project team should review notes regarding this issue and consider the following options:
     - Include a new condo type, "Condo Type #5." Condo Type #5 applies to instances where a single parcel will be stacked to model a combination of residential, undeveloped, or agriculture *in combination with* a special class, such as Managed Forest Land.
     - If this change is made, the appropriate accommodations should be made to the Validation and Submission Tool to accept this condition.
     - Require any county modeling this condition to meet one of the four existing models, requiring them to manipulate their data before submitting. If this change is made, the appropriate accommodations should be made to the Validation Tool to detect and flag this condition.

9. **Mixed type condo modeling**
   - Some counties practice mixed type condo modeling. It appears that at least Iowa County is confirmed to follow this practice, they have predominantly Type #1–Discrete but also practice Type #2, as determined by the project team's observations.
   - **Recommendation:** This condition was accepted as valid for V3 submission as there are no reason that this condition would degrade the value of the statewide layer. The project team should provide documentation that supports this concept and informs submitters that it is acceptable. The project team should also provide an option in the Submission Form for "Mixed type condo modeling #1-4."

10. **Populating SCHOOLDIST and SCHOOLDISTNO on non-taxable parcels**
    - Some counties are faced with a problem in assigning SCHOOLDIST values to their rights of way (ROW) or other non-parcel features, such as Hydrography, that do not have PARCELIDs. It would be ideal to procure a SCHOOLDIST and SCHOOLDISTNO for even non-tax parcels.
    - **Recommendation:** Currently, there is no definition requiring non-tax parcels be populated with school district values. The project team should review the existing definition for SCHOOLDIST and SCHOOLDISTNO and revise the definition to require SCHOOLDIST or SCHOOLDISTNO on all parcels, if determined appropriate. Aspects to consider include:
      - How feasible is this to expect of counties?
      - What is the extent of this problem statewide and what type of benefits will it offer, if perfected. Consider discussing with the Department of Public Instruction.
      - Some counties, such as Rock, appear to have made a deliberate effort to achieve this for V3.

11. **Zoning layer polygon coverage includes non-zoning polygons or municipal jurisdictions**
    - This is a condition observed on a handful of V2 and V3 zoning submissions where a variation of the following happens:
      - A zoning layer may cover the entire county but portions of the zoning layer may be annotated with "Village of X" or something similar within zoning class field—indicating that this area falls under municipal jurisdiction and thus does not contain any usable county zoning class.
      - A zoning layer may cover all parts of the county that are *not* included in the zoning type. For example, the airport protection zoning layer may include polygons covering the entirety of the county that does not fall under airport protection.

- **Recommendation:** Project team should discuss implications, however, a change to the data model is not recommended at this point.

12. A zoning layer's coverage includes other zoning types
- This issue was discovered under the V3 Project by data submitted by Jim Landwehr (Waukesha County, LIS Analyst), who indicated this condition within their GENERAL zoning layer. Specifically, their GENERAL zoning layer also contains attribution pertaining to FARMLAND and SHORELAND zoning.
- **Recommendation:** Two possible solutions may be proposed to handle this condition of data:
  - FARMLAND and SHORELAND could be extracted from the general zoning layer, creating a gap in the GENERAL zoning layer but possibly adding confusion to the users of the GENERAL zoning layer.
  - FARMLAND and SHORELEND could be left as-is in GENERAL but also extracted from GENERAL into their own layers. Thus, the features would be duplicated between the GENERAL and FARMLAND/SHORELAND layers. This solution was recommended to Waukesha County for the purpose of V3 data submission.

Given the above, it is recommended that the two solutions be considered by the project team and the chosen solution should be reflected in the submission documentation and anywhere else applicable.

13. <Null> values in all cases where an IMPVALUE does not exist
- It appears that a few counties have provided <Null> values in all cases where an IMPVALUE does not exist. The majority of the data contributors provides a value 0 instead of <Null>, which indicates that there is no improvement, whereas <Null> would indicate there is missing data. This practice adds a level of granularity and value to the data. The submission documentation does not define how to handle <Null> versus 0 so this practice is not technically in violation of the schema documentation.
- **Recommendation:** Explicitly specify how to handle this scenario in the V4 Submission Documentation. More broadly, this should be expanded to consider making a definition clarifying how to use <Null> vs 0 within value fields. If this precedent is adopted, it could be enforced through the Validation and Submission Tool.

6.2.3 Data Submission Documentation Recommendations

14. Consider adding a designation in the documentation of which schema attributes contain values from the tax roll
- In order to aid counties in preparing their data submission, consider adding a designation in the documentation of which schema attributes contain values from the tax roll.
  - ▶ Time required to implement: ~1.0 day – Submission Documentation

15. Handle cases of NETPRPTA greater than GRSPRPTA
- It was observed in several counties (approximately 11 counties in total) that the NETPRPTA value was occasionally greater than that of the GRSPRPTA. NETPRPTA should always be less than GRSPRPTA because conventional tax credits and deductions are expected to reduce GRSPRPTA, thus causing NETPRPTA to be less than GRSPRPTA.
- **Recommendation:** Project team should review notes regarding this issue to thoroughly describe the values that should or should not be included in NETPRPTA. This description should be included in the submission documentation and should provide detailed direction for counties to exclude non-tax values from their V4 submission if feasible. If NETPRPTA cannot be separated from delinquent charges, the county should be directed to <Null> out the NETPRPTA field or provide the NETPRPTA values with a note in the Submission Form indicating that "non-annual tax" values are included. Logic should be written into the Validation and Submission Tool to test and flag conditions where this issue occurs.
  - ▶ Time required to implement: ~0.5 day – Validation and Submission Tool

16. PARCELID labels/domains
- It is apparent that many counties interpret the listed examples under PARCELID to be the only valid values for labeling non-tax parcels. As a result, there may be more <Null> PARCELID values or inappropriately labeled PARCELID values.
- **Recommendation:** The definition for PARCELID for the V3 Submission Documentation should be reviewed by the project team in attempt to get the PARCELID populated more robustly in cases where a PARCELID does not exist. The team should make it more obvious to the submitter that the PARCELID labels are examples and not an explicit list of acceptable domains. It would also be valuable to add more examples for V4 documentation of PARCELID.
  - ▶ Time required to implement: Negligible time – Submission Documentation

17. Tax roll and geometry after parcel split or annexation
- The V3 Submission Documentation states on page 6 that "Every record in the tax roll should attach to a parcel geometry" and that "There should be no missing parcel geometries."

- However, note that due to the temporal differences between the parcel update cycle and the tax roll update cycle, some counties will have occasional records that do not match. This is anticipated by the project team and the following might be situations where missing parcel geometries under the following situations:
  - Annexations – e.g., parcel 9-1-1 was annexed to 10-15-0
  - Split Parcels – e.g., parcel 9-1-1 was a 40 and has been split into four 10 acre lots now numbers 9-1012-1; 9-1012-2; 9-1012-3; 9-1012-4, etc.
  - Merge Parcels – e.g., parcel 9-1-1 and 9-1-2 were merged together to 1 parcel, and is now known as 9-1-3
  - Combination of Split and Merge – e.g., parcel 9-1-1 and 9-1-2 merged together then divided into 4 lots (9-1012-1; 9-1012-2; 9-1012-3; 9-1012-4)
  - Parcel changes due to road right-of-way
- **Recommendation:** Even though this issue is known to exist by the project team, some counties are not aware of the subtle flexibility that the project has regarding this issue. The project team should articulate through the submission documentation that some mismatch is expected on recently changed parcels (where the tax roll and parcel dataset might be out of sync). The best recommendation is that the parcel geometries should be as complete as possible, and each parcel geometry should join to a tax roll element to the greatest extent possible. The submission document should add this language:
  - *Some tax roll elements may not be represented in the parcel layer if they do not have a geometry created yet to join to.*
  - *Some geometries may not have a tax element to join to if the parcel was recently altered (e.g., split, annexed, merged, etc.)*
  - ▶ Time required to implement: Negligible time – Submission Documentation

6.2.4 Data Collection and Assessment Workflow Recommendations

18. Parcel Initiative tools, update, and assessment
- All Parcel initiative tools on the tools site have been validated against ArcGIS 10.2, 10.3, or 10.4 and are expected to work under ArcGIS 10.5. However, the Validation and Submission Tool was recently noted to contain an issue
- **Recommendation:** In preparation for V4, each tool should be tested by the project team for compatibility with ArcGIS 10.5 to ensure that the tool is compatible for its use for the V4 Project. In the longer term, these tools should each be adapted for use in ArcGIS Pro, which will require re-writing *some* code for every tool. The reason for this update is ArcGIS Pro's use the 3.X version of Python whereas ArcGIS Desktop uses a 2.7 version of Python. There are non-trivial differences between the syntax of Python 2.x and Python 3.x, requiring that some portions of code be updated, but the tools as a whole should not need to be rewritten in their entirety. It is not expected that adaptation to ArcGIS Pro will be necessary for the V4 Project, but should be considered for any subsequent project.
  - ▶ Time required to implement: 1 week

19. Incomplete PSTLADRESS
- Occasionally, records will be found within submitted parcel data that contain some portions of an address but are not complete enough to be a usable complete address.
- **Recommendation:** The solution to this issue should be two-part:
  - Submission documentation should be updated with the following real address examples depicting unacceptable/incomplete addresses in addition to:
    - Existing Example: CITY, STATE, ZIP → enter <Null> instead
    - Additional Example: GILMAN, WI, 54433 → enter <Null> instead
  - Validation tool should have logic added to it that enables the tool to flag PSTLADRESS values that are not only <Null> but also those populated with an incomplete address.
  - ▶ Time required to implement: 0.5 day – Validation and Submission Tool

20. TAXPARCELID is unnecessarily redundant with PARCELID
- Some counties populate TAXPARCELID with the same value as PARCELID, TAXPARCELID should be populated only if it is distinct from that of PARCELID.
- **Recommendation:** The documentation for TAXPARCELID and PARCELID can be strengthened to articulate this concept to the submitter. The Validation and Submission Tool should also be updated to detect and flag any instances where TAXPARCELID is the same as PARCELID.
  - ▶ Time required to implement: 0.5 day – Validation and Submission Tool

21. Zoning data does not meet submission standards
- This issue is more general in nature and deals with a broad issue with errors and non-compatibility of zoning layers participating in the submission. Generally there are higher numbers of issues in the zoning layers than that of the parcels, on a per element basis.
- **Recommendation:**

- Submission Documentation should be refined to point out any common mistakes found in zoning data submitted to the V3 Project. The V3 Observation Reports could be used to drive which specific issues should be addressed.
- A zoning-specific validation or zoning function within the existing Validation and Submission Tool should be added so that counties are required to validate their zoning layers before submission.
  ▶ Time required to implement: 1 week – Zoning Validation Tool

22. Issues related to PROPCLASS of '4' combined with other PROPCLASS values
- This is an issue that occurs in some counties where records with a PROPCLASS value equal to '4' (agriculture) exists on a record in addition to one or more additional taxable property class, such as 1,2,3,5,5M,6, or 7. Under these conditions for a county that contains the issue, the technical team has found that there will be a <Null> ESFMKVALUE associated with the record, which is erroneous. If PROPCLASS of '4' alone were to be present then a <Null> would be expected and acceptable, but not when other classes are present. An example record would be this: PROPCLASS = '1,4' ESTFMKVALUE = <Null>.
- **Recommendation:** After this issue was discovered and upon further research the following the following explanation was provided by Scott Shields (Wisconsin Department of Revenue) in the 2017 Guide for Property Owners:
  Use-value assessment of agricultural land
    ▪ *Note: If all or a portion of a parcel contains farmland assessed according to its use-value as agricultural land, the Estimated Fair Market Land and Total Estimated Fair Market Value cannot be estimated using the Average Assessment Ratio and, therefore, will not be shown.*
- This document explains the condition of missing Estimated Fair Market Value on these properties as accurate, thus, no change need be made to the data model. Modification should, however, be made to the Validation and Submission Tool so as to not flag these records erroneously, or to explain the context of the condition if they are flagged. It would also be appropriate to add a citation to the 2017 Guide for Property Owners within the submission documentation and V4 public schema documentation in order to explain this scenario to submitters.
  ▶ Time required to implement: 1 day – Validation and Submission Tool

23. DOR Parse Tool – PROPCLASS and AUXCLASS will output as <Null> on 0-value <Acres> tags
- The parcel initiative's DOR XML parse tool will not count Class of Property <Acres> records that are populated with a 0. While technically this is a problem with the XML, it is confirmed to cause issues with Dodge, and Waupaca counties and is suspected to cause issues with Juneau and Buffalo data.
- **Recommendation:** Project team should alter the DOR XML tool to include a toggle that decides whether to include or exclude 0-value <Acres> tags in the output.
  ▶ Time required to implement: 0.5 day – XML Tool

24. Condos missing UNITID values
- It was identified in Walworth County that UNITID was not properly populated on condos under two different scenarios:
  - Condos contain distinct PARCELID values and same SITEADRESS values, but no unit distinguishing values (i.e., missing UNITID values)
  - Condos contain distinct PARCELID values and expected differing SITEADRESS values. Under this condition, SITEADRESS should be distinct.
- **Recommendation:** No solution yet known. The project team should review documentation of this issue and consider possible solution to this problem via the Validation and Submission Tool.
  ▶ Time required to implement: 1 day – Validation and Submission Tool

25. Genera Revisions to the Validation and Submission Tool
- The parcel initiative's V2 Validation and Submission Tool appeared to be successful, however there are four main improvements that should be focused on in order to improve its effectiveness. These are listed as recommendations.
- **Recommendation:** Project team should target the following:
  1. Include functionality to test all 5 types of zoning data
  2. Remove any options related to submitting in the Export Format
  3. Enforce completion of successful validation before submission can occur
     - This could come in the form of some type of a validation key that the user can be given once their data passes the minimum requirements within the tool
  4. Integration of "Explain/Certify" section into tool, rather than requiring a separate text file input
  5. Addition of a section for upload of "Other Layers" for Robinson Map Library
  6. General maintenance, re-distribution, and improvement of existing functions
  7. Updates for any and all schema changes/clarifications
  8. Updates to address re-approach/re-submit issues from V3, as appropriate
  ▶ Time required to implement: 1 week – Validation and Submission Tool

6.2.5 Data Distribution (App and Data Downloads) Recommendations

26. Web app re-assessment
- By the point at which the V4 parcel layer will be released to the public in summer of 2018, the app will be two years old. It is possible that some elements of the application will have degraded by this point.
- **Recommendation:** Time should be allocated for reassessing the app's functionality and fixing any bugs. It is recommended that the app be thoroughly reassessed as a part of the automated update workflow at the point when the automated workflow is implemented, the app may require significant changes to accommodate the automatic updates.
  - ▶ Time required to implement: 2-3 weeks – For app review

6.2.6 Other Recommendations

27. Overall conclusion regarding zoning layer's utility
- It is evident that there is a niche audience that utilizes the statewide zoning data. This audience appears to be rooted in environmental preservation and civil engineering disciplines.
- **Recommendation:** The zoning layers are used significantly less than that of the parcel layer but are still consumed enough to be considered an asset to the community.

28. Other zoning-specific recommendations
- To pursue improvements to the zoning layers in the future, the following recommendations should be considered. These recommendations are deliberately general.
- **Recommendation:**
  - Allow any improvements to the data to be driven by user feedback. This objective can be supported by soliciting more robust feedback from users of the data, through surveys and possibly direct outreach.
  - Continue to emphasize the importance of preserving the authoritative nature of the zoning layers. The data model should remain flexible, possibly could even become more flexible.
  - Focus on covering gap areas with the authoritative jurisdiction, so that users will know where to look for zoning data if the area of interest is not covered.
  - Stay abreast and continue to coordinate with agencies that collect and aggregate county zoning data (i.e., *farmland preservation* from Wisconsin DATCP; and *floodplain* zoning from FEMA/DNR).
  - Continue to improve documentation and outreach.

6.2.7 Summarized Time Estimates

For many of the items above, the amount of time required to implement them is subject to decisions made about how to resolve each issue appropriately. Such decisions include alterations to the Submission Documentation and other documentation, and decisions on how to proceed with data collection. Other time estimates appear below.

V4 Prep Labor Summary		
Component	**Item Type**	**Time Estimate**
V4 Call for Data – Cover Letter	Document	TBD
V4 Submission Documentation	Document	TBD
[RML] Other Layers Documentation	Document segment	
[LTSB] WISE-Decade Upload Instructions	Document segment	
Validation and Submission Tool	Tool with Guide	~ 2.5 weeks
Other Tools		~1 weeks
Address Parsing Tool	Tool with Guide	
DOR XML Parse Tool	Tool with Guide	
Data Standardize Tool	Tool with Guide	
Condo Stack Tool	Tool with Guide	
Class of Property Dissolve Toolset	Tool with Guide	
Null Fields and Set to UPPERCASE Tool	Tool	
Other Documentation/Guides		TBD
Field Mapping Workflow Guide	Document	
Summary Table Guide	Document	
FEMA Floodplain Guide	Document	
[DOA] County_Contacts_and_Websites	Document	
GIS Templates		TBD
V3_GISTemplates.gdb	File geodatabase	
• SearchableFormatTemplate		
• ZoningFormatTemplate		
V3_Parcel_Domain_List.xlsx	Spreadsheet	
Data Submission Website	Website	TBD
Submission page		
Tools page		
FAQs page		
[BOX] Alternate upload page		
[DOA] DOA's Parcel Initiative page		
Web Application	Web App	In summer of 2018: ~ 2-3 weeks
[LTSB] Feature Services		

■   ■   ■

APPENDIX A.   V3 MOU EXCERPT

Specific V3 Project deliverables:

- **A statewide parcel database and map layer** aggregated from existing county and municipal parcel datasets using a documented update process that at a minimum includes the parcel attributes required by s. 59.72(2)(a), those listed in the parcel schema and Searchable Format standard detailed by the *V1 Interim Report,* and those recommended in the *V2 Final Report*.
- **Statewide county-maintained zoning layers** aggregated from existing county datasets that at a minimum includes county-maintained zoning information required by s. 59.72(2)(a)
- **Display of V3 parcel and zoning layers**. Develop an online app to display the statewide parcel database and map layer, as well as the county-maintained zoning districts.
- **Download/export of data and data subset capabilities**, including a clip, zip, and ship or download by filter function. This may take various forms, such as use of ArcGIS Open Data, an ArcGIS Desktop a geoprocessing service hosted and assigned to a geoprocessing widget in the map application, or another more efficient, cost-effective solution.
- **Hosting solution for V3 parcel and zoning layers**. Employ a hosting solution for the statewide parcel database and map layer, with the potential for a third-party hosting solution.
- **Prototype solution for collection and display of public lands information maintained by the county**. The ideal scenario is to have county public lands information integrated into the statewide parcel layer, but complexities in local land information systems and variation in designation of public lands may inhibit the comprehensiveness of this solution in the given time frame.
    1. In collaboration with DOA, public lands information should, at a minimum, be collected, inventoried, analyzed, organized, and included in the V3 parcel layer if it is possible to do so accurately, or otherwise be presented in the form of a prototype solution and recommendations for future efforts by local governments to track public lands data.
    2. The public lands solution should include a classification typology extending from "public lands" (as defined by state statute 24.01) to lands with a public interest on them (easements, government leases) or to which public access is granted (e.g., lands purchased by a land trust), and those lands open to public hunting (private lands enrolled in the managed forest or forest crop program).
    3. The classification should include a comparison to DOA Division of State Facilities inventory of state-owned properties and integrate the most recent DOA Division of State Facilities data if possible.
- **A final project report,** written in collaboration with DOA. At a minimum, the report shall address:
    1. <u>Project background</u>
    2. <u>Statewide schema evaluation</u> – Assessment of the fitness of the V3 attribute schema against user needs, along with recommendations for potential changes to the schema
    3. <u>Benchmark progress assessment</u> – Assessment of where each county is at in terms of meeting the four benchmarks listed by the *V1 Interim Report* and the requirement for counties to achieve by the V4 call for data deadline of March 31, 2018.
        - Benchmark 1 – Parcel and Zoning Data Submission
        - Benchmark 2 – Extended Parcel Attribute Set Submission
        - Benchmark 3 – Completion of County Parcel Fabric
        - Benchmark 4 – Completion and Integration of PLSS
    4. <u>Assessment and implementation outline for the Four A's</u> – A goal for future iterations of the statewide parcel layer is to achieve authoritative, automated, asynchronous aggregation, allowing county data stewards to submit datasets at any time or interval by automatically merging the local data with the most current statewide database. The report should evaluate progress made on this goal since V2, make recommendations, and outline steps that would facilitate future achievement of the Four A's for all 72 counties.
    5. <u>Evaluation of V2 and V3 zoning layer utility</u> – Evaluation of county zoning layers for utility by end users, with a recommendation of whether to also collect and display municipal zoning data.
    6. <u>Recommendations for V4</u>

APPENDIX B.   V1-V3 USER FEEDBACK

ABOUT V1-V3 USER FEEDBACK

The following is a compilation of from comments provided by users of the Wisconsin statewide parcel layer. These comments were received via email, and the V1, V2, and V3 online user feedback forms. This data has been cleaned. Questions and comments dealing with technical subject matter have been omitted. Some comments have been omitted due to lack of content, or combined, in the case of multiple comments from the same user. The total number of responses that appear here is **151 responses**.

> **Legend**
> - Green text indicates Organization/Affiliation
> - User responses are broken down into the following sub-groups:
>
>   STATE GOVERNMENT
>   FEDERAL GOVERNMENT
>   LOCAL GOVERNMENT
>   PRIVATE SECTOR
>   NON-PROFIT ORGANIZATIONS
>   EDUCATIONAL INSTITUTIONS
>   PRIVATE CITIZENS

STATE GOVERNMENT USERS

V1 – STATE GOVERNMENT

▪ DATCP – Wisconsin Department of Agriculture, Trade and Consumer Protection
USES • Identify parcels eligible for enrollment in the WI farmland preservation tax credit program
BENEFITS • I estimate that it saved 25 hours of staff time for acquiring and processing parcels.

▪ Wisconsin Department of Military Affairs
USES • The Layer will be used to support emergency management activities surrounding all four phase (planning, mitigation, response and recover). It will also be used by our National Guard Construction and Facility Management Office to help with management of all our facilities statewide. This includes the maintenance, expansion of an issues related to encroachment.

▪ Wisconsin Department of Public Instruction
USES • Attempted to dissolve by school district code to get authoritative polygons. Was not possible, but showed possibilities. Also use the parcel map to validate a parcel is/is-not within a school district.

▪ Wisconsin Department of Revenue (DOR) – Division of State and Local Finance – Equalization Bureau
USES • – Map large acre sales.
– Track sales statewide for Wisconsin DOR
BENEFITS • Time saved

V2 – STATE GOVERNMENT

▪ Wisconsin Department of Revenue – Division of State and Local Finance – Manufacturing & Utility Assessment Bureau
USES • The State & Local Finance division of the Department of Revenue employs real estate appraisers in two bureaus, the Manufacturing & Utility Assessment Bureau and the Revenue Equalization Bureau. Both have a continuing need for updated statewide maps which include parcel lines, property assessment and taxation, zoning data, Tax Incremental Finance district, school and special district boundary lines as well as wetland, leaf-on and leaf-off ortho and streetmap layers. It looks like much of this is already online. To be most useful, all data including parcel lines would need to be updated annually at least, biannually if possible.

▪ DATCP – Wisconsin Department of Agriculture, Trade and Consumer Protection
USES • The DATCP farmland preservation group has used the V1 and V2 parcels the last two years for identifying parcelids eligible for farmland preservation tax credits.
BENEFITS • We have not made any parcel data requests in 2015 and 2016. As a result, the statewide parcels have saved us a lot of time and effort!

▪ Wisconsin Department of Natural Resources (DNR) – Watershed Management – Runoff Management Section
USES • Looking up quarries/pits
BENEFITS • Finding landowner names/addresses

▪ DNR – Technology Services – GIS Section
USES • – I used it to verify the locations of several questionable coordinate datums (SPS nad27 vs nad83) in one of our agency databases by comparing the ownername in our database with the owner name in the parcel database.
– Querying different types of property owners (currently have to do it based on name keywords), hopefully there will be more flags later for state, county, city, private, federal, etc.

▪ Wisconsin Department of Health Services – Division of Public Health, Bureau of Environmental and Occupational Health
USES • – Using this data to show residences that have not been tested for radon or lead. I will like to put this data onto geology maps to show who is at risk for high radon exposure, groundwater contamination, and floodplain risk.
– Creating a map of percentages of residences not tested. I am using for a numerator geocoded addresses of radon test results. The denominator will be addresses. This is the closest I can get to 1 address for a building
BENEFITS • The radon map is showing that most residences have not been tested for Radon.

▪ University of Wisconsin System Administration/Office of Capital Planning & Budget
USES • Querying for and extracting our agency's owned parcels as part of an effort to develop and round out a statewide parcel dataset for our agency.
manually extracting formerly owned parcel polygons to link to historical real estate documents and data.

V3 – STATE GOVERNMENT

▪ University of Wisconsin System Administration/Office of Capital Planning & Budget
USES • The University of Wisconsin System Administration (UWSA) Office of Capital Planning and Budget (CPB) has used the Wisconsin statewide parcel layer to develop and map an inventory of UW landholdings. This information is being used to meet the requirements of the biennial property inventory under Wisconsin statute 13.48(14)(d). It is also being used for internal planning and reporting purposes.
BENEFITS • The Wisconsin statewide parcel layer provides CPB with an extremely efficient means of understanding the location and attributes of owned property around Wisconsin. The UWSA Board of Regents owns property in 43 different counties in Wisconsin. Were it not for the statewide parcel layer, CPB would need to coordinate data collection and updates with each county individually, and then synthesize 43 different data sets. The statewide parcel layer alleviates this work and provides a current, reliable, and consistent data source for this information. It is incredibly valuable and much appreciated.

▪ Wisconsin Elections Commission
USES • This is an excellent reference, but especially to help and cross-check school district boundaries until DPI is able to put together its own definitive list. It is also great to check addresses for voting locations.
BENEFITS • School Districts and Voting Ward locations. A great first stop for this kind of data.

▪ Wisconsin Department of Natural Resources
USES • – To help delineate recreational and preservation lands (about 1.6 million acres) managed by the DNR on behalf of the citizens of Wisconsin.
– To help update the Public Access Lands Atlas, particularly for the locations of county and local parks.
– To evaluate wetland compensatory mitigation options for the wetland permit applicants.
– To oversee the cleanup of contaminated properties. Often, an approved clean-up will require and environmental land use control (LUC) on the property; these LUCs are posted on the Internet to alert future owners about the parcel.
– In the review of construction site plans to make assessments regarding potential water quality impacts. Parcel data is often need to identify responsible or affected neighboring parties, is useful when seeking permission to inspections on private property, or when enforcement actions are involved.
– In discerning land ownership and ownership of manure storage structures associated with large fish kill events.
– To help track the locations of rare species and natural communities and to carry out land and species management practices.
BENEFITS • By having statewide parcels available, staff are able to save time in addressing the business needs identified in the "USES" above.

▪ Wisconsin Department of Transportation – Bureau of Aeronautics – Airport Land Program
USES • Statewide planning

- Wisconsin Historical Society, State Historic Preservation Office
  USES • Background data, identifying property owners, feature mapping
  BENEFITS • Greater accuracy in mapping, ability it contact property owners

- Wisconsin Department of Transportation – NC Region – Planning
  USES • Right of way lines, parcel boundaries for trails and project related information

- Wisconsin Department of Public Instruction – School Management Services
  USES • Citizens may petition to have territory "detached" from one school district and "attached" to a different district. We have been using the parcel maps to verify the location of the properties with regard to school district boundaries.
  BENEFITS • Verifying the correct property description and location – matching parcel numbers from the petition with actual property

- Wisconsin Department of Transportation, Division of Transportation Investment Management – Rails and Harbors
  USES • Assist in identifying property ownership including state-owned rail corridors; identifying encroachments
  BENEFITS • Generally shows ownership

- Wisconsin Department of Revenue, Division of State and Local Finance – Bureau of Property Tax Equalization
  USES • Obtaining detailed location and attribute data including measurements which is difficult or unobtainable from any other source quickly and reliably.

FEDERAL GOVERNMENT USERS

V1 – FEDERAL GOVERNMENT
- U.S. Census Bureau – Geography Division; U.S. Department of the Interior – Office of Wildland Fire
  USES • We are using the parcel data for two applications - wildland fire RAVAR to identify possible structures at risk by locating parcels that have a structure on them and for the Census Bureau BQARP program to align admin boundaries (municipal (place and MCD) school district and county boundaries to parcel data as appropriate
  BENEFITS • Because of the processing we have to do we are not sure about the savings yet but at least we can get the data that is a huge first step

- USDA Forest Service – Chequamegon-Nicolet National Forest
  USES • – Check ownership against our Forest Service ownership layer
  – Saves having to visit each individual county website
  BENEFITS • Time savings from only having to visit one website rather than finding & using multiple county websites

V2 – FEDERAL GOVERNMENT
- USDA Forest Service – Chequamegon-Nicolet National Forest
  USES • Identify land owners adjacent to proposed project areas, compare to our agency's ownership layer for QC purposes
  BENEFITS • Don't have to visit each individual county website, can overlay the parcels on top of our own GIS layers

V3 – FEDERAL GOVERNMENT
- USDA Forest Service – Chequamegon-Nicolet National Forest
  USES • Mapping, identifying adjacent landowners for project planning, comparing to our ownership layer to identify inaccuracies on both sides and help verify boundaries, investigating special use permits & road right of way parcels
  BENEFITS • Before we had to contact 11 different counties to request data and go through different logistics with each county, now can get one seamless layer as an easy download so saves us a lot of time

- USDA Animal and Plant Health Inspection Service Wildlife Services
  USES • This is a great resource! As a wildlife biologist it is important to be able to determine landownership for various wildlife management activities. Thanks for providing this data!
  BENEFITS • Verification of landownership is important for the wildlife management activities that we conduct.

- **U.S. Fish & Wildlife Service**
  USES • This parcel layer will be overlayed ontop of our stream survey sites so we know who to contact to gain permission to access their property if we need to.
  BENEFITS • Nice to have this layer for planning our work.

- **USDA – United States Department of Agriculture**
  USES • We use it to determine correct ownership for farmsteads and farmland too keep our records up to date.
  BENEFITS • It is a convenient way to get all the county information; a lot of the county's websites are very unhelpful and this is much better.

LOCAL GOVERNMENT USERS

V1 – LOCAL GOVERNMENT
- **Richland County Land Conservation**
  USES • It would be nice to query land ownership in other counties, especially next to our county when people own land in more than one county.

- **Dane County Land & Water Resources Department**
  USES • Checking parcel ownership information for lands in surrounding counties for Farmland Preservation Program participation.
  BENEFITS • Staff time saved in reviewing information

- **Waukesha County Land Information Office**
  USES • Potentially for working with boundaries that cross County borders, like watersheds and school districts

- **Menominee County Land Information Office**
  USES • It is on our website for public access to GIS since we did not have that available on our website.

- **[Anonymous]**
  USES • Adjacency checks.

- **Bayfield County Land Records**
  USES • I would like to take our current layers in our mobile application and put in the Statewide parcel layer. http://maps.bayfieldcounty.org/LandRecordsMobile
  BENEFITS • It will save time in updates.

- **Racine County Land Information**
  USES • – The statewide project has coincided with a GIS project at Racine County. We have migrated to the parcel fabric and we have worked to set up our data to match the statewide parcel requirements. It provided better guidelines for improving the data structure.
  – With taking a closer look at our parcel structure, it has sparked interest from other depts/individuals that are looking at new projects that utilize the GIS data. We have gained attention that has encouraged more projects and thus building our GIS at Racine County.
  – It has inspired some to become for educated on what GIS is and how our organization is using it.

- **Town of Dover Clerk/Treasurer**
  USES • LOVE LOVE LOVE this interactive map! It's so simple and fast to use! We get so many property inquiries. The only thing that would make this even better is if it included the property owners phone number!

- **Ho-Chunk Nation**
  USES • Referencing the parcels location. Having a reference for the boundaries and owners name. It is nice to use this mapservice because of the high speed vs using a particular county GIS webpage.

V2 – LOCAL GOVERNMENT
- **Vilas County Mapping Department**
  USES • Potentially being able to gather data from surrounding counties to complete projects that cross county lines.
  BENEFITS • An assessor who works with many counties in the state called to request our parcel data for

the City of Eagle River. Instead of him having to contact the City to have them request that we release the data on their behalf to another entity, I was able to direct him to the Statewide Parcel Map Initiative webpage where he was able to get not only our data, but also data for another county that he was going to have to contact in a few days.

▪ Dane County, Land Information Office
USES • Having access to parcel data in neighboring counties. This may be for programs that are managed by one county that provides services in another county. It could also be help to understand land ownership across the border.

▪ GIS Specialist, City of New Berlin & Emergency Management Tech for SE WI Incident Team
USES • I think the Statewide Parcel database would be a great tool for Emergency Management purposes.

▪ Florence County Zoning/Land Conservation/Land Information
USES • I have completed a review of a dozen parcels in Florence County.

▪ West Central Wisconsin Regional Planning Commission
USES • Here at West Central Wisconsin Regional Planning Commission we utilize this data for numerous projects and planning purposes including: comprehensive planning, transportation planning, economic development, TIF, grant planning/applications, and mapping.
BENEFITS • Updates to this layer allow us to be as current as possible with our land use and assessed value information for parcels within our planning jurisdiction that includes the following counties: St. Croix, Polk, Barron, Dunn, Chippewa, Eau Claire, and Clark.

▪ Ho-Chunk Nation
BENEFITS • About once a week, we are presented with a property for sale. We created a hard copy map of the property and a KMZ layer to information our decision makers on the potential acquisition. It is nice to have that parcel dataset for quickly copy and paste the parcel and have all the attributes included.

V3 – LOCAL GOVERNMENT

▪ North Central Wisconsin Regional Planning Commission (NCWRPC)
USES • Planning
BENEFITS • Nice to have everything together with the same attributes

▪ Town of Oakland
USES • I'm on the town planning committee. Many of the paper copy maps are outdated. Zooming in on an area versus trying to project outward from a parcel number would be easier and give me, at least, the ability to see it in relation to other parcels, especially those down stream.

▪ [Anonymous]
USES • Assessor
BENEFITS • We are able to use this information to provide higher quality assessed value.

▪ City of Ashland Wisconsin
USES • Use as a general base map layer for reference info.

▪ Oneida County (LIO)
USES • The fix to the Geo-Locator button is very much appreciated. It will make the app more useful across the state. I will work with it more but the address and name search is a bit more finicky. It would be nice for V4 to have that auto complete or build a list as you type like StreetView and then you pick the one that pops up integrated into the system. All in all pretty good.

▪ Ashland County Land and Water Conservation Department
USES • Use in EVAAL model in watersheds spanning multiple counties.
BENEFITS • This layer will make our watershed modeling cohesive for multi-county watersheds.

▪ [Anonymous]
USES • Parcels outside of our coverage area

▪ Chute Lake Protection & Rehabilitation District #1
USES • Healthy Lakes grant application

- Jefferson County Land & Water Conservation Department
  USES • Updating our Drainage District data per request by the County Drainage Board. Ultimately this data will be sent to DATCP for review and utilized at the state level
  BENEFITS • Accurate and complete listing of parcels benefitting from Drainage Board activity that overlap adjoining counties

PRIVATE SECTOR USERS

V1 – PRIVATE SECTOR

- WEC Energy Group – GIS Services Green Bay
  USES • I was able to merge parcels in a specific area and quickly create an overview map of a planned [service] outage area that was then communicated to the public. Using the parcels along with available road tiger files saved me a day of work instead of converting our Mapinfo tab data to shapefiles and manipulating our company parcel data that is not as extensive or accurate as the Statewide Parcel database. My company also uses parcel data on Trimble GPS units and the SPDb will make it easier to gather the necessary data instead of contacting 20+ counties that cover our service area.
  BENEFITS • Cannot estimate dollar amount as I dont know wage of other staff members or how they specifically use the SPDb. Cost savings are by reducing time spent on projects and not having to pay each county for requested extracts.

- Commonwealth Heritage Group – Cultural Resource Management
  USES • – We use this resource for project planning and implementation and it has been invaluable.
  – Archaeology
  BENEFITS • This resources saves staff time, streamlines mapping efforts, and maintains accuracy which we need for the projects we conduct. Accuracy saves funds and staff time from duplicating efforts or correcting mistakes.

- Appraisal Consultants, LLC
  USES • Appraisal exhibits; Comparable sale property lookups, property characteristics, map exhibits.
  BENEFITS • Minimum of $300 to $1,000 per project. Estimate at least $3,000 in savings to date.

- Davel Engineering & Environmental, Inc. – Survey Department
  USES • Looking up parcels to derive basic information for surveys and quoting survey work

- NorthstarMLS [Multiple Listing Service of Minnesota] – IT department / GIS section
  USES • We are in the process of incorporating the parcel database into an error checking and updating process to insure that Real Estate listings are correct and accurate with regard to property characteristics and location. We will be correlating the property data that has been inputted into a Real Estate listings database against the data contained in the parcel dataset and using the parcel data to improve accuracy of the Real Estate listing data.
  BENEFITS • Without the statewide parcel source, we wouldn't be able to utilize the parcel data at all. It is simply too expensive to buy from each of the counties we serve. This has been an especially important improvement to our data quality program. Thank you!

- Onterra, LLC
  USES • Aquatic Ecologist. [Onterra, LLC was created 2005 by Tim Hoyman, a familiar face in Wisconsin lake management, to offer objective lake management planning services at a reasonable cost. The firm provides a variety of lake-related services ranging from science-based diagnostic/feasibility studies to comprehensive lake management plans consisting of aquatic plant inventories, stakeholder education, watershed and water quality analysis, and implementation plan development.]

- AccuWeather – Locations Management, State College, PA
  USES • I have several questions and comments about the parcel dataset. [AccuWeather provides hourly and minute by minute forecasts with superior accuracy for any longitude/latitude on Earth.]

- TomTom – Lebanon, New Hampshire
  USES • I am working to make the newly released parcel geodatabase available for our office staff to use [We design and develop innovative products that make it easy for people to keep moving towards their goals. A global leader in navigation and mapping products, TomTom also creates GPS sports watches, as well as state-of-the-art fleet management solutions and industry-leading location-based products.]

■ Edge Consulting Engineers, Inc.
USES • I love the new mapping website, I am glad I don't have to navigate to individual county websites anymore.

■ Taxography: A Professional Tax Jurisdiction Mapping Agency
USES • Wonderful that you have put parcel data online and for download! I was wondering if Glendale and Bayside Village (as well as all other Villages) are also included in the parcel data? And also was wondering if the parcel data includes the tax code for the parcel? We map tax districts and this would be awesome!

V2 – PRIVATE SECTOR

■ [Anonymous]
USES • Appraiser

■ Kickapoo Woods Cooperative
USES • Private forest land management.
BENEFITS • Will be able to reference parcel boundaries and compare to MFL plan maps and on site monuments and fences. This will help us more effectively design our cruises.

■ [Anonymous]
USES • This is the most useful website and database I've found out of anything relating to what my job requires. I can see not only myself but others within the company I work for using this on a daily basis. (Tell Iowa and Minnesota to do the same.)

■ GAI Consultants [Engineering, Planning, and Environmental Consulting Firm] – GIS/Environmental
USES • Environmental permits
BENEFITS • 1 stop shop for tax paid for public data that will allow for business development and utility improvements in communities we are working in.

■ Cedar Corporation [Engineering, Architecture, Planning, Economic Development, Surveying Services]– Madison, WI
USES • I am a civil engineer and I work for a consulting firm. I am using the parcel data as supporting information in CAD drawings.
BENEFITS • It adds us in pulling together design plans by helping us create a more detailed area map.

■ [Anonymous]
USES • Parcel information
BENEFITS • This website database will help so I may download the data needed instead of trying to use the DOR.

■ Cadmus Group [Technical and Strategic Consultants]
USES • Energy savings

■ [Anonymous]
USES • We use this data to reach out to landowners about potential development on or near their land and the compensation they could receive as well as the local community benefits.
BENEFITS • Ensures accurate landowner identification

■ Cedar Corporation – Civil Department/Planning
USES • Parcel data is being used for future property development proposals
BENEFITS • Ability to show background information for locations we don't currently have mapped

■ Montgomery Associates: Resource Solutions
USES • We use parcel and zoning data to supplement environmental permitting submittals
BENEFITS • Quicker project turnarounds, easier project scoping, and more coherent deliverables

■ Grota Appraisals, LLC; Assessment Technologies, LLC
USES • View parcel data for multiple municipalities
BENEFITS • – As a contract assessor: I benefit by having one map which uses the same format rather than multiple maps in various formats.
– As a CAMA software provider: I benefit by being able to see the parcel distribution of our clients. Market Drive is provided to about 70% of the municipalities in the state.

- AND Products B.V. – the Netherlands
  USES • – We are a Dutch Company specialized in Digital Maps. We are interested to use the statewide parcel data of Milwaukee county, that we found here: sco.wisc.edu/images/stories/publications/V2
  – We want to use the Parcel Data to improve our own parcel layer, because our own layer has some 'holes' in the data (incomplete coverage). We will copy some of the information out of the layer and integrate it into our product (make a derivative work).

V3 – PRIVATE SECTOR

- Milestone Materials – A Division of Mathy Construction Company
  USES • – Public Hearing Maps
  – Approximate boundary locations
  – Verify ownership of a parcel
  BENEFITS •
  We use this shapefile daily in ArcGIS. With this shapefile it saves us time from always having to use the county's GIS sites. Thank you for making this available.

- Grota Appraisals, LLC; Assessment Technologies, LLC
  USES • – Mapping of Assessment related data. Posting Sales, land use, tax classes and so on
  – I think the state wide parcel map is a great tool!
  BENEFITS • – All areas on the map are in the same projection thereby minimizing the number of maps that need to be made.
  – As a contract assessor, it is great to have one location to find parcels. As the largest CAMA provider to the assessors/municipalities in Wisconsin (about 70% of the state) it is fantastic to have one location for all parcels.

- Strand Associates Inc. [Engineering firm]
  USES • Engineering design projects/web applications

- Associated Appraisal Consultants, Inc.
  USES • – Data used in conjunction with assessment data for various uses
  – Appraisal property searches
  BENEFITS • The program has given us an easy way to get the data to make layers to check for errors, aid in valuation, and visually show property owners what's going on in a bigger picture. We are just figuring out how to make more and more use of the data.

- [Anonymous]
  USES • Basemap layer for small area projects

- Kickapoo Woods Cooperative
  USES • Determining more correct property boundaries for writing MFL plans and marking timber sales.
  BENEFITS • Faster, more accurate ownership property location determination.

- Short Elliott Hendrickson Inc. [Engineering, Architectural, Environmental and Planning firm] – Transportation Group
  USES • Planning and concept maps and exhibits for highway and commercial development projects.
  BENEFITS • 1. Tremendous! Fantastic! "HUGE!" Outstanding! Excellent! I have been waiting to see this data layer for about 15 years. And to top it all off it's all on 1 web page, well ordered and in easily manageable chunks. Thank you, thank you, thank you. A hundred times thank you.
  2. Yes. Here's how we benefit:
  – We no longer have to pester County GIS staff with pesky parcel data request. Conversely, I imagine it's easier for the counties not to have to deal with all of the request and transactions.
  – We now have the ability to use the data without all of the planning and delays of purchasing it. A tremendous time saver, that gives us the ability to provide better, faster, and more accurate answers to our clients.
  Yes. Here's how "I" benefit:
  – I no longer have to beat my head against the wall in an insane rage asking myself "Why-o-why is this so flipping hard to do????" Now, it's easy-peasy, and my psyche can finally be at peace. I'm now optimistic about the future of the world as, a tiny problem that can be fixed, has been fixed.

- WE Energies
  USES • Use for property ownership information

- **[Anonymous]**
  USES • Many times I need to identify all real property owned in Wisconsin by a particular person or entity. For many counties, I must have an address or tax key number, as there is no option to search land records by name. I then contact county treasurers and ask them to search their files. Some county treasurers will search their databases to locate owners; some can search by name but decline to; other counties do not have the ability to search tax records by name (believe it or not). The next step is to search municipal assessor websites, which sometimes allow searches by name. This map allows me to search a county, or several counties, or all 72 counties by name. Once I have identified a parcel owned by a person or entity, I can then access current land information records at the county level.
  BENEFITS • When I don't know the county in which a property is located, I can run one search of your map to obtain results from all 72 counties. Without this map, I must search each county individually. This saves time calling individual treasurers and asking them to search their databases by name. I expect I will also use the zoning layer and find other uses in the future.

- **Tetra Tech, Inc. [Consulting and Engineering Services]**
  USES • Parcel and zoning data will be used to complete environmental review for utility projects.
  BENEFITS • Helps create landowner mailing lists so that mailing lists of affected landowners can be notified.

- **We Energies – Gas System Engineering**
  USES • Various GIS projects, we are always looking for updated parcel data—physical boundary and landowner information.
  BENEFITS • We can compare our internal data and the Statewide parcel data for accuracy. It has helped make our product better.

- **[Anonymous]**
  USES • Environmental Scientist: due dilligence and phase 1 inspecitons
  BENEFITS • Better that locating areas in GIS county maps which differ from each other

- **Auth Consulting & Associates [Engineering services]**
  USES • Bringing parcel layers into Autocad mapping applications for preliminary survey reconaissance, site mapping, site planning, identifying adjoining land owners
  BENEFITS • I haven't benefited yet from V3, but I forsee that I will be able to as I used V2 and was very happy with the available results.

- **KL Engineering, Inc. [Civil Engineering services]**
  USES • Used Columbia County shapefile to help register aerial photos obtained from Columbia County GIS viewer in preparation for a topographic survey.
  BENEFITS • Parcel data supplements our field survey work. Very easy to use.

- **[Anonymous]**
  USES • Approximate parcel boundaries, ownership, assessment and land use classification.
  BENEFITS • I work at an engineering firm, and commonly need approximate parcel boundaries with ownership. Most of our clients are small municipalities without GIS capabilities. We work in a fast-paced environment, and commonly need data faster than counties can provide it. The statewide parcel dataset is an easy way to fulfill the needs of our clients.

- **US Solar – Site Selection team**
  USES • Planning renewable energy
  BENEFITS • Really happy to find this resource. However this resource is not available on many city/county websites and cities claim they have no GIS data available.

- **Financial Business Systems, Inc. [Software development, real estate industry] – GIS Department/GIS Technician**
  USES • I plan on organizing the PIN and physical address fields for geocoding (MLS) purposes.

- **Hiawatha Broadband Communications, Including. – Winona, MN**
  USES • I am with a broadband company whose footprint extends into Wisconsin and we use the parcel data for planning and design.
  BENEFITS • We have used previous versions of the data to help determine wireless tower locations as well as for scoping communities that might be interested in our services. We also use parcel data when designing our data networks to help determine the capacity as well as design functions such as right of way boundaries and pedestal locations. We often find ourselves looking at the parcel data when discussing design options.

- **[Anonymous]**
  USES • Analyzing healthcare trends and population shifts
  BENEFITS • Yes, we anticipate being able to make informed decisions based on the information provided through this portable that will benefit the communities we serve. This is a great website!

- **FutureWood Corp**
  USES • Ownership identification for forest management.
  BENEFITS • We can easily identify and analyze ownership data more efficiently than web services offered through the counties.

- **Becher Hoppe Associates, Inc. [Engineers] – Surveying**
  USES • I download county parcel data for narrowing down search areas for field surveying when online survey maps are not available. Certified survey maps or plats of surveys can be built and then rotated to the parcel map until we can locate monuments in the field to narrow down location even further.
  BENEFITS • It helps cut down on time spent in the field locating property monuments and gives me an idea of additional search areas when doing survey work.

- **4-Control Inc.**
  USES • We are a Herbicide Application business who sprays along powerline right of ways. We are going to attempt to use the parcels data to better locate customers who are on our no spray list or are organic farmers.
  BENEFITS • Hopefully we will locate no spray customers faster and more accurately to prevent mistakes when spraying.

- **Private Engineering**
  USES • Parcels for the land we own around the USA
  BENEFITS • We can better track our lands and do spatial analysis.

- **WoodsCamp Technologies Inc.**
  USES • Woodscamp.com in collaboration with Wisonsin DNR.
  BENEFITS • We create a tool to allow family forest owners to get immediate insights about their forest and we connect qualified landowners interested in support to DNR foresters.

- **Courthouse Retrieval System**
  USES • Downloaded the data to see if it would work with an application used for real property data verification.

- **OBG**
  USES • Identifying property boundaries
  BENEFITS • We use it all the time for base mapping efforts

- **[Anonymous]**
  USES • Nutrient Management Planning; permit applications to local and state governments

- **County Materials Corp.**
  USES • Use in ArcGIS for basic site maps, showing land ownership and neighboring properties.
  BENEFITS • This is a one-stop location for all the parcel information that we own in the State, and it's updated on a regular basis.

- **Northwoods Land Trust, Inc.**
  USES • Selecting owners of large lakefront and riverfront properties for landowner conservation shoreland education projects.
  BENEFITS • We have used county parcel maps previously for our projects, but have not used the statewide layer yet. We expect the results will be the same, but are concerned about how we will be able to link the statewide parcel maps with current county tax roll data.

- **Sebold Appraisal Company**
  USES • Re appraisals

- **[Anonymous]**
  USES • Looking up parcel numbers and assessment values of properties and homes.

- **[Anonymous]**
  USES • Realtor trying to help clients with lot lines

- Advanced Disposal Logistics Department
  USES • We use the parcel information in our routing software. We can get the exact address latitude and longitude rather than relying on reverse geocoding, especially in more rural communities. We make very high-quality maps for our drivers, dispatchers, call center, and for advertisements.

V3 – PRIVATE SECTOR

- [Anonymous]
  USES • Planning of site development.

- BayView Real Estate Inc.
  USES • Real estate related work.
  BENEFITS • information on parcel size.

- Barr Engineering Co./Water Resources
  USES • We are using the parcel layer to assist with permitting in relation to Soil and Groundwater Management at facilities in Oneida County.

- [Anonymous]
  USES • Mapping for NEPA coordination for a highway transportation project for WISDOT

- Associated Appraisal Consultants, Inc. – Field Staff
  USES • Finding parcels for assessment purposes.

- [Anonymous]
  USES • Land owners

NON-PROFIT USERS

V2 – NON-PROFIT

- Southwestern Wisconsin Regional Planning Commission
  USES • For developing Hazard Mitigation Plan
  BENEFITS • It has offered the data that is critical for any type of development

- Waze [Community-based traffic and navigation app]
  USES • This GIS map is used to keep the Waze Navigation app up to date in order to provide the best possible directions to our users.
  BENEFITS • We have made changes within our map that have allowed proper navigation to addresses, especially for new subdivisions.

V3 – NON-PROFIT

- [Anonymous]
  USES • I will use the data to map (or, in some cases, re-map and refine) a database of protected natural and park lands covering the entirety of the state, for use in natural areas planning and management. This database will include both fee-owned and conservation easement sites.
  BENEFITS • The protected lands database which I am building and will enhance using the V3 data (described in the "USES" portion of this feedback) requires comprehensive, _accurate_ parcel data as the foundation upon which all of my efforts have been and will continue to be built. In short, I cannot emphasize strongly enough the benefits that this service provides to those engaged in work such as mine. Those involved have both my sincere thanks, and deep appreciation.

- Valley Stewardship Network: Partners in Stewardship of Land and Water
  USES • Mapping conservation projects for landowners we work with.
  BENEFITS • We are able to find landowners properties and create maps for site visits. Having a map with the landowners property in hand for site visits helps drive conversation and planning for conservation practices.

- Gathering Waters: Wisconsin's Alliance for Land Trusts
  USES • Support activities of Land Trusts and Conservancies.
  BENEFITS • We anticipate working with numerous organizations, some entirely new to GIS, and some quite proficient.

- Ice Age Trail Alliance, Lands Program
  USES • – To determine landowners for conservation purposes, potential acquisition and neighbors of our lands
  – Identifying parcels for trail layout purposes
  BENEFITS • Our work is done over 21 counties and this saves lots of time usign our own ArcGIS app instead of going to 21 websites.

- Kinnickinnic River Land Trust
  USES • I am the Executive Director of a small land trust in River Falls and find this tool extremely easy to use and very useful!

- Mississippi Valley Conservancy
  USES • Land use information

- Madeline Island Wilderness Preserve
  USES • GIS project for Madeline Island to evaluate land cover, topography, ownership, etc. for purposes of land conservation
  BENEFITS • Developing trail and land-management plans for our local land trust

- American Forest Foundation / WoodsCamp.com
  USES • Use in private land forest conservation planning. Essential data for us to run conservation analysis that will be relevant to individual landowners
  BENEFITS • Absolutely! The compilation of this data relieves a significant barrier to conservation planning and cost for our organization.

- Diggers Hotline -- Mapping Services Department
  USES • Diggers Hotline- updating of base maps to be able to more accurately determine excavation locations
  BENEFITS • While we attempt to obtain mapping data directly from each county, several counties have referred us to download parcel data from your site, rather than providing it directly.

EDUCATIONAL INSTITUTION USERS

V1 – EDUCATIONAL INSTITUTION

- Wisconsin Geological & Natural History Survey – UW Extension
  USES • We used the statewide parcel layer to geocode WDNR WCR water well locations in 3 counties. We are presently conducting a statewide project to inspect all of the large volume springs (>.25 cfs), so we are using the parcel layer to contact land owners to verify the existence of, the character of, and to request permission to inspect large volume springs in every county in the state. Subsets of the parcel layer are loaded onto mobile GIS platforms for use in the field for many projects. We use the parcel layer to identify and aid in well construction report acquisition when someone is seeking a copy of the construction report for a specific well. We also use the parcel layer to identify land owners in order to request permission to drill or to inspect rock outcrop.
  BENEFITS • The dollar cost savings to our agency is already substantial. In regards to the statewide springs inventory, to acquire each parcel data set I would have had to contact each county LIO by telephone, there would have been follow-up emails, licensing and non-distribution agreements, data transfer, data conversion, parsing or aggregation of house number/street address field(s), loading the data into a simplified schema for easy import/export...sound familiar?!? A very conservative estimate for the financial savings from the amount of time it would have taken us to do all of that is at least $25,000-$35,000...and that's only one project.

- UW-Madison – Space Science & Engineering Center
  USES • I/we integrated 7 disparate Wisconsin land use coding systems. I'm hoping land use will be included in the attributes available in the parcel layer. With the integrated hierarchy we made to resolve differences in land use code terms, users could query for land use across the state. That's my vision. I think this would be very useful.

V2 – EDUCATIONAL INSTITUTION

- UW-Madison School of Medicine and Public Health – Wisconsin Office of Rural Health
  USES • I am trying to determine land use for rural (as designated by the OMB) counties so I can say, for example, approximately x% of rural land is used for farming, x% is residential, etc. I plan to use the PROPCLASS attribute in the county shapefiles to calculate proportions.

- UW-River Falls – Geography and Geographic Information Science; Agricultural Economics
  USES • Developing a model to access the value of agricultural production on recently sold parcels of land in Wisconsin. Joint project between UW-RF and UW-Extension.

V3 – EDUCATIONAL INSTITUTION

- UW-Milwaukee Libraries – American Geographical Society Library
  USES • We archive this data to allow quick access for students but we also use this data whenever we need uniform parcel layers for multiple counties or for projects that cross county lines. We frequently distribute this dataset to students looking for parcel datasets in Wisconsin.
  BENEFITS • Best source of uniform parcel data, otherwise much time was spent making sure that data from different counties was formatted similarly. Students completing projects with a geographic coverage beyond a single county benefit from the systematic standardization of this dataset. It's also using for obtaining parcels for counties that do not have a data download page.

- Geography Department
  USES • Beginning phases of hedonic pricing model and selection of areas of interest.
  BENEFITS • Saves us a ton of time, not having to go to each county's website to pull the data, and is a ready resource for future projects.

- UW-Milwaukee – Cultural Resource Management - College of Letters & Science - Anthropology
  USES • Primarily the data is used for depicting parcels on project mapping, identifying road right of way, quickly determining property ownership, and displaying property addresses quickly and easily.
  BENEFITS • The database provides a great single, consistent resource for all of our GIS users and students across a vast majority of the state. Different county GIS departments across the state all have different budgets, processes, and streaming feature classes when it comes to parcel data. The parcel database allows us to have convenient access to parcels across most of the state.

- Calvin College – Grand Rapids, Michigan
  USES • Research application—evaluating subdivision development and common-interest development in Wisconsin and other Midwestern States.

- [Anonymous]
  USES • For housing research in Madison.
  BENEFITS • It is a robust and yet elegant data source. Easy to use. Clean attribute table.

- Yale University – Economics
  USES • Research on the historical evolution of land holdings.
  BENEFITS • It has greatly simplified our data collection work.

- University of Wisconsin-Milwaukee Cultural Resource Management
  USES • Helping government and private entities comply with federal and state regulations.
  BENEFITS • It has saved us a lot of money in terms of time and effort! We don't have to make trips to Land Info offices or negotiate to download the data from county governments anymore.

PRIVATE CITIZEN USERS

V2 – PRIVATE CITIZENS

- [Anonymous]
  USES • When looking at real estate listings—we go to the property and use the webmap to see conditions near and around the property of interest
  BENEFITS • Narrows our interests in property that don't find criteria for our purpose

- Private Citizen
  USES • I've used the parcel database to contribute to OpenStreetMap (www.openstreetmap.org).
  BENEFITS • OpenStreetMap is a community-driven project that provides an important open source alternative to proprietary mapping services like Google or Bing. OpenStreetMap depends on users contributing accurate and up-to-date information. The WI statewide parcels is an excellent source of open information that allows community mappers to draw accurate boundaries for municipalities, public and private lands, planned roads/subdivisions, and attribute information like street numbers. Having up-to-date parcel information saves time by allowing mappers to overlay current OpenStreetMap and find holes or discrepancies to focus on before conducting field work.

- Private Citizen
  USES • I am researching the history of land ownership in select Dane County townships.

- Private Citizen
  USES • In ArcMap 10.3.1 I am using the parcels data to compare parcel boundary and ownership patterns as well as physical features in Primrose Twp, Dane County. I am layering the current parcel a data over raster data that I am digitizing: plats (1861, 1890 . . .) and 1834 PLSS notebooks.
  To be quite honest this is a family-hobby type history project that started with simply reading up on the people who used to own a specific 40 acres. From there it expanded looking at how both the map content and map precision & accuracy have changed though each map iteration.
  Such free, public data is a common good that should be continued.
  BENEFITS • Better understand local land ownership patterns.

- Private Citizen
  USES • Need parcel map to build a shed.

V3 – PRIVATE CITIZENS

- Private Citizen
  USES • – Use the app to research landowner info for real estate search(s) when we were looking to buy property
  – For getting a sense of ownership/fragmentation/human 'pressure' related to hunting lands
  BENEFITS • – As above – This helped us choose a property to buy
  – This helps us in our outdoors activity choices

- Private Citizen
  USES • Looking up land owners in my surrounding area

- Private Citizen
  USES • Checked out my own parcel to practice. Works very well.

- Private Citizen
  USES • I'm using it to aid in my search for land to buy. I'm looking at land for sale listings on sites like realtor.com, wisconsinhomes.com and landwatch.com. I have a Google MyMaps map I created of the area I'm looking for land. To add polygons to my map, they have to be in KML format (it's what MyMaps needs). Rather than draw them by hand, by loading the parcel data into Postgres using the PostGIS extension, I can easily get KML-formatted data with:
  SELECT ST_AsKML(geom) FROM parcels WHERE parcelid = '1234';
  BENEFITS • It saves me from having to slowly and inaccurately eyeball-draw polygons by hand on my maps. I've even been thinking maybe I could automate some of the process I follow into a web app to help other people find land to buy—it doesn't seem like there are many good tools out there for the discerning land buyer

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- Private Citizen
  USES • Trying to see our parcel of [street address].

- [Anonymous]
  USES • Possible vacation spot

- [Anonymous]
  USES • Identify location of parcel owned by Town of Winneconne

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- [Anonymous]
  USES • I used it to see what the layout of my land looked like and to get parcel IDs and acreage.
  BENEFITS • It was interesting to see my property escpecially in the US topographical map. Also nice to see who owned the land around me.

- [Anonymous]
  USES • Check property

- [Anonymous]
  USES • Parcel info

- [Anonymous]
  USES • Shopping for home with acreage.
  BENEFITS • Visualize lot dimensions and position in context of surrounding property and typography.