WV Redistricting GIS Products

PRODUCT	DESCRIPTION	WEB LINKS
County Report Lists (Excel Spreadsheet)	Precinct Mismatch List	Download County Mismatch File
	Voter List (all SVRS records)	Download County Voter List File
	E-911 Site and Street Ranges	Download Select Counties
Map Viewers (Online Web)	WV Voter Map 2022 (Public)	www.mapwv.gov/vote
	WV Geo-Enables SVRS Tool (Non-Public) *formerly the redistricting web map*	www.mapwv.gov/svrs
Progress Tracking (Excel Spreadsheet)	County SVRS-GEO and Address Geocoding Statuses	Table | Graphic | Geocode Status
	Precinct SVRS-GEO Status	Table | Graphic
Online Resources	County Clerk Redistricting Resources	www.mapwv.gov/redistricting
	Background info about Reports and Map Viewers	GEO-SVRS Reports and Map Viewers

Statewide Voter Registration System (SVRS) Reports link tabular data to Map Viewer

County Precinct Mismatch Report

G-SVRS Map Tool

Geo-enabled SVRS

STATEWIDE SPATIAL DATA ASSESSMENT
1 April 2022

County Summary Audit Report for SVRS Data Pull 4/1/2022
- 7% of the site geocoded SVRS PRECINCT records do not match the GEO PRECINCTS; or vice versa, a statewide 93% SVRS-GEO match rate. Refer to County Progress Tracking Excel table (Column N summary).
- 30 counties have SVRS-GEOgraphic Precinct Mismatch Rates < 5% (Column N in spreadsheet)
- 93% of the Total SVRS records were geocoded to site voter points (Column H in spreadsheet) and then validated by the spatial data audit.

Precinct Summary Audit Report for SVRS Data Pull 4/1/2022
- 79% of the precincts (1,315 of 1,674) statewide have a Precinct Mismatch Rate < 10%. *The statewide precinct-level graphic is in the process of being updated.* Refer to Precinct-Level Progress Tracking Excel table (Column M).
- 20 precincts have less than 25 site geocoded voters in the precinct
- Precinct 43 in Mingo County (town of Kermit) has the lowest address "site" geocode rate at 27.8%

SVRS Site Geocoding Match Rate

**Countywide *Geocode* Site Address Match Rate should be > 95%**

Statewide Geocoding results:
- 93% **site address** points
- 6% address points
- 1% no match

County Percent of Site Address Matches
April 2022

Geocoding is the computational process by which a physical street address is converted into geographic coordinates, which can be used for a variety of mapping applications including redistricting.
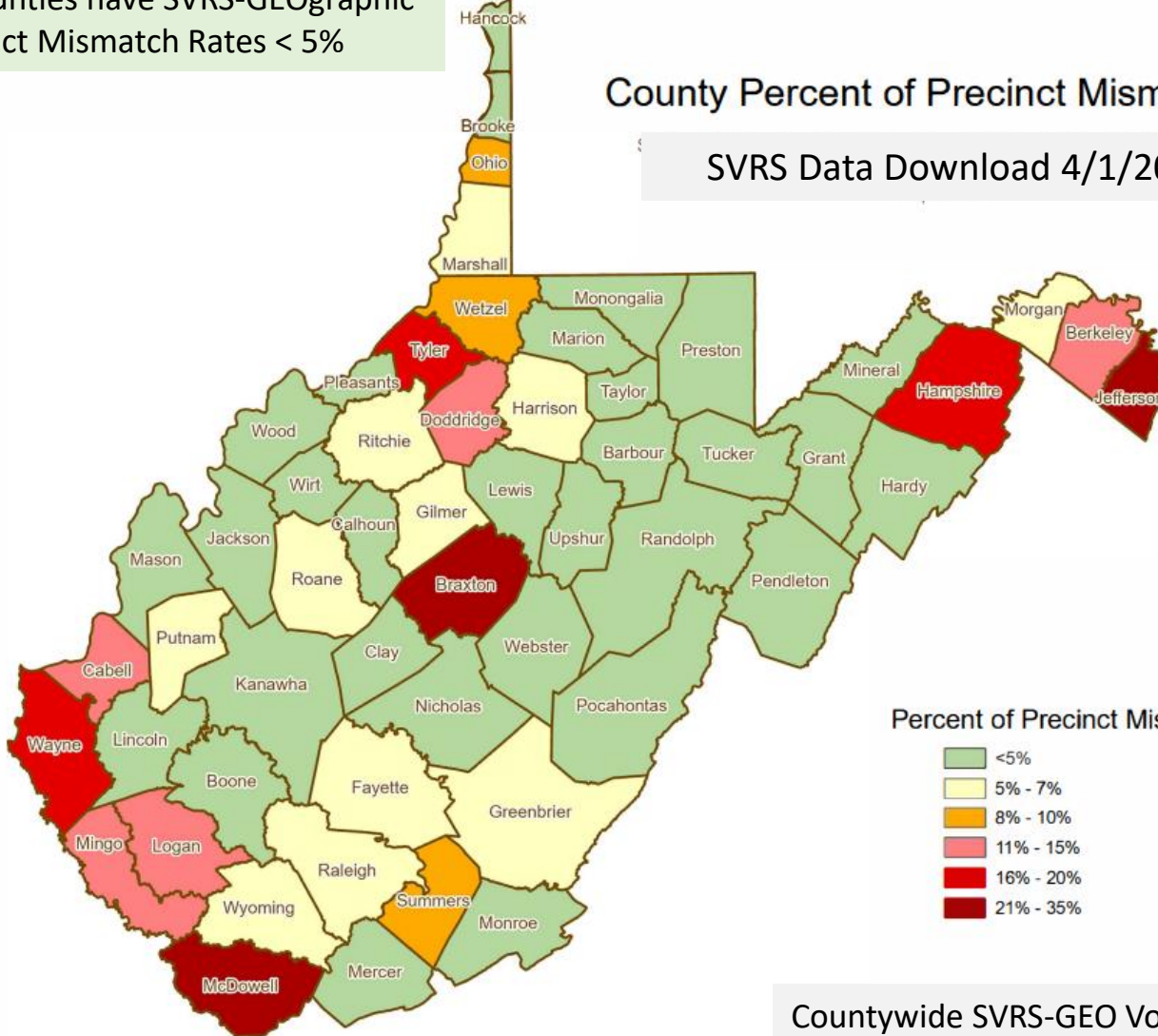
Percent of Site Address Matches

- ≤ 53%
- 54% - 80%
- 81% - 94%
- ≥ 95%
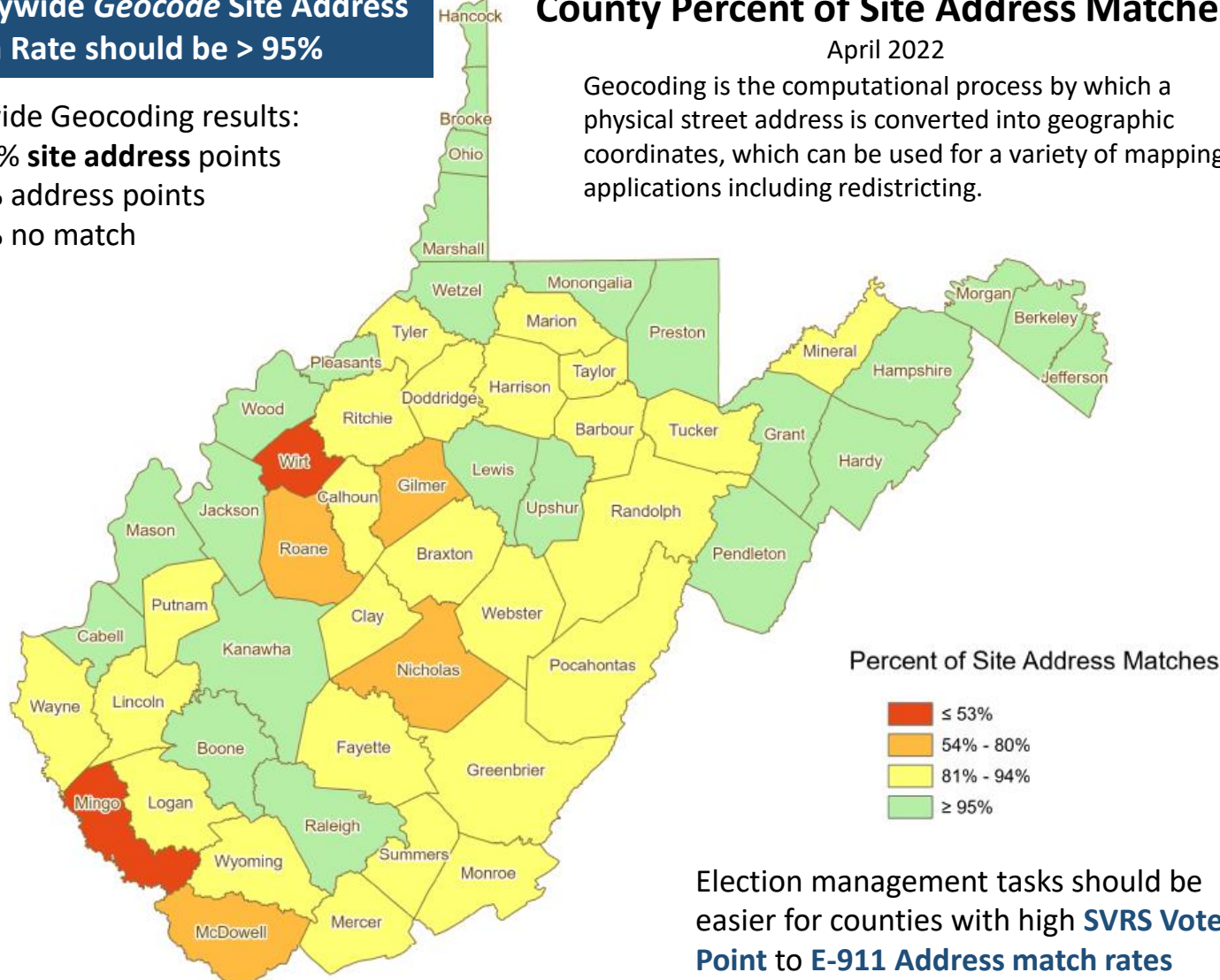
Election management tasks should be easier for counties with high **SVRS Voter Point** to **E-911 Address match rates**

WVGISTC 2022-04-04

[Geocoding Status Graphic]

Data Source: WV Secretary of State's SVRS Data Extract 01 April 2022

County Precinct Mismatch Status

30 counties have SVRS-GEOgraphic Precinct Mismatch Rates < 5%

County Percent of Precinct Mismatches

SVRS Data Download 4/1/2022

Percent of Precinct Mismatches

- <5%
- 5% - 7%
- 8% - 10%
- 11% - 15%
- 16% - 20%
- 21% - 35%

WVGISTC 2022-04-04

County Mismatch Status Graphic

Countywide SVRS-GEO Voter Mismatch Rate should be < 5%

Precinct-Level Mismatch Status

SVRS Data Download 4/1/2022

79% of precincts (1,315 of 1,674) have an SVRS-GEO mismatch rate of less than < 10%
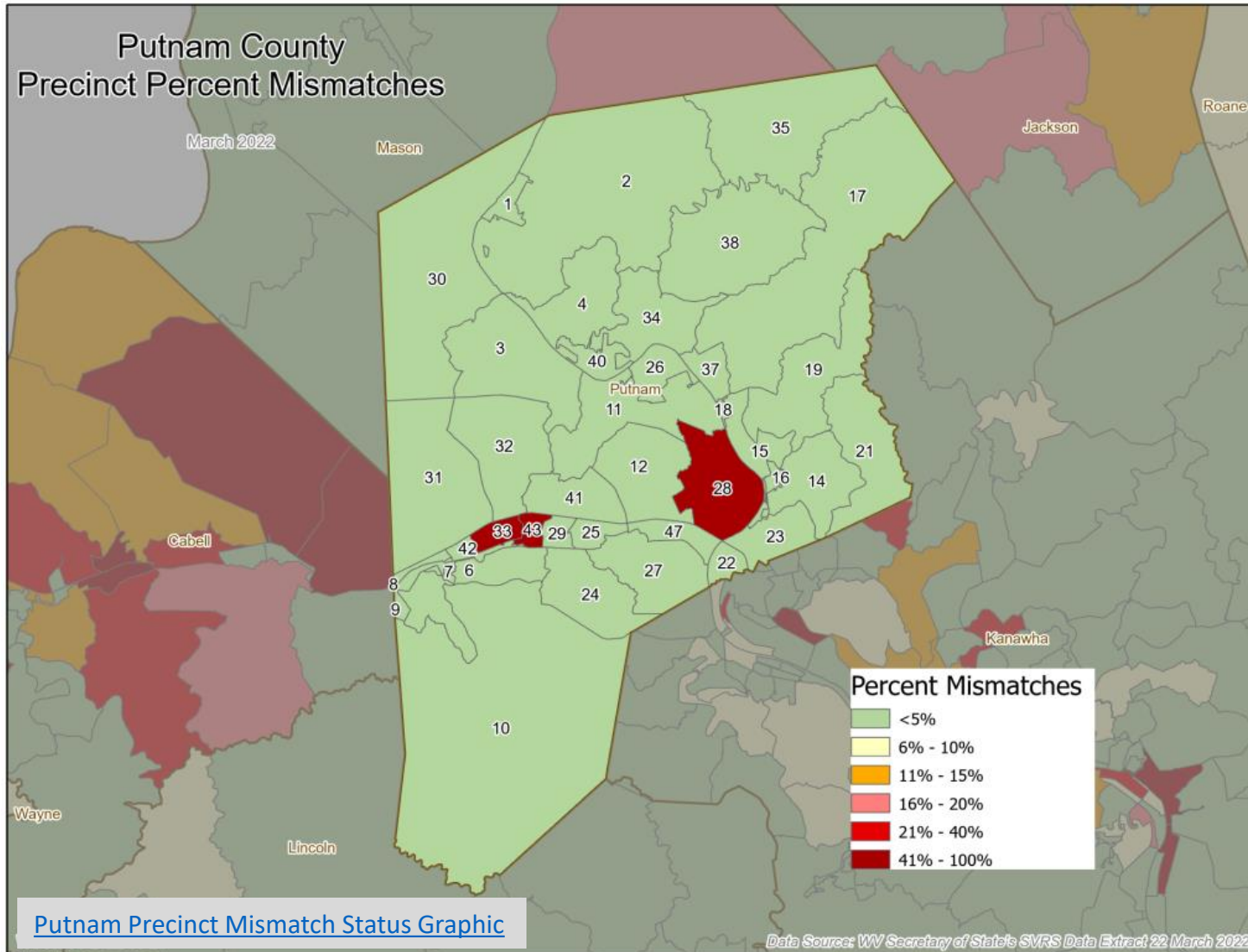
Precinct Percent Mismatches

Spatial Data Audit: Mismatches between SVRS and 1,674 GIS Precincts

1 April 2022

Precinct Mismatch Status Graphic

Percent Mismatches

- <5%
- 6% - 10%
- 11% - 15%
- 16% - 20%
- 21% - 40%
- 41% - 100%

WVGISTC

Data Source: WV Secretary of State's SVRS Data Extract 1 April 2022

Precinct-Level Mismatch Status

Putnam Precinct Mismatch Status Graphic
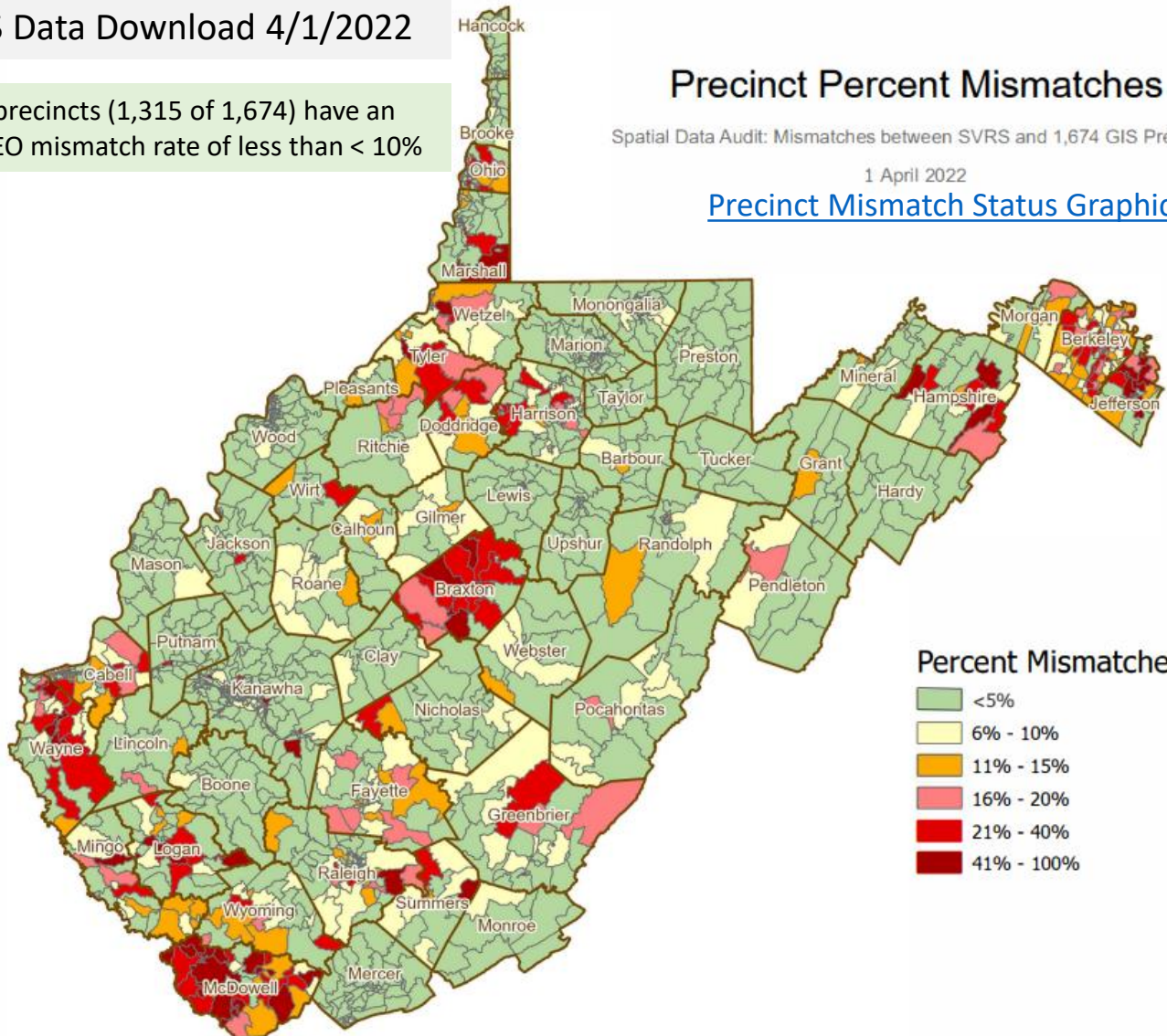
A zoomed-in view of Putnam County's precinct redistricting status of 3/22/2022 reveals it will attain a countywide "mismatch" rate of less than 5% if Precincts 28, 33, and 43 are updated in the SVRS

County-Level Audit (Putnam)

County	Total Voting Register Records	# Precincts	**1** # Precincts Standardized	**2** # SLDBP	# Magisterial Districts	**3** Geocoding (Address Matching)					
						# SITE ADDRESS MATCHES	% SITE Address Matches	# STREET Address Matches	% STREET Address Matches	# UN-MATCHED Address Matches	% UN-MATCHED Address Matches
Putnam	37,893	39	7	34	3	35,963	**94.9%**	1,842	5%	88	0%

County	**4** # Precinct Mismatches	**5** % Precinct Mismatches	Spatial Audit between SVRS Records and GEO-Election Districts										**6** # Total Mismatch Flags
			# Magisterial Mismatches	% Magisterial Mismatches	# House Mismatches	% House Mismatches	# Senate Mismatches	% Senate Mismatches	# Congressional Mismatches	% Congressional Mismatches	# County Mismatches	% County Mismatches	
Putnam	3,861	**10.7%**	15,961	44%	33,317	93%	185	1%	6	0.0%	66	0.2%	**53,396**

1) # of precincts standardized (e.g., leading zeros 02, alphabet splits, 25-6 or 25A, town suffix 12T)
2) # of precincts where the State Legislative District Borders the Precinct (SLBD)
3) Geocode site address match rate for county (target match rate > 95%)
4) # of mismatched voter points between SVRS Records and GEO-Election Precincts
5) % of precinct SVRS-GEO mismatches (target mismatch rate < 5%)
6) Total mismatch flags (precinct, magisterial, state house, state senate, congressional, outside county)

County Progress Table | Graphic

Precinct Level Audit (Putnam)
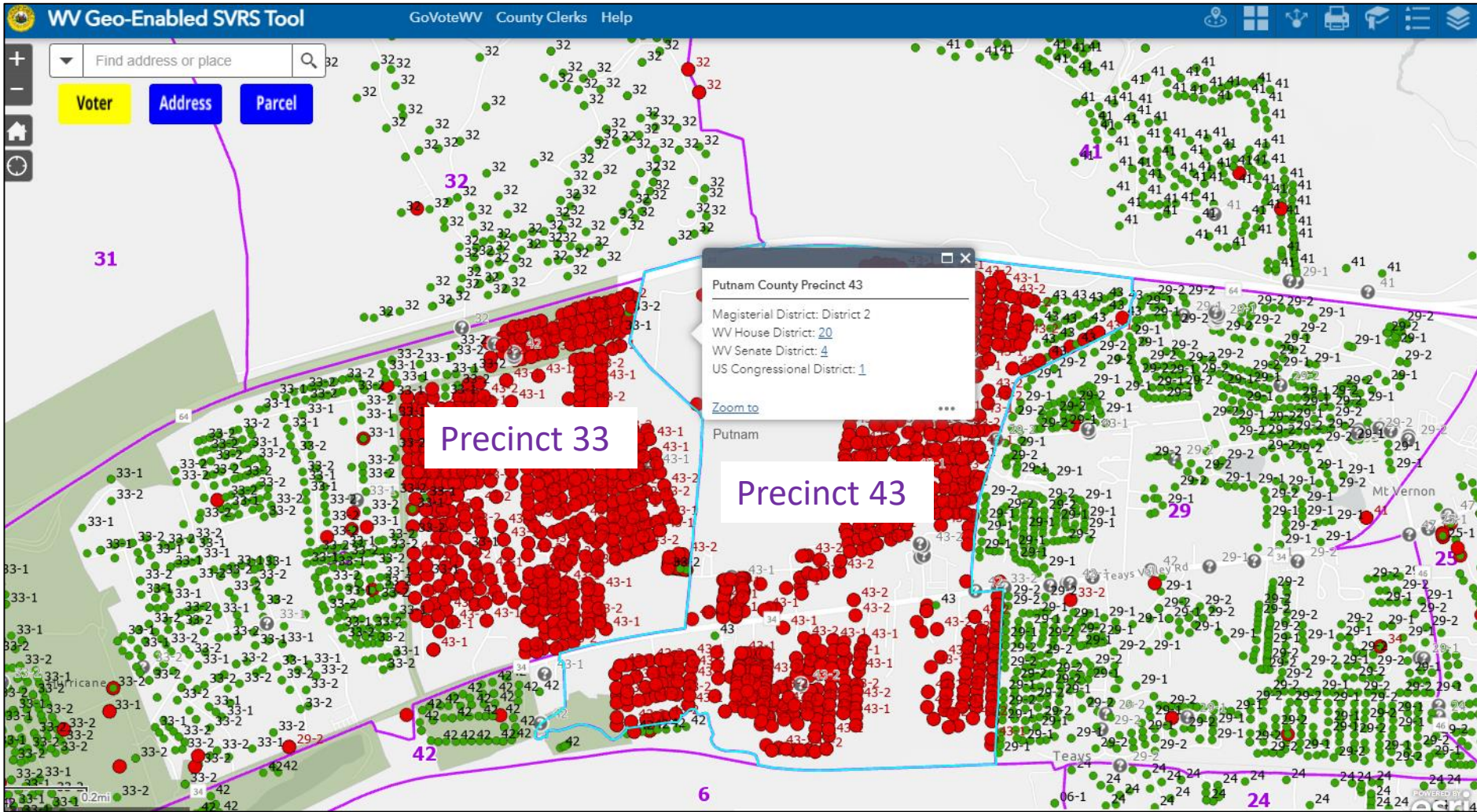
| | | | **1** | **2** | **3** | **4** | **5** |
Precinct	County	Total Registered Voter Records	Precinct Standard-ized	SLDBP	**# Precinct Mismatches**	% Precinct Mismatches	Map Link
43	Putnam	1476	No	Yes	**1359**	95.0%	SVRS
33	Putnam	2458	Yes	Yes	**1169**	48.1%	SVRS
28	Putnam	867	No	Yes	**823**	99.5%	SVRS
23	Putnam	1296	No	Yes	**60**	4.9%	SVRS
37	Putnam	346	No	Yes	**11**	4.5%	SVRS
18	Putnam	236	No	Yes	**5**	3.9%	SVRS
35	Putnam	226	No	Yes	**8**	3.8%	SVRS

1) # of SVRS precincts standardized (e.g., leading zeros 02, alphabet splits 25-6 or 25A, town suffix 12T)
2) # of precincts where the State Legislative District Borders the Precinct (SLBD)
3) # of of mismatched voter points between SVRS Records and GEO-Election Precincts
4) % of precinct SVRS-GEO mismatches (target mismatch rate < 5%)
5) Map link to precinct using GIS-Enabled SVRS Tool

Precinct Progress Table | Graphic

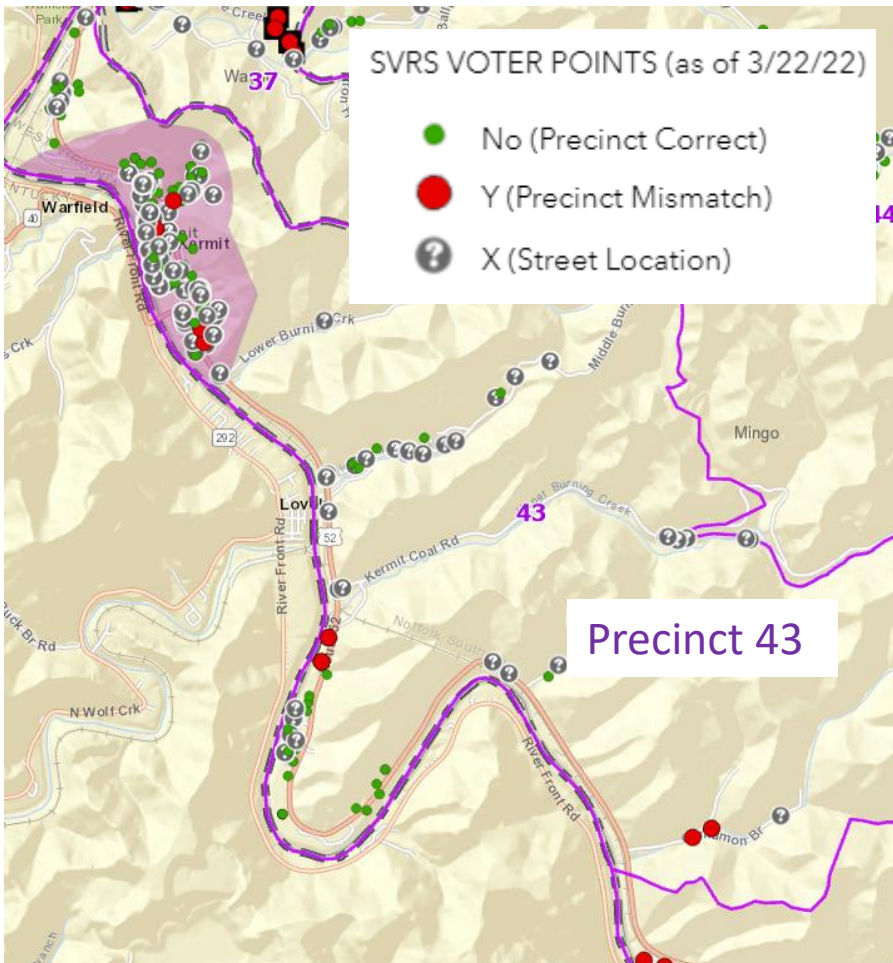# Precinct Level Audit (Putnam)


View specific precincts on G-SVRS Tool

Precinct-Level Audit (3/22/22)

SVRS Precinct Mismatch Spreadsheet Report

Precinct 43 in Mingo County (town of Kermit) has the lowest address "site" geocode rate at 30.6%

Precinct 36 of Jefferson County has the largest number of Voter Precinct Mismatches at 1,440

SVRS VOTER POINTS (as of 3/22/22)

- 🟢 No (Precinct Correct)
- 🔴 Y (Precinct Mismatch)
- ❓ X (Street Location)

Precinct 43
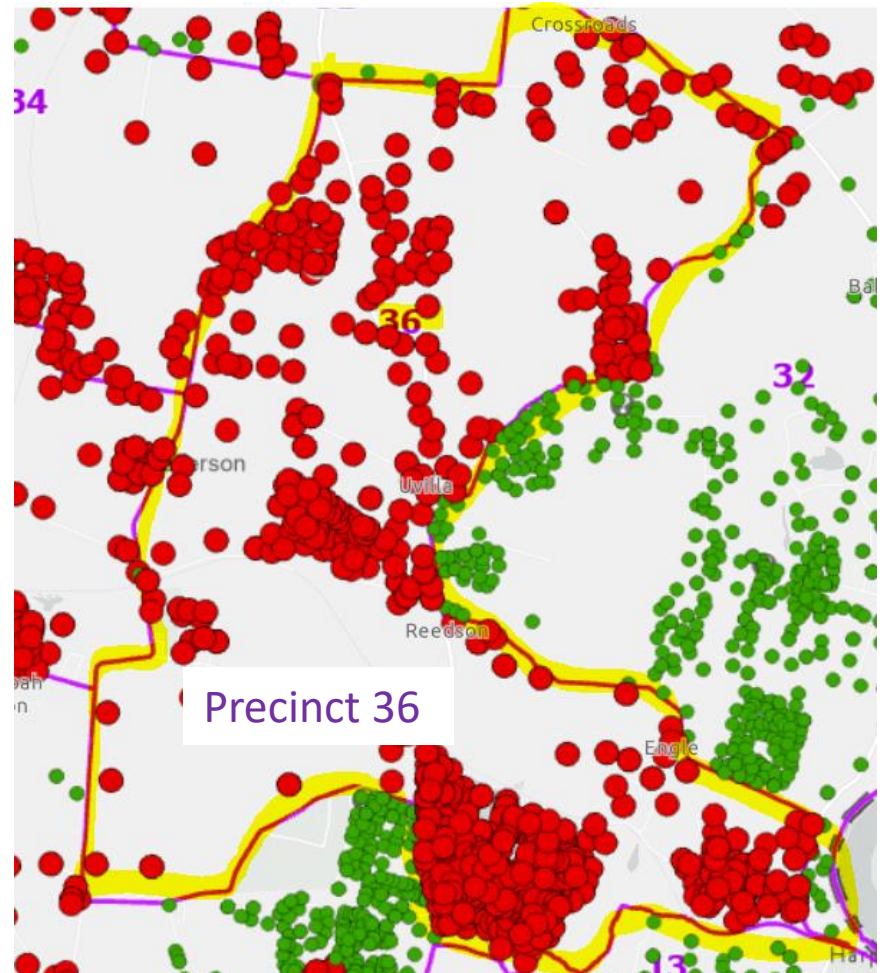
Precinct 36

Statewide Spatial Audit Overview

SVRS SPATIAL AUDIT 4/1/22	COUNT	%	NOTES
SVRS Records Geocoded	**1,051,191**		
Precinct Mismatch	76,093	7%	7% of SVRS records do not match the GIS PRECINCT files
Magisterial District Mismatch	136,526	13%	13% of SVRS records do not match the GIS MAGISTERIAL Districts
State House	116,667	11%	11% of SVRS records do not match the GIS STATE HOUSE Districts
State Senate	17,242	2%	2% of SVRS records do not match the GIS STATE SENATE Districts
Congressional	5,863	1%	1% of SVRS records do not match the GIS CONGRESSOINAL Districts
Outside County	1,704	0.2%	0.2% of SVRS records are located OUTSIDE of the County. Points in parcels that overlap jurisdictional boundaries may be valid.

GEOCODING STATUS 4/1/22	COUNT	%	NOTES
Total SVRS Records	**1,132,283**		**Two Address Locators (WV SAMS & Esri) performed the geocoding**
Site Address Match	1,051,191	92.8%	93% of SVRS records geocode to a site point. Some points may not be located to the building footprint or are false positives.
Street Address Match	69,716	6.2%	Records not evaluated for mismatch by spatial audit
Unmatched	11,376	1.0%	Records not evaluated for mismatch by spatial audit
County Site Match Rates			**County Site Matches should be > 95%**
Highest Site Match		99.5%	Jefferson County has the highest site address match rate
Lowest Site Match		49.6%	Wirt County has the lowest site address match rate

PRECINCT/MAGISTERIAL STATEWIDE COUNTS	COUNT	%	NOTES
Voting Precincts	**1,674**		
Precincts Standardized	54	3%	3% of SVRS Precincts have to be standardized to Geo Precincts
SLDBP	1,251	75%	75% of the precincts border State Legislative Districts
Min	9		Richie County has the least number of precincts
Max	191		Kanawha County has the highest number of precincts
Magisterial Districts	**195**		
Max	8		Hampshire County has the highest number of magisterial districts

[State and County Level Spatial Data Assessment](#)

Geo-Enabled SVRS

County Reports

County Redistricting Reports

Report Type	Download	Source	Description
Precinct Mismatch (also known as V3 report)	Download Link Metadata	SVRS 3/22/2022 data pull	Spatial Audit. Lists precinct mismatches between site geocoded SVRS points and GEOgraphic GIS file. Links records to Geo-Enabled SVRS (www.mapwv.gov/svrs) map view. Sorted on GEO Precinct, House Number, Street Name. Excel Spreadsheet format.
Voter List	Download Link Metadata	SVRS 3/22/2022 data pull	Spatial Audit. Lists all SVRS records and Address Matching (geocoding) status of each record: site match, street match, unmatched, and site matched outside county border. Identifies six mismatch types (precinct, magisterial, state house, state senate, congressional, and outside county) for site geocoded SVRS points. Links records to Geo-Enabled SVRS (www.mapwv.gov/svrs) map view. Sorted on GEO Precinct, House Number, and Street Name. Text CSV format which can be imported into Excel or other software. Voter lists are generated at both the state and county levels.
E-911 Street and Site Addresses	Download Link	Statewide Master Address File	Two reports that provides street range and site address information of voting precincts for redistricting. Excel spreadsheet format.

Note: Use the Excel "Freeze Panes" and "Filter" commands to navigate and screen records of interest.

County **Precinct Mismatch** Report

A spreadsheet that identifies the number of flagged Voter Points that are potentially incorrect in the SVRS. A map link to the G-SVRS Tool allows users to visualize precinct mismatches generated from the spatial audit of SVRS Voter Points. Records are sorted on Geo Precinct, House Number, and Street Address. Download County Mismatch File.

| GEO | SVRS | | | | | | | GEO | GEO Link |
Voting Precinct Name (NEW)	VRS Voter ID	VRS Combo ID	VRS House Number	VRS Street Name	VRS City	VRS Zip	VRS Precinct	GEO Precinct (NEW)	G-SVRS Map Link
33	741486	3		#3 GREENBRIER AVENUE	HURRICANE	25526	43-1	33	Link
33	736541	3	301	ADA DELL COURT	HURRICANE	25526	43-1	33	Link
33	100757647	15	302	ADA DELL COURT	HURRICANE	25526	43-2	33	Link
33	100187086	3	303	ADA DELL COURT	HURRICANE	25526	43-1	33	Link
33	739249	3	303	ADA DELL COURT	HURRICANE	25526	43-1	33	Link
33	100805746	15	304	ADA DELL COURT	HURRICANE	25526	43-2	33	Link
33	100587102	3	27	AUGUSTA LANE	HURRICANE	25526	43-1	33	Link

Example extract from Putnam County's Precinct Mismatch Report

County **Voter List** Report

Text CSV file that lists all SVRS records and Address Matching (geocoding) status of each record: site match, street match, unmatched, and site matched outside county border. Identifies six mismatch types (precinct, magisterial, state house, state senate, congressional, and outside county) for site geocoded SVRS points. Links records to Geo-Enabled SVRS (www.mapwv.gov/svrs) map view. Download County Voter List File

SVRS Data Fields

GEOgraphic Data Fields

Voter List Data Fields (SVRS Fields)

DATA FIELD (SVRS)	SAMPLE SVRS RECORD 1	SAMPLE SVRS RECORD 2
USER_ID_VOTER	100421159	100741380
USER_County_Name	PUTNAM	PUTNAM
USER_Address	116 18 MILE CREEK RD	35 ALLEN ST
USER_HOUSE_Number	116	35
USER_STREET	18 MILE CREEK RD	ALLEN ST
USER_STREET2	N/A	N/A
USER_UNIT	N/A	N/A
USER_CITY	BUFFALO	BUFFALO
USER_STATE	WV	WV
USER_ZIP	25033	25033
USER_MAIL_HouseNum	116	35
USER_MAIL_Street	18 MILE CREEK RD	ALLEN ST
USER_MAIL_Street2	N/A	N/A
USER_MAIL_Unit	N/A	N/A
USER_MAIL_City	BUFFALO	BUFFALO
USER_MAIL_State	WV	WV
USER_MAIL_ZIP	25033	25033
USER_Precinct_Number	1	1
USER_Congressional	1	1
USER_Senatorial	8	8
USER_Delegate	13	13
USER_Magisterial	I	I
USER_ComboID	5	5
USER_POLL_NAME	BUFFALO HIGH SCHOOL	BUFFALO HIGH SCHOOL
USER_POLL_St_Num	19005	19005
USER_POLL_Street	CHARLESTON ROAD	CHARLESTON ROAD
USER_POLL_Street2	N/A	N/A
USER_POLL_City	BUFFALO	BUFFALO
USER_POLL_State	WV	WV
USER_POLL_ZIP	25033	25033

Columns A to AH are SVRS data fields

Data records sorted by
- GEO Precinct (Column AM)
- House Number (Column H)
- Street Name (Column I)

[Download County Voter List File](#)

Voter List Data Fields (GEO Fields)

DATA FIELD (SVRS)	SAMPLE GEO RECORD 1	SAMPLE GEO RECORD 2
Address_Match_Type	WV Site Match	WV Street Match
Geo_CensusBlock	Block 2015	Block 2028
Geo_Municipality	Buffalo	Buffalo
Geo_County	Putnam	Putnam
Geo_Precinct	1	1
Geo_Magisterial	I	I
Geo_House	19	19
Geo_Senate	8	8
Geo_Congressional	1	1
MM_Precinct	N	X
MM_Magisterial	N	X
MM_House	Y	X
MM_Senate	N	X
MM_Congressional	N	X
MM_County	N	X
Total_Flags	1	0
SLDBP	Yes	Yes
VR	G-SVRS map link	G-SVRS map link
PV	Property Viewer	Property Viewer
FT	Flood Tool	Flood Tool
POINT_X	-81.96915167	-81.98440036
POINT_Y	38.62528299	38.61527717

Columns AI to BD are GEO data fields

Data records sorted by
- GEO Precinct (Column AM)
- House Number (Column H)
- Street Name (Column I)

Download County Voter List File

Voter List Metadata (GEO Fields)

Geocoded Address Match Type	
Address_Match_Type	Whether the SVRS address point was a site match, street match or unmatched in the geocoding process. Two geocoder locators are used: WV SAMS and Esri.
GIS Administrative Boundaries	
GEO_Census_Block	Census Block 2020
GEO_Municipality	Unincorporated Community (Census)
GEO_County	County Boundary (1:24,000 scale)
GIS Election GEOgraphies	**2022 Redistricting**
GEO_Precinct	New Precinct District after 2022 Redistricting
GEO_Megisterial	New Magisterial District after 2022 Redistricting
GEO_House	New House District after 2022 Redistricting
GEO_Senate	New Senate District after 2022 Redistricting
GEO_Congressional	New Congressional District after 2022 Redistricting
Mismatch Flags	Mismatch between SVRS and GIS Election District
Mismatch_Precinct	"Y" if USER_Precinct_Number does not equal GEO_Precinct; "N" if equal; "X" if not applicable (all street matches and unmatched)
Mismatch_Magisterial	"Y" if USER_Magisterial does not equal GEO_Magisterial; "N" if equal; "X" if not applicable (all street matches and unmatched)
Mismatch_House	"Y" if USER_Delegate does not equal GEO_House; "N" if equal; "X" if not applicable (all street matches and unmatched)
Mismatch_Senate	"Y" if USER_Senatorial does not equal GEO_Senate; "N" if equal; "X" if not applicable (all street matches and unmatched)
Mismatch_Congressional	"Y" if USER_Congressional does not equal GEO_Congressional; "N" if equal; "X" if not applicable (all street matches and unmatched)
Mismatch_County	"Y" if USER_County_Name does not equal the geographic county the point is located; "N" if equal; "X" if not applicable (all street matches and unmatched)
Boundary Flags	
Total_Flags	# of Mismatch Flags (Precinct, Magisterial, State House, State Senate, Congressional, Outside County)
SLDBP	A State Legislative District Borders Precinct (SLDBP).
Web Map Links	
VR	Web map link to SVRS Geo-Enabled Tool (www.mapwv.gov/svrs)

Download Full Metadata

County **E-911 Address** Reports

Two reports that provides street range and site address information of voting precincts for redistricting. Some counties found these reports helpful for assigning street segments to precincts. Excel spreadsheet format. Download Select Counties

County	PRECINCT	Address Number	Street Name	Full Address	Place	Zip
Putnam	1	6	6TH AVE	6 6TH AVE	Buffalo	25033
Putnam	1	66	6TH AVE	66 6TH AVE	Buffalo	25033
Putnam	1	124	6TH AVE	124 6TH AVE	Buffalo	25033
Putnam	1	68	7TH AVE	68 7TH AVE	Buffalo	25033
Putnam	1	106	7TH AVE	106 7TH AVE	Buffalo	25033
Putnam	1	118				25033
Putnam	1	39	8TH AVE	39 8TH AVE	Buffalo	25033
Putnam	1	55	8TH AVE	55 8TH AVE	Buffalo	25033
Putnam	1	64	8TH AVE	64 8TH AVE	Buffalo	25033
Putnam	1	41	9TH AVE	41 9TH AVE	Buffalo	25033
Putnam	1	46	9TH AVE	46 9TH AVE	Buffalo	25033
Putnam	1	62	9TH AVE	62 9TH AVE	Buffalo	25033
Putnam	1	63	9TH AVE	63 9TH AVE	Buffalo	25033
Putnam	1	72	9TH AVE	72 9TH AVE	Buffalo	25033

Address Precinct Report

Data records sorted by:
- GEO Precinct
- House Number
- Street Name

27,012 Putnam County address points from statewide master address file

The **Address Precinct** report is a list of all 911 addresses within a specific county precinct. This list does not reflect the voters of that precinct, only addresses.

County **E-911** Address Reports

The report summarizes all 911 addresses based upon the street name, giving a high and low address range per **Precinct Road Summary** precinct. This list provides the majority of street and address ranges per precinct, but there are known issues with roads that have discontinuous areas, or roads that traverse multiple precincts (Roads Highlighted in Orange). It is highly recommended that counties consult a map to determine proper ranges for these roads. Download Address Reports for select counties.

Precinct Road Summary Report

County	PRECINCT	MIN Address	MAX Address	Street Name	County Road ID	Place	Address Count	Multi Precinct
Putnam	1	6	124	6TH AVE	Putnam - 6TH AVE	Buffalo	3	1
Putnam	1	68	118	7TH AVE	Putnam - 7TH AVE	Buffalo	3	1
Putnam	1	39	64	8TH AVE	Putnam - 8TH AVE	Buffalo	3	1
Putnam	1	41	103	9TH AVE	Putnam - 9TH AVE	Buffalo	6	2
Putnam	1	12	73	ALLEN ST	Putnam - ALLEN ST	Buffalo	7	1
Putnam	1	35				Buffalo	4	1
Putnam	1	56				Buffalo	3	1
Putnam	1	18	188	BARBERSHOP LN	Putnam - BARBERSHOP LN	Buffalo	10	1
Putnam	1	36	62	BIRCH LN	Putnam - BIRCH LN	Buffalo	6	1
Putnam	1	106	20924	BUFFALO RD	Putnam - BUFFALO RD	Buffalo	113	2
Putnam	1	17	154	CARDINAL CT	Putnam - CARDINAL CT	Buffalo	22	1

Data records sorted by
- GEO Precinct
- House Number
- Street Name

2,285 Putnam County road summary records from statewide master address file

Field Definitions
- **Multi-Precinct field:** Number of precincts the road appears in county
- **Address Count field:** Number of addresses within that precinct on that road

Geo-Enabled SVRS

Map Viewers

WV Voter Map 2022 (Public)

Find Voter Info function
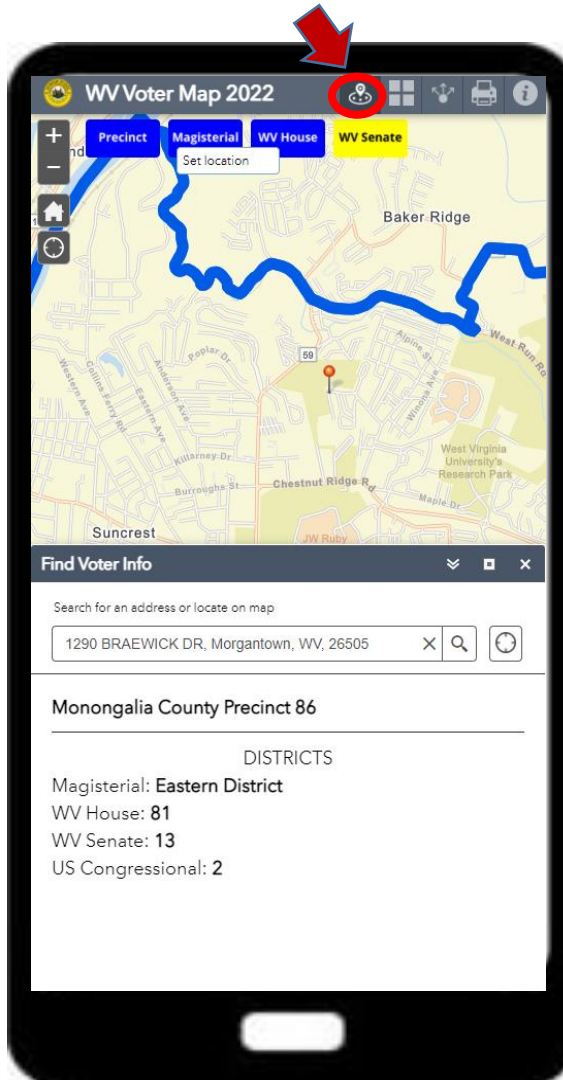
A public web map application powered by GIS mapping technology to look up election districts and precincts by address

Statewide Extent URL: www.mapwv.gov/vote
County Extent URL Example: www.mapwv.gov/vote/county/Marion

Instructions: Enter your street address in the *Find Voter Info* widget to locate your residence. If the address location found by the search tool is incorrect, then use the navigation buttons and base map layers to identify the exact location.

Voter Info: The Voter Info panel lists the Voting Precinct, Magisterial District, WV House District, WV Senate District, and U.S. Congressional District.

Alternatively, if the *Voter Info* widget is closed, a *Popup Window* will display same voter information by clicking on the map fame.

Map Tools: Find Voter Info, Basemap Gallery, Share Web Link, Print, Info, and Navigation. Refer to the Help for more instructions about the different map functions

WV Voter Map 2022 (Public)
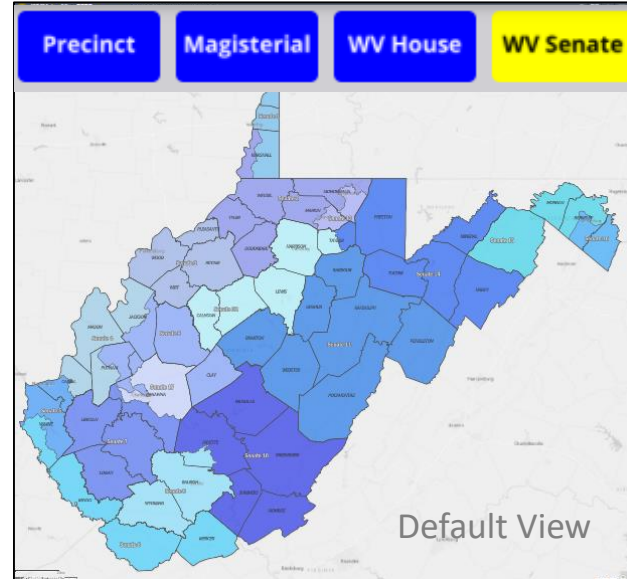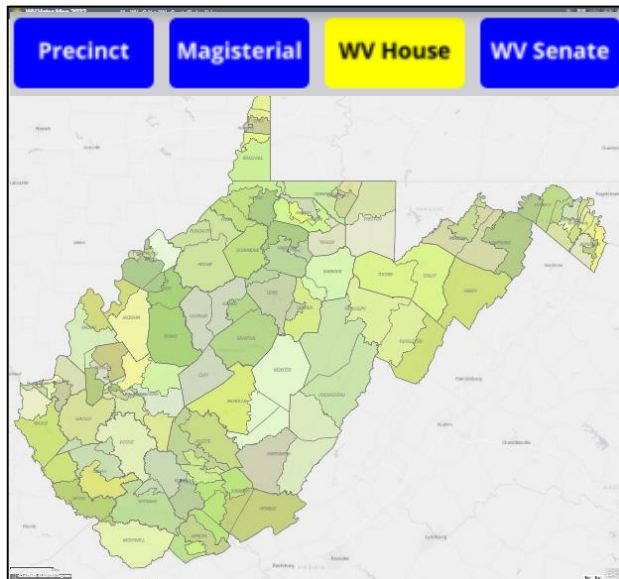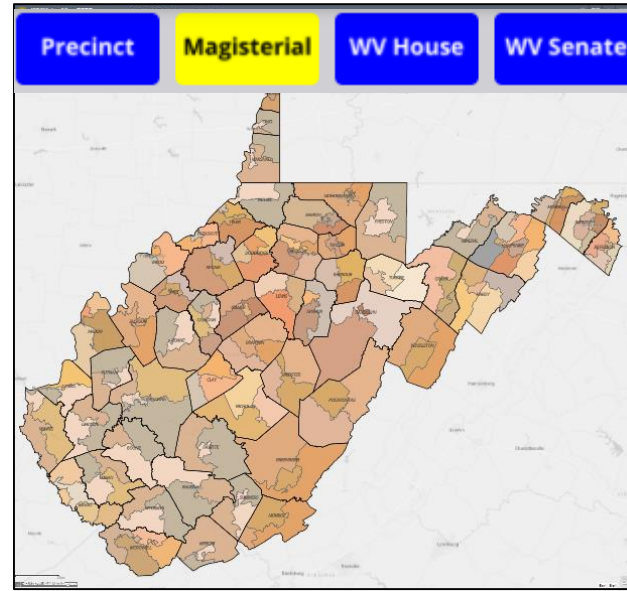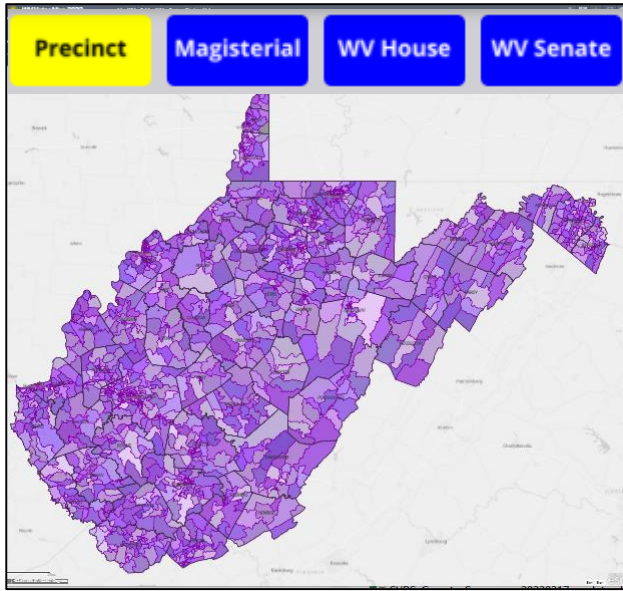
Election Layer
On / Off
Buttons

Make **election layer** of interest visible by selecting **on/off buttons** (yellow-on; blue-off). Only one election layer can be visible at a time. State Senate districts are visible by default.

- Voter Precinct
- Magisterial District
- State House District
- State Senate District

Default View

Geo-Enabled SVRS Tool (Non-Public)

A non-public web map application to visualize and validate SVRS points and election boundaries

Statewide Extent URL: www.mapwv.gov/svrs
County Extent URL Example: https://Mapwv.gov/svrs/county/Marion

Geo-Enabled SVRS Tool

A non-public web map application to visualize and validate SVRS points and election boundaries

Statewide Extent URL: www.mapwv.gov/svrs
County Extent URL Example: https://mapwv.gov/svrs/county/Putnam

Popup Window Attributes

SVRS Voter Point Precinct Mismatch

Legend

Geo-Enabled SVRS Tool

*County Clerks should verify if SVRS Points Geocoded **Outside County Boundary** are Valid*

SVRS Voter Points OUTSIDE County Boundary

District Popup

Incorporated Place Boundary

Voter Info Popup

Layer List (turn layers on /off)

GIS Layers (G-SVRS Tool)

GIS Layers. The G-SVRS Tool makes available contextual GIS layers (E-911 addresses, tax parcels, jurisdictional boundaries, and census blocks) to verify that SVRS Voter Points are properly located and attributed. Background layers include street and aerial imagery base maps.

- **GEO Elections Layers**. Displays precincts, magisterial, state house, state senate, and congressional layers. Precinct layer visible on default view.

- **SVRS Point Layer**. Displays SVRS address geocoded points symbolized by spatial data precinct audit: Precinct SVRS-GIS Match (Green Dot), Precinct SVRS-GIS Mismatch (Red Dot), Match (Green Dots), or SVRS Outside County (Black Square with White Letter O). A grey circle with a question mark indicates an SVRS street match (not site match or to building footprint) and thus not accurate enough to determine a precinct mismatch type. An unmatched geocoded address (e.g., PO Box, rural address) is not shown.

- **E-911 Address Layers**. Displays E-911 addresses and street ranges.

- **Parcel Layer**: Displays parcel lines and owner information in Voting Widget when layer visible.

- **GEO Boundaries**: Boundaries for counties, incorporated places, and census blocks

- **Background Layers**: Various Street or Aerial Imagery base layers

Geo-Validation (G-SVRS Tool)

A GIS tool to the SVRS for assisting the County Clerks and the Secretary of State's Office in their redistricting efforts. Another objective is to assist those counties with limited access to GIS technologies as well as producing online mapping resources.

Geo-Validate **Voter Points** and **Geographic Boundaries**

- <u>Validate Voter Points and Attributes</u>
  - o **Voter Precincts**: Review spatial data audit of precincts to ensure voters are assigned to the correct precinct.
  - o **Reference Layers**: Use geospatial layers E-911 Addresses, Tax Parcels, and Aerial Imagery reference layers to validate Voter Point information.
  - o **Site Address Geocode**: Update street and unmatched address errors (e.g., P.O. Boxes, Rural Addresses, incomplete addresses) to site address points such that every Voter Point is located within the correct building footprint. If necessary, coordinate with the local E-911 Office about the authoritative address for residents.

- <u>Validate Geographic Boundaries (Election, Administrative, Statistical)</u>
  - o **Election Boundaries:** Review and ensure precinct and magisterial district boundaries on the map are correct and current.
  - o **Administrative Incorporated Place Boundary**: Ensure incorporated place boundaries are correct and coincide with municipal precincts. Submit incorporated place boundary changed through Census BAS program. Refer to WV BAS Updates for past decade.
  - o **Statistical Census Block Boundaries:** Use to identify and submit census block boundary suggestions to Census as part of the 2030 Census Redistricting Data Program.

Geo-Enabled SVRS Tool

*Use Tool to Geo-Validate SVRS **Voter Points** are in correct Precinct*

Voting Info Widget or Popup

Find Voter Info Widget: Open the widget function and click the point of interest on the map. Select the Data Content Group of interest: Election Districts (on by default), Incorporated Place (activated if point in municipality), and SVRS Voter Point, E-911 Address, and Parcel data (Voter, Address, and Parcel content groups are activated if layers are turned on or visible).

Popup Attribute Window: Alternatively, click on the map frame and cycle through the Popup Info Attributes for Election District, Voter, Address, and Parcel layers.

Voting Info Data Content Groups:

- **GEO Election Districts.** If no Toggle Button Layers (Voter, E-911 Address, and Parcel) are turned on, then the election districts (precincts, magisterial, state house, state senate, congressional) are listed for the map location.

- **SVRS Voter Point.** If the Voter Layer is visible, then the SVRS voter point withing 100 feet of the map point are selected. SVRS Voter ID, Voter Name, and Voter Address attributes are displayed.

- **Tax Parcel.** If the Parcel Layer is visible, then the tax parcel owner and link to the WV Property Viewer are displayed.

- **E-911 Address.** If the Address Layer is visible, then site and street address matches are displayed. Search buffer is narrower the more zoomed in.

- **Incorporated Place** (Voter Info Widget Only). Name of municipality displays if location within an incorporated area.

Voter Point Info (G-SVRS Tool)

Popup Window Function
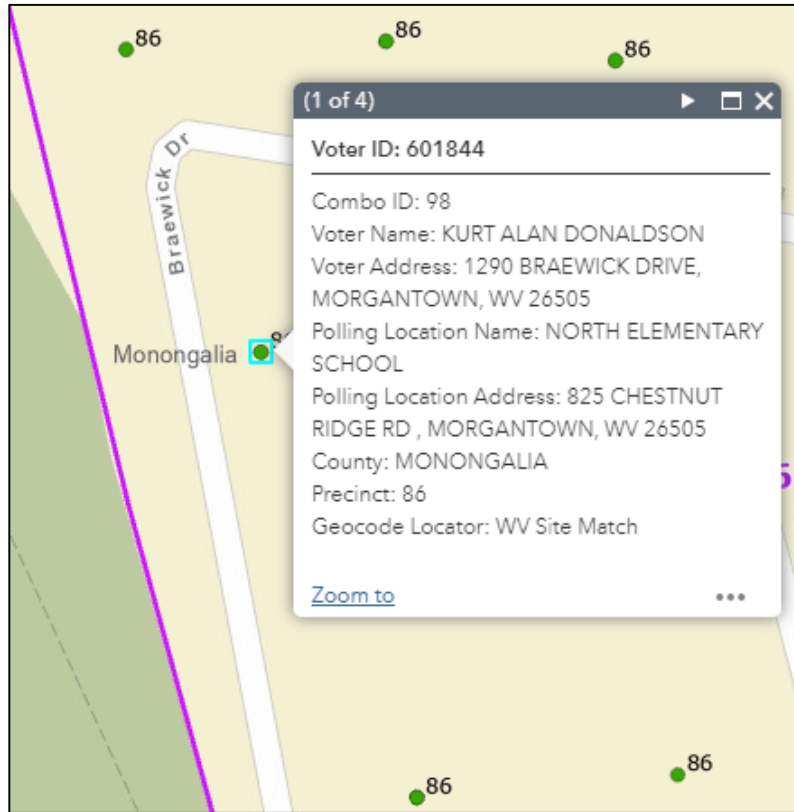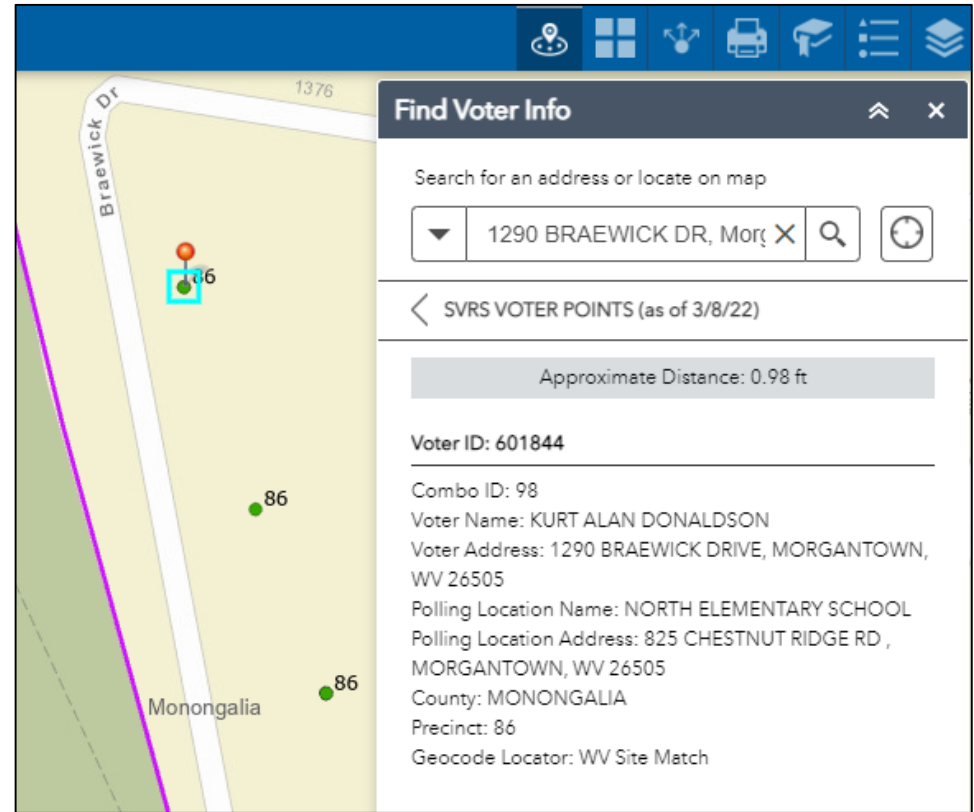
Voter Info Widget

View **Voter Point** information two ways: Popup Window Function or Find Voter Info Widget

E-911 Address (G-SVRS Tool)

Popup Window Function
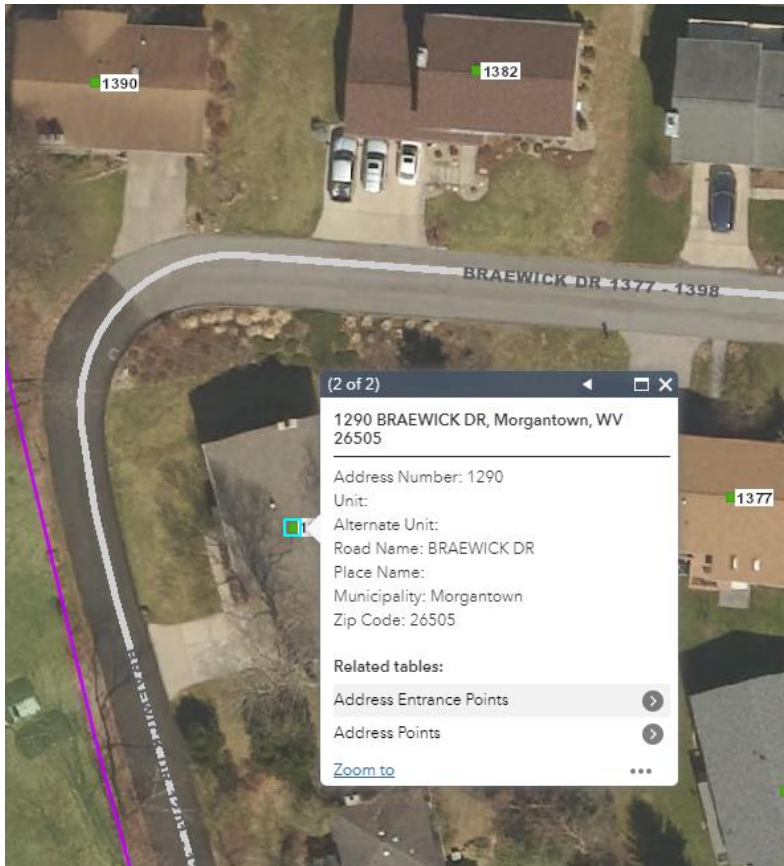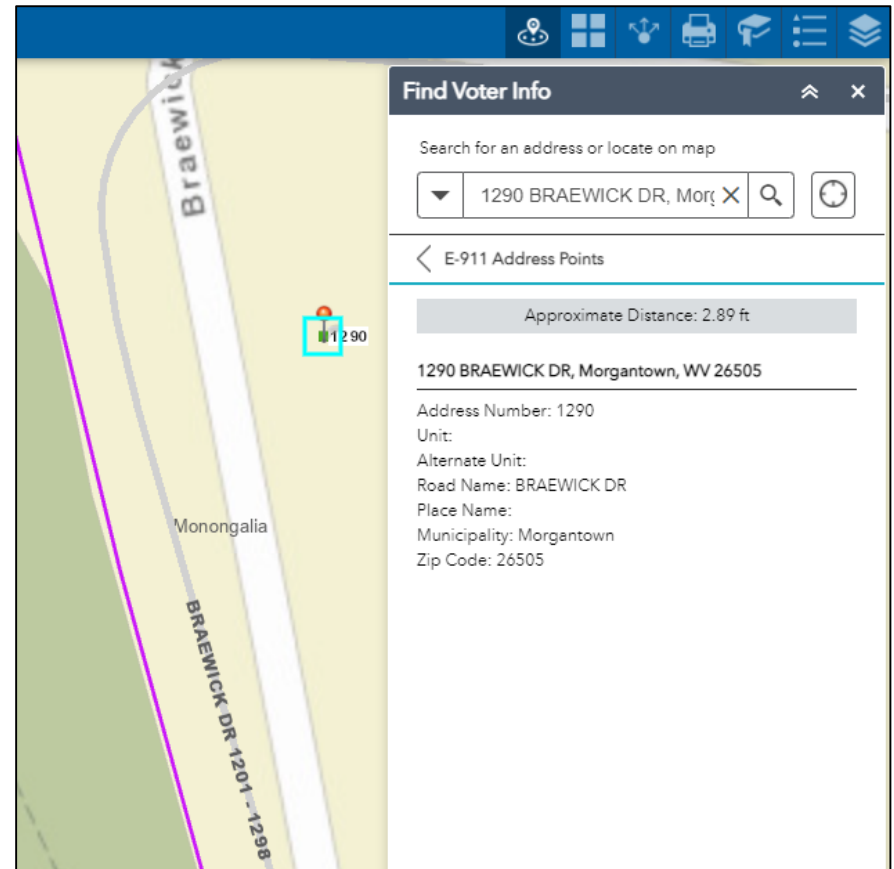
Voter Info Widget

View **E-911 Address** information two ways: Popup Window Function or Find Voter Info Widget

Tax Parcel (G-SVRS Tool)

Voter   Address   Parcel

Popup Window Function   Voter Info Widget

Link to WV Property Viewer or Assessment Record for more parcel information to include **Owner** and **Physical Addresses**
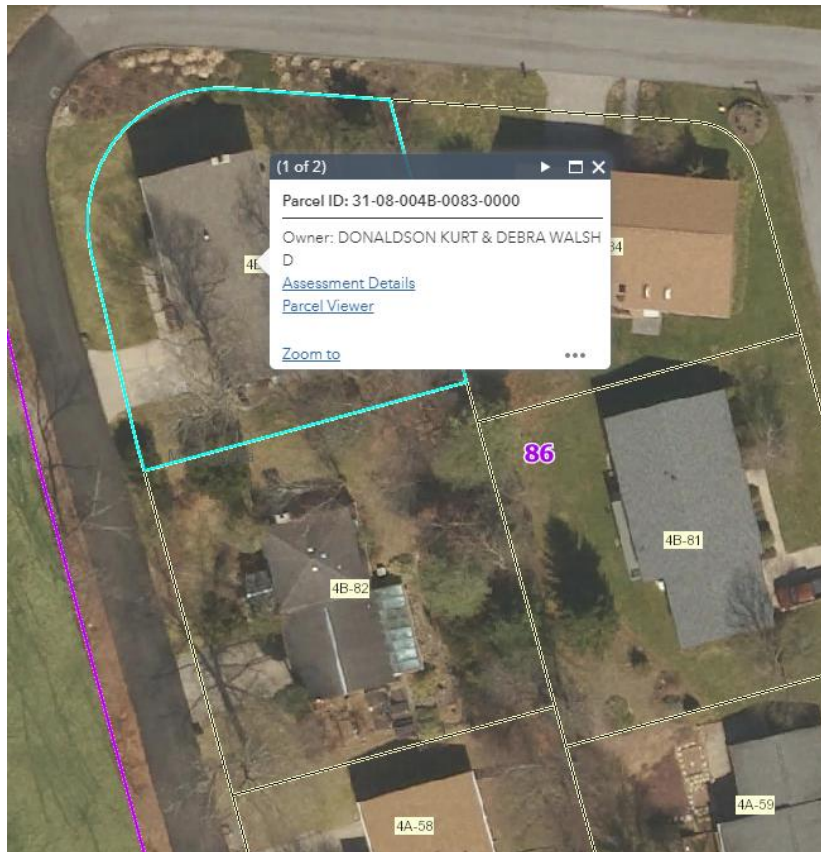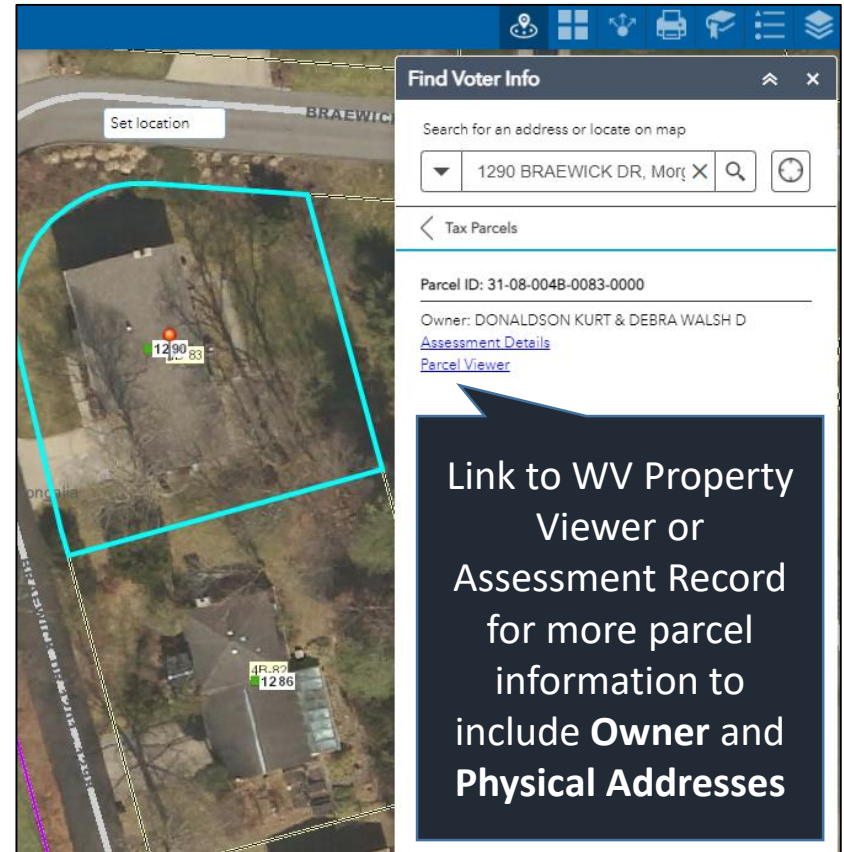
View **Tax Parcel** information two ways: Popup Window Function or Find Voter Info Widget

Map Tips (G-SVRS Tool)

*Visualize and Geo-Validate **Voter Points** and **Geographic Boundaries***

- **Improve Layer Display Performance.** Toggle off data layers when navigating (zoom in, zoom out, pan) to area of interest to quicken display rendering of map layers.

- **Display Attribute Information.** The **Popup Window** and **Find Voter Info** functions display attribute information only if the Voter, Address, and Parcel layers are visible.

- **Shared Map Link:** Use the **Shared Link** function to share map location of interest to others. Shared links can be done by the G-SVRS Tool function or programmatically. Example shared links for 1290 Braewick Drive, Morgantown, WV:
    - URL with Long./Lat. Coordinates, Marker, Zoom Level 17:
      https://www.mapwv.gov/svrs/?marker=-79.957363;39.663569;&level=17

    - URL with Address Coordinates:
      https://www.mapwv.gov/svrs/?find=1290%20Braewick%20Drive,%20Morgantown,%20WV

- **Background Layers**: Select various street and imagery basemap from the **Background Gallery** function.

- **Apply Transparency to Incorporated Place Layer**: Set the transparency level of the group Geo Boundaries layer in the **Layer List** function to make the polygon shade Incorporated Areas less opaque.

- **Clear Web Cache**: Reset or clear the web cache if online layers are not displaying properly

Jurisdictional Boundaries (G-SVRS Tool)

Precinct Mismatch Errors will result if *County* ***or*** *Incorporated Place* ***boundaries are incorrect***

The Lincoln-Logan county boundary changed by the 2020 BAS was not correct for the 3/22/2022 spatial audit, resulting in mismatch and outside county precinct errors for voter points in Lincoln County Precinct 11. The GIS boundary has been updated in the G-SVRS Tool, so the precinct mismatch errors should be corrected when the next spatial audit is performed.
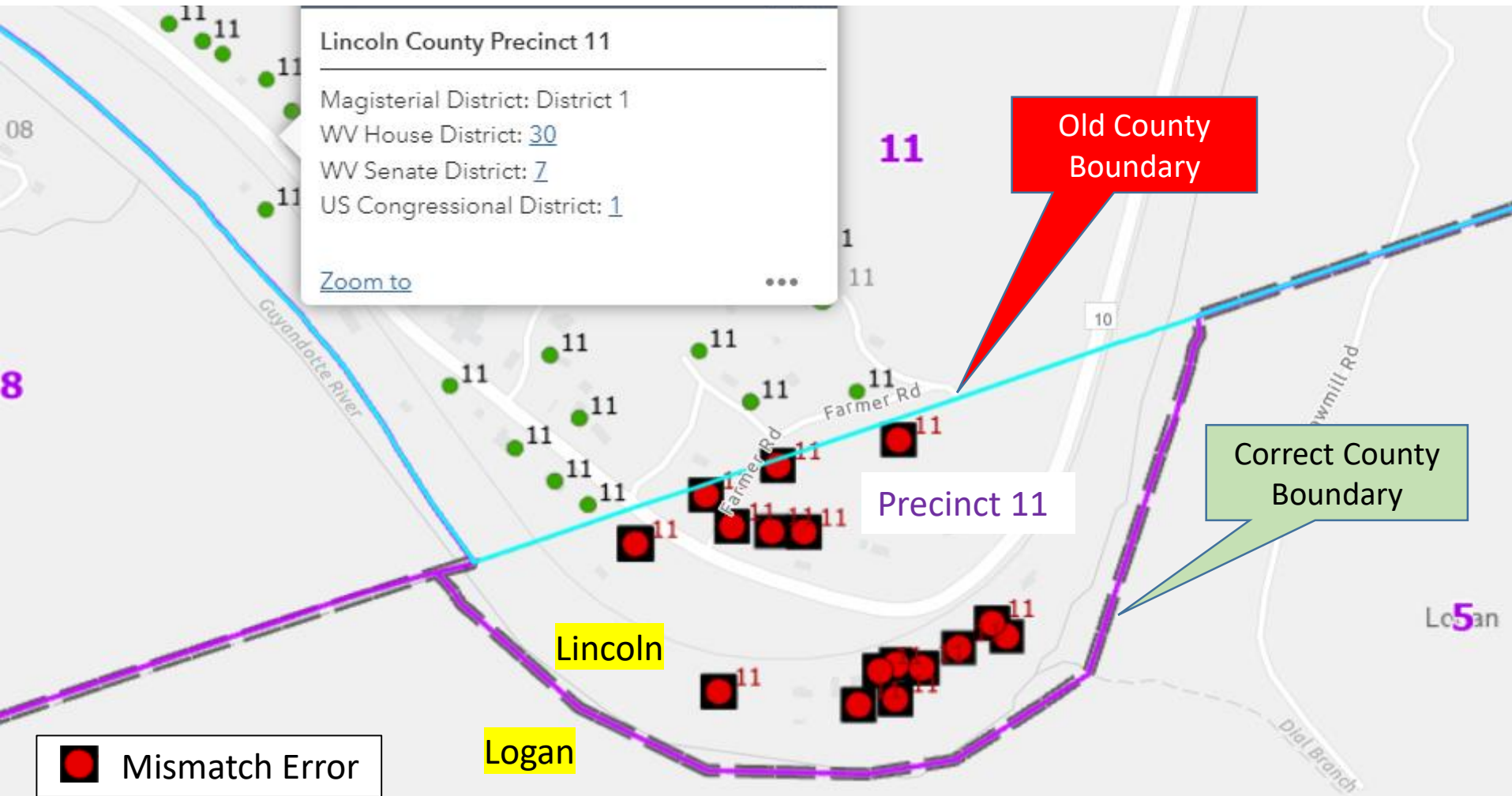
Future Directions

G-SVRS Tool Functions
- **Authentication Log-on.** Investigate login feature to authenticate access to G-SVRS Tool.
- **Modify Voter Point Location**. If an authorized user believes that the given geopoint of the address is incorrect, the user can drag the geopoint to the correct location on a map, and therefore assign a new geopoint for a given address. District assignment information is corrected in the SVRS.
- **Modify Flagged Voter Records**. Flagged geocoded site points in error (e.g., voter point at county border) can be denoted with an exception status to override the geocoding status.

G-SVRS Tool GIS Layers
- **Census Boundary Layer.** Add U.S. Census County Boundary layer to compare with county boundary from 1:24,000 scale USGS topographic maps**.**
- **Polling Station.** Add polling stations from SVRS to Layer List and map.
- **Apartment Units.** Improve address features to more easily distinguish multiple units located in apartment buildings

GoVoteWV Online Voter Tools
- **Online Voter Tools.** Explore integrating GIS technologies with GoVoteWV online voter tools on the Secretary of State's website

Address Geocoding
- Improve accuracy of Geocode Locators
- Provide address mismatch lists to County Clerks and E-911 Offices

Geocoding (Address Matching)

Geocoding. Geocoding, or address matching, is the computational process by which a physical address is converted into geographic coordinates, which can be used for a variety of mapping applications. The most highly accurate and precise geocode you can return is at the address point that is within the building footprint. Created by the WV GIS Technical Center, a composite locator of public and commercial address layers geocodes voter points.

Source Esri
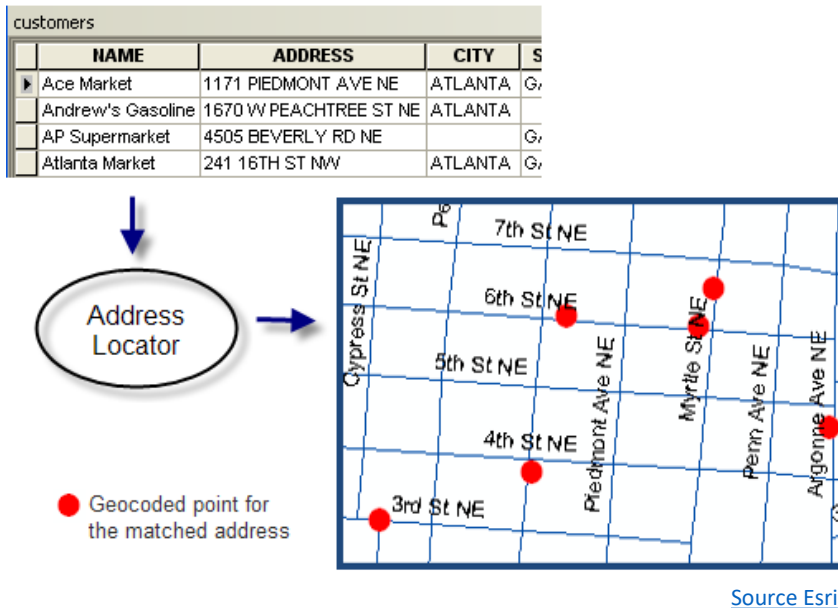
Address Match Types and Reports. Voter addresses are matched or unmatched based on geocode scores above the minimum match score. Geocoded results are classified by the *Locator Type* (WV Master Address file, Esri) and *Locator Role* (site point address, street address range, parcel, etc.)

- *Site Match:* Match to S**ite** address point. The location match ideally is within building footprint.
  - *Site Match Outside County:* Voter records *site*-matched outside the county.
- *Street Match:* Match to the **street** address range but not pinpointed to the building location. A GIS file of street address matches can be provided for counties to improve the address matching of these voter records.
- *Unmatched Records:* Voter records could not be geocoded or geospatially pinpointed

Geocoding Definitions

Geocode Match Report Example

WV Geocoding Process

Geocode Process Sequence
1) Clean and standardize address formats
2) Geocode all addresses with WV Locator address points using 90% confidence level
3) Geocode unmatched addresses with Esri Locator address points using 75% confidence level
4) Geocode unmatched addresses with WV Locator address street ranges using 90% confidence level
5) Geocode unmatched addresses with Esri Locator address street ranges using 75% confidence level

Site Match

(WV or Esri Locators)

→

Street Match

(WV or Esri Locators)

→

No Match

False Positives

A False Positive is an address geocoded to the wrong location
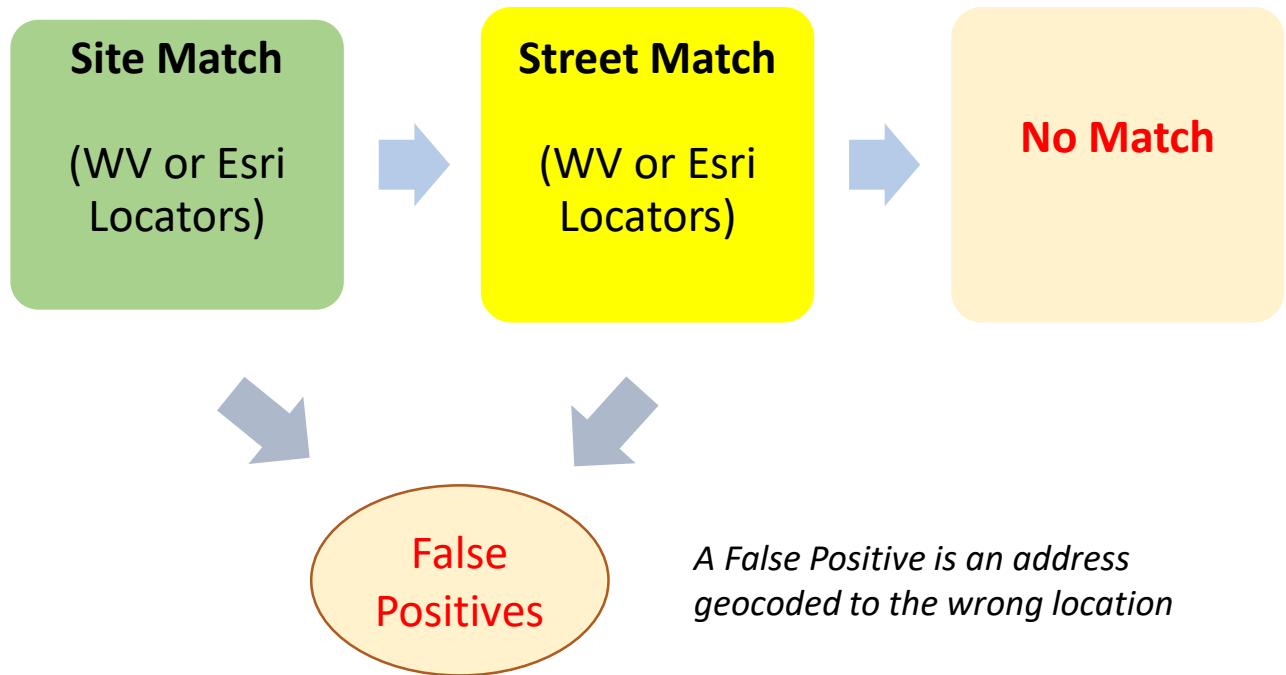
Geocoding Locators

The composite locator combines geocoding results from both the **West Virginia** (public) and **Esri** (commercial) address lists

Composite Locator

Esri Locator, 10%
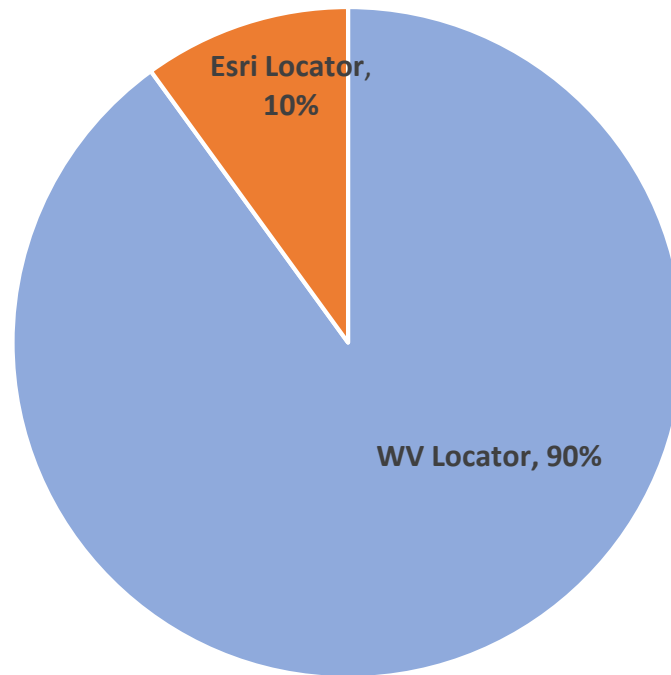
WV Locator, 90%

- 90% of address matches are from the WV Locator

- 10% matches from the Esri Locator

Override False Positives

Site geocodes that are "false positives" or geocoded to the wrong precinct can be overridden by providing a user-defined file with the voter information below

First check with…
- SVRS: Clean and standardized address input into SVRS
- E-911 Office: Current and accurate E-911 addresses have been uploaded by your County E-911 Office to Statewide Addressing File
- WVGISTC: Not an issue that can be resolved by geocoder

Voter ID	Geo Precinct	SVRS Precinct	Address	Latitude of correct location	Longitude of correct location	Note
38444	1	4	84 Bells Drive, Nitro, WV, WV	**38.288530**	**-81.68883**	Bad Geocode
322	1	4	105 Sandstone Dr, Eleanor, WV	**38.238530**	**-81.68996**	Bad Geocode
8739	1	6	200 Midland Trail, Hurricane, WV	**38.354444**	**-81.72233**	Outside County point is valid

Update G-SVRS Tool by…
- Highlight site match exceptions on Precinct Mismatch Tabular Report
- Add correct X,Y coordinates with Display Coordinate function to end of Precinct Mismatch Report
- Use Edit SVRS Widget (in development) to mark exceptions and update X,Y coordinate

Geocode Exceptions

Use the **Display Coordinate** function to copy decimal degree Latitude and Longitude coordinates to Exception List

Use **Display Coordinate** Tool to Copy Coordinates

Exceptions

Site geocodes that are "false positives" or precinct mismatch errors can be overridden by providing a user-defined file with the voter information below

Voter ID	Geo Precinct	SVRS Precinct	Address	Longitude	Latitude	Note
38444	1	4	84 Bells Drive, Nitro, WV, WV	-81.68883	38.288530	Bad Geocode
322	1	4	105 Sandstone Dr, Eleanor, WV	-81.68996	38.238530	Bad Geocode
8739	1	6	200 Midland Trail, Hurricane, WV	-81.72233	38.354444	Outside County point is valid

A geocode returns a false positive if the address is geocoded to the wrong location

Geo-Enabled SVRS

Election and Reference GIS Layers that support G-SVRS Tool

GIS Layers for SVRS
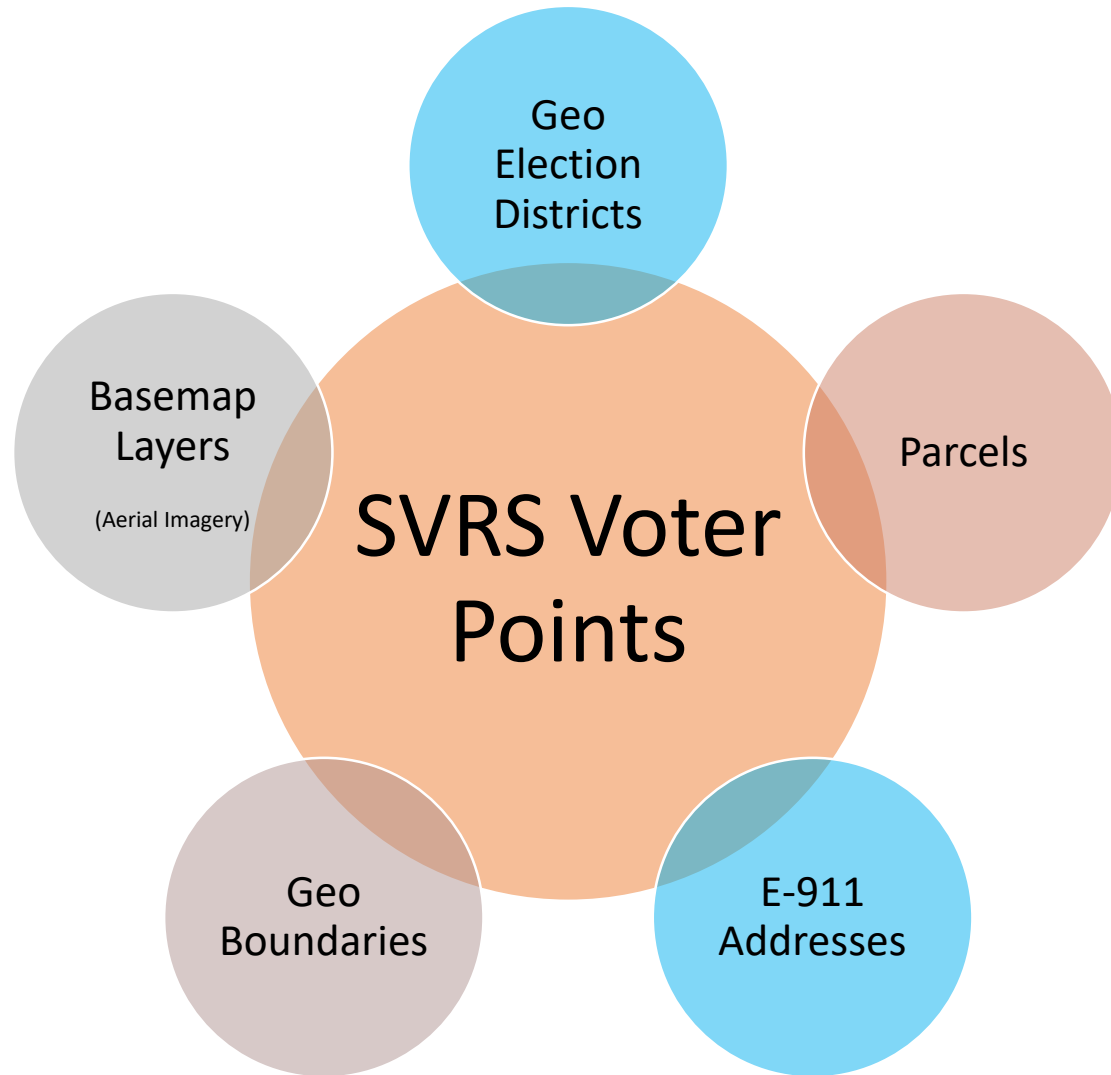
Election Districts and **Addresses** are the most important GIS layers for *geo-enabling* elections

GIS Layers for G-SVRS Tool

DATA LAYER	SVRS	GEO LAYER	G-SVRS VOTER INFO WIDGET	GIS DATA SOURCE(S)	SVRS-GEO Mismatch Flag
				GIS	
VOTER POINTS	VOTER POINTS			VOTER POINTS	
Voter ID	SVRS-Voter ID	Geo-VoterPoint*	Voter Point	Statewide Voter Registration System (SVRS)	
Address	SVRS-Address	Geo-VoterPoint	Voter Point, E-911, Parcel	SVRS, E-911 Address (WVEMD), Parcels (WVPTD)	
Name	SVRS-Name	Geo-VoterPoint	Voter Point, Parcel	SVRS, Parcels	
ELECTION DISTRICTS	ELECTION DISTRICTS			ELECTION DISTRICTS	
Precinct	SVRS-Precinct	Geo-Precinct**	Election Districts	County Clerks / WVSOS	Yes
Magisterial	SVRS-Magisterial	Geo-Magisterial	Election Districts	County Clerks / WVSOS	Yes
State House	SVRS-WVHouse	Geo-WVHouse	Election Districts	State Legislature / WVSOS	Yes
State Senate	SVRS-Senate	Geo-WVSenate	Election Districts	State Legislature / WVSOS	Yes
Congressional	SVRS-Congressional	Geo-Congressional	Election Districts	State Legislature / WVSOS	Yes
BOUNDARIES	BOUNDARIES			BOUNDARIES	
Census Block		Geo_CensusBlock		Census 2020 (Statistical Boundary)	
Incorporated Place		Geo-Place	Incorporated Areas	Municipality-Census BAS (Legal / Administrative)	
County	SVRS-County	Geo-County		1:24K Scale Topo (Legal / Administrative)	Yes
BASEMAP GALLERY	BASEMAP GALLERY			BASEMAP GALLERY	
Street Background		Street		Esri Commercial Services	
Aerial Imagery		Aerial Imagery		Commercial, WVGISTC, Counties	

Site Voter Addresses can be validated with *statewide* **E-911 Address** and **Tax Parcel** GIS Layers
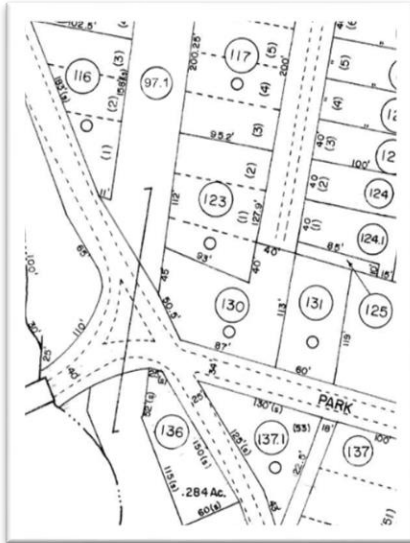
GIS Layers

Data Development and Integration

- **Local-Level Data Development**

- **State-Level Integration**

GIS Data Development

Parcels

Site Addresses

Aerial Imagery

Election Districts

Tax Parcel layers provide owner name and address
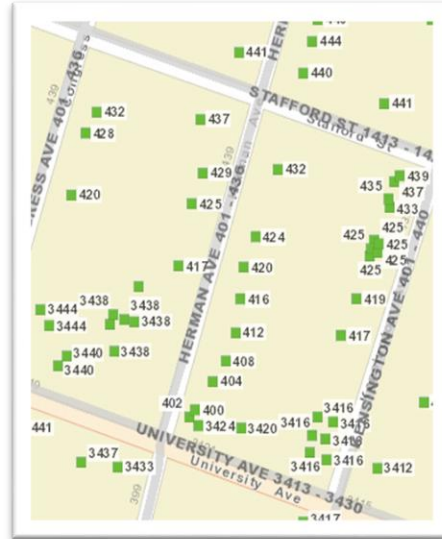
Authoritative Source of E-911 addresses and street names
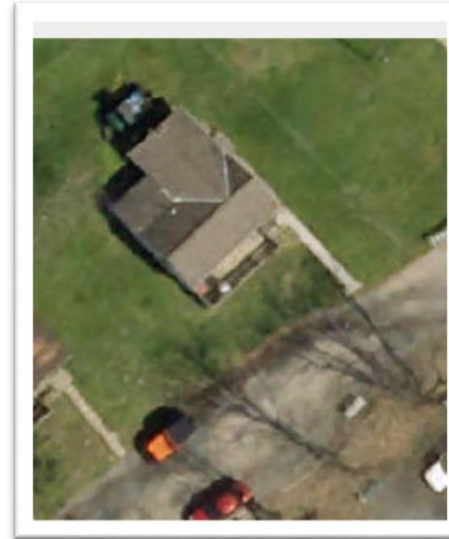
County Leaf-off imagery should be no older than 5 years
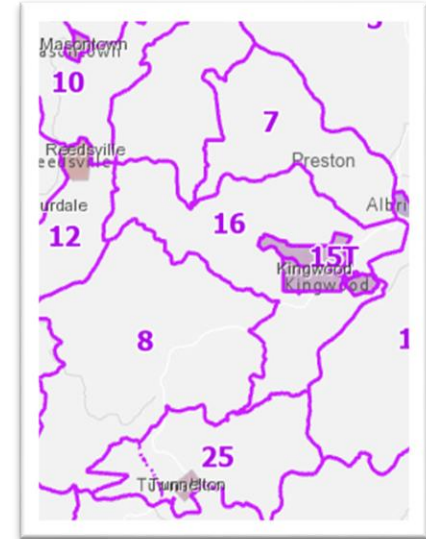
County subdivision Precinct and Magisterial Districts

Improving State's Spatial Data Infrastructure

GIS Data Development Projects

Recent grant-funded GIS Data Development Projects via statewide contracts for for Addresses/Parcels and Leaf-off Aerial Imagery. Seed funding and state contracts are necessary to help disadvantaged counties.

State-Level Integration

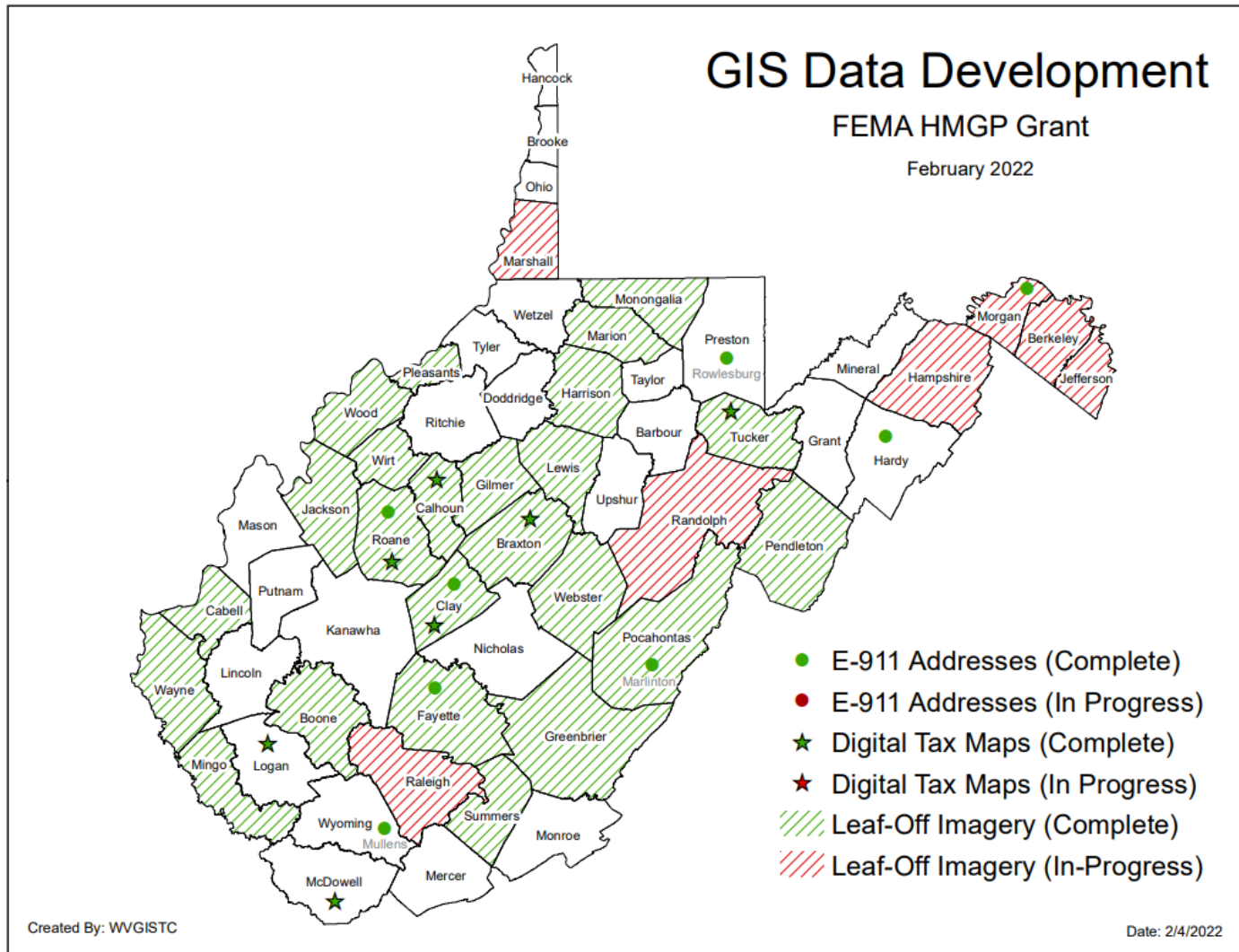| *Parcels*	*Addresses*	*Imagery*	*Voter Information*
SOURCE: County Assessors	SOURCE: Local Addressing Offices	SOURCE: County Offices	SOURCE: County Clerk
↓	↓	↓	↓
Property Tax Division	WV Emergency Management Division	WV GIS Technical Center	WV Secretary of State's Office
↓	↓	↓	↓
Statewide Master Parcel File / IAS	Statewide Addressing & Mapping System	Statewide Leaf-Off Imagery Service	Statewide Voter Registration System (SVRS) Geo-Enabled

State-level integration allows for statewide mapping products and services

WVU GIS Technical Center creates web map services of these key mapping layers

WV Addressing Stakeholders

LOCAL GOVERNMENT

- County Clerks
- E-911 Address Directors
- County Assessors
- GIS Specialists and Mappers

STATE GOVERNMENT

- WV Secretary of State's Office
- WV Emergency Management Division
- WV Division of Motor Vehicles
- WV Office of GIS Coordination
- WV GIS Technical Center
- WV Property Tax Division
- WV DHHR

Addressing standards/workflows are important for business/government services including
Election Management Systems

WV ASSOCIATIONS

- WV Association of County Clerks
- WV E-911 Council
- WV Association of Geospatial Professionals
- WV Broadband Enhancement Council
- WV Association of Counties
- WV Association of Assessors

NATIONAL ORGANIZATIONS

- U.S. Census
- U.S. DOT
- U.S. Postal Service
- NSGIC
- NENA

PRIVATE SECTOR

- GIS Professional Companies
- Address Vendors
- CAD Vendors
- Utilities

Geo-Enabled SVRS

Other Notes

Total Voter Registration Records

Total County Voter Registration Records

Statewide Voter Registration System

March 2022

Voter Registration Records

Total Voter Registration Records

	3K - 10K
	11K - 17K
	18K - 34K
	35K - 79K
	80K - 117K

WVGISTC 2022-03-10

Data Source: WV Secretary of State's SVRS Data Extract 08 March 2022

2021 Redistricting Vendors

WV County 2021 Redistricting Vendors

GIS Vendors for 2021 County Redistricting

County Vendor
- Atlas Geographic
- County (in-house)
- Doug McKenzie
- Michael Baker Intl
- Landmark
- Semaphore Hill
- WVGISTC

WVGISTC 2022-03-16

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