

# Tax Maps – Current & Future Directions

- **Statewide Tax Map Practices and Directions**
  - Tax Map Products and Examples
  - GIS Tax Map Benefits
  - Statewide Parcel File
  - Tax Map Survey
  - Future Directions
- **County Digital Tax Map Programs**
  - Hi-level presentations - history, benefits, workflows, applications
- **New Tax Map Guidelines**
  - Procedural Rules
  - SB 588 Legislation

# Digital Tax Map Products

## ***Parcel Related Features***

- Geo-Referenced Tax Map
- **PARCEL BOUNDARY** (*Shapefiles*)
- Parcel ID Label
- Interior Lot Lines and IDs
- Land Hooks and Buildings
- Parcel Dimension/Acre Annotation

## ***Reference Datasets***

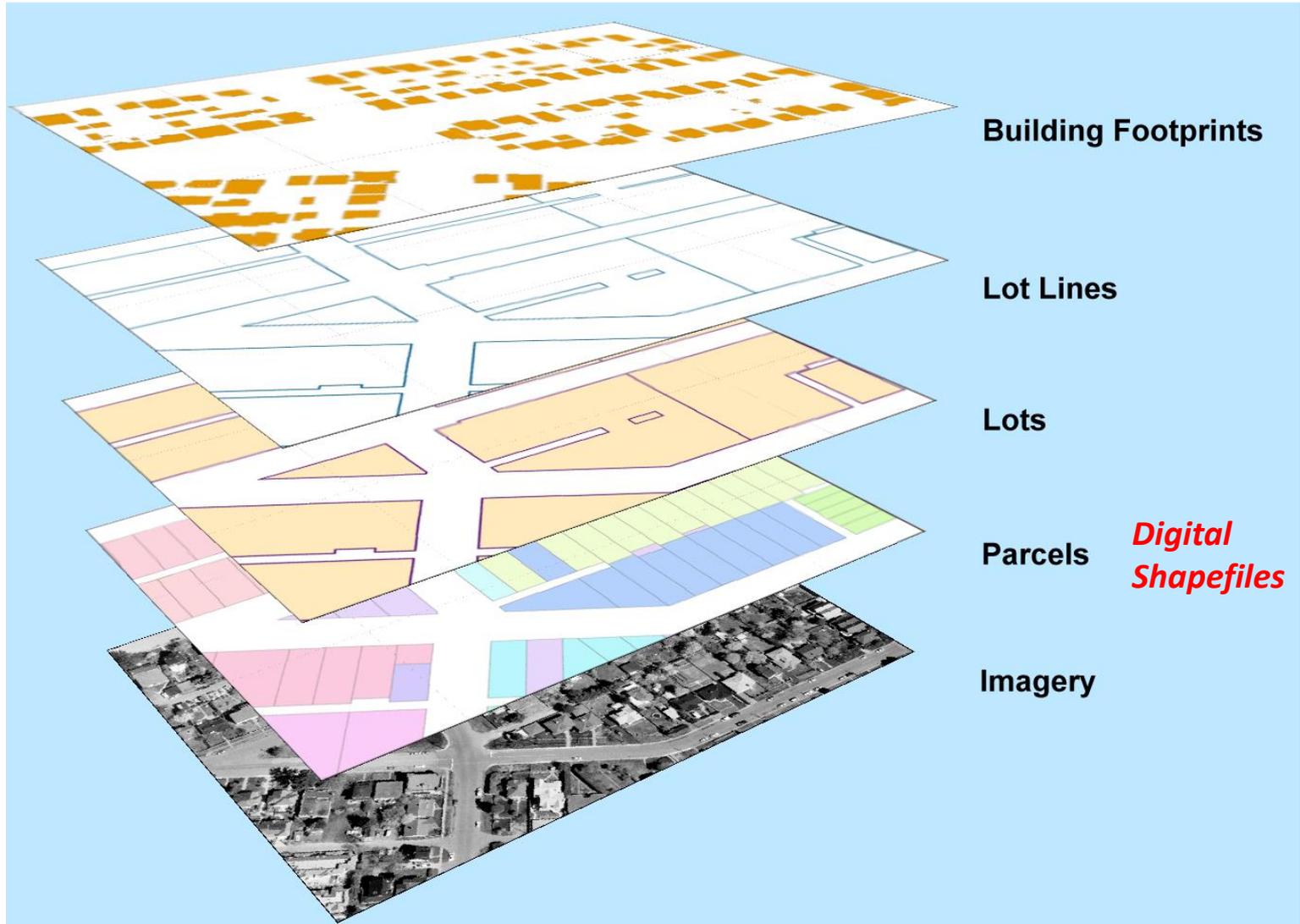
- Road and Water Layers
- Aerial Photography



- **FULL or FINISHED DIGITAL TAX MAP**  
(*Web Map or Static TIFF/PDF*)

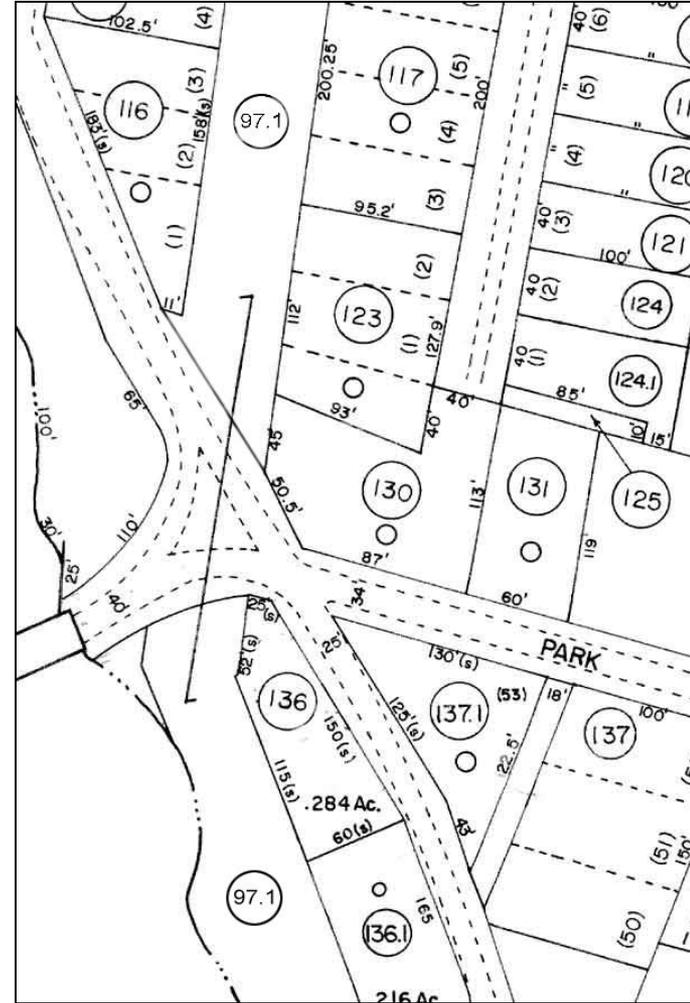


# Parcel Boundary – Key Cadastral Layer



# Finished Tax Map Standard 189-3

- Show the property and lot lines, set forth dimensions and/or areas, and other cadastral and cultural features that assessors are required by state law to maintain and publish for the public.
- Created by either *manual* or *automated* methods in accordance with 189-3 standards approved by the Property Valuation Training and Procedures Commission
  - Cartographic Design / Layout Specifications
  - Map Content
  - Maintenance Procedures / Map Currency
  - Submission Requirements / County Monitoring



# Finished Tax Map Standard 189-3

## 189-3 Statewide Procedures for the Maintenance and Publishing of Surface Tax Maps

**§189-3-5. Finished Tax Maps.** Finished surface tax maps show the property and lot lines, set forth dimensions and/or areas, and other cadastral and cultural features that assessors are required by state law to maintain and publish for the public. These scaled tax maps are created by either manual or automated methods in accordance with the cartographic design, map content and layout specifications mandated by the Property Valuation Training and Procedures Commission.

### **§189-3-6. Map Content.**

6.1. Basic Information. -- Finished tax maps shall display the following:

6.1.a. Parcel identifiers.

6.1.b. Parcel boundaries. *Parcel Boundary Shapefiles subset of Digital Tax Maps*

6.1.c. Parcel dimensions or acreage.

6.1.d. Lot boundaries, lot numbers and subdivision block identifiers.

6.1.e. Municipal and tax district boundaries.

6.1.f. Location and names of streets, highways, alleys, railroads, rivers, lakes, etc.

6.1.g. Contextual information including the map number, date map was prepared, scale, legend, north arrow, disclaimer, and key to adjoining maps.

# Finished Tax Map – Waterfront Hotel



*Static Individual Finished Tax Map (Paper or Print-Ready PDF/TIFF Digital Format)*

# Web Tax Map – Waterfront Hotel

The screenshot displays the 'Monongalia Parcel Viewer' web application. The main map area shows an aerial view of a waterfront hotel complex with various parcels outlined in cyan and numbered (e.g., 14.1, 14.2, 14.3, 14.4, 15.1, 15.2, 15.3, 15.4, 16.1, 16.3, 16.4). A popup window for parcel 9-37A-3.1 provides the following details:

Parcel: 9-37A-3.1  
Details: [View IAS](#)  
Parid: 09 37A000300010000  
Owner: MINSYR-OXBRIDGE LLC  
Owner2:  
Nghbrhd: 202C  
Legal1: REVISED LOT 3AR OR 2.0570 AC  
Book-Page: 1493-349  
Land Value: \$1193100  
Bldg Value: \$15374600  
[Zoom to](#)

The right-hand side of the interface features a legend and a search bar. The legend includes the following layers and features:

- Aerials 2015
- Aerials 2010
- Layers
  - Anno
  - Anno Acres
  - Anno PID
  - PID Leaders
  - AddressPoints
  - Misc Lines
    - COUNTY-LINE
    - EASEMENT
    - LEADER
    - LOT-LINE
    - PARCEL-HOOK
    - RR CENTERLINE
    - STATE-LINE
  - Hydro
  - Parcel Number Label
  - Parcels
  - Contour10ft
  - MajorRoads
    - INTERSTATE
    - STATE HWY
    - US HWY
  - Roads
  - TaxDistricts
  - TransmissionLines
  - FloodZones
  - MajorWater
  - StateForest
  - SurroundingCounties

30 counties have online county parcel viewers which link to IAS records

# Digital Parcel Application (Waterfront Hotel)

**WV Flood Tool**  
Remember: When In Doubt, It's Not Out!

Views: Public | Expert | Risk MAP | Flood | Reference | Basemaps

Search: Address 3 Waterfront, Morgantown, WV

Tools: [Icons for search, zoom, pan, etc.]

**Metadata Panel:**

Click on each tab to view information		
Address	Parcel	Risk
<b>DESCRIPTION</b>		
IAS Parcel ID	09 37A000300010000	
GIS Parcel ID	31-09-037A-0003-0001	
County ID	31 - Monongalia	
District Name	09 - Morgantown-1st Ward Corp	
Map	37A	
Parcel Number	3	
Parcel Suffix	1	
Legal Description	REVISED LOT 3AR OR 2.0570 AC; (EXCLUDING FLOORS 12-17 & UNDERGROUND GARAGE)	
Acreage (deed)	2.057	
Tax Year	2015	
Tax Class	4	
Deed Book	1493	
Deed Page	349	

**Map Information Panel:**

- Flood Hazard Area: Location is NOT WITHIN any identified flood hazard area. Unmapped flood hazard areas may present.
- Flood Zone: N/A
- Stream: N/A
- Watershed (HUC8): Upper Monongahela (5020003)
- FEMA Issued Flood Map: 54061C0227E
- Map Effective Date: 1/20/2010
- Contacts: Monongalia
- CRS Information: N/A
- Location (long, lat): (79.964326 W, 39.623640 N)
- Location (UTM 17N): (588889, 4386498)
- Elevation: About 823 ft
- Address: 3 WATERFRONT PL, MORGANTOWN, WV
- Parcel ID: 31-09-037A-0003-0001
- Flood Risk Information: Flood Risk Assessment: N/A, 3D Flood Visualization: N/A

Scale: 1:1,128  
x: -79.962800, y: 39.623721

@WVGIS/STC Leaf-Off Mixed-Resolution Imagery

Interactive Web Application - Is Waterfront Hotel location in a flood zone?

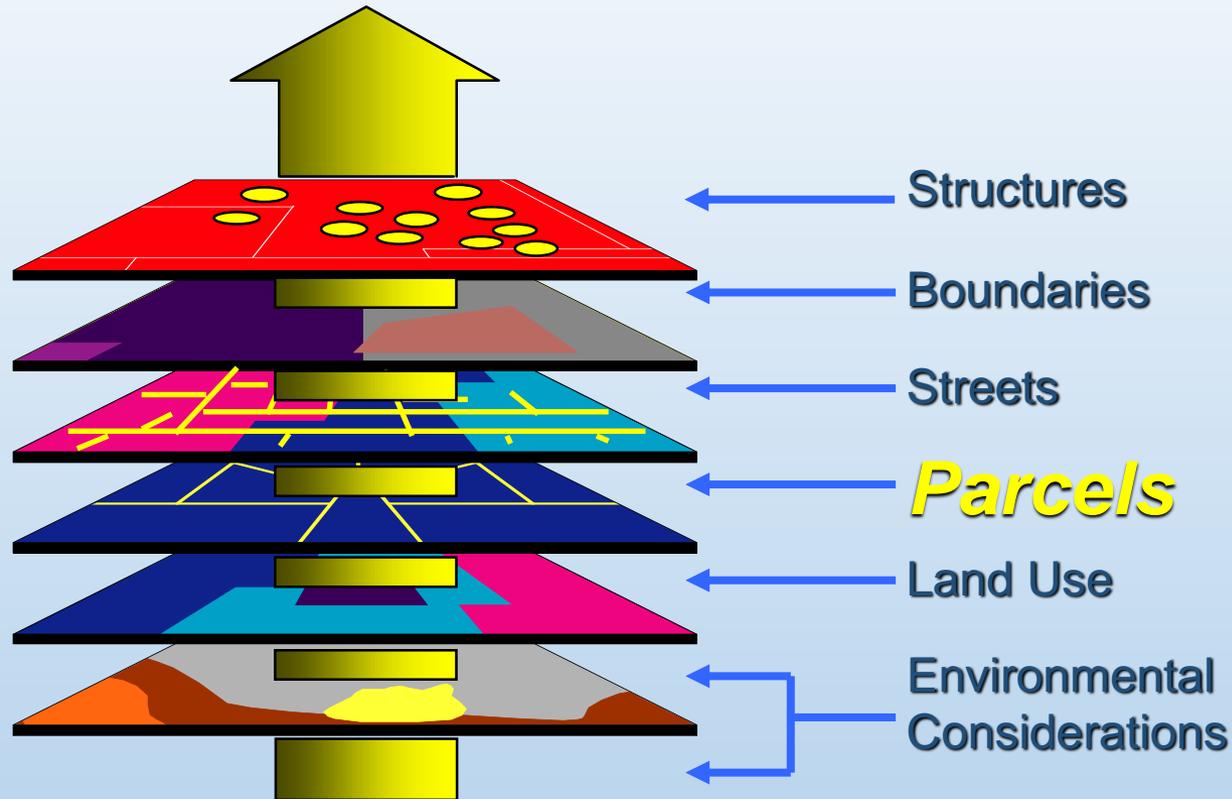
# Tax Map Products

	Individual Finished Tax Maps	Web Finished Tax Maps	Digital Parcel File (subset of Digital Tax Map)
Map Content	Parcel Boundary Parcel Identifier Parcel Dimensions Lot Boundaries Contextual Information	Parcel Boundary Parcel Identifier Parcel Dimensions (most viewers) Lot Boundaries (most viewers)	Parcel Boundary Parcel Identifier
Coverage	Statewide*	30 Counties with Web Viewers	95% State Coverage**
Current	Yes	Yes	Varies by County
Source	County Assessors	County Assessors	Assessors, E-911, MLMP
Map System	Digital/Manual (80%/20%)	Digital (GIS)	Digital (GIS)
Static or Dynamic	Static - viewed as paper map or fixed image	Dynamic - interactive web maps with online tools	Dynamic - interactive web maps with online tools
Linkable to IAS	No	Yes	Yes
Seamless	No	Yes	Yes
Aerial Photos	No	Yes	Yes
Formats	Paper or Digital (PDF, TIFF) Print-Ready images	Web Map Services	Shapefiles, Geodatabase, CAD Files, Web Map Services

\* All paper tax maps are scanned to a digital image-file format by the Tax Department for statewide coverage

\*\* Varying source years when created

# Geographic Information System (GIS)



- Data is organized by layers, coverages or themes (synonymous concepts), *with each theme representing a common feature.*
- Layers are integrated using explicit location on the earth's surface, *thus geographical location is the organizing principal.*

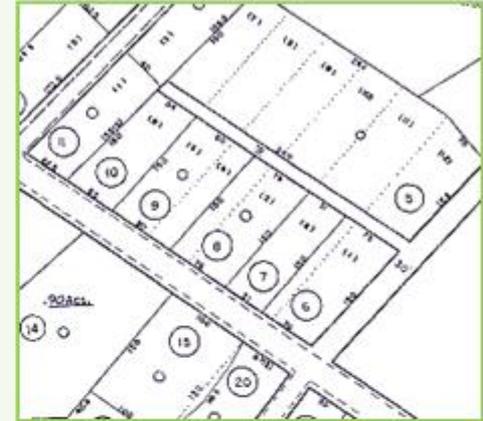
"The Real World"

# GIS Matters for Assessment...

*GIS technologies help county Assessors develop fair and equitable valuations*

## HERE ARE JUST A FEW EXAMPLES:

- ❖ *Improving quality of property valuations*
- ❖ *Knowing the location of the subject property in relation to factors such as flood zones or water frontage improves valuation*
- ❖ *Use of automated valuation systems help identify homogeneous areas so mass assessment techniques can be used*
- ❖ *Spotting disparities between selling prices and assessed values or missing assessments*
- ❖ *Properly locate properties with similar use codes, sizes, and location*
- ❖ *Square footage and acreage calculations can be performed on the fly*



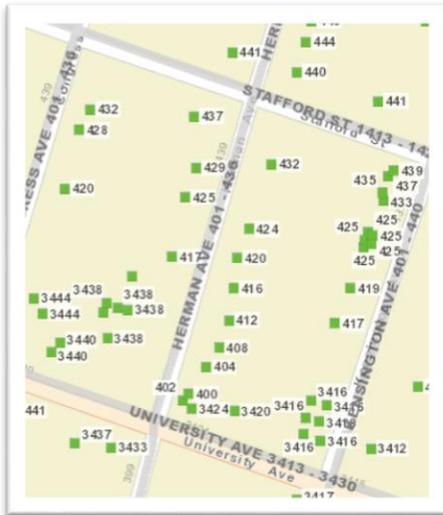
# Applications...

*Land records information needed for a variety of applications*

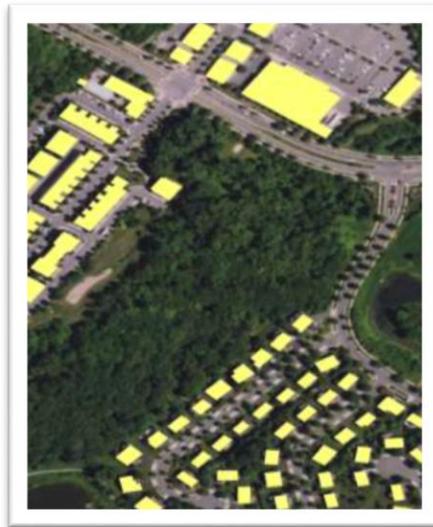
- Zoning
- Planning
- Public Utilities
- Police
- **Assessors**
- Risk Assessments
- Coal Valuations
- Permitting
- Boundaries
- Natural Resources
- Economic Development
- Energy Exploration
- Emergency Response
- Wildfire Notification

# Other Spatial Data Layers

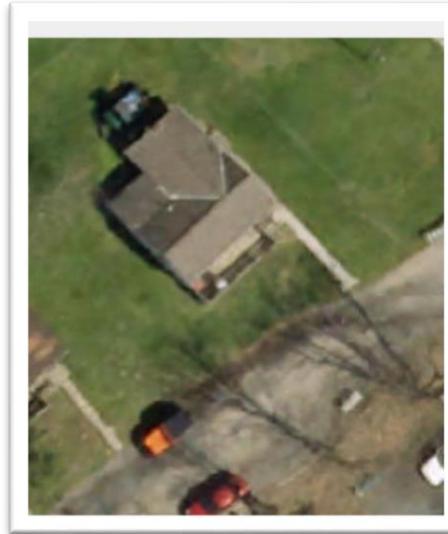
Site Addresses



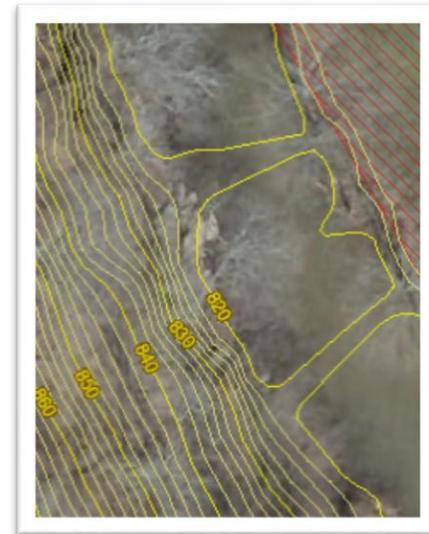
Building Footprints



Aerial Imagery



Elevation Contours

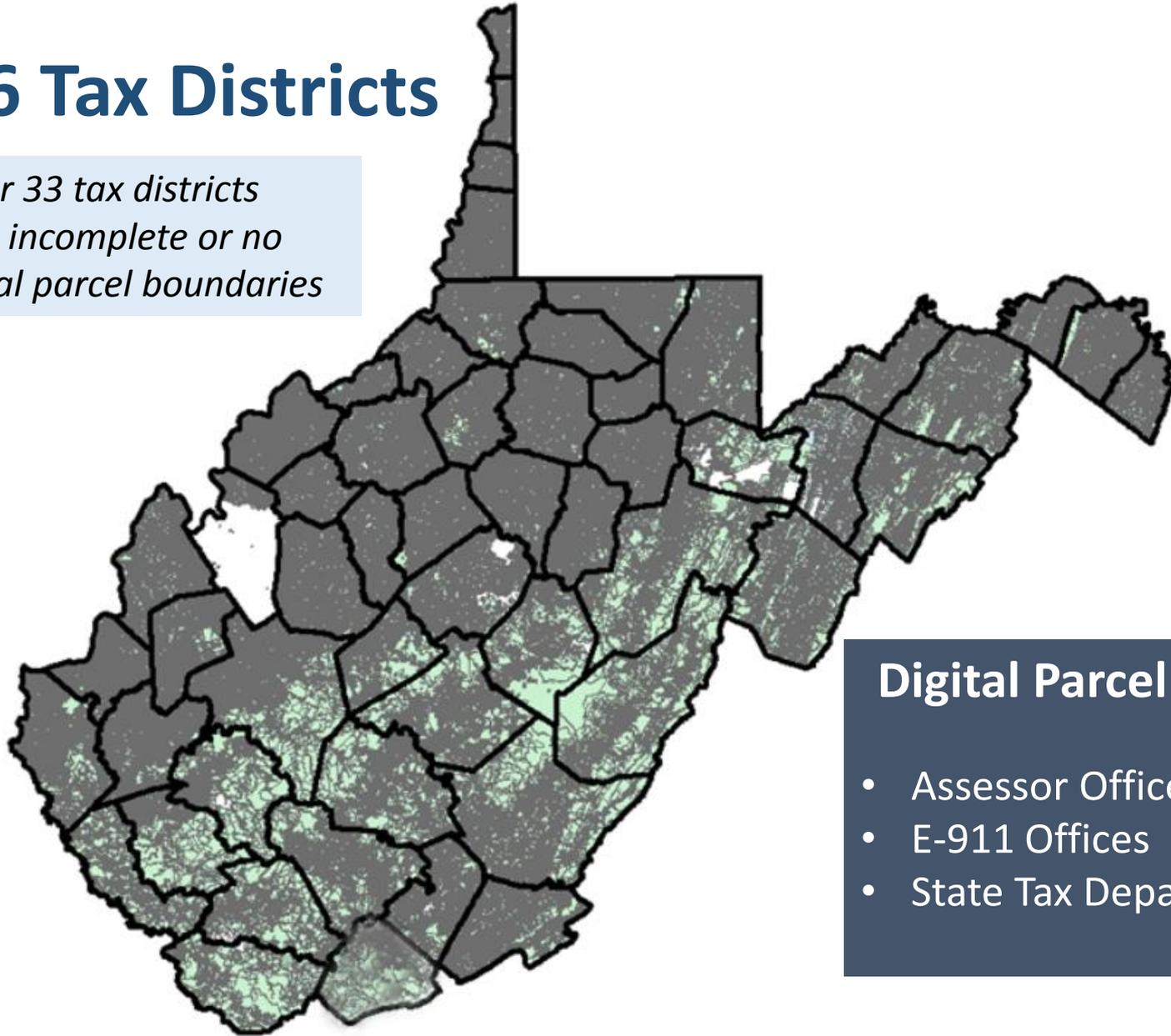


*\$\$ Access millions of dollars worth of spatial data \$\$*

# Statewide Digital Parcel File

## 606 Tax Districts

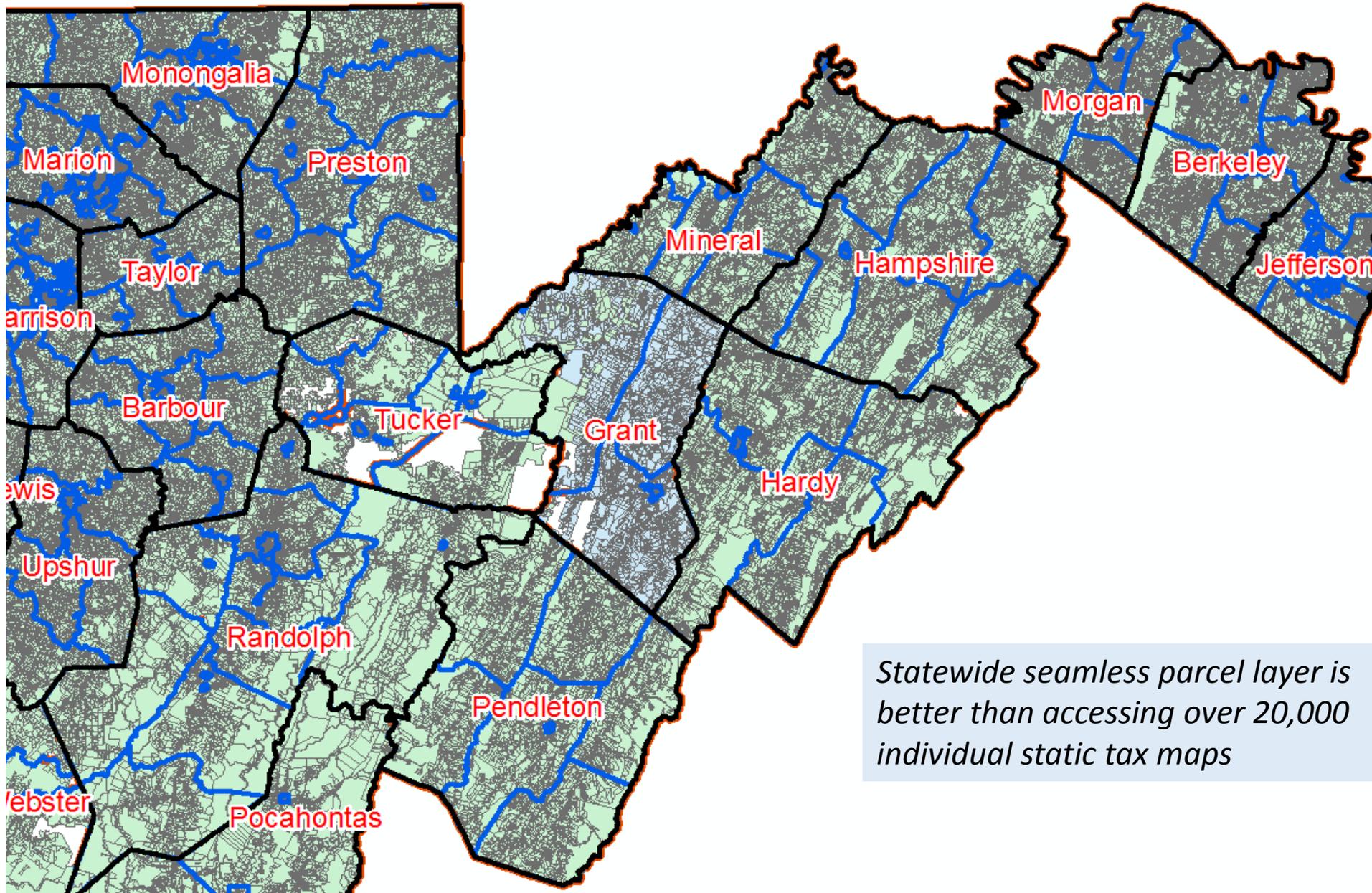
*5% or 33 tax districts  
have incomplete or no  
digital parcel boundaries*



### Digital Parcel Sources

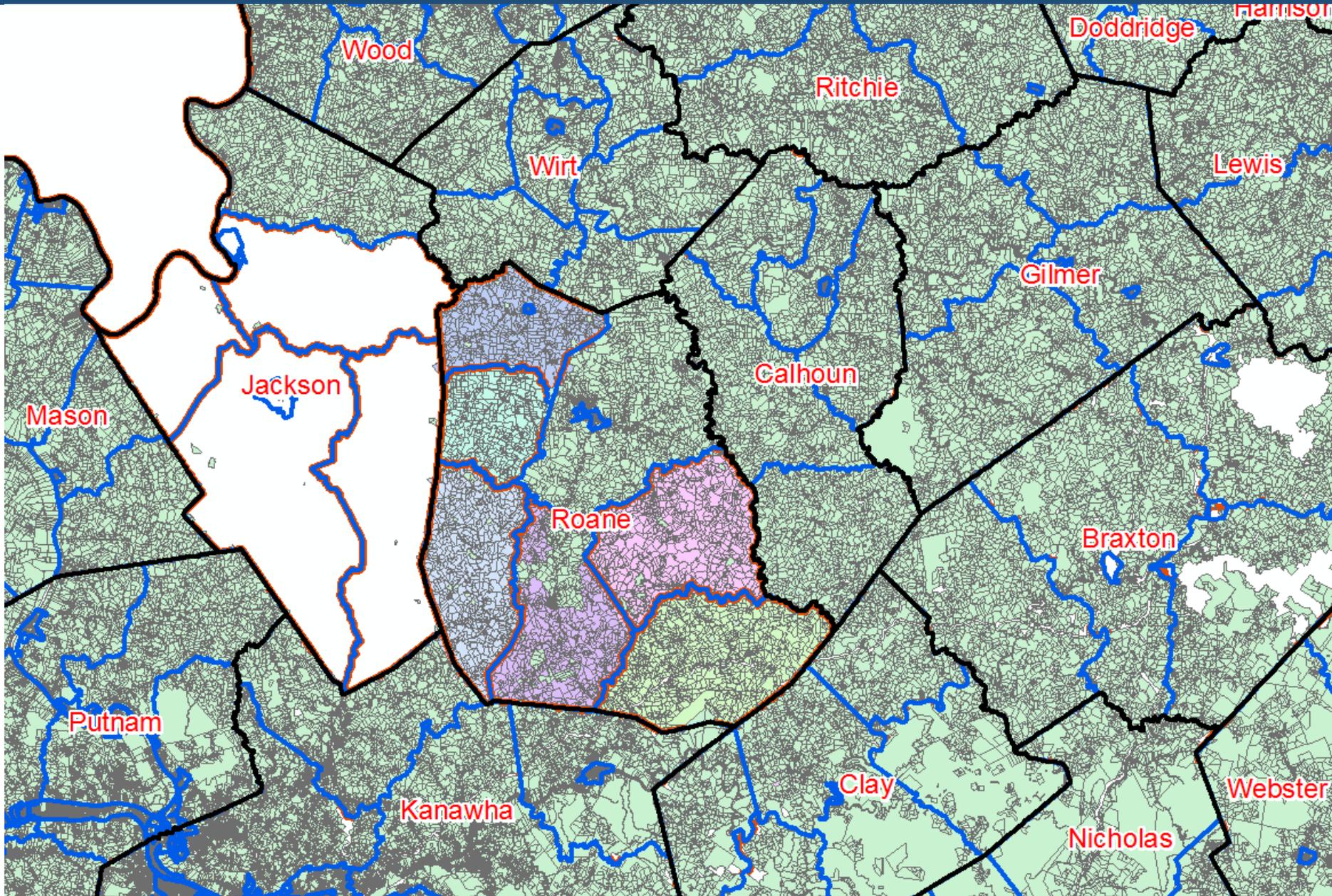
- Assessor Offices
- E-911 Offices
- State Tax Department

# Statewide Digital Parcel File

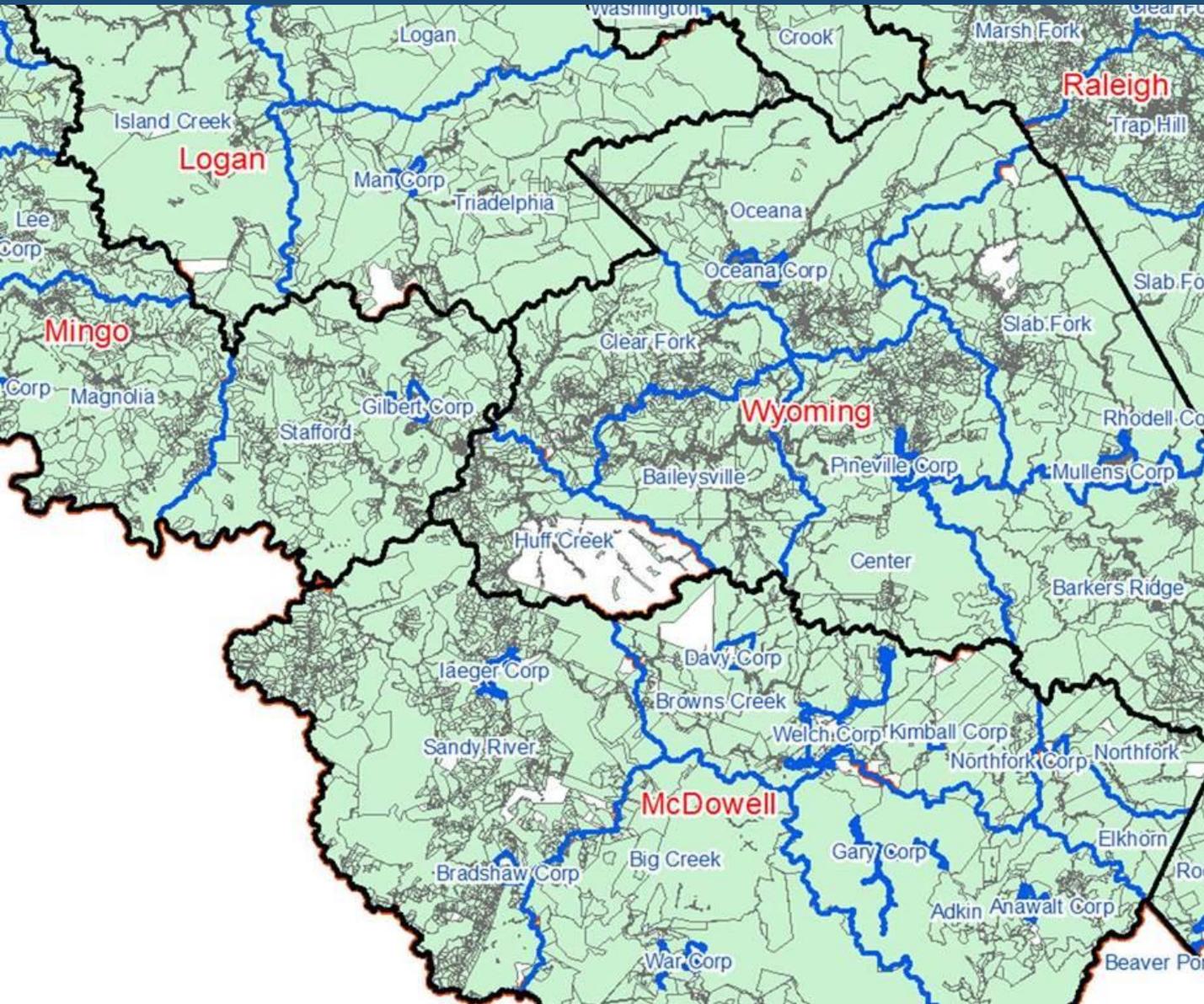


*Statewide seamless parcel layer is better than accessing over 20,000 individual static tax maps*

# Statewide Digital Parcel File



# Statewide Digital Parcel File



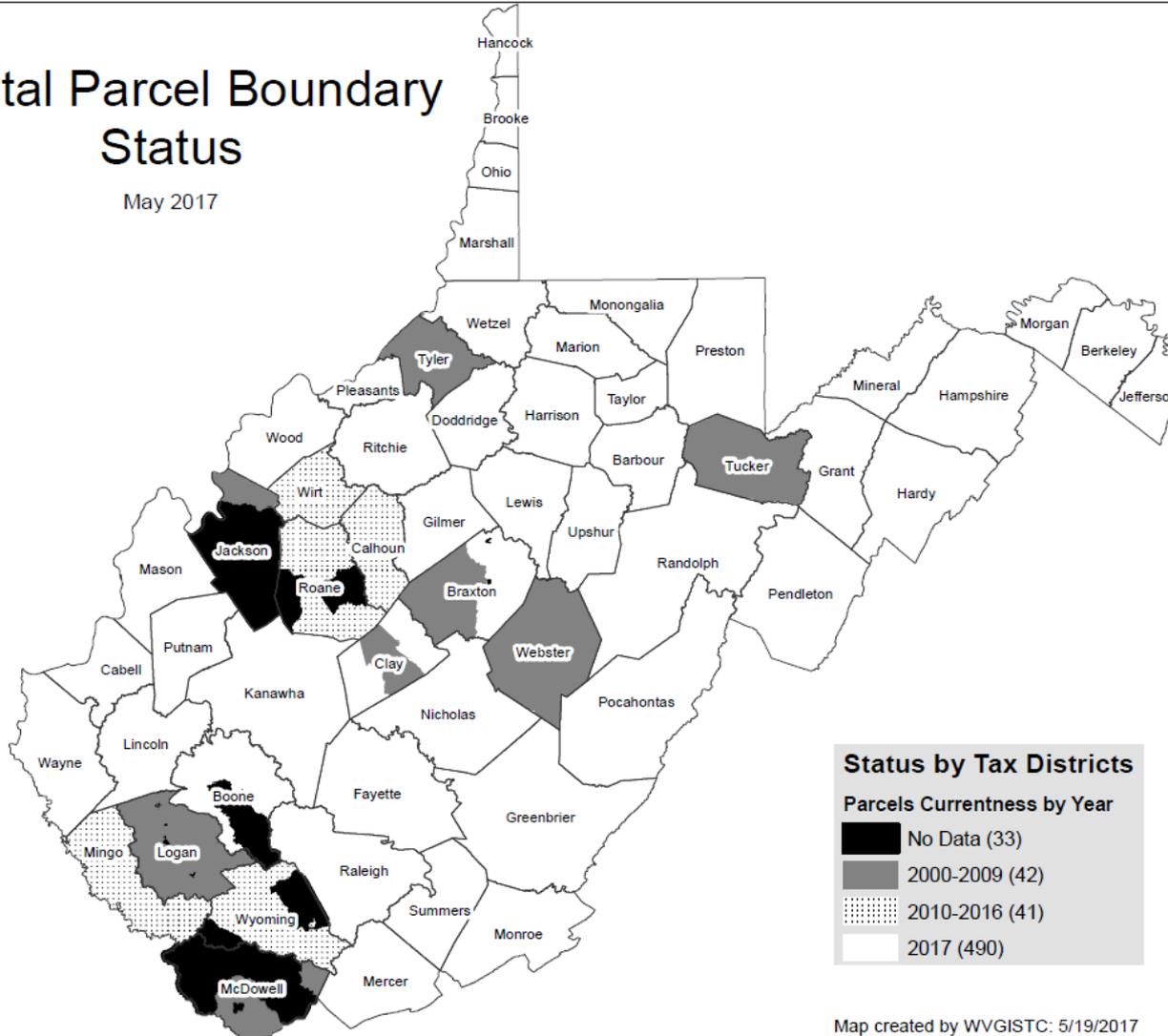
#	Missing/ Obsolete Data Parcels
1	Boone
2	Braxton
3	Calhoun
4	Clay
5	Jackson
6	Logan
7	McDowell
8	Roane
9	Tucker
10	Tyler
11	Wirt
12	Wyoming

Cost estimate of \$250K to achieve a current and accurate Digital Parcel Boundary file

# Statewide Digital Parcel File

## Digital Parcel Boundary Status

May 2017

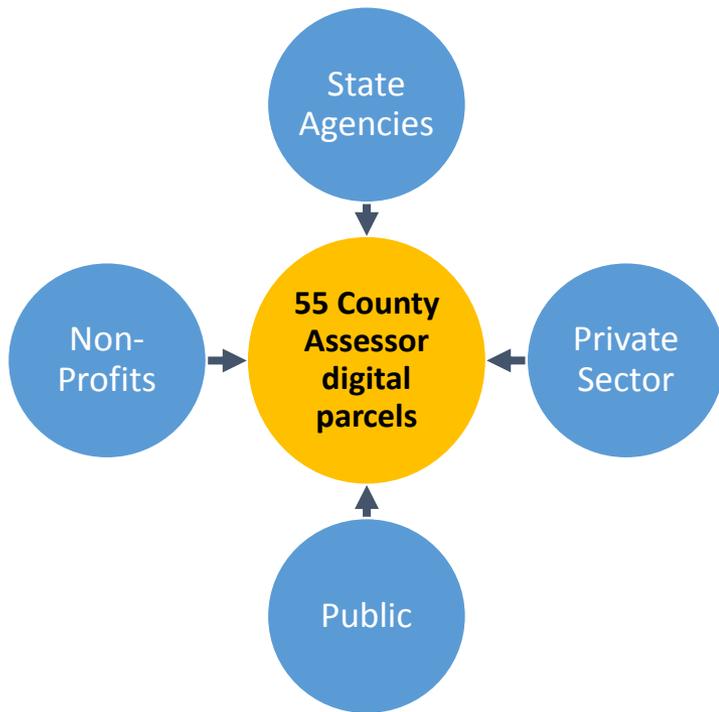


Map created by WVGISTC: 5/19/2017

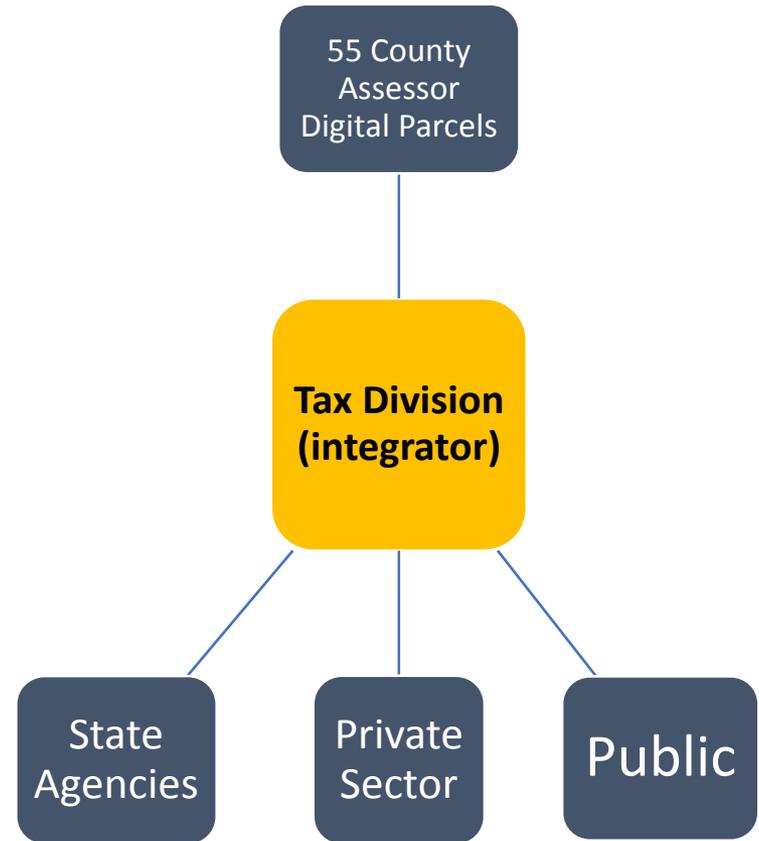
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Cost estimate of \$250K to achieve a current and accurate Digital Parcel Boundary file

# Tax Division: State-Level Integrator



*old way*



*better way*

# Tax Map Survey - Current Trends

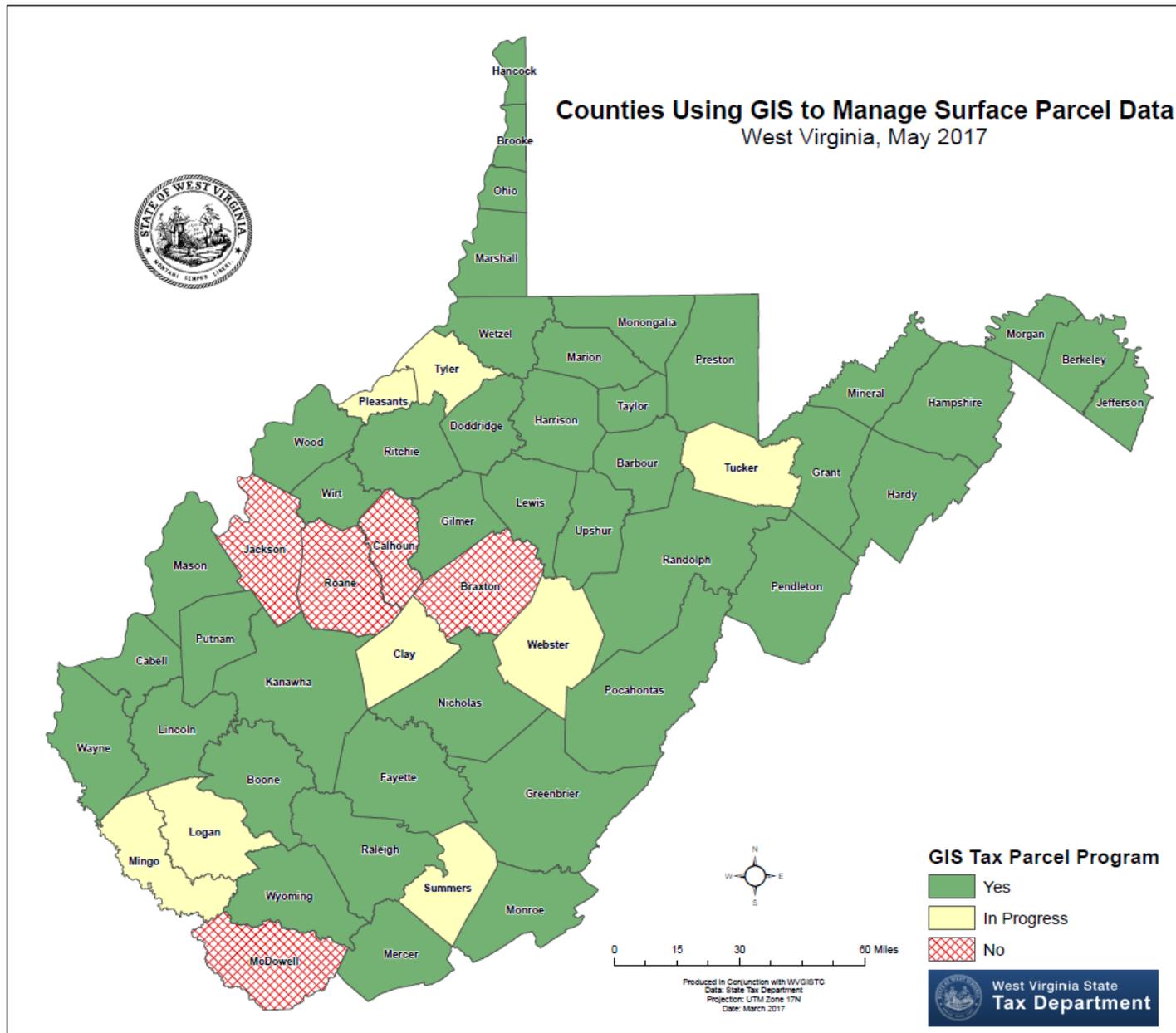
GIS Status	
GIS	43
Transition	7
Paper	5

Outsource % of Digital/Manual Maintenance	
In-House	29
Outsource	26

Maintenance	
Digital	43
Both	5
Manual	7

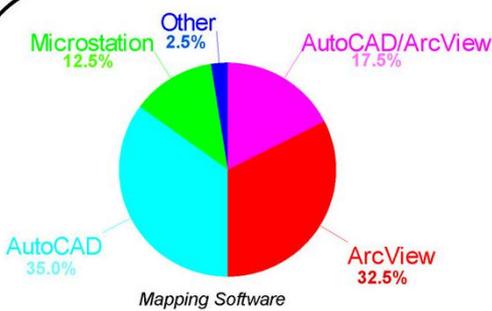
GIS Software	
ESRI	49
AUTOCAD	1
None	5

# Assessors using GIS



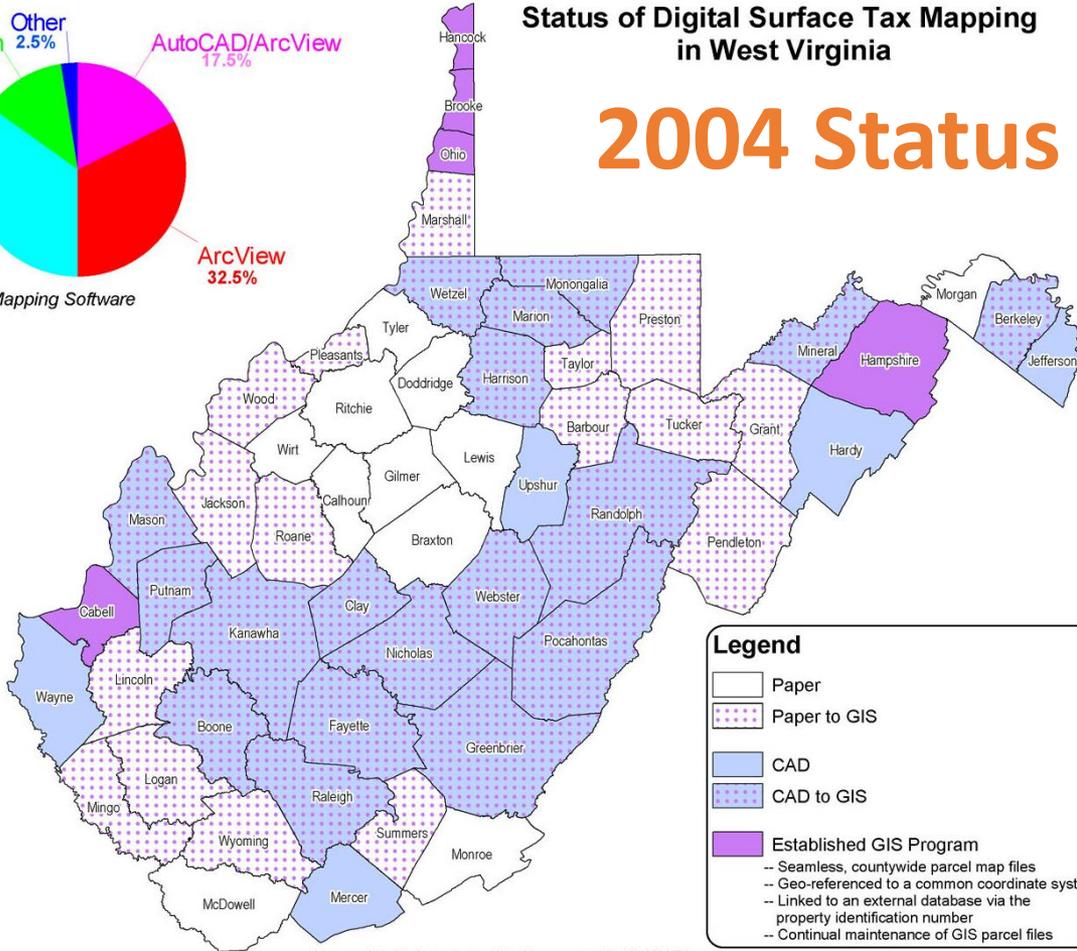


# ESRI Primary GIS Software



## Status of Digital Surface Tax Mapping in West Virginia

### 2004 Status



Source: County Assessors. Graphic prepared by WVGISTC.

### 2004 Map Software

Esri GIS	33%
CAD	50%
Both	17%

### 2017 Map Software

Esri GIS	84%
CAD	2%
Both	14%

**98% of counties use Esri as primary mapping software**

# Paper to Digital Tax Maps

Mapper: *“I was apprehensive four years ago when our newly elected assessor decided to digitize our parcel mapping system; but with the work done by the mapping contractor then and their continual assistance today, I cannot imagine returning to the manual system.”*

Source: 2017 Tax Map Survey

MANUAL (Paper)

5 counties



TRANSITION

7 counties



DIGITAL

43 counties



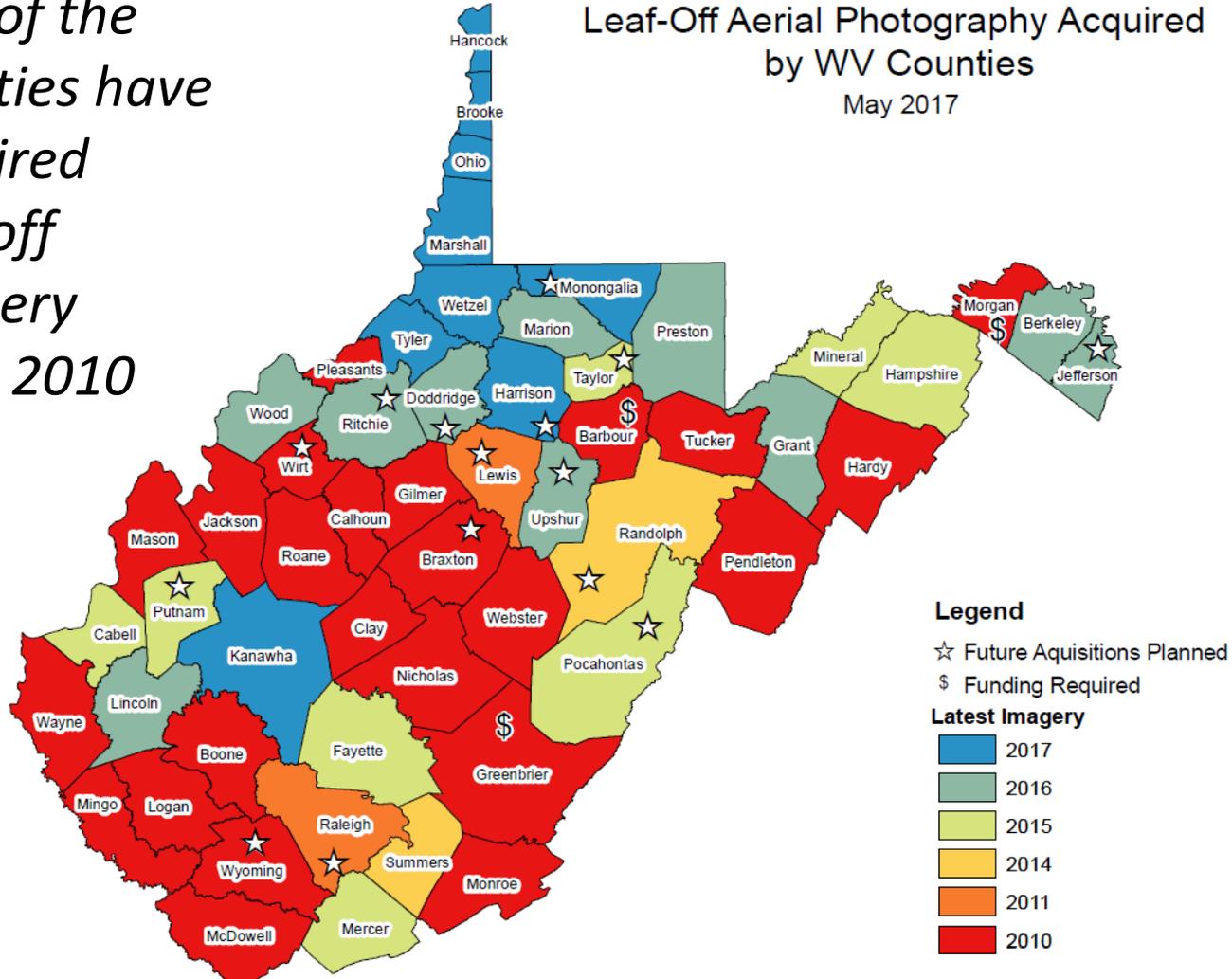
- Manual drafting of tax maps is becoming obsolete!!!
- There are no schools that teach manual drafting skills
- Manual drafting supplies are becoming scarce
- Tax Division may remove itself from drafting contract services

# Aerial Imagery

*Ideally, leaf-off imagery should not be older than 5 years*

*55% of the counties have acquired leaf-off imagery since 2010*

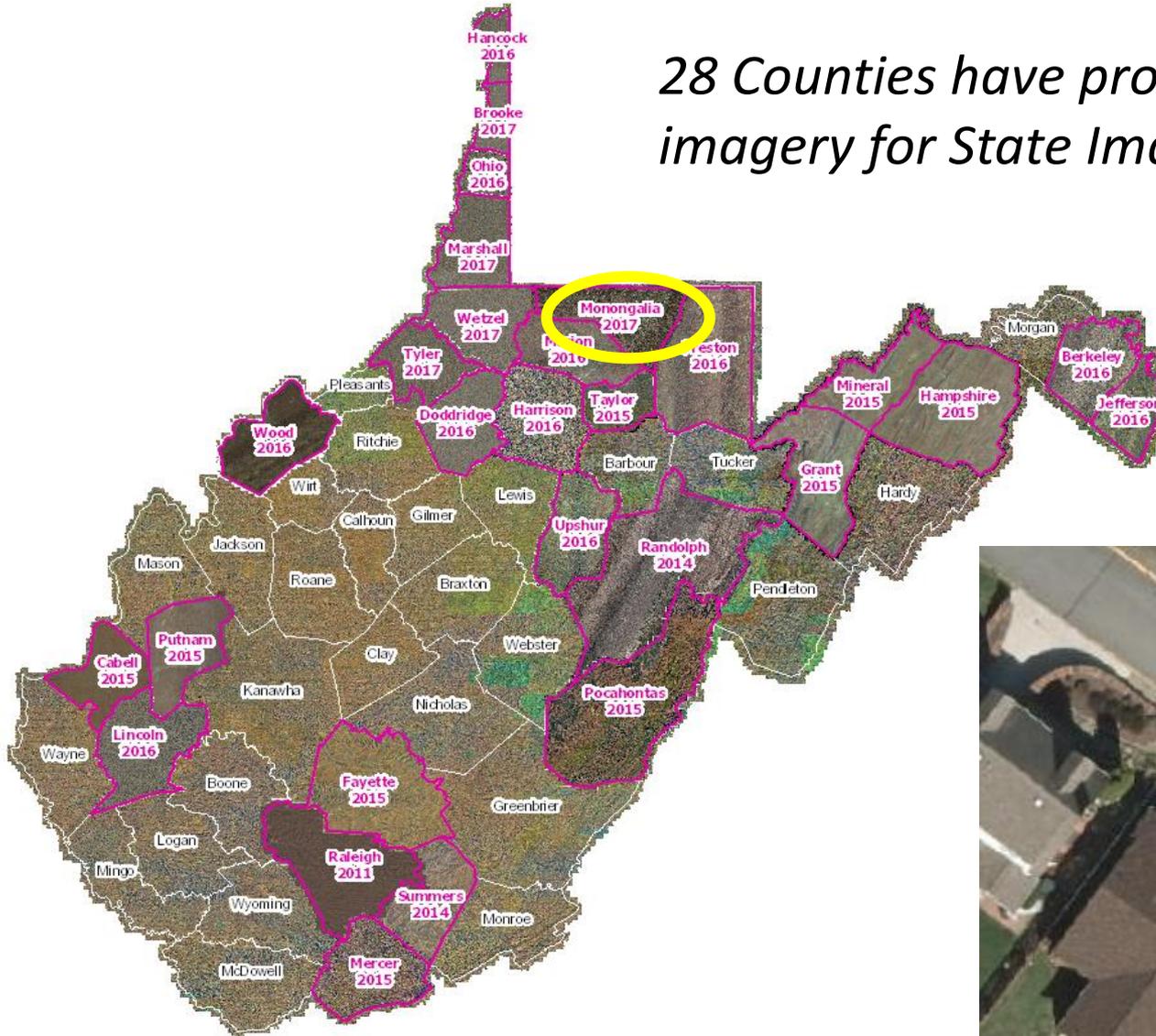
Leaf-Off Aerial Photography Acquired by WV Counties  
May 2017



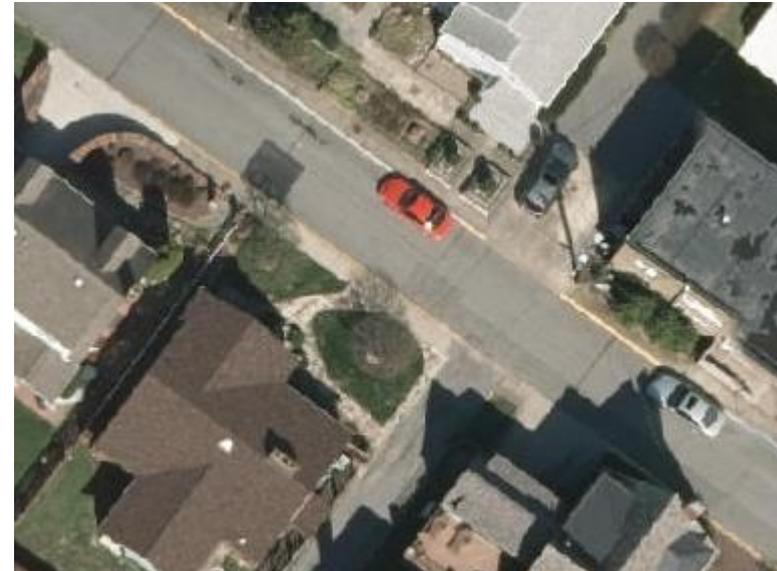
# Leaf-Off Aerial Imagery Web Service

[https://services.wvgis.wvu.edu/arcgis/rest/services/ImageryBaseMaps/wv\\_aerial\\_photos\\_mixed\\_resolutions\\_wm/MapServer?f=jsapi](https://services.wvgis.wvu.edu/arcgis/rest/services/ImageryBaseMaps/wv_aerial_photos_mixed_resolutions_wm/MapServer?f=jsapi)

*28 Counties have provided leaf-off imagery for State Imagery Web Service*



2017  
Monongalia  
County  
Aerial Imagery



# Aerial Imagery Costs

Source --->	WV Area (Sq. Miles)		Target Counties
Categories --->	Area	%	
WV Totals --->	24,231	\$ 1,696,200	
COUNTY ↓			
Barbour County	343	\$ 23,994	\$ 23,994
Berkeley County	322	\$ 22,513	
Boone County	503	\$ 35,225	\$ 35,225
Braxton County	516	\$ 36,134	\$ 36,134
Brooke County	92	\$ 6,458	
Cabell County	288	\$ 20,163	
Calhoun County	281	\$ 19,646	\$ 19,646
Clay County	344	\$ 24,070	\$ 24,070
Doddridge County	321	\$ 22,436	
Fayette County	668	\$ 46,788	
Gilmer County	340	\$ 23,806	\$ 23,806
Grant County	480	\$ 33,616	
Greenbrier County	1,024	\$ 71,714	\$ 71,714
Hampshire County	645	\$ 45,127	
Hancock County	88	\$ 6,185	
Hardy County	585	\$ 40,916	\$ 40,916
Harrison County	417	\$ 29,164	
Jackson County	472	\$ 33,013	\$ 33,013
Jefferson County	212	\$ 14,811	
Kanawha County	911	\$ 63,775	
Lewis County	390	\$ 27,285	\$ 27,285
Lincoln County	439	\$ 30,703	
Logan County	456	\$ 31,894	\$ 31,894
Marion County	312	\$ 21,806	
Marshall County	312	\$ 21,854	



Mason County	445	\$ 31,139	\$ 31,139
McDowell County	535	\$ 37,446	\$ 37,446
Mercer County	421	\$ 29,450	
Mineral County	329	\$ 23,041	
Mingo County	424	\$ 29,656	\$ 29,656
Monongalia County	366	\$ 25,614	
Monroe County	474	\$ 33,158	\$ 33,158
Morgan County	230	\$ 16,078	\$ 16,078
Nicholas County	654	\$ 45,812	\$ 45,812
Ohio County	109	\$ 7,620	
Pendleton County	698	\$ 48,875	\$ 48,875
Pleasants County	135	\$ 9,422	\$ 9,422
Pocahontas County	942	\$ 65,933	
Preston County	651	\$ 45,602	
Putnam County	350	\$ 24,529	
Raleigh County	609	\$ 42,657	\$ 42,657
Randolph County	1,040	\$ 72,800	
Ritchie County	454	\$ 31,753	
Roane County	484	\$ 33,866	\$ 33,866
Summers County	368	\$ 25,741	\$ 25,741
Taylor County	176	\$ 12,299	
Tucker County	421	\$ 29,479	\$ 29,479
Tyler County	261	\$ 18,250	
Upshur County	355	\$ 24,842	
Wayne County	512	\$ 35,856	\$ 35,856
Webster County	556	\$ 38,933	\$ 38,933
Wetzel County	361	\$ 25,297	
Wirt County	235	\$ 16,440	\$ 16,440
Wood County	377	\$ 26,389	
Wyoming County	502	\$ 35,130	\$ 35,130

**Currentness**  
Yellow highlighted counties indicate imagery older than 5 years.

**Resolution**  
6-inch resolution or better

**Leaf-Off**  
WV 3<sup>rd</sup> most forested state (78% forested)

**Funding Sources**  
Assessor Valuation or County Commission Funds

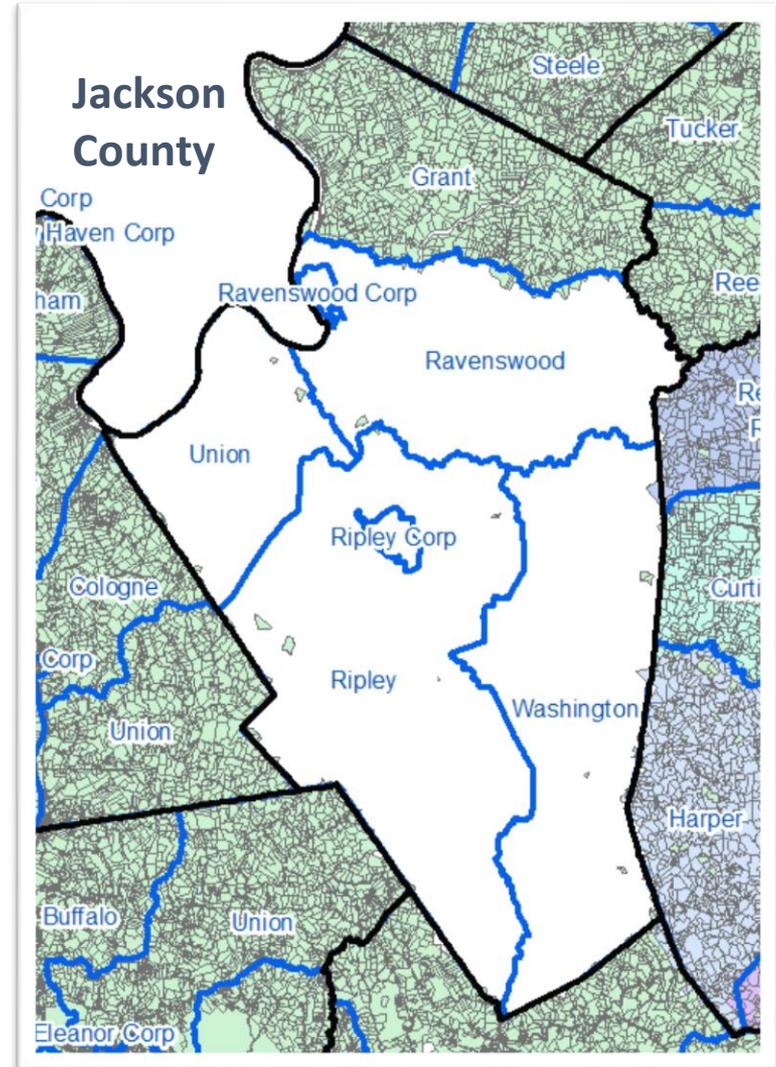
# GIS Program Costs

- \$3.00 per parcel for paper-to-digital conversion for Full Digital Tax Maps
- \$70 per square mile for aerial imagery

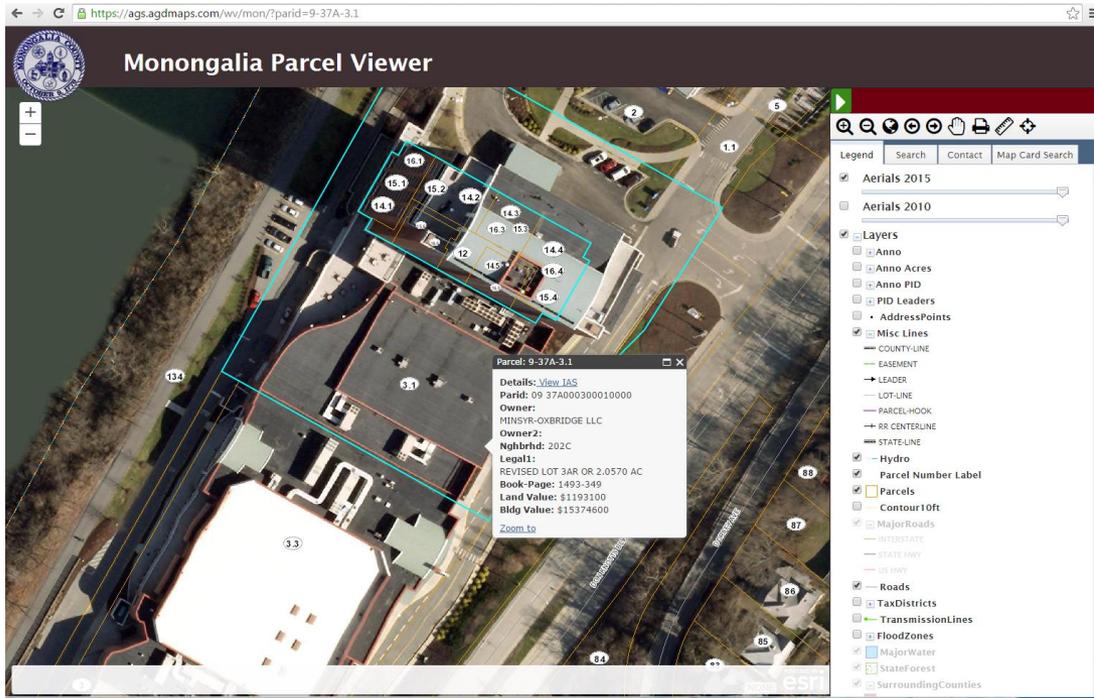
## Jackson County example

- 1) *Parcel Conversion*  
20,000 parcels x \$3 per parcel = **\$60,000**
- 2) *Leaf-Off Aerial Imagery*  
472 square miles \* \$70 per square mile = **\$33,013**

*\$7.8 million in 2017-18 Unobligated Balances for State Assessor's Valuation Funds*



# Web Parcel Viewer Features

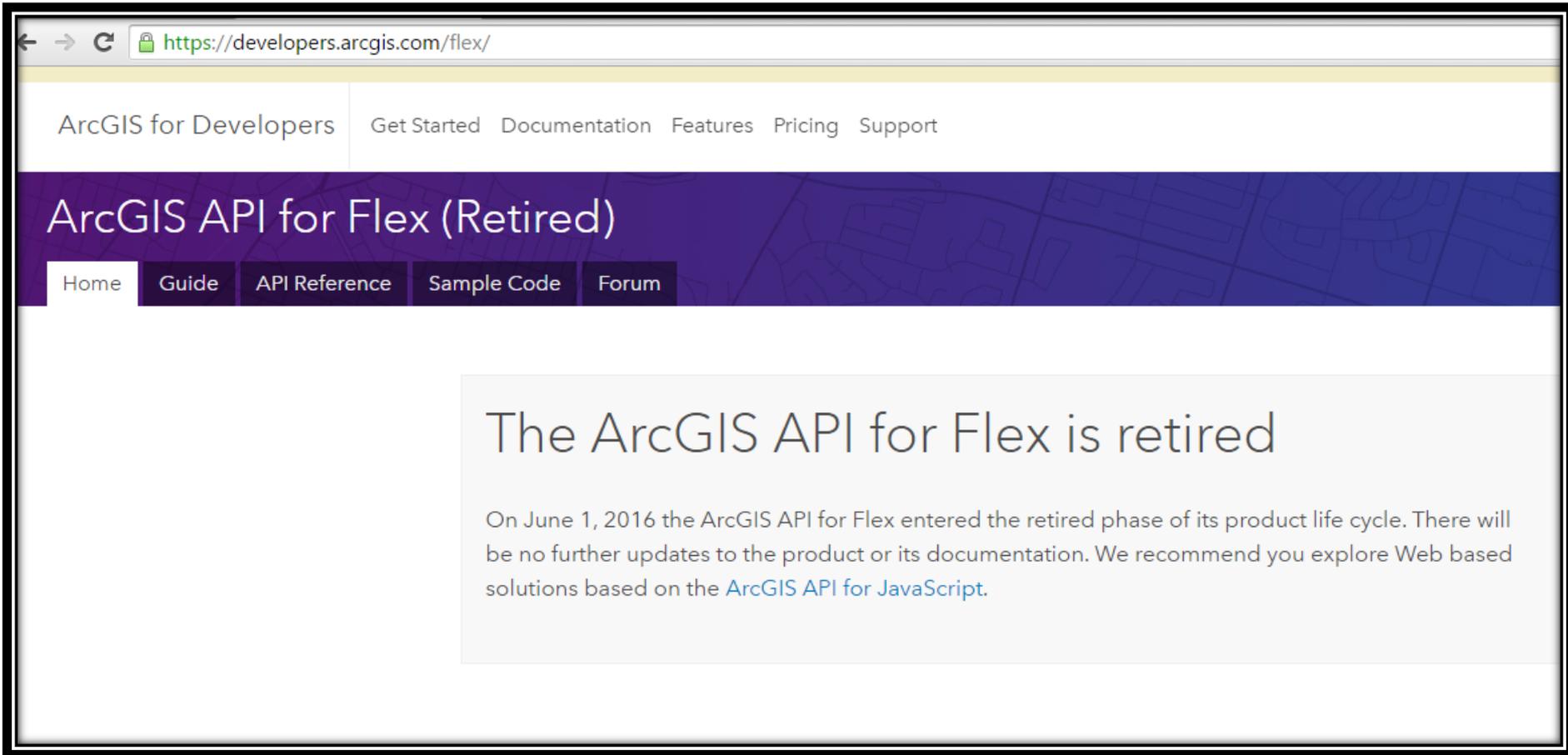


*30 counties have online county parcel viewers which link to IAS records*

*County Parcel Viewers vary in sophistication and features*

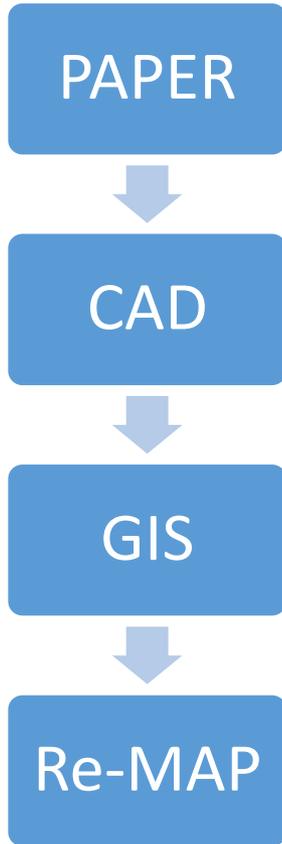
- Web Exchange Shared Link
- Address-Parcel Integration
- Street View Images of Structures
- Assessment Reports links for of all properties
  - Multiple structures on parcel
  - Other Building Features on parcel
- Online Download Links for Finished Tax Maps

# ArcGIS API for Flex (Retired)

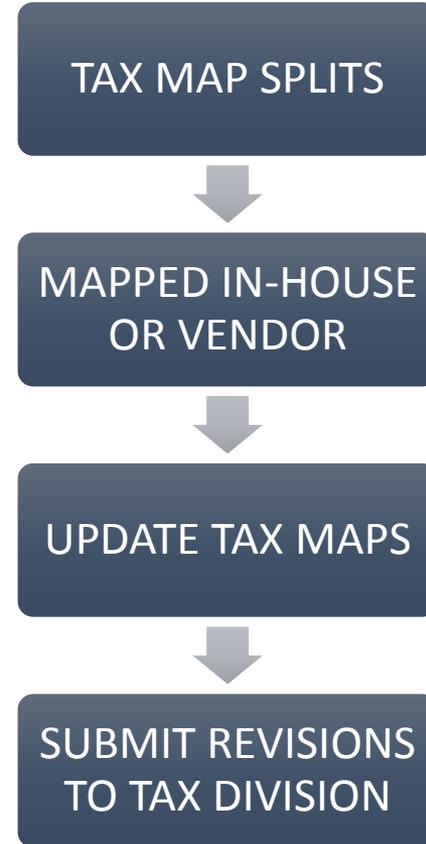


Some County Parcel Web Viewers use Esri ArcGIS Flex API which is no longer supported

# Workflows



*Digital Tax Map Conversion*



*Tax Map Maintenance*

# Future Directions

- Complete Statewide Parcel File by 2020
- All 55 Counties maintain Digital Tax Maps by 2025
- Increase in online services for viewing and downloading digital tax maps from authoritative sources
  - Use of tax map disclaimers regarding accuracy and currentness
  - More feedback from public; links to map office or contact
- Improved web assessment reports for all property types and multiple structures (cards)

# Contact Information

## WVU GIS Technical Center

- **Kurt Donaldson**

[kurt.donaldson@mail.wvu.edu](mailto:kurt.donaldson@mail.wvu.edu), phone: 304-293-9467