Vermont's Statewide Parcel Program

Municipal Parcel Data: Features, Improving Data Quality, and the Future

ANR Municipal Day 2022

tim.terway@vermont.gov | October 28, 2022

VERMONT

VERMONT CENTER FOR GEOGRAPHIC INFORMATION

Overview & Outline

Status of Parcel Program

Current and New Uses of Parcel Data

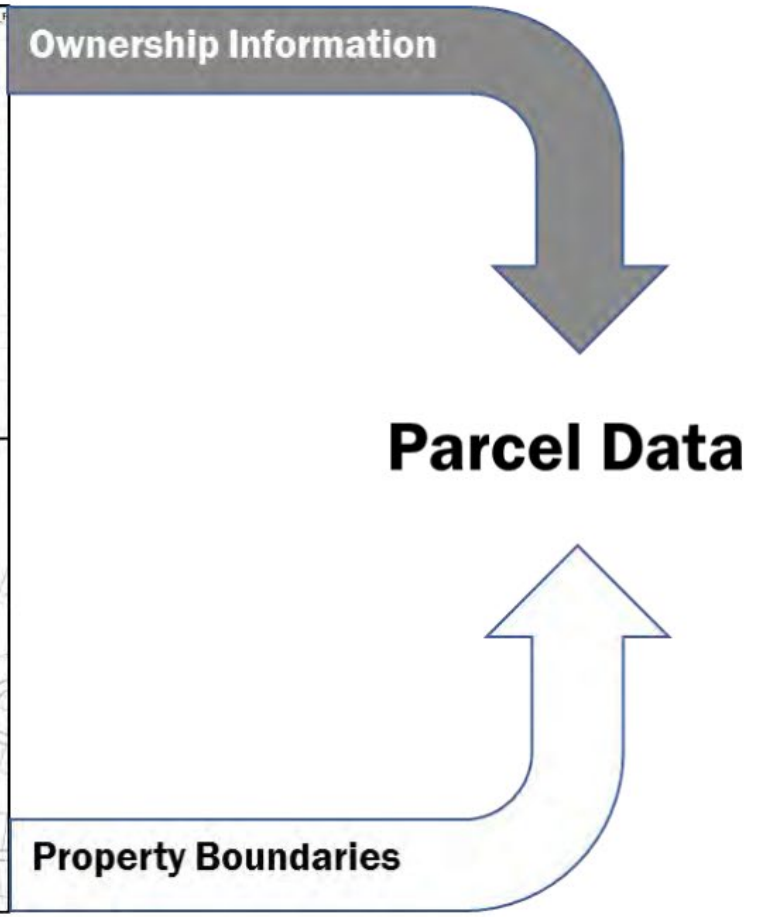
Status of Municipal Parcels

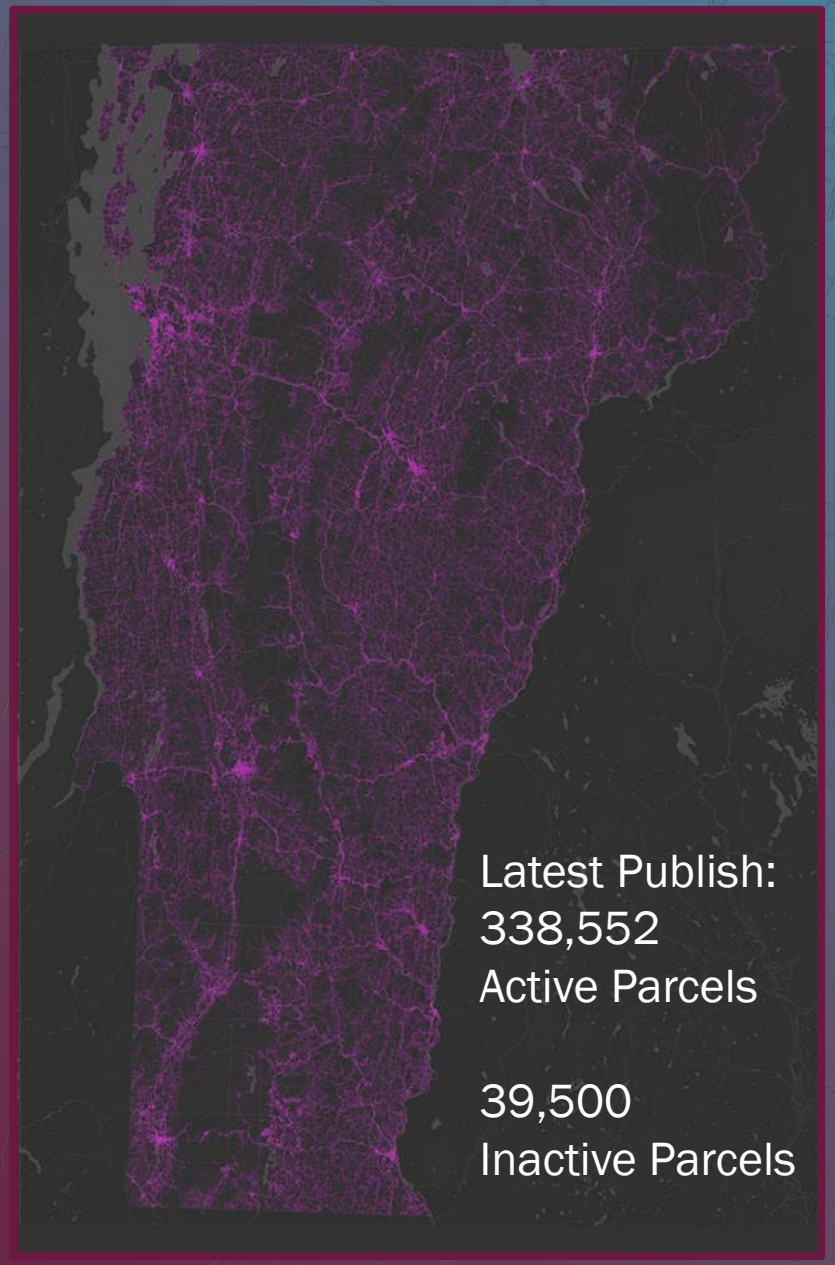
Reviewing Status and Quality

Data Quality: Common Issues in Parcel Data

Parcel Data?

TNAME	SPAN	CAT	ACRESG	OWNER1	OWNER2	PARCE	DESCPROP	LOCAPROP	REAL_F	HSTED_F
Alburgh	900310411	Residential-1	5.5	STATE OF VERMONT		CP111-	LAND & HOUSE		25600	
Alburgh	900312252	Miscellaneous	0	STATE OF VERMONT		CP111-X	LOT & HOUSE		116700	
Bakersfield	2400710337	Commercial	1	STATE OF VERMONT	AGENCY OF TRANSPC	MN018B.	1.0 AC	1.0 AC	62000	
Bakersfield	2400710543	Residential-1	0.13	STATE OF VERMONT	AGENCY OF TRANSPC	OMN019.	0.13 AC & DWL	0.13 AC & DWL	66300	
Barnard	3000910859	Miscellaneous	66.79	VERMONT STATE	FISH & GAME	06-0935.	VL-66.79	TH 9	69200	
Barnard	3000910860	Miscellaneous	43.89	VERMONT STATE	FISH & GAME	06-0936.	VL-43.89AC	TH 9	62900	
Barnard	3000910861	Miscellaneous	11.48	VERMONT STATE	FISH & GAME	06-0937.	VL-11.48AC	TH 9	18080	
Barnard	3000910862	Miscellaneous	35.14	VERMONT STATE	DEPT OF PARKS & RE	01-0939.	STATE CAMP PARK	TH 3	534300	
Barnard	3000910864	Miscellaneous	2627	VERMONT STATE	FISH & GAME	07-0942.	VL-2627AC	TH 26	2317700	
Barnard	3000910896	Miscellaneous	81.03	VERMONT STATE	DEPT OF PARKS & RE	01-0930.1	SILVER LAKE	TOWN CENTER	120040	
Barnard	3000910898	Miscellaneous	0.11	VERMONT STATE	DEPARTMENT OF PAI	01-0930.2	SILVER LAKE DAM	TH 3	2200	
Barnard	3000910900	Miscellaneous	388.55	VERMONT STATE	FISH & GAME	07-0941.	Exempt State	TH 26	431800	
Barton	4201311501	Miscellaneous	0.47	STATE OF VERMONT	ENVIRONMENTAL CC	20306007I	CRYSTAL LAKE DAM SITE		32700	
Barton	4201311511	Miscellaneous	660	STATE OF VERMONT	AGENCY OF NATURAI	-9E+07	WILLOUGHBY SF - A	X-932	581700	
Barton	4201311512	Miscellaneous	0.83	STATE OF VERMONT	FISH AND WILDLIFE D	-9E+07	MAY POND ACCESS	PUBLIC ACCESS	32600	
Barton	4201311513	Miscellaneous	1.03	STATE OF VERMONT	FISH AND WILDLIFE D	-7E+07	BAKER POND ACCE	EAST ALBANY I	21000	
Barton	4201311514	Miscellaneous	107.85	STATE OF VERMONT	FISH AND WILDLIFE D	-1.2E+08	PILOT - BARTON RIVER STREAMBA		83400	
Barton	4201311515	Miscellaneous	27.9	STATE OF VERMONT	FISH AND WILDLIFE D	-9003003	X-941	X-941	36000	
Barton	4201311517	Miscellaneous	71.2	STATE OF VERMONT	FISH AND WILDLIFE D	-1.9E+07	76.18 AC (PILOT FW	X-943	29600	
Barton	4201311518	Miscellaneous	0	STATE OF VERMONT	AGENCY OF TRANSPC	08160106	RADIO STATION PE	X-945	51100	
Barton	4201311519	Miscellaneous	0	STATE OF VERMONT	AGENCY OF TRANSPC	08160106	FREIGHT HOUSE PE	X-944	141500	
Barton	4201311520	Miscellaneous	4.3	STATE OF VERMONT	AGENCY OF TRANSPC	-8.2E+07	VTRANS BLDGS	VTRANS BLDGS	511800	
Barton	4201311860	Miscellaneous	0.51	STATE OF VERMONT	DEPT OF FOREST PAR	-1.2E+08	.51 acres - improved boating acces		176700	
Belvidere	4801410234	Miscellaneous	14.5	STATE OF VERMONT	FOREST PARKS & REC	-4.002	14.5 ACRES		19400	
Belvidere	4801410235	Woodland	828	STATE OF VERMONT	FORESTS PARKS & RE	-15	828 ACRES	TNC/KARBARN	927900	





PROGRAM STATUS

Project: Early 2018 (~2012) – December 2019.

Fed/State Funded, One-Time.

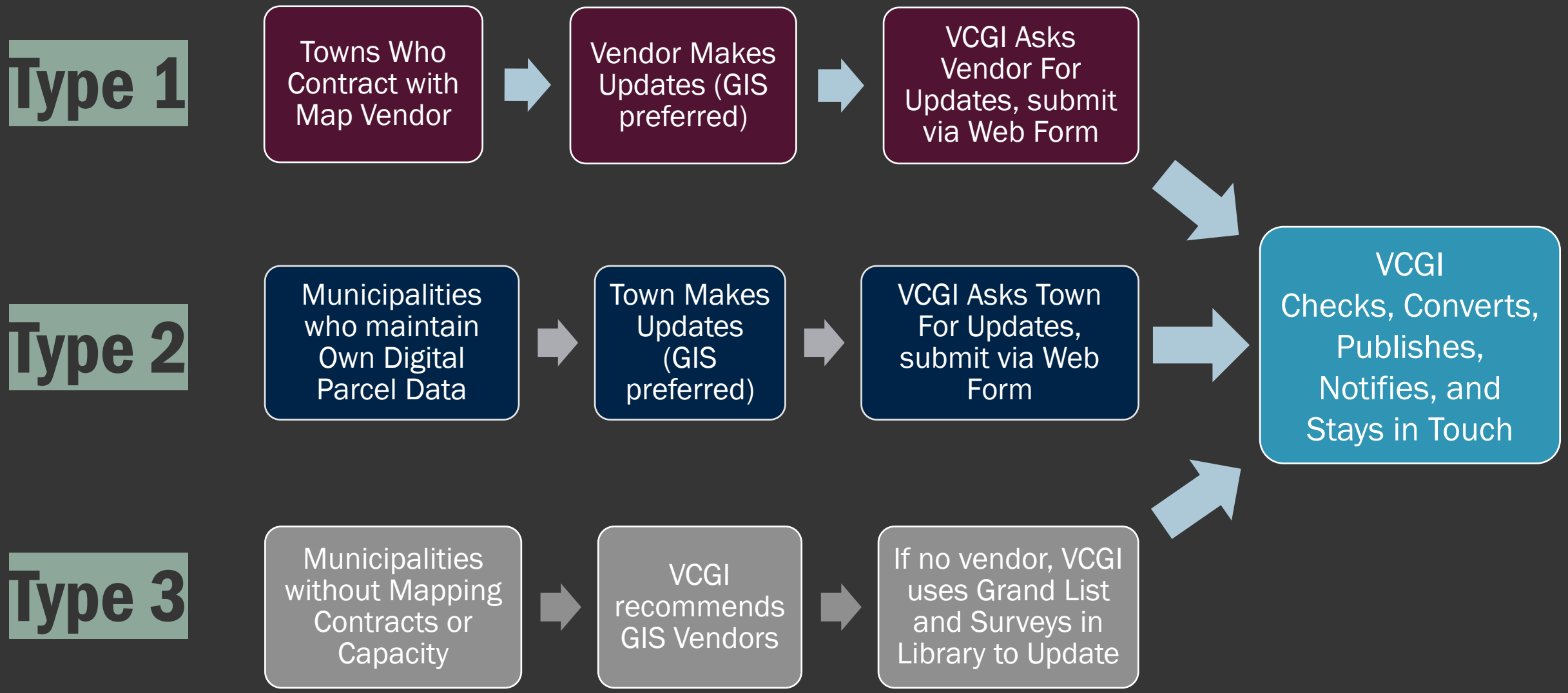
Program: January 1, 2020 – Present

Muni. Funded, Ongoing Voluntary Participation

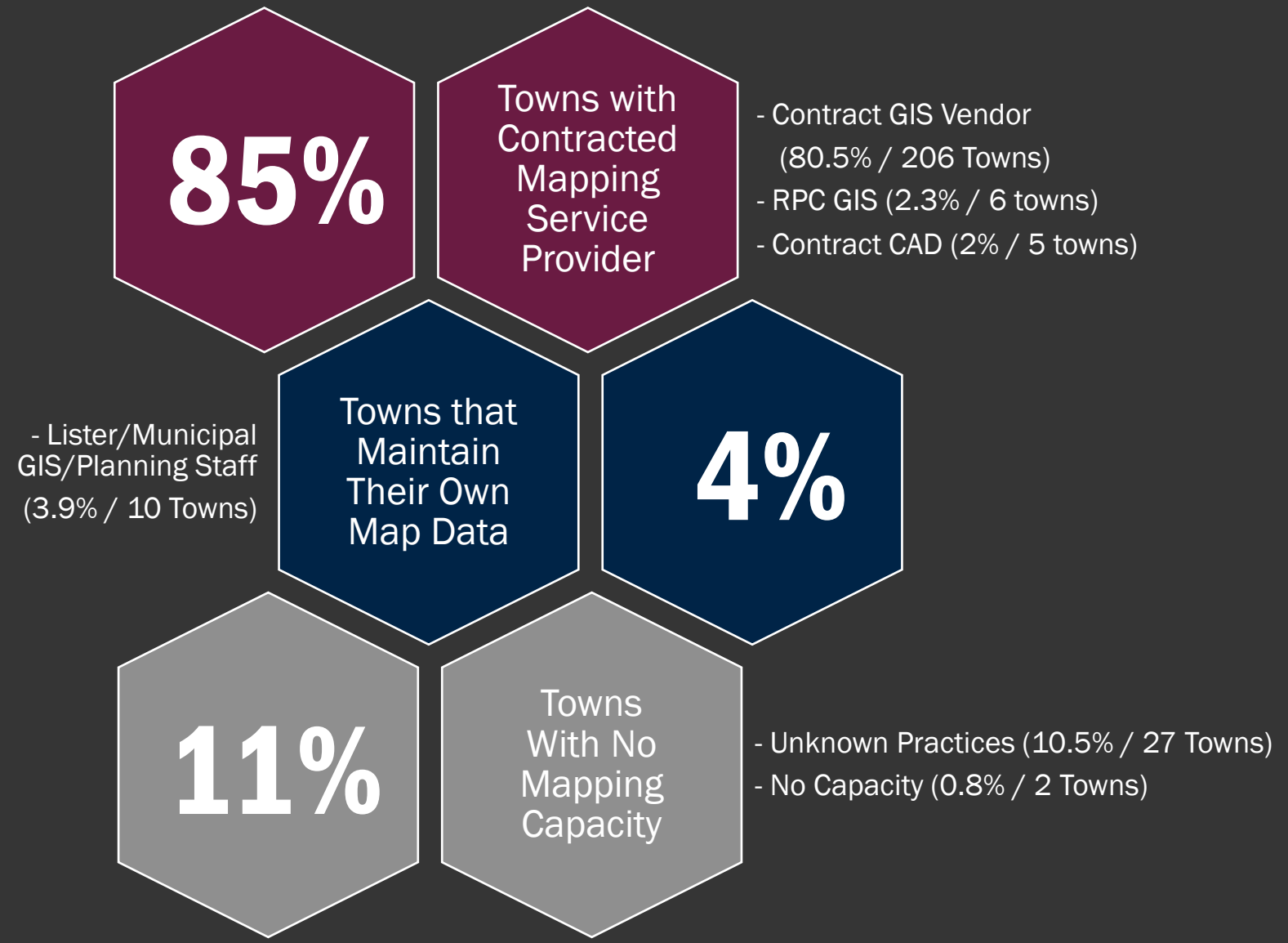
vcgi.vermont.gov/data-and-programs/parcel-program

VT TOWNS

"Shared Responsibility Model" : A Refresher on How the Program Works



How are geometry maintained?



Practices Tracked Here, updated weekly:
maps.vcgi.vermont.gov/parcelstatus

Deja Vu?

funds to create digital parcel data had to follow the guidelines. Among other things, the guidelines request that municipal parcel maps be separated into three Arc/Info data layers in order to be compatible with the State GIS. The first layer is the "parcel" layer. This layer contains property boundaries and public road right-of-ways only. A second layer, "tax maps," contains all lines which are not actual property boundaries, but which appear on tax maps, such as streams and private right-of-ways. A third layer, "town boundaries," is simply the town boundary derived from the parcels.

Once the guidelines were established, the Center issued an RFP for contractors and selected five vendors that demonstrated the ability to meet the municipal property mapping standards. The Center then put participating towns in touch with contractors and assisted them in issuing RFPs and other facets of project management. By the end of the project, the state had provided funding to approximately 100 towns, covering about two-thirds of the state population, to generate digital parcel layers from their original paper tax maps. (See Figure 4.1)

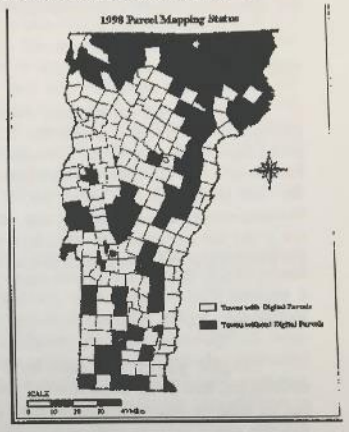


Fig. 4.1 Parcel Mapping Availability in Vermont (Courtesy of Vermont Center for Geographic Information)

Although the project has been very successful, several problems were encountered along the way. First, the quality of the towns' paper parcel maps varied a great deal. As a result the project took quite a while longer than initially expected. Second, the Center found that providing the full funding to the towns meant that many invested very little of their own time into the project, thus creating additional sources of delay. The Vermont Center for Geographic Information believes that towns should be asked to match state dollars as a way of increasing their investment in the timely outcome of the project. A third problem relates to maintenance of the data and is addressed in the following section.

Maintenance

At present the state has not provided funding for database maintenance, and each town carries the responsibility for maintaining and updating its parcel map database. Unfortunately, because updating is expensive, only some of the towns have dedicated the necessary financial resources to regular database maintenance. The hope is that towns, recognizing the immense value afforded by having a digital parcel map layer, will be able to generate the necessary maintenance revenue in the future.

Towns that do maintain their databases use a variety of methods to update their digital parcel data. Some municipalities have in-house GIS systems and continually update the parcel data on an as-needed basis. The sophistication of technology at a town or city could range from

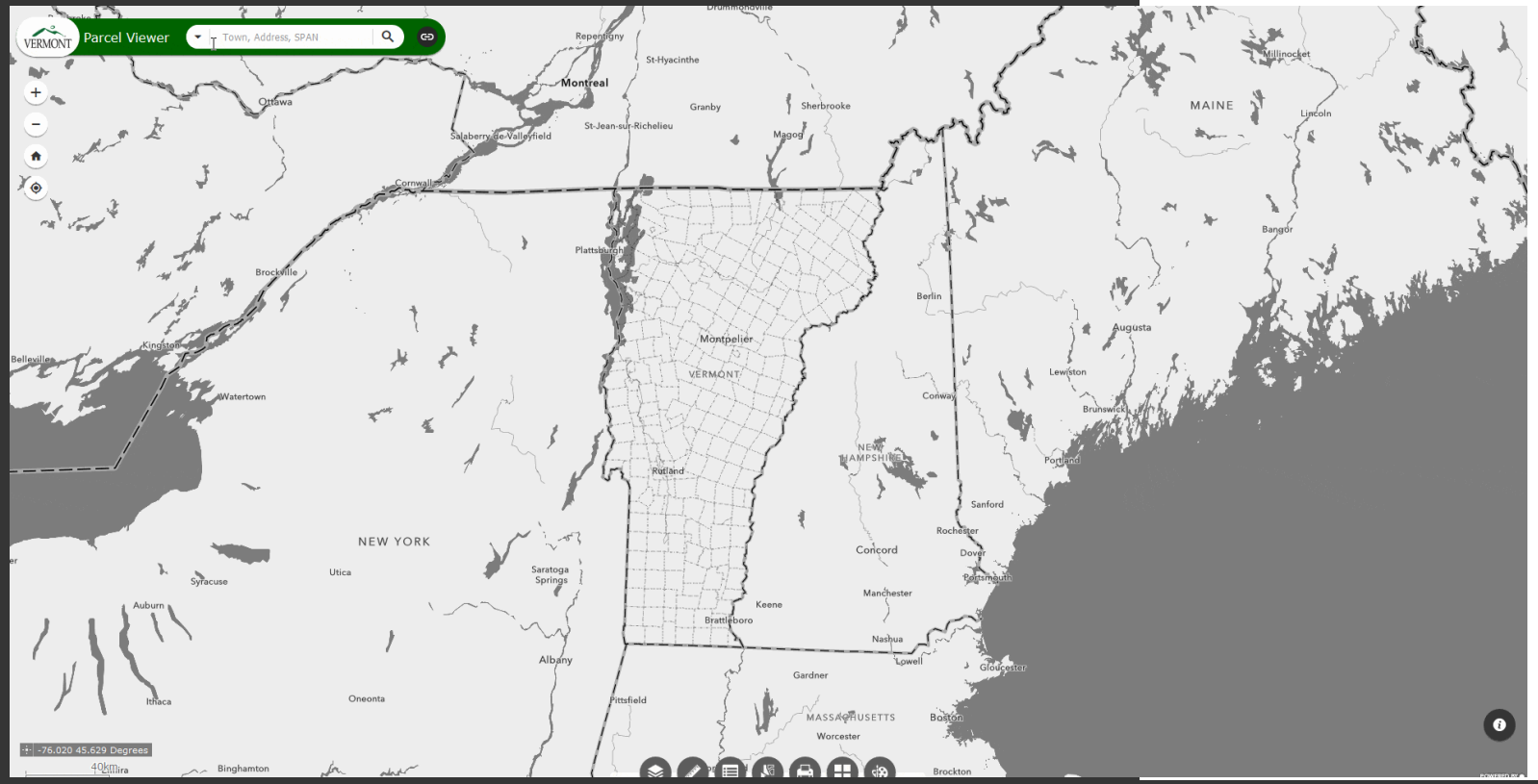
"The hope is that towns, recognizing the immense value afforded by have a digital parcel map layer, will be able to generate the necessary maintenance revenue in the future."

- Circa 1990's…

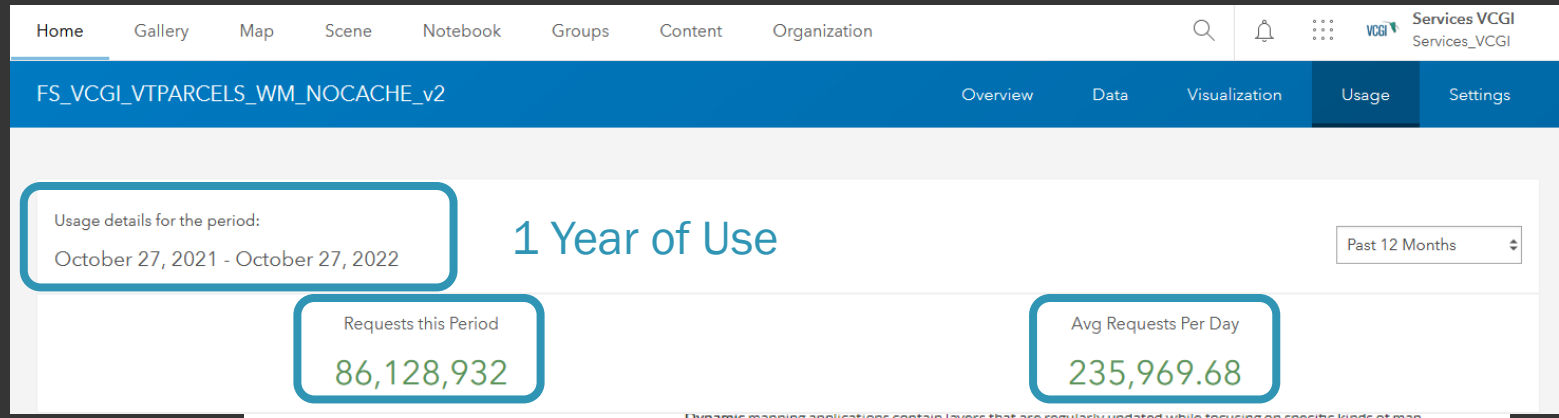
USES OF DATA

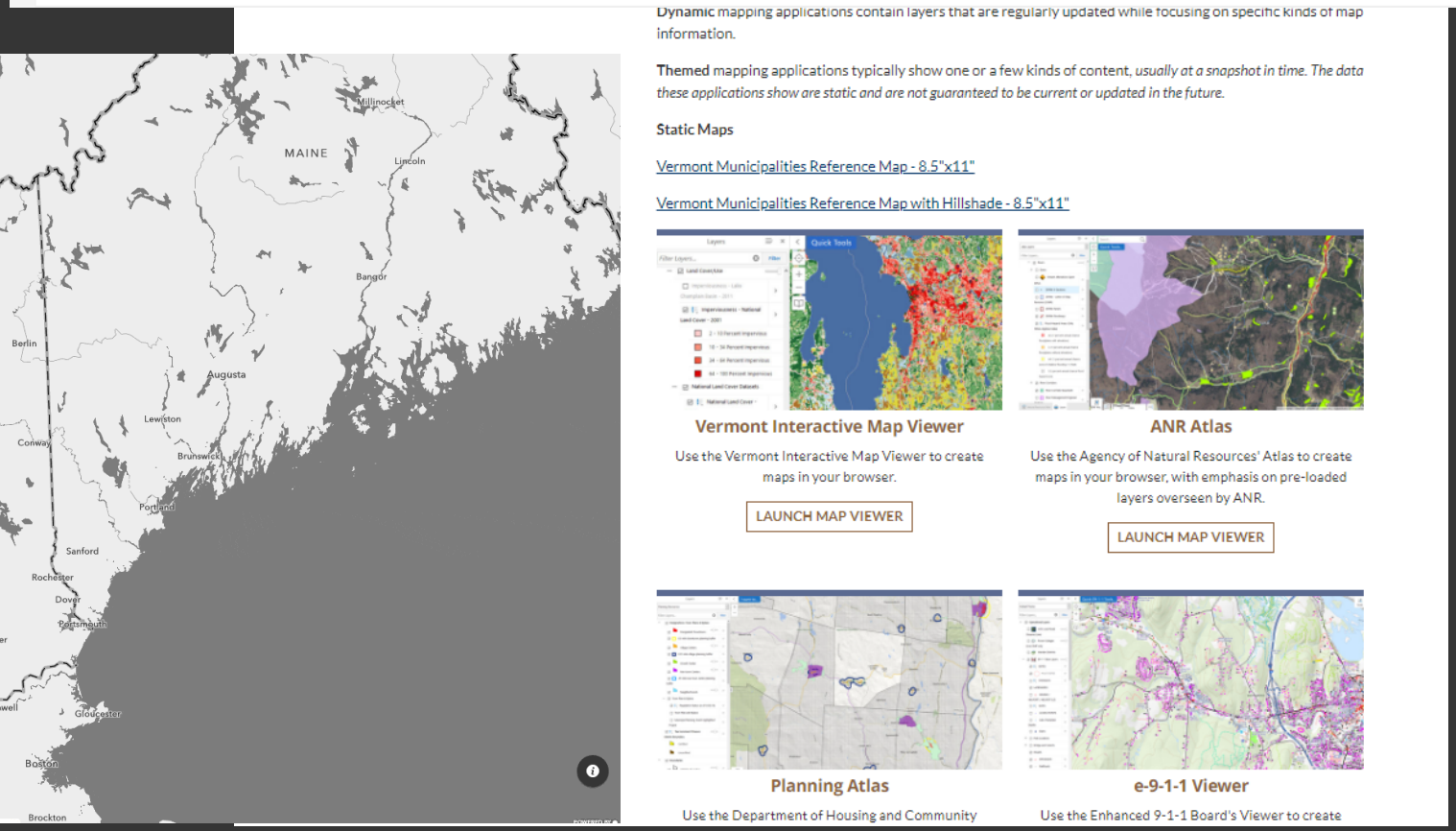
As of October 27, 2022

Current Uses of Parcel Data



https://maps.vcgi.vermont.gov/parcelviewer/

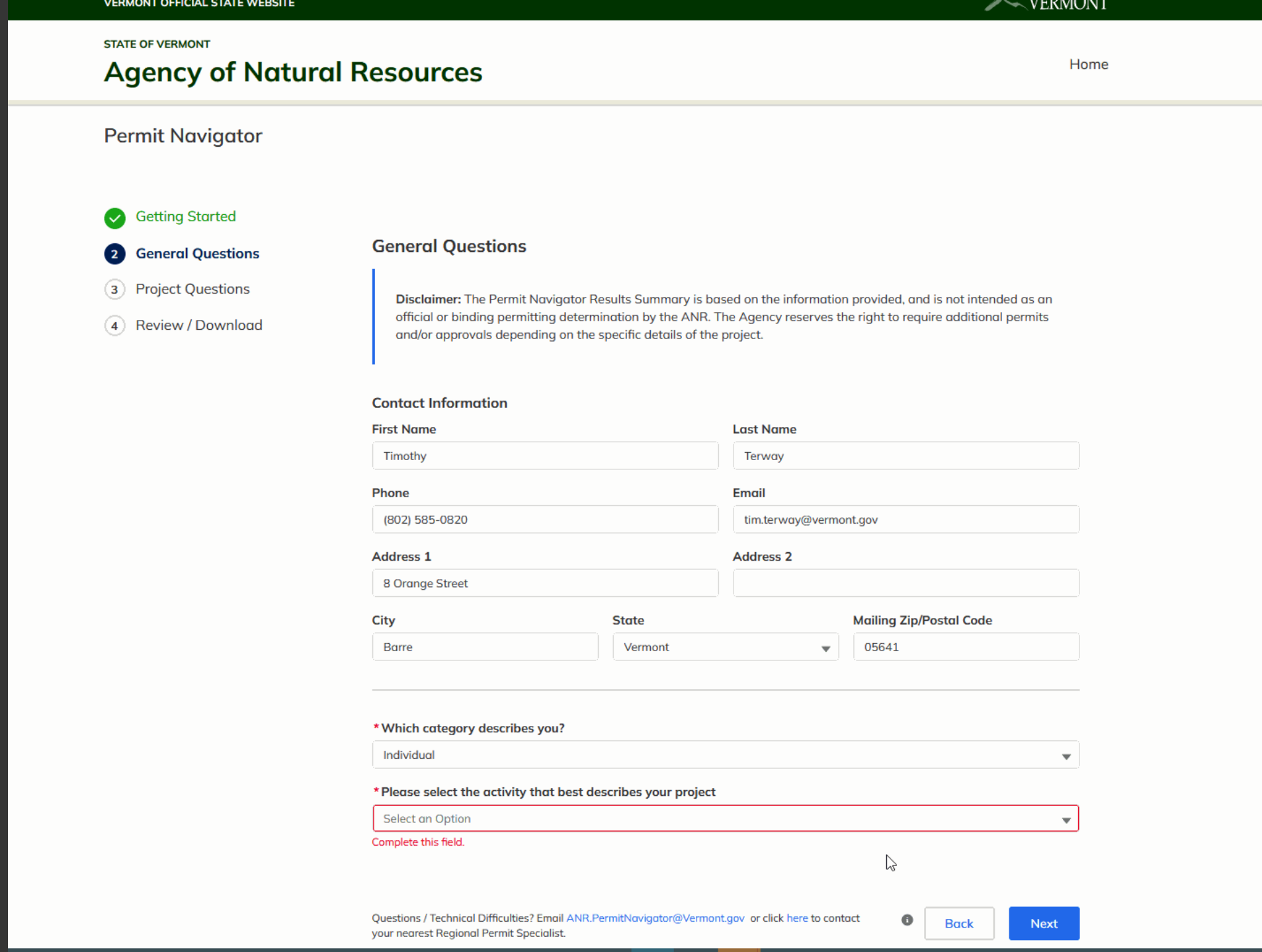




https://vcgi.vermont.gov/maps

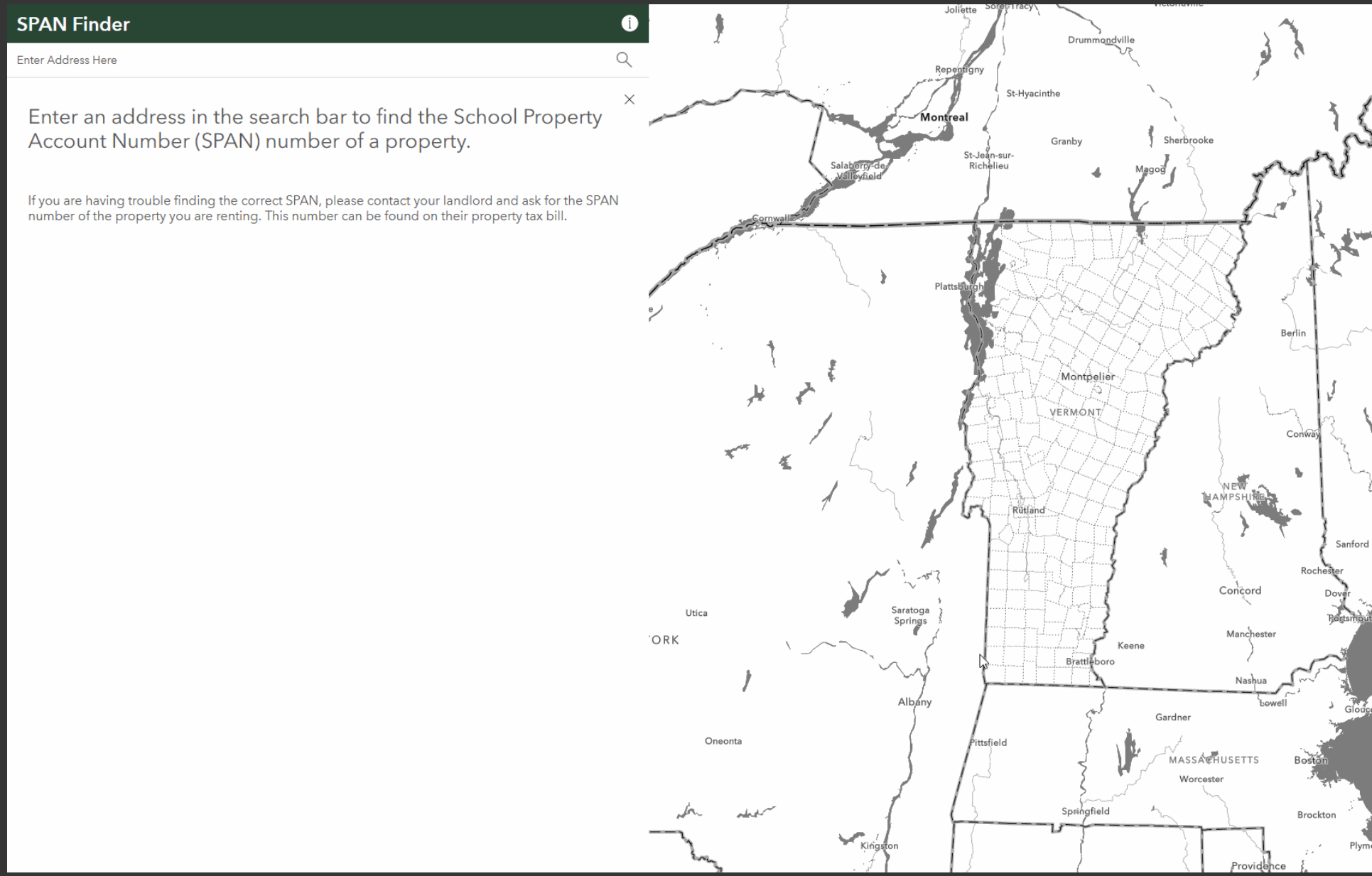
New Uses of Parcel Data

[ANR Permit Navigator]



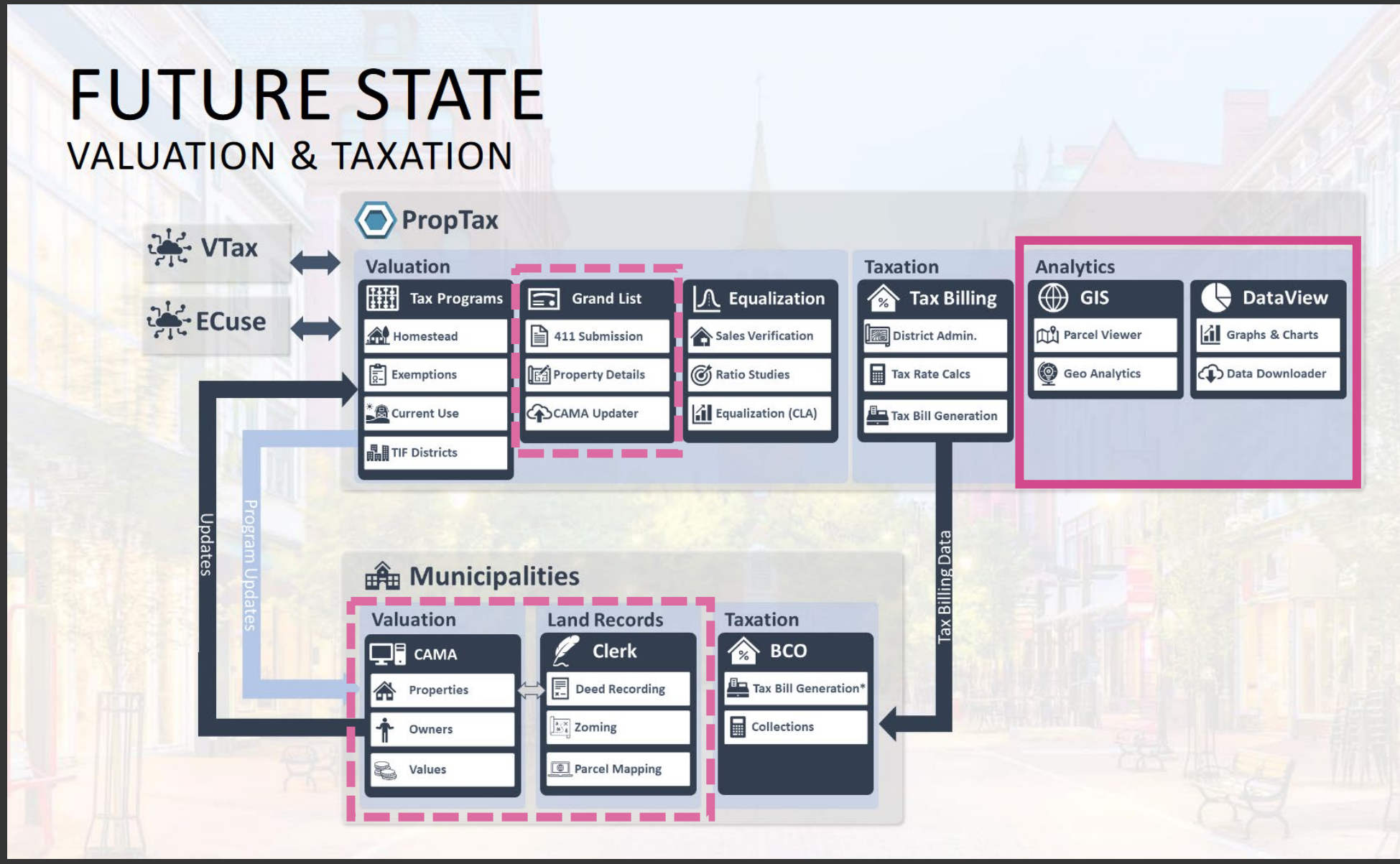
New Uses of Parcel Data

[Rental Assistance SPAN Finder]



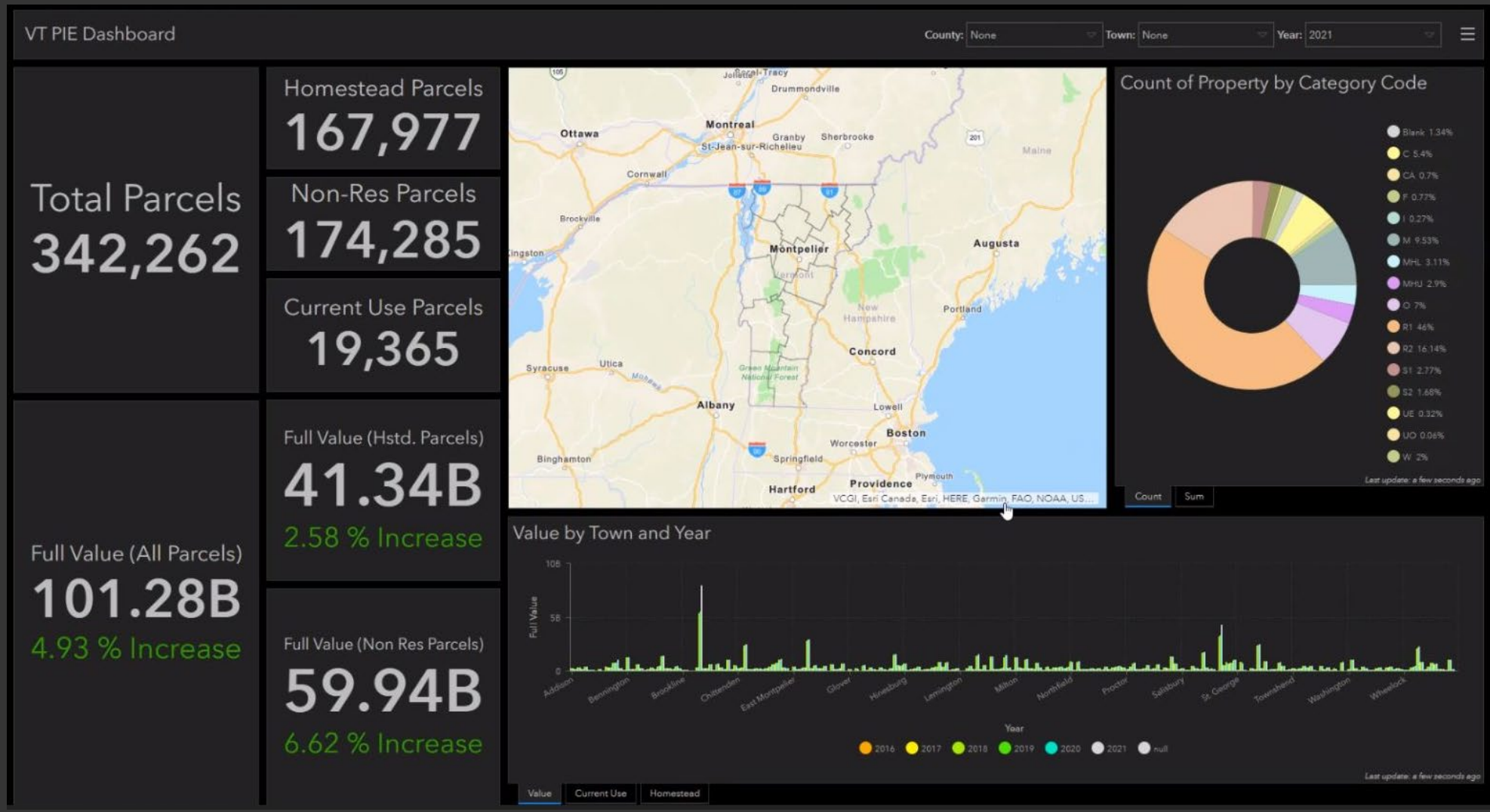
New Uses of Parcel Data

[VT Property Information Exchange]



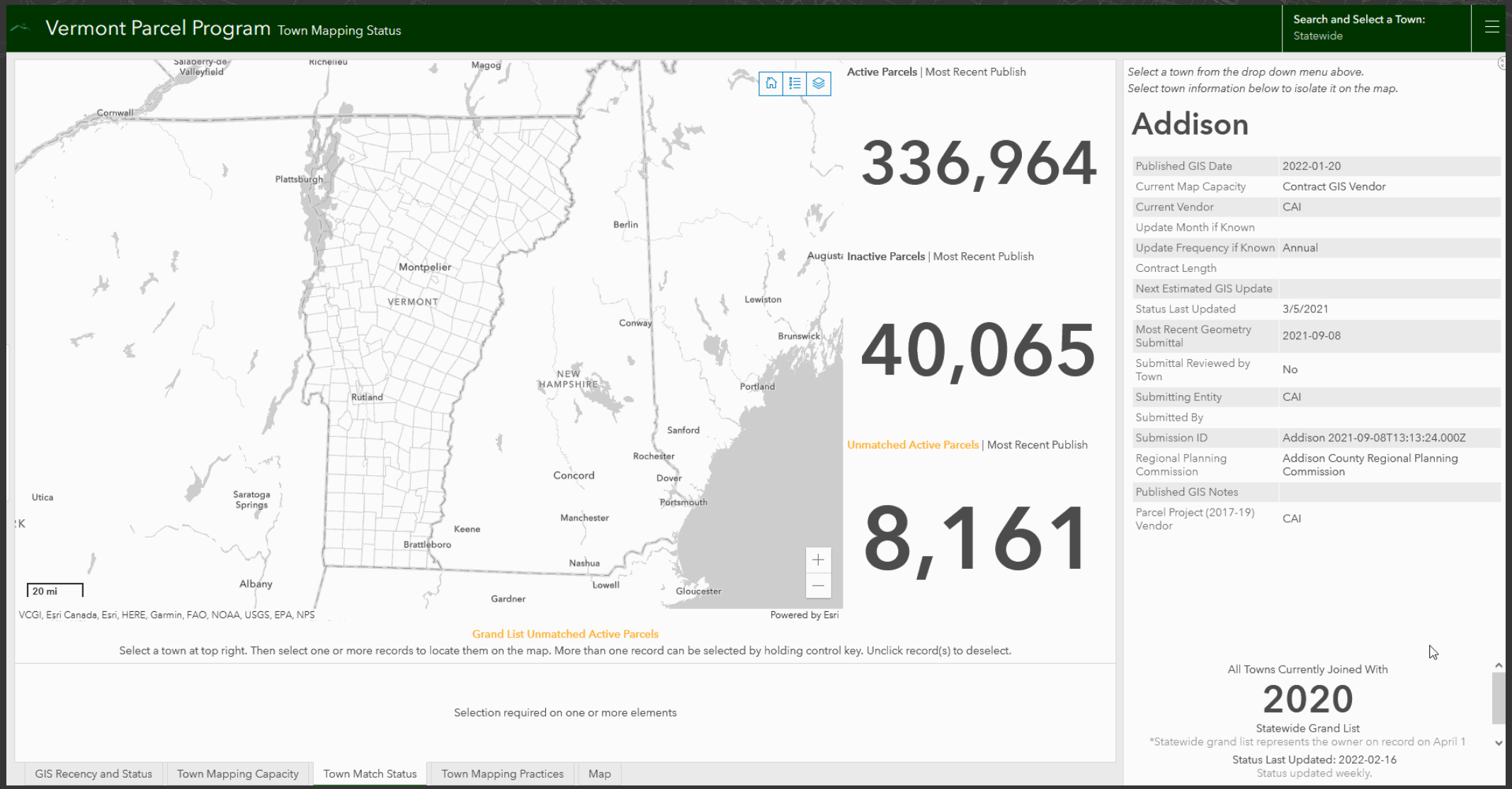
New Uses of Parcel Data

[VT Property Information Exchange]



New Uses of Parcel Data: Review of Unmatched Parcels

Learn More Here.



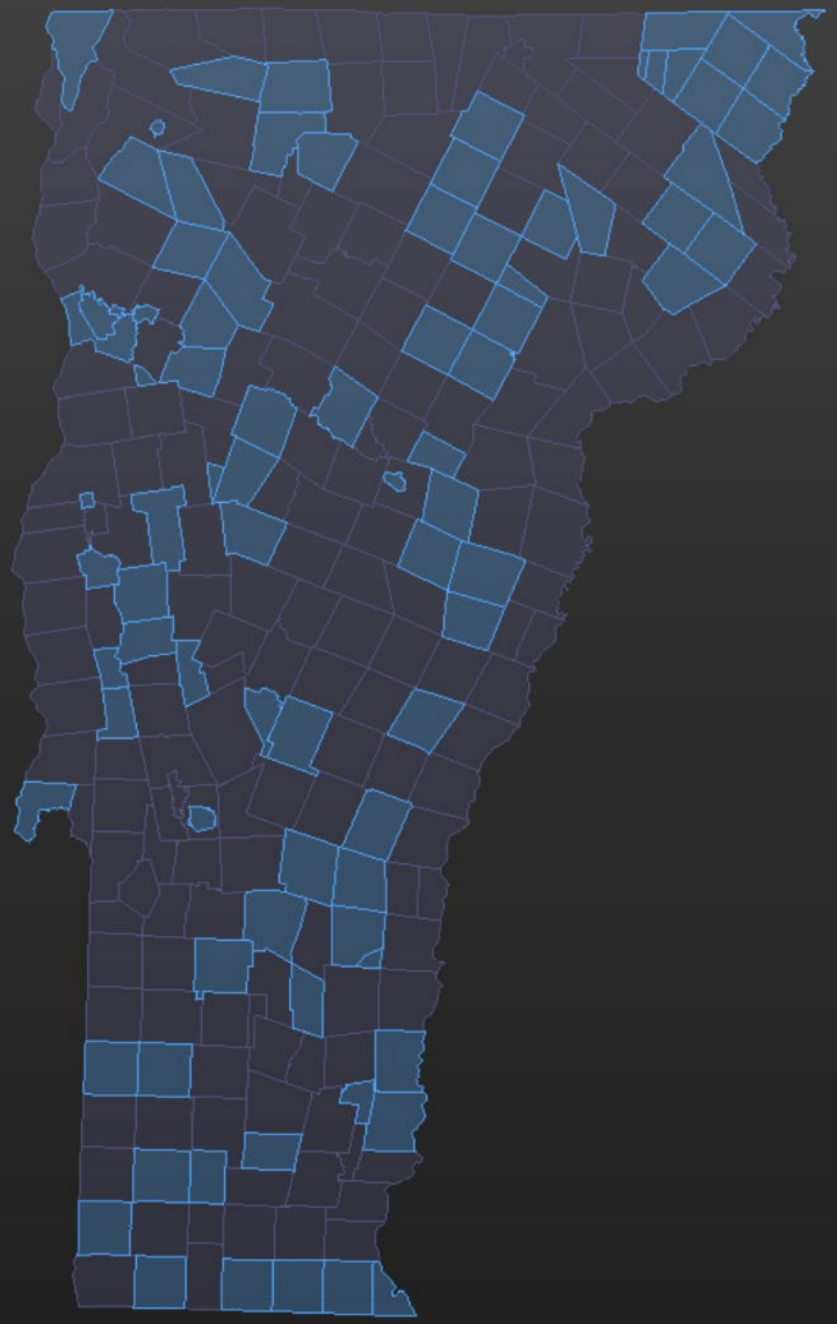
MAPPING STATUS

Town Updates Received

Geometry Revisions and Maintenance

vcgi.vermont.gov/data-and-programs/parcel-program

As of October 27, 2022



Who has sent updates?

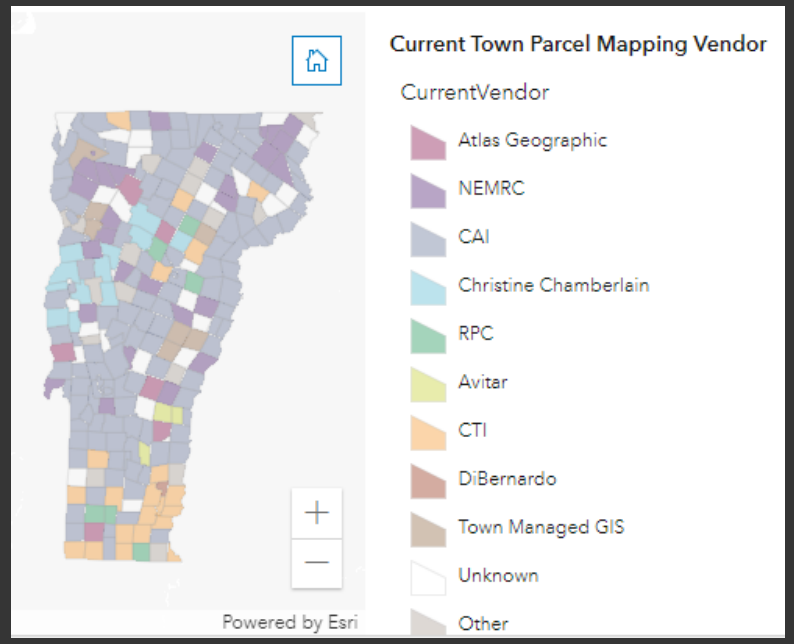
1 Town	5 submittals	>1% of All Towns
5 Towns	4 submittals	2% of All Towns
41 Towns	3 submittals	16% of All Towns
55 Towns	2 submittals	21% of All Towns
68 Towns	1 submittal	27% of All Towns
86 Towns	0 submittals	34% of All Towns

170 (66%) Towns Have Submitted Updates

86 (34%) Towns Have Not

Since beginning of program on January 1, 2020,
as of Oct. 27, 2022

Who has sent updates?



10 Non-VCGI Updating Entities - 326 Submittals Total (156 Towns Submitted >1)

Updating Entity	Total Submittals	
CAI	233	(71%)
CTI	41	(13%)
Christine Chamberlain Mapping	21	(6%)
NEMRC	11	(3%)
Town Managed GIS	6	(2%)
Town Managed Lister	6	(2%)
Atlas Geographic	5	(2%)
VHB	1	(<1%)
John Deleo	1	(<1%)
Avitar	1	(<1%)

Since beginning of program on January 1, 2020, as of Oct. 27, 2022

170 Currently Published Town Submittals (Non-VCGI Update)

Updating Entity	Published Towns	
CAI	116	(68%)
CTI	18	(11%)
Christine Chamberlain Mapping	12	(7%)
NEMRC	10	(6%)
Atlas Geographic	4	(2%)
Town Managed GIS	4	(2%)
Town Managed Lister	3	(2%)
VHB	1	(<1%)
John Deleo	1	(<1%)
Avitar	1	(<1%)

Who hasn't?

86 Towns No Submitted GIS Updates Total

Vendor as Known	Outstanding Towns	
Unknown	28	(33%)
NEMRC	19	(22%)
CAI	9	(10%)
RPC	6	(7%)
CTI	4	(5%)
Town Managed GIS	3	(3%)
Avitar	2	(2%)
Main Street GIS (now CAI)	3	(3%)
Christine Chamberlain	1	(1%)
None	1	(2%)
Town Managed Lister	2	(2%)
DiBernardo	1	(1%)
Brow Survey and Engineering	1	(1%)
Landvest	1	(1%)
LaRose Survey	1	(1%)
CDM Smith	1	(1%)
Atlas Geographic	1	(1%)

Since beginning of program on January 1, 2020, as of Oct. 27, 2022

Who hasn't?

86 Towns No Submitted GIS Updates Total

VCGI-updated Towns (37) → 49 towns total not GIS updated

Vendor as Known	Outstanding Towns	
Unknown	28	(33%)
NEMRC	19	(22%)
CAI	9	(10%)
RPC	6	(7%)
CTI	4	(5%)
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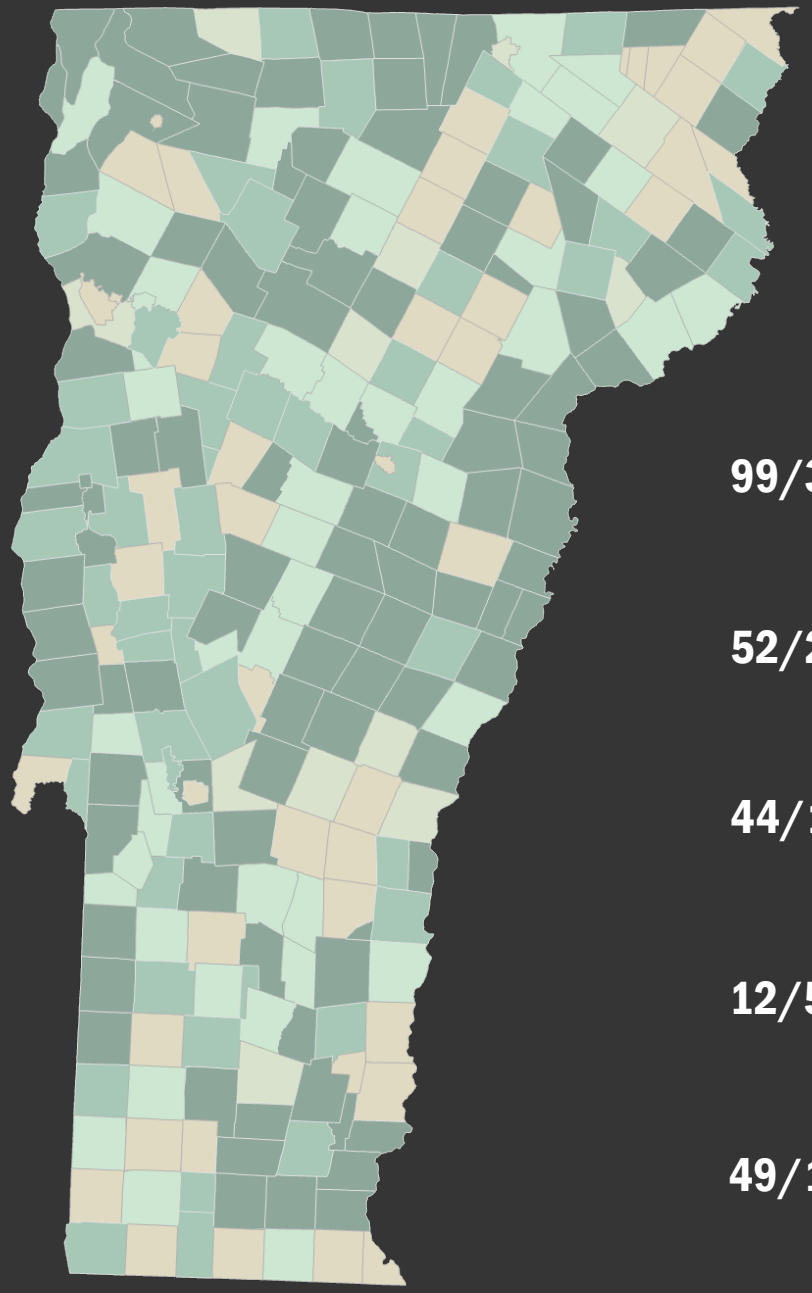
LaRose Survey	1	(1%)
CDM Smith	1	(1%)
Atlas Geographic	1	(1%)

Since beginning of program on January 1, 2020, as of Oct. 27, 2022

How recent are geometry?

as of Oct. 27, 2022

2022	139 Towns	54%	74%
2021	51 Towns	20%	
2020	15 Towns	6%	26%
2019	31 Towns	12%	
2018	20 Towns	8%	



99/39% Updated within last 6 months

52/20% Updated 6–12 months ago

44/17% Updated 1–2 years ago

12/5% Updated 2–3 years ago

49/19% Updated over 3 years ago

as of Oct. 27, 2022

as of Oct. 27, 2022

253/99% Not in publishing queue

3/1% In publishing queue

GIS Vendor

Maintain Own GIS

No Capacity

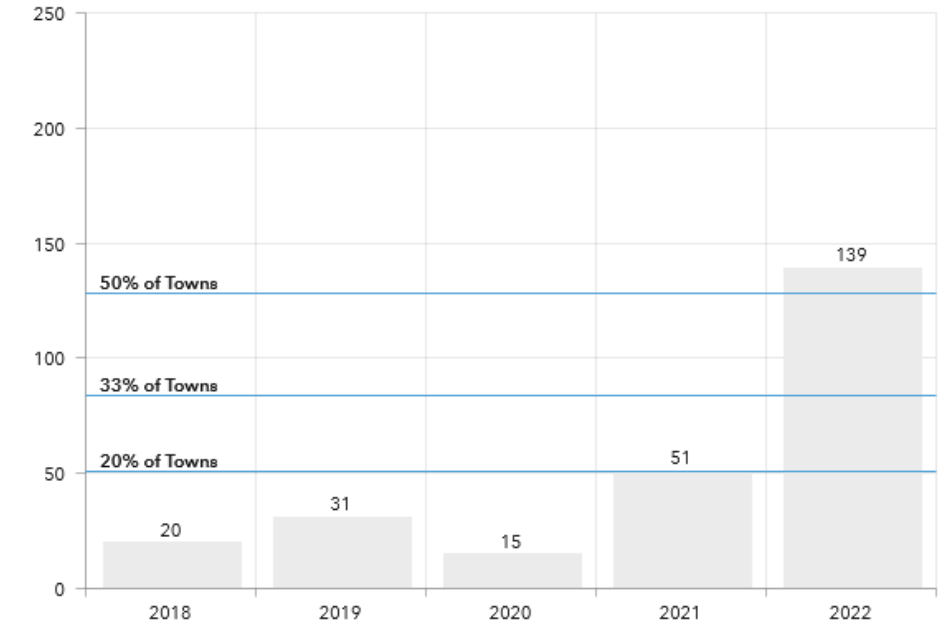
RPC

Unknown (VCGI Update)

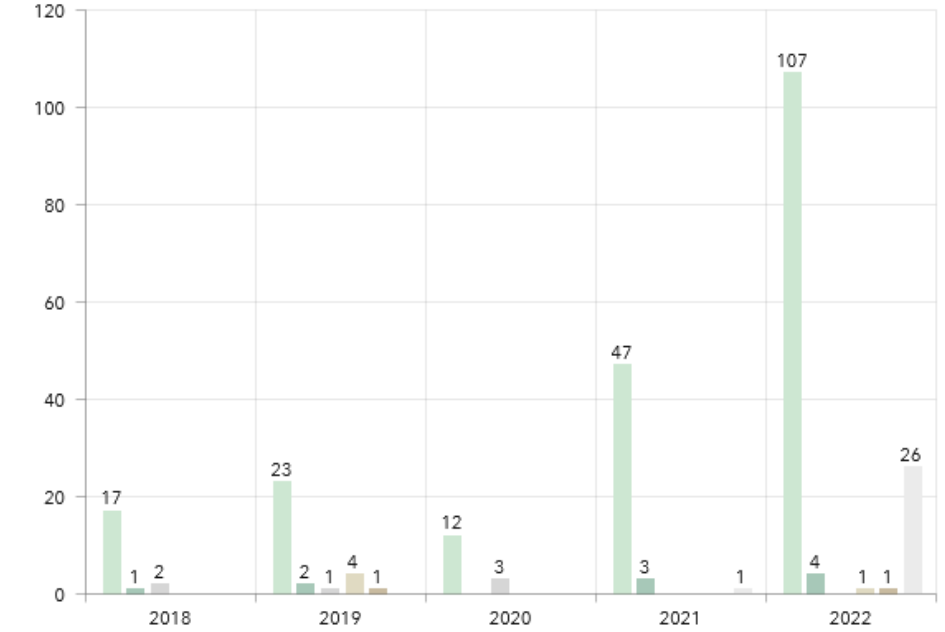
CAD Vendor

How recent are geometry?

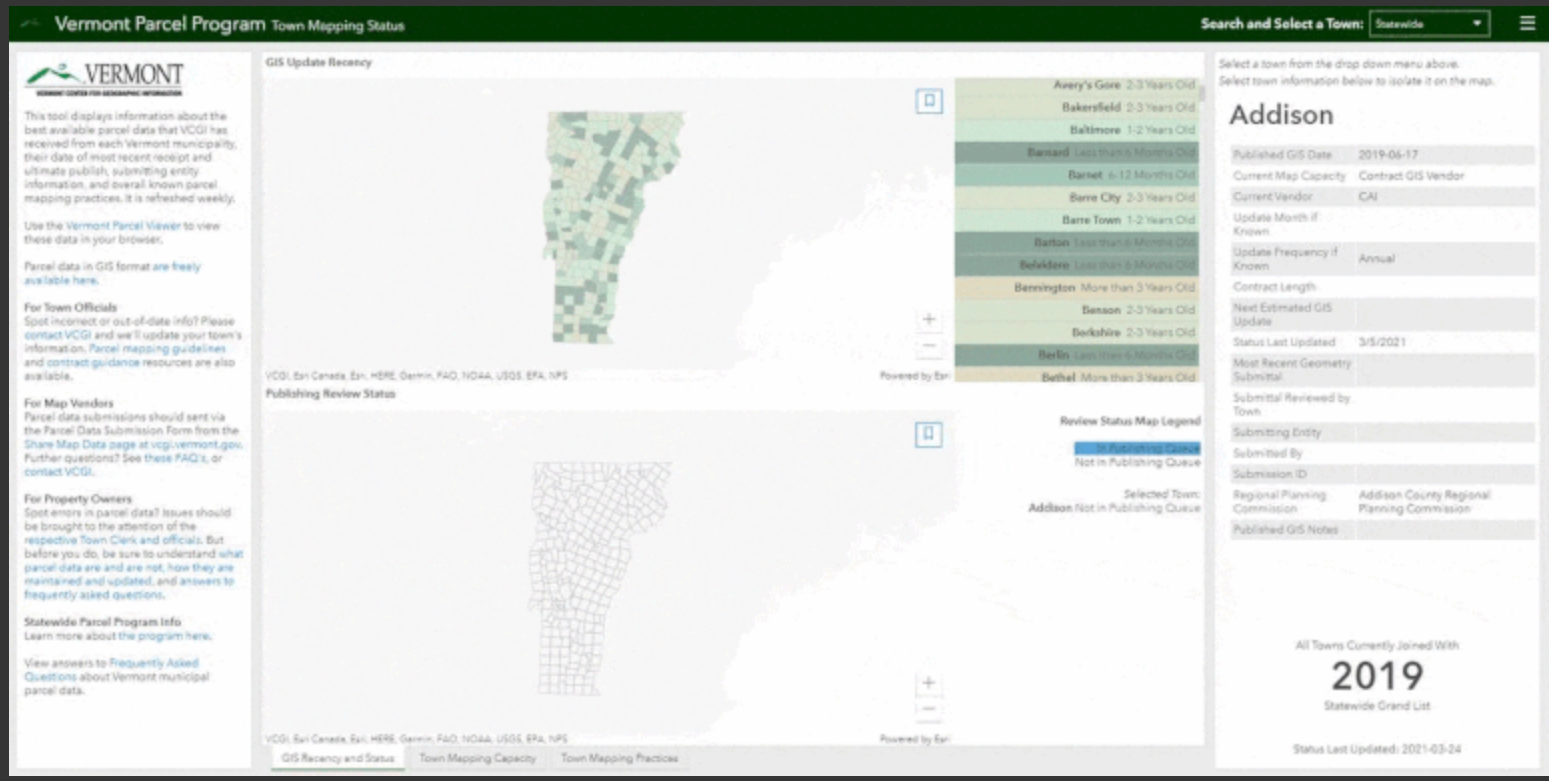
Most Recent Published Town GIS Updates by Year



Most Recent Published Town GIS Updates by Year by Known Map Capacity



How are geometry maintained?



Practices tracked and updated weekly at:
maps.vcgi.vermont.gov/parcelstatus

DEMO: PARCEL STATUS APP

https://maps.vcgi.vermont.gov/parcelstatus/

How-To:

https://vcgi.vermont.gov/how/improving-parcel-data-quality-reviewing-match-status

DATA QUALITY

Common GIS Jargon Defined

Multipolygons

Gaps & Overlaps

Multi-SPAN Parcels

Unlanded Structures & Grand List

Acreage Discrepancies

Unmatched Parcels

Ways Forward to Improve Data Quality

As of October 27, 2022

Common GIS Jargon Defined

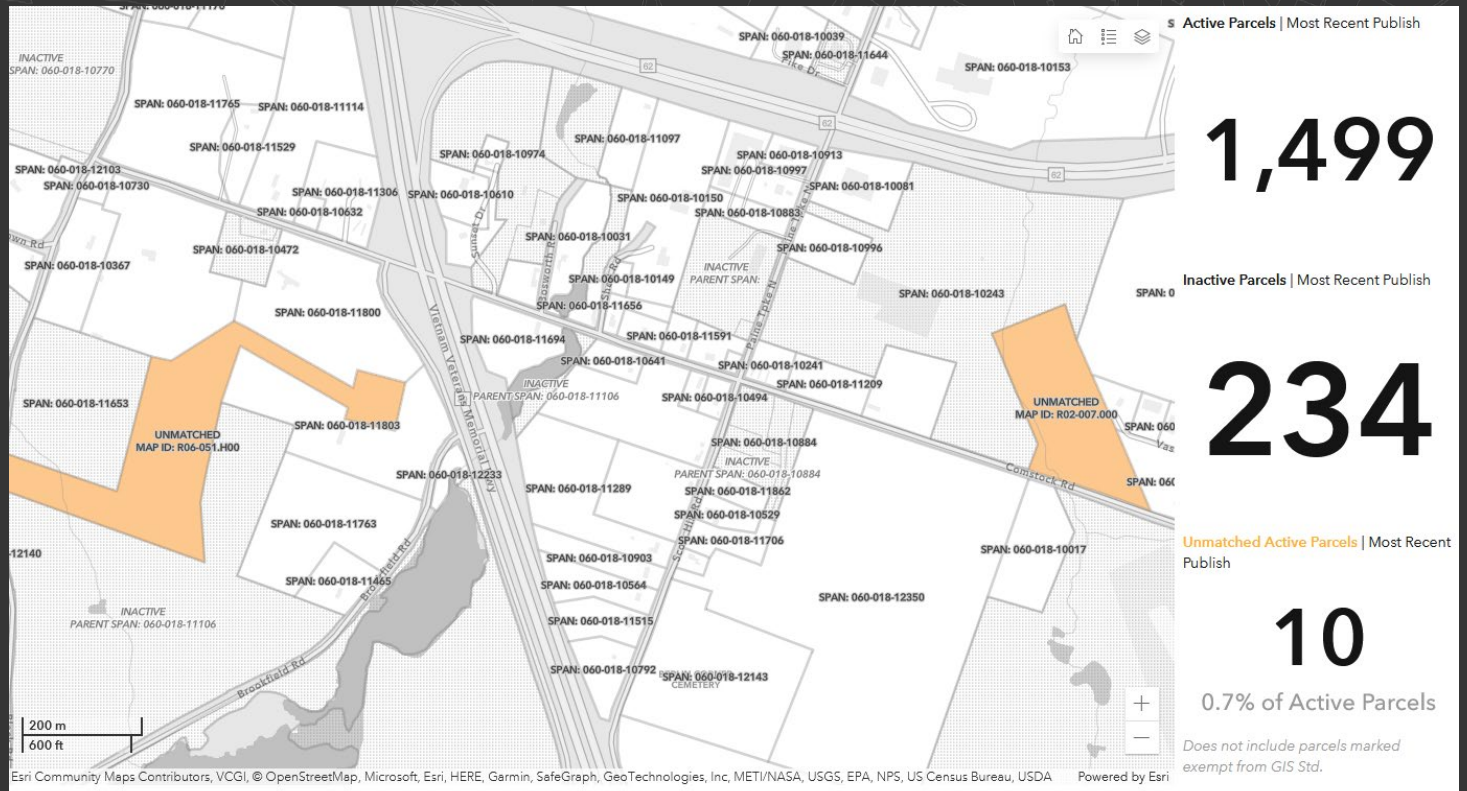
Attribute: A piece of information related with a map feature, listed in a table

Feature: A point, line, or polygon item on the map

Polygon: A multi-sided area shape

Symbology: Style and colors of map features

Unmatched Parcels



Grand List Unmatched or Exempt from GIS Standard Active Parcels

Select a town at top right to filter by town. Then select a record to locate it on the map. Unclick record(s) to deselect.

TOWN	GIS SPAN	Grand List SPAN	MAPID	PARCEL ID	PROPTYPE	MATCHSTAT
BERLIN			R01-022.COM		PARCEL	UNMATCHED
BERLIN			R09-010.000		PARCEL	UNMATCHED
BERLIN			U04-027.A00		PARCEL	UNMATCHED
BERLIN			R11-078.000		PARCEL	UNMATCHED
BERLIN			R06-051.H00		PARCEL	UNMATCHED
BERLIN			No Number		PARCEL	UNMATCHED
BERLIN			U03-018.000		PARCEL	UNMATCHED

GIS Recency and Status | Town Mapping Capacity | Town Match Status | Town Mapping Practices

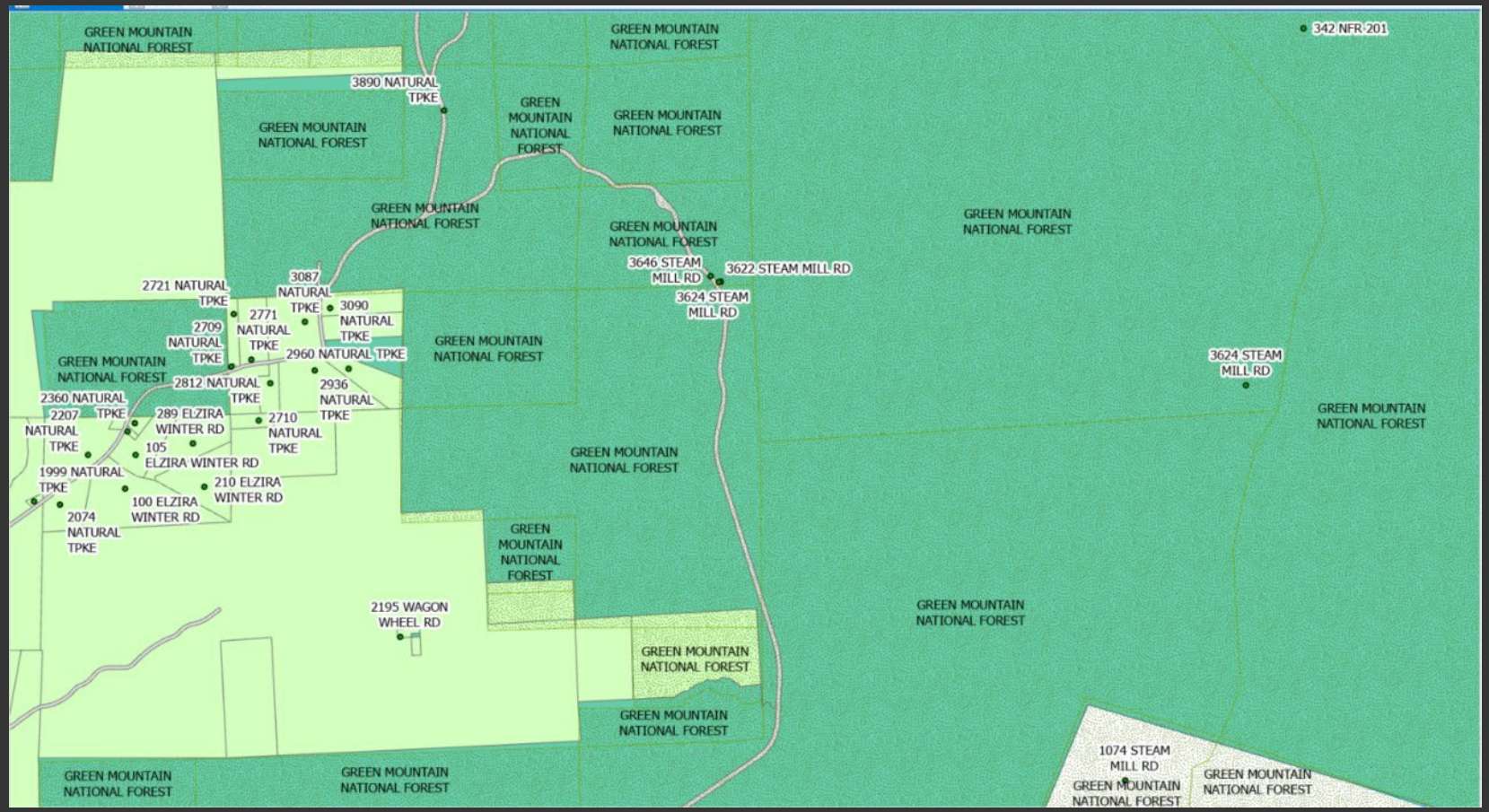
Addressing the Issue:
Municipal parcel data stewards should review digital map updates with their map vendor/maintainer to check for any inadvertently unmatched or misclassified parcels before their submittal to VCGI for publishing + after to catch next time.

Example: Berlin

Unmatched Parcels

Unmatched parcels that are conserved lands such as the Green Mountain National Forest.

Addressing the Issue:
All “PARCEL” PROPTYPE parcels should have a SPAN.



Example: Ripton

Multipolygons

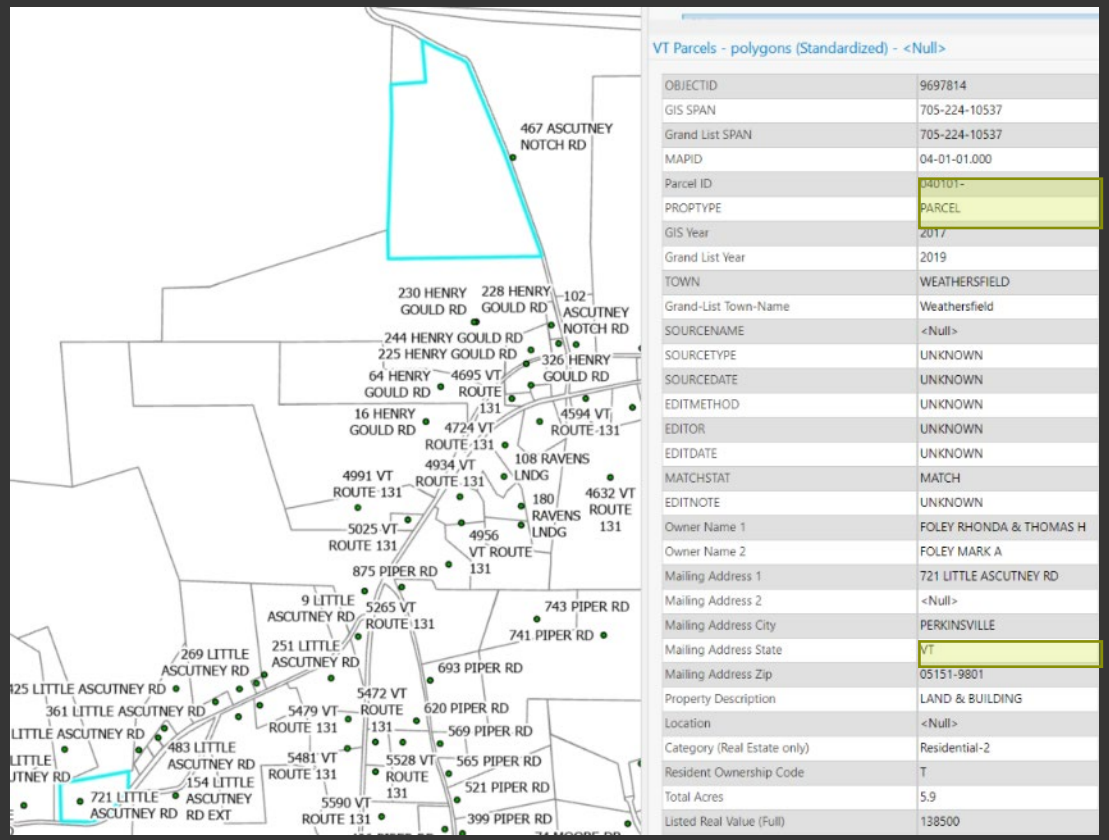
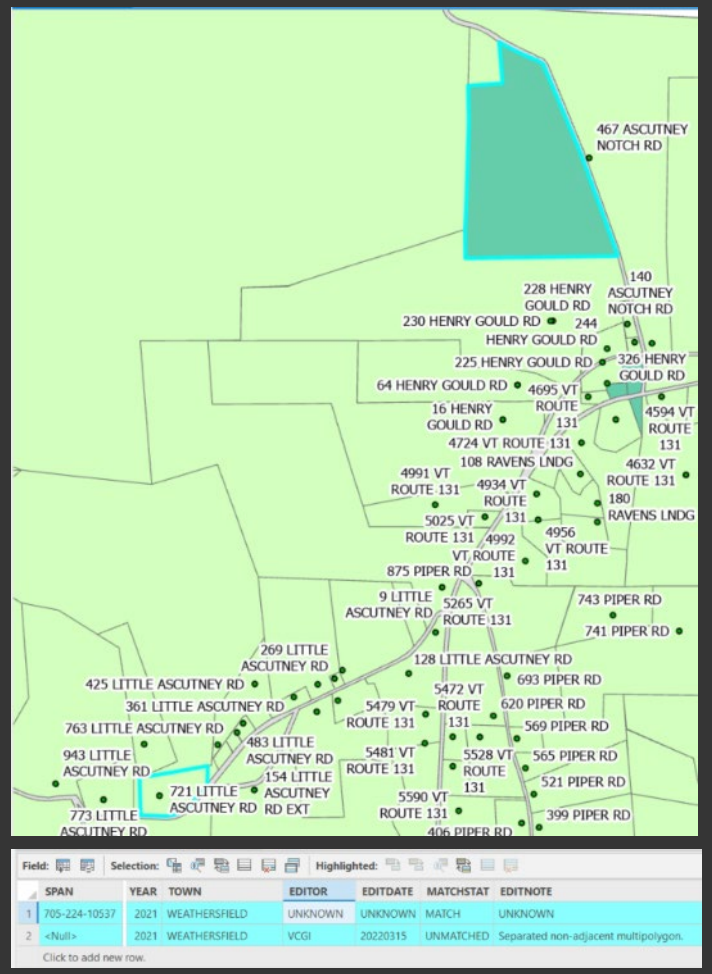


Image 1



Field: Selection: Highlighted:

	SPAN	YEAR	TOWN	EDITOR	EDITDATE	MATCHSTAT	EDITNOTE
1	705-224-10537	2021	WEATHERSFIELD	UNKNOWN	UNKNOWN	MATCH	UNKNOWN
2	<Null>	2021	WEATHERSFIELD	VCGI	20220315	UNMATCHED	Separated non-adjacent multipolygon.

Click to add new row.

Image 2

State statute defines a parcel as "all contiguous land in the same ownership, together with all improvements thereon" (32 V.S.A. § 4152(a)(3)). Though not specifically stated above, the accepted interpretation is that division of a tract by a road does not create two parcels (multi-part parcels, non-contiguous parcels, or multipolygons).

- Multipolygons are OK if they are split by an "exempt" feature such as a road or body of water.
- **Addressing the Issue:** check for multipolygons that are geographically very far away, they're often erroneous.

Example: Weathersfield

Gaps & Overlaps

Image 1

Addressing the Issue: Review with vendor/Check if there are any gaps between features or if any features are overlapping. Here, we've identified a gap present in Saint Albans Town parcel data.

Image 2

Create new feature to fill gap which created a new row in the attribute table.

Edit attribute table fields to match existing features.

New features are usually left unmatched (without a valid SPAN in the Grand List).

Example: Saint Albans Town

Multi-SPAN Parcels

Condos / Common Interest Ownership in Concept

By definition, there is common property involved in condominium ownership, and in property subject to the Uniform Common Interest Ownership Act (UCIOA) contained in Title 27A of the Vermont Statutes Annotated. The assessment of each unit must include the value of that unit's percentage of undivided interest in the common areas and common facilities. **27 V.S.A. § 1322** and **27A V.S.A. § 1-105**.

As an example, in a 100-unit condominium where each was purchased with an undivided interest in the common land, the grand list would have 100 parcels, each including 1% interest in the common property. The building, the land and any of the common areas and facilities are not to be separately listed.

Multi-SPAN Parcels

Visualization

Image 1

Image 2

Building footprints

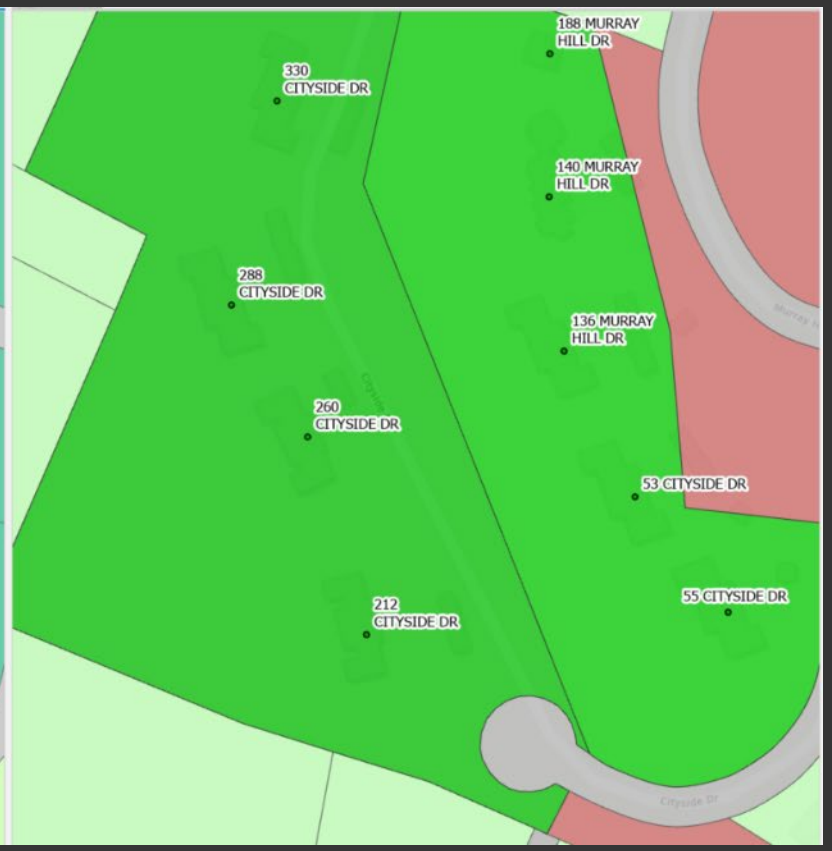


Image 3

No building footprints

Multi-SPAN parcels are almost always associated with unlanded structures such a condos, mobile home parks, seasonal camps, solar farms, etc.

Addressing the Issue: Building footprints are used to distinguish between the unlanded structures and the common land. Not ideal; instead use entire parcel as "stacked" polygons…but with caveat on next slide.

(When no building footprints are used, all relevant SPANs will be associated with the entire polygon including the common land, as it should be per definition of portion stake in common land.)

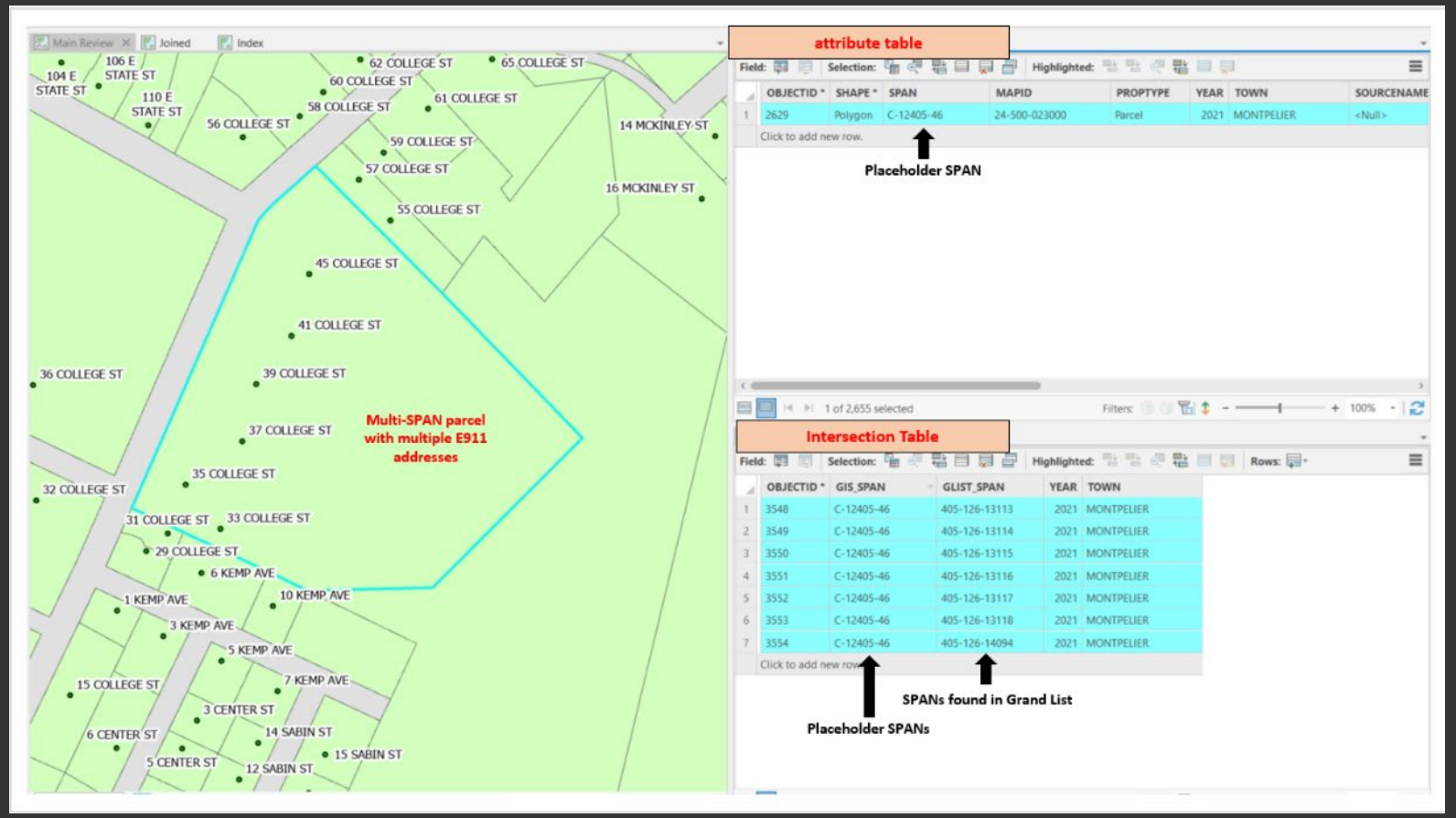
Example: Montpelier

Multi-SPAN Parcels

Attribution

When no building footprints are used, all relevant SPANs will be associated with the entire polygon, creating a challenge as every parcel gets one SPAN in the attribute table.

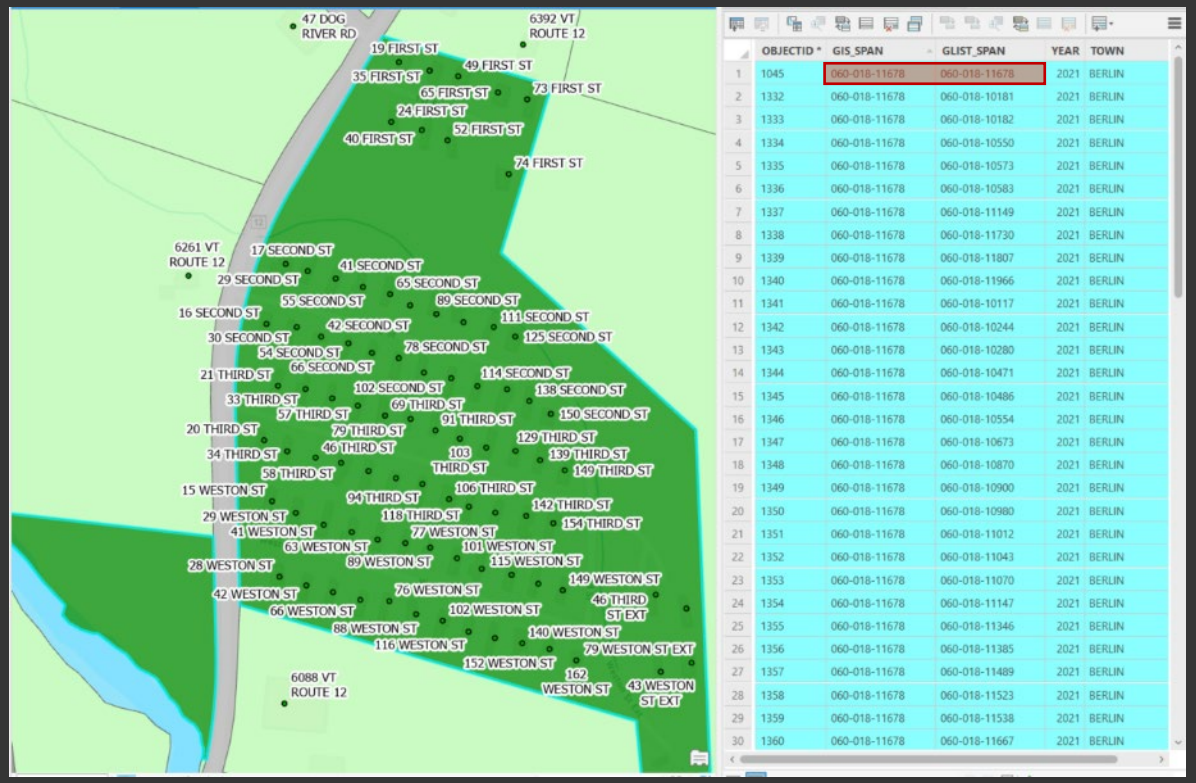
Addressing the Issue: The Intersection Table is used to relate one "placeholder" SPAN in the attribute table to several SPANs in the Grand List.



Example: Montpelier

Multi-SPAN Parcels

Attribution

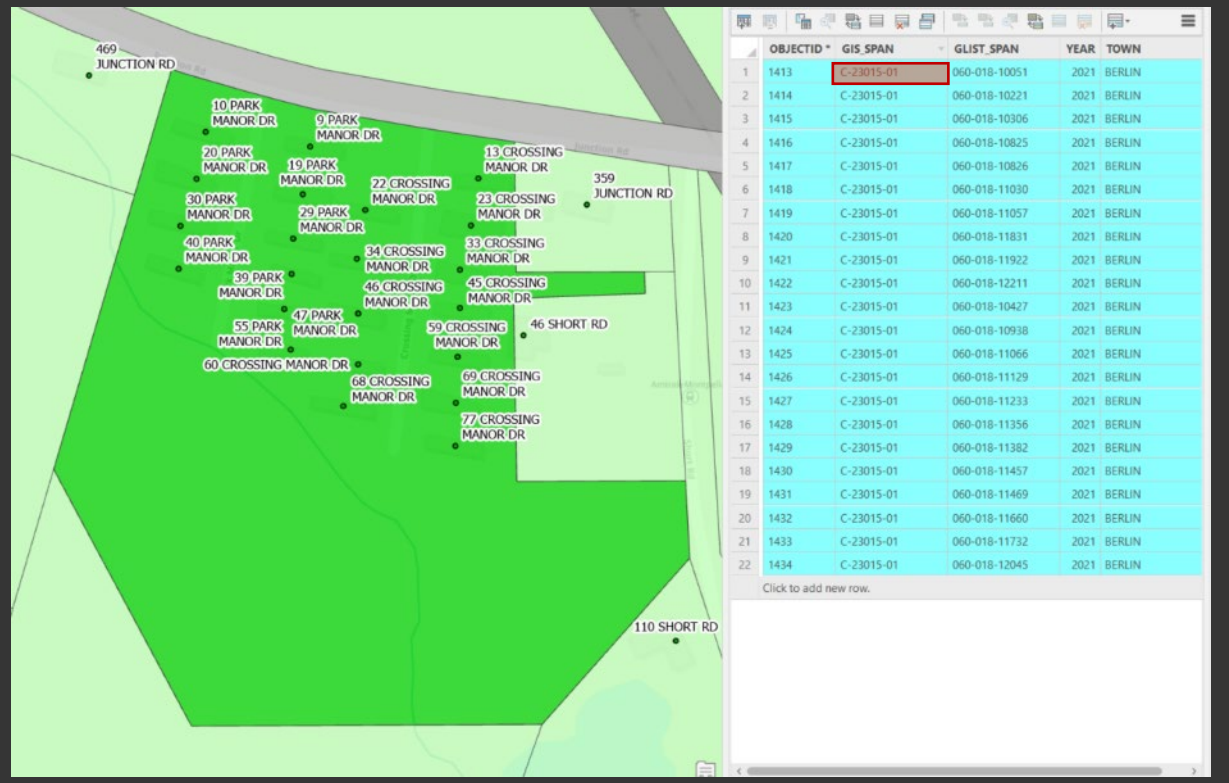


OBJECTID *	GIS_SPAN	GLIST_SPAN	YEAR	TOWN
1	1045	060-018-11678	060-018-11678	2021	BERLIN
2	1332	060-018-11678	060-018-10181	2021	BERLIN
3	1333	060-018-11678	060-018-10182	2021	BERLIN
4	1334	060-018-11678	060-018-10550	2021	BERLIN
5	1335	060-018-11678	060-018-10573	2021	BERLIN
6	1336	060-018-11678	060-018-10583	2021	BERLIN
7	1337	060-018-11678	060-018-11149	2021	BERLIN
8	1338	060-018-11678	060-018-11730	2021	BERLIN
9	1339	060-018-11678	060-018-11807	2021	BERLIN
10	1340	060-018-11678	060-018-11966	2021	BERLIN
11	1341	060-018-11678	060-018-10117	2021	BERLIN
12	1342	060-018-11678	060-018-10244	2021	BERLIN
13	1343	060-018-11678	060-018-10280	2021	BERLIN
14	1344	060-018-11678	060-018-10471	2021	BERLIN
15	1345	060-018-11678	060-018-10486	2021	BERLIN
16	1346	060-018-11678	060-018-10554	2021	BERLIN
17	1347	060-018-11678	060-018-10673	2021	BERLIN
18	1348	060-018-11678	060-018-10870	2021	BERLIN
19	1349	060-018-11678	060-018-10900	2021	BERLIN
20	1350	060-018-11678	060-018-10980	2021	BERLIN
21	1351	060-018-11678	060-018-11012	2021	BERLIN
22	1352	060-018-11678	060-018-11043	2021	BERLIN
23	1353	060-018-11678	060-018-11070	2021	BERLIN
24	1354	060-018-11678	060-018-11147	2021	BERLIN
25	1355	060-018-11678	060-018-11346	2021	BERLIN
26	1356	060-018-11678	060-018-11385	2021	BERLIN
27	1357	060-018-11678	060-018-11489	2021	BERLIN
28	1358	060-018-11678	060-018-11523	2021	BERLIN
29	1359	060-018-11678	060-018-11538	2021	BERLIN
30	1360	060-018-11678	060-018-11667	2021	BERLIN

Image 1

Example: Berlin

Valid SPAN in the Grand List used as placeholder SPAN



OBJECTID *	GIS_SPAN	GLIST_SPAN	YEAR	TOWN
1	1413	C-23015-01	060-018-10051	2021	BERLIN
2	1414	C-23015-01	060-018-10221	2021	BERLIN
3	1415	C-23015-01	060-018-10306	2021	BERLIN
4	1416	C-23015-01	060-018-10825	2021	BERLIN
5	1417	C-23015-01	060-018-10826	2021	BERLIN
6	1418	C-23015-01	060-018-11030	2021	BERLIN
7	1419	C-23015-01	060-018-11057	2021	BERLIN
8	1420	C-23015-01	060-018-11831	2021	BERLIN
9	1421	C-23015-01	060-018-11922	2021	BERLIN
10	1422	C-23015-01	060-018-12211	2021	BERLIN
11	1423	C-23015-01	060-018-10427	2021	BERLIN
12	1424	C-23015-01	060-018-10938	2021	BERLIN
13	1425	C-23015-01	060-018-11066	2021	BERLIN
14	1426	C-23015-01	060-018-11129	2021	BERLIN
15	1427	C-23015-01	060-018-11233	2021	BERLIN
16	1428	C-23015-01	060-018-11356	2021	BERLIN
17	1429	C-23015-01	060-018-11382	2021	BERLIN
18	1430	C-23015-01	060-018-11457	2021	BERLIN
19	1431	C-23015-01	060-018-11469	2021	BERLIN
20	1432	C-23015-01	060-018-11660	2021	BERLIN
21	1433	C-23015-01	060-018-11732	2021	BERLIN
22	1434	C-23015-01	060-018-12045	2021	BERLIN

Click to add new row.

Image 2

Addressing the Issue: Create unique C-SPAN as placeholder SPAN using FIPS code, placing record in same parcel while retaining Unique GL SPAN

Unlanded Structures & Grand List Acreage

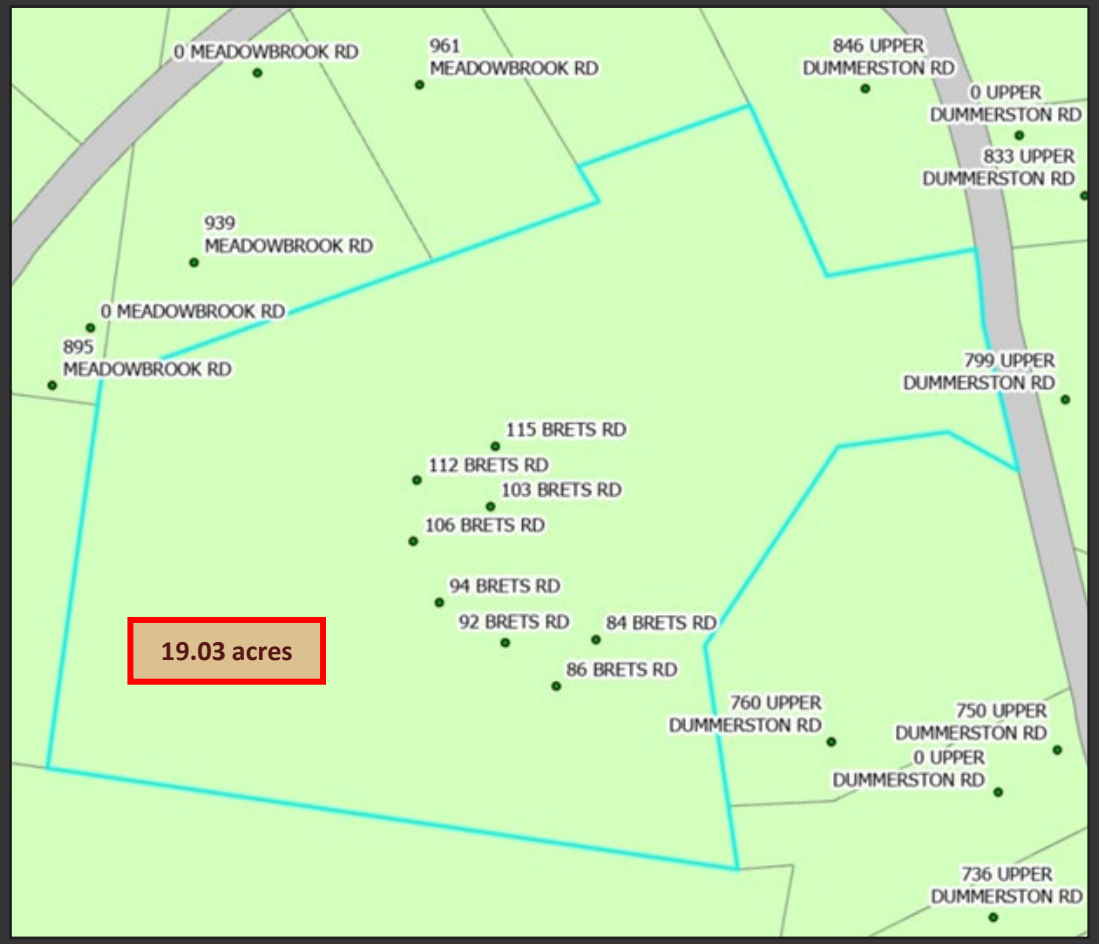


Image 1

Image 2

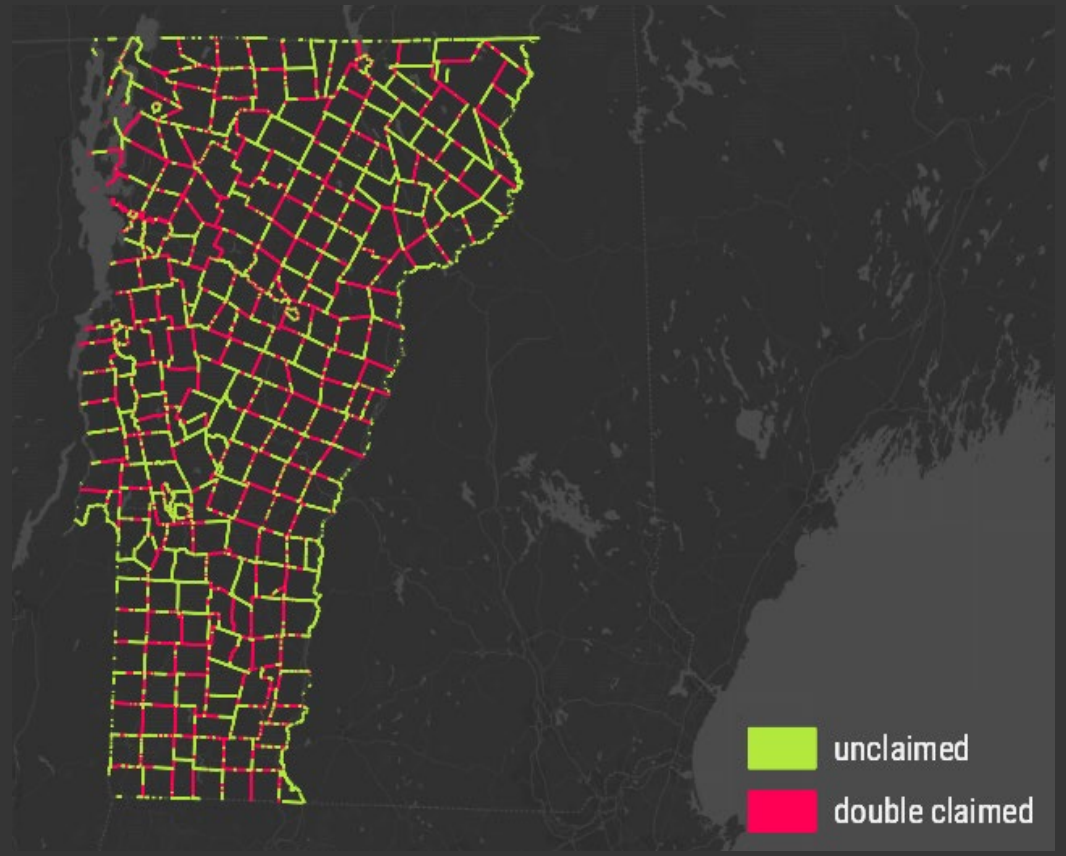
Total acres associated with multi-SPAN parcel in Brattleboro and the associated Grand List entries for each address.

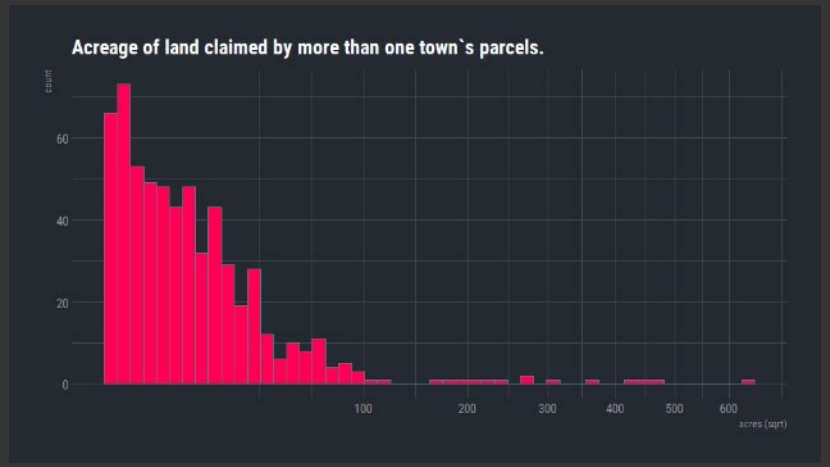
Addressing the Issue: Ideally, equal percentage of total acreage for each unit (e.g., 2.38 ac in this example)

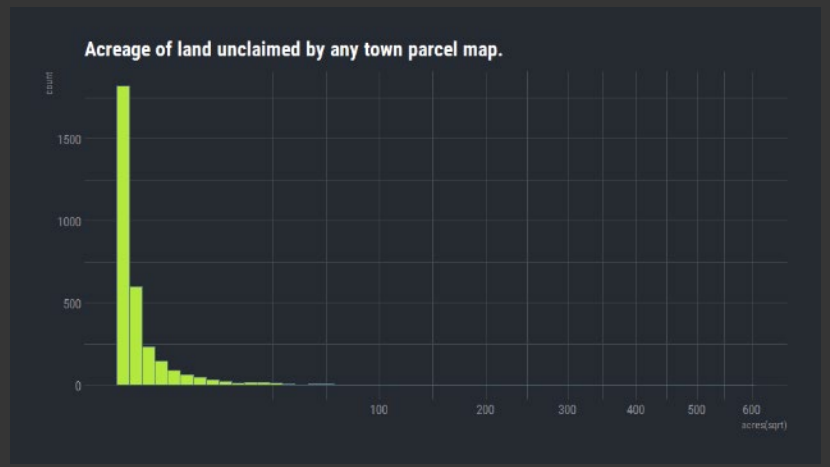
acresgl	descprop	locaprop	cat	rescode	e911addr
0.0	CONDOMINIUM	NULL	Other	T	84 BRETS RD
0.0	CONDOMINIUM	NULL	Other	T	86 BRETS RD
0.0	CONDOMINIUM	NULL	Other	T	92 BRETS RD
0.0	CONDOMINIUM	NULL	Other	T	94 BRETS RD
0.0	CONDOMINIUM	NULL	Other	T	106 BRETS RD
0.0	CONDOMINIUM	NULL	Other	NS	112 BRETS RD
0.0	CONDOMINIUM	NULL	Other	T	115 BRETS RD
0.0	CONDOMINIUM	NULL	Other	T	103 BRETS RD

Example: Brattleboro

Border Discrepancies



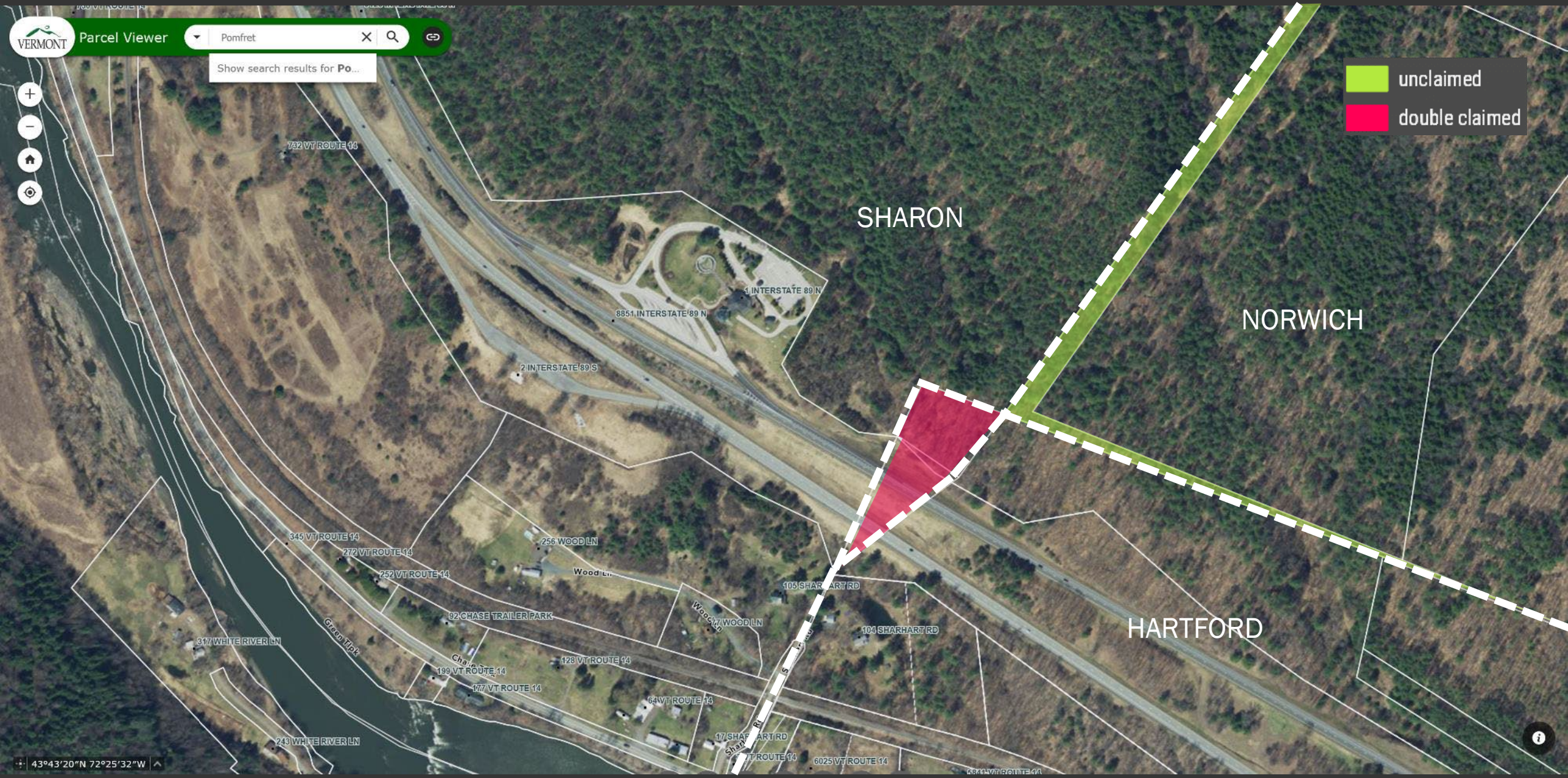




Ongoing challenge of unclaimed and double claimed land at town boundaries.

Many of the claims represent small slivers of land.

Addressing the Issue:
Likely a larger, statewide effort to accurately document town bounds and establish relationship with parcels. For now, be aware.



Addressing the Issue: For now, carefully review parcels with shared boundaries, may have to coordinate cross-town

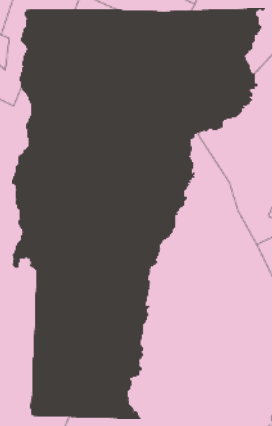
Inactive Parcels

A) Maintain them
B) Standardize & Require Submittal

Parcel Program

Recommendations:

Ways Forward to Improve Data Quality



- Regular, planned, and **documented continual maintenance** is key: from property transfers (quick) to geometry (slow). **Review vendor's work** regularly and make sure they **share!**

- **SPANS for all parcels** (When in doubt, attribute!)
  - If parcel is not in GL utilize notes to provide context (i.e., utility, common land, national guard, cemetery, etc.), vendor carries to EDITNOTE field

- Normalize tracking of **unlanded buildings** (condos/mobile homes). At the least, make sure all are attributed w/ SPAN

- **Edge-matching** without uniform town boundaries: for now, work with neighboring towns on border properties

- Develop **regular tracking practices** and **cross-referencing of source material** (e.g., plat #, book/page…), YoY changes

- **Review parcels in reference to best-available GIS info** (e.g., aerial imagery, surveys, web tools, published data)

- **Prioritize changes, professionalize maintenance, be in contact**

Questions?

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Dylan Broderick: Dylan.Broderick@vermont.gov; 802-272-7344

https://vcgi.vermont.gov/data-and-programs/parcel-program

VERMONT

VERMONT CENTER FOR GEOGRAPHIC INFORMATION

RESOURCES

Vermont Parcel Program Overview

Parcel Program FAQ's

Vermont Parcel Viewer

Municipal Parcel Data Status

Improving Parcel Data Quality: Match Status

Vermont Parcel GIS Data

Vermont GIS Parcel Data Standard

Vermont Parcel Mapping Guidelines

Vermont Land Survey Library

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Vermont's Statewide Parcel Program

Municipal Parcel Data: Features, Improving Data Quality, and the Future

ANR Municipal Day 2022

tim.terway@vermont.gov | October 28, 2022

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