
AN ASSESSMENT OF PARCEL DATA IN THE UNITED STATES

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A cadastral survey of all states and the District of Columbia was conducted between October, 2002 and February, 2003. This survey was part of the FGDC Cadastral Subcommittee's efforts to test and evaluate a cadastral core data layer¹ for the purpose of creating a design and implementation strategy for a national parcel database. The success of this effort is dependent upon the ability of local governments to annually provide parcel core data to an area integrator for compilation into a multi-jurisdictional database. The objective of this survey was to acquire a preliminary assessment of the number of parcels in the United States and the status of the conversion of parcel maps into a digital form. The survey was sent to each state GIS coordinator who had the appropriate person complete the questionnaire. The data provides a good estimate of the status of parcel data, but should not be considered definitive because some states were only able to partially respond to the survey and/or estimate numbers. A summary of the results is provided in the appendices.

STATE MANAGEMENT AND COLLECTION:

All states, with the exception of Alaska, distribute the responsibility of collecting parcel data to local governments with varying degrees of oversight and support provided by a state agency. Sixteen (16) states indicated that they have some sort of central management of local property assessors² and twenty-two (22) states indicated that they compiled some form of parcel data³ from local governments at the state level, usually on an annual basis to the state revenue authority. Even though the data may not be a parcel GIS layer, central reporting does provide an infrastructure for the transfer of parcel core data to an area integrator.

DISTRIBUTION OF RESPONSIBILITY: The number of entities in a state that are responsible for collecting parcel data varies from under 10 in Rhode Island, Hawaii, and Montana to over 250 in Texas, Massachusetts, Vermont, and Maine. In most states the responsibility rests at the county level with a total of 2,907 counties acting as the primary responsible entity for collecting and

managing parcel data. On the average there are 65 counties per state that are responsible for managing parcel data with Texas having the most at 265 counties. Yet the 11 states that have delegated responsibility to the municipal or township level accounted for an additional 1,587 entities with Connecticut, New Hampshire, Vermont, Massachusetts, and Maine accounting for over 1,335.

PARCELS AND DENSITY: The total number of privately owned parcels in all 50 states and the District of Columbia is approximately 140 million; the average number of persons per parcel was 1.99, ranging from .9 in Montana to 3.5 in New York. As expected these two states were at the limits of population density with 6.2 (47th) and 401 (6th) persons per square mile. New Jersey reported the highest population density of 1,134 with 2.4 persons per parcel and Alaska the least at 1.1 persons per square mile. The actual number of parcels in Alaska was not estimated because of the large proportion of federal lands.

Another perspective on density can be acquired by looking at the parcels per square mile, the average for all fifty states being forty (40). Five states were at the lower end of the range, having densities of less than ten parcels per square mile: Wyoming (3), South Dakota (4), North Dakota (5), Montana (7), and Nevada (9). Four states were on the high end, having densities greater than 250 parcels per square mile: Connecticut (260), Massachusetts (281), Rhode Island (373), and New Jersey (472). The District of Columbia, which represents a 100% urban environment, reported 2,787 parcels per square mile.

PARCELS CONVERTED: Because of the way in which states are organized, only thirty-four (34) states were able to provide an estimate on the number of parcels that have been digitally converted into a format that can be readily used in a GIS. Of those thirty-four, it is estimated that 61% of the parcels are converted with the range varying from 10% to 100% with 13 states having over 70% converted. It is probably safe to say that most communities with populations over 250,000 have some type of GIS for their parcel data and it could be expected that an active conversion effort is underway, if not complete. The cost of conversion ranges from \$4.25 per parcel to \$15 per parcel for coordinate geometry (COGO) data⁴.

DIGITAL ORTHO'S: Large-scale Ortho's, approximately 1 ft resolution, are practically a requirement for the use of digital parcel data, primarily for quality assurance and verification. This large-scale imagery is collected by local governments in the more urbanized and high growth areas. The small-scale orthoimagery, 1-meter Digital Ortho Quarter Quads (DOQQ), which were designed for mapping and planning purposes, are used in rural areas if large-scale imagery is not available. The DOQQ's are conveniently pervasive throughout most of the United States as a result of the US Geological Survey's (USGS) cooperative assistance pro-

gram. Forty-two states indicated that they have or had participated in some sort of small-scale (1 meter) orthoimagery program in the past ten years. Interestingly, the survey identified a trend that states are beginning to move away from 1-meter statewide coverage towards the statewide acquisition of 1 foot imagery. Nine states indicated that they had some sort of large-scale imagery acquisition program and four of those states are not planning to acquire any additional 1-meter imagery. The driving force appears to be the reduced costs of large-scale imagery, which is now roughly on par with the cost of previous acquisitions of 1-meter imagery and the broader utility of large-scale imagery. Furthermore, digital multi-spectral cameras are replacing film cameras and increasing the options because they are capable of capturing black and white, true color, color infra red, and 3D imagery in a single flight.

SUMMARY: The conversion of parcel databases appears to be well underway with over half of the 140 million parcels converted into a form that can be used in a GIS. Large-scale orthoimagery goes hand in hand with the development and maintenance of a parcel database. There appears to be a trend to replace the acquisition of 1-meter Digital Orthophoto Quarter Quads with large scale one foot imagery. In regard to the long-term goal of creating a national parcel database the institutional issues appear to be the biggest hurdle. Less than half of the states indicated that parcel data was being centrally collected. Without this infrastructure in place, it will make it difficult at best to gather the data from local governments into a statewide or multi-state coverage.

¹ <http://www.fairview-industries.com/core.html>

² Property assessor is used in a generic sense, the titles and the distribution of responsibilities vary widely from state to state.

³ Frequently CAMA attribute data.

⁴ US Mapping Cost Model, National States Geographic Information Council, Bill Burgess, 2002, <http://www.msgic.state.md.us/publicat/index.htm>

Appendix A

Parcel Data and the Status of the States 2003

State	Centrally Maintained	Centrally collected	State Population	Square Miles	Density <i>Persons per square mile</i>	Parcels in State	Persons Per Parcel	%Converted	Converted	Growth Rate	County	Cities
Alabama	Yes	Yes	4,500,000	50,750	88.7	2,600,000	1.7	65%	1,690,000	10.1%	67	
Alaska	Yes	Yes	634,892	571,591	1.1	**	**	85%	**	14.0%	0	
Arizona	No	No	5,130,632	113,635	45.2	2,538,250	2.0	72%	1,827,540	40.0%	15	
Arkansas	No	No	2,692,090	52,068	51.7	2,016,500	1.3	UK	UK	13.1%	75	
California	No	No	33,871,648	155,959	217.2	12,000,000	2.8	73.5%	8,820,000	13.5%	58	
Colorado*	No	No	4,301,261	103,718	41.5	2,200,000	2.0	UK	UK	30.6%	64	
Connecticut	No	No	3,405,565	5,009	679.9	1,300,000	2.6	60%	780,000	3%	0	169
Delaware*	No	Yes	783,600	1,954	401.0	402,897	1.9	UK	UK	17.6%	3	
District of Columbia	Yes	Yes	572,059	61	9,378.0	170,000	3.4	100%	170,000	-5.7%	1	
Florida	Yes	Yes	15,982,378	53,927	296.4	8,500,000	1.9	82%	6,970,000	23.5%	67	
Georgia	Yes	Yes	8,383,000	57,906	144.8	3,300,000	2.5	30%	990,000	26.4%	159	
Hawaii	No	No	1,211,537	6,423	188.6	351,352	3.4	100%	351,352	9.3%	4	
Idaho	Part	No	1,293,953	82,747	15.6	1,000,000	1.3	60%	600,000	28.5%	44	
Illinois	No	No	12,419,293	55,584	223.4	6,500,000	1.9	UK	UK	8.6%	102	
Indiana	Yes	Yes	6,800,000	35,867	189.6	3,500,000	1.9	50%	1,750,000	9.7%	92	
Iowa	No	No	2,926,324	55,869	52.4	2,180,000	1.3	50%	1,090,000	5.4%	99	
Kansas	No	Yes	2,688,418	82,000	32.8	1,504,405	1.8	75%	1,128,304	.8%	105	

An Assessment of Parcel Data in the United States

State	Centrally Maintained	Centrally collected	State Population	Square Miles	Density <i>Persons per square mile</i>	Parcels in State	Persons Per Parcel	%Converted	Converted	Growth Rate	County	Cities
Kentucky	Yes	Yes	4,041,769	40,409	100.0	2,024,125	2.0	70%	1,416,888	9.7%	120	
Louisiana	No	No	4,465,000	43,562	102.5	2,100,000	2.1	UK	UK	5.9%	70	
Maine	No	No	1,274,923	30,862	41.3	720,000	1.8	UK	UK	3.8%	0	500
Maryland**	Yes	No	5,296,486	9,774	541.9	2,000,000	2.6	60%	1,200,000	10.8%		1
Massachusetts	No	Yes	6,349,097	7,840	809.8	2,200,000	2.9	60%	1,320,000	5.5%	0	351
Michigan	No	No	9,938,444	56,804	175.0	5,000,000	2.0	50%	2,500,000	6.9%	83	
Minnesota	No	Yes	4,919,479	86,943	56.6	3,000,000	1.6	50%	1,500,000	12.4%	87	13
Mississippi	No	Yes	2,844,658	46,907	60.6	1,676,927	1.7	20%	335,385	10.5%	82	
Missouri	No	No	5,595,211	69,686	80.3	2,994,212	1.9	58%	1,736,643	9.34	114	1
Montana	Yes	Yes	902,195	145,552	6.2	1,000,000	0.9	99%	990,000	12.9%	8	
Nebraska	Part	Yes	1,711,263	76,872	22.3	1,000,000	1.7	UK	UK	8.4%	84	
Nevada*	No	No	1,998,257	109,826	18.2	1,030,029	1.9	UK	UK	66.3%	17	6
New Hampshire	No	No	1,235,786	9,282	133.1	650,000	1.9	UK	UK	11.41%	0	234
New Jersey	No	No	8,414,350	7,417	1,134.5	3,500,000	2.4	UK	UK	8.6%		
New Mexico	Yes	Yes	1,819,046	121,356	15.0	1,800,000	1.0	30%	540,000	15.0	33	
New York	No	No	18,976,457	47,214	401.9	5,400,000	3.5	50%	2,700,000	5.5%	61	20
North Carolina	No	No	8,049,313	48,000	167.7	4,421,245	1.8	95%	4,200,183	21.4%	100	
North Dakota*	No	No	642,200	69,976	9.2	331,031	1.9	UK	UK	.5%		
Ohio	No	Yes	11,355,000	44,824	253.3	5,750,000	2.0	60%	3,450,000	4.7%	80	
Oklahoma	No	No	3,450,654	68,677	50.2	2,101,658	1.6	95%	1,996,575	9.7%	77	
Oregon	Yes	Yes	3,421,399	95,997	35.6	1,616,119	2.1	55%	888,865	20.4%	36	
Pennsylvania	No	No	12,300,000	44,000	279.5	5,500,000	2.2	UK	UK	3.4%	67	
Rhode Island	No	No	1,048,319	1,045	1,003.2	390,000	2.7	UK	UK	0%		37
South Carolina	No	No	4,012,012	32,007	125.3	2,800,000	1.4	10%	280,000	15.1%	46	
South Dakota	No	No	754,844	75,885	9.9	329,346	2.3	20%	65,869	8.5%	66	
Tennessee	Yes	Yes	5,700,000	41,219	138.3	3,600,000	1.6	39%	1,404,000	14.3%	95	

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State	Centrally Maintained	Centrally collected	State Population	Square Miles	Density <i>Persons per square mile</i>	Parcels in State	Persons Per Parcel	%Converted	Converted	Growth Rate	County	Cities
Texas	No	No	20,851,820	261,797	79.6	15,385,913	1.4	UK	UK	22.8%	253	
Utah	No	No	2,233,169	82,144	27.2	980,000	2.3	30%	294,000	29.6%	29	
Vermont	No	Yes	609,000	9,250	65.8	314,500	1.9	UK	UK	8.2%	0	255
Virginia*	No	No	7,100,000	43,000	165.1	3,648,719	1.9	UK	UK	14.4%	134	
Washington	No	No	5,894,121	66,544	88.6	2,779,861	2.1	75%	2,084,896	21.1%	39	
West Virginia	Yes	Yes	1,808,344	24,231	74.6	1,400,000	1.3	10%	140,000	.8%	55	
Wisconsin	No	Yes	5,400,000	54,310	99.4	3,500,000	1.5	78%	2,730,000	9.6%	72	
Wyoming	Yes	Yes	493,782	97,100	5.1	336,605	1.5	UK	UK	8.9	23	
Total			282,503,048	3,555,380		141,343,694			57,940,500		2907	1587
Mean					367		1.99					
Median					94		1.94					
Percentage									61%			

** The number of counties is blank in Maryland because the Department of Assessments and Taxation appraises and manages their parcel data statewide.

Appendix B Management of Parcel Data

State	Central Collection	Centrally Manage	Responsible Entity	State Parcel Standard	State Assessment Standard	County Responsible	Municipalities Responsible
Alabama	Yes	Yes	County	In Progress	Yes	67	
Alaska	Yes	Yes	State and Federal	In Progress	No	0	
Delaware	Yes	No	Counties	No	No	3	
District of Columbia	Yes	Yes	Real Property Tax Administration	Yes	Yes	1	
Florida	Yes	Yes	County Property Appraiser	Yes	Yes	67	0
Georgia	Yes	Yes	County Tax Assessor Office	No	Yes	159	
Indiana	Yes	Yes	Townships, Counties, Municipalities	No	Yes	92	
Kansas	Yes	No	Local County Appraisers	Yes	Yes	105	
Kentucky	Yes	Yes	State Property Valuation Administrator (PVA)	de facto	de facto	120	
Massachusetts	Yes	No	Towns	Yes	Yes	0	351
Minnesota	Yes	No	County Assessor	No	No	87	13
Mississippi	Yes	No	County Tax Assessor	Yes	No	82	
Nebraska	Yes	Yes	County Assessors and County Register of Deeds	No	Yes	84	NA
Nevada	Yes	Somewhat	Counties, NDOT, State Lands	No	No	17	6
New York	Yes	Yes	County Real Property Services Director	Yes	Ad Hoc	61	20
Oklahoma	Yes	No	County Assessor's Office	Yes	Yes	77	
Pennsylvania	Yes	Yes	County Recorder of Deeds	Yes	Yes	67	
Texas	Yes	Yes	County - Chief Appraiser of County Appraisal Districts	No	No	253	

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State	Central Collection	Centrally Manage	Responsible Entity	State Parcel Standard	State Assessment Standard	County Responsible	Municipalities Responsible
Virginia	Yes	No	Counties and cities	In Progress	No	134	
Wisconsin	Yes	Yes	Counties and large (population) municipalities	Yes	Yes	72	Unknown
Wyoming	Yes	No	County Property Appraiser	In Progress	Yes	23	
Arizona	No	No	County Assessors	No	No	15	
Arkansas	No	No	County Assessor	No	No	75	
California	No	No	Local Government; County Assessor	No	No	58	
Colorado	No	No	County Assessor	Yes	UK	64	
Connecticut	No	No	Municipalities	No	No	0	169
Hawaii	No	No	County Real Property Divisions	No	No	4	
Idaho	No	Somewhat	County Assessors	In Progress	In Progress	44	
Illinois	No	No	Counties and Municipalities	Yes	Yes	102	
Iowa	No	No	County Auditor & Assessor	No	No	99	
Louisiana	No	No	County Tax Assessors	No	Yes	70	
Maine	No	No	Municipalities, Unorganized Territories - State	In Progress	No	0	500
Maryland	No	Yes	State with County Land Records Office	No	Yes	0	1
Michigan	No	No	Local Tax Assessor (Towns/Cities/Counties)	No		83	
Missouri	No	No	County Assessor	?	No	114	1
Montana	No	No	State Dept. of Revenue & 8 counties	de facto	Yes	8	
New Hampshire	No	No	Municipalities, Regional Planning Councils	In Progress	No	0	234
New Jersey	No	No	Local Government	In Progress		0	
New Mexico	No	Somewhat	County Assessor's	In Progress	In Progress	33	
North Carolina	No	No	County Tax Administration Offices	Yes	No	100	
North Dakota	No	No	UK	No	No	0	

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State	Central Collection	Centrally Manage	Responsible Entity	State Parcel Standard	State Assessment Standard	County Responsible	Municipalities Responsible
Ohio	No	No	County Auditor and County Engineers	Yes	Yes	80	
Oregon	No	No	County Assessor	Yes	Yes	36	
Rhode Island	No	No	Municipalities	In Progress	No		37
South Carolina	No	No	County Assessor's Office	Yes	No	46	
South Dakota	No	No	County Local Governments	No	No	66	
Tennessee	No	No	Tennessee's Comptroller of the Treasurer, Office for Local Government (OLG)	de Facto	Yes	95	
Utah	No	No	County Clerk/Assessor	No	de facto	29	
Vermont	No	No	Town	Yes	No	0	255
Washington	No	No	County Assessor	No	No	39	
West Virginia	No	No	Local County Assessor	Yes	Yes	55	
	21	13				2907	1587

Appendix C

Small-Scale Ortho Imagery Programs

State	Small Scale Ortho Program	Coverage	Resolution	Type	Update Cycle	Large Scale Ortho Program
Arizona	Yes	Statewide	1 M	BW	As Possible	No
California	Yes	Statewide	1 M	BW	As Available	No
Delaware	Yes	Statewide	1 M	BW 97, CIR 92	5 year	Yes
District of Columbia	NA	NA	NA	NA	NA	Yes
Florida	Ad Hoc	Statewide	1 M	CIR	5 year	Yes
Georgia	Yes					No
Hawaii	Yes	Statewide	1 M	CIR	NA	No
Idaho	Yes	Statewide	10 M; 2.5 M			Ad Hoc
Illinois	Yes	Statewide	1 M	BW	5 year	No
Iowa	Yes	Statewide	1 M	CIR	Annual	No
Kansas	Yes	Statewide	1 M		3 - 5 year	Local
Kentucky	Yes	Statewide	1"=1000 ft	BW		No
Louisiana	Yes	Statewide	1 M	CIR	UK	No
Maine	Yes	Unorganized Territories	1 M	True Color		Yes
Maryland	Yes	Statewide	1 M	BW & CIR	As needed	In Progress
Massachusetts	Yes	Statewide	.5M	Color	UK	No
Michigan	Yes	Statewide	1 M	CIR	5 year	Somewhat
Missouri	Yes	Statewide	1 M		5 - 7 years	No

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State	Small Scale Ortho Program	Coverage	Resolution	Type	Update Cycle	Large Scale Ortho Program
Montana	Yes	Statewide	1 M	BW	UK	Local
Nebraska	Yes	Statewide	1 M	BW	No	Ad Hoc
Nevada	Yes	Statewide	1 M			No
New Jersey	Yes	Statewide	1 M	CIR		Yes
North Carolina	Yes	Statewide	1 M	?	?	Local
Ohio	Yes	Statewide	1 M	BW		Local
Oklahoma	Yes	Statewide	1 M	BW	UK	No
Oregon	Yes	Statewide	1 M	BW	~ 5 year	No
Pennsylvania	Yes	Statewide	1 M	BW	5 - 10 years	Ad Hoc
South Dakota	Yes		1 M	B & W	UK	No
Texas	Yes	Statewide	1 M	CIR	8 year refresh, greater in urban areas	Ad Hoc
Utah	Yes	Statewide	1 M	BW		No
Virginia	Yes	Statewide	1 M	BW	Varies	Yes
Washington	Yes	Statewide	1.5 ft	BW/Color Current	6 - 10 years	No
West Virginia	Yes	Statewide	1 M	CIR	7 year	No
Wyoming	Yes	Statewide	1 M	CIR	8 year	Ad Hoc
New Mexico	Yes	Statewide	1 M	BW	USGS Update Cycle	Local
Arkansas	Ad Hoc	State Wide	1 M		5 year	No
Connecticut	Ad Hoc	Statewide				No
Indiana	Ad Hoc	Statewide	1 M		None	No
New York	No					Yes
Tennessee	No					Yes
Vermont	No					Yes

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State	Small Scale Ortho Program	Coverage	Resolution	Type	Update Cycle	Large Scale Ortho Program
North Dakota	In Progress	Statewide	1 M	BW	In Progress	No
Alabama	No					Ad Hoc
Minnesota	No	?				Local
Rhode Island	Ad Hoc	Statewide	2 ft	Color		Somewhat
Colorado	No					No
Mississippi	No	Statewide	1 M	CIR	Unknown	No
New Hampshire	No	Statewide	1:12,000	BW	UK	No
South Carolina	No					No
Wisconsin	No	Statewide	1 M		None	Local
Alaska						Local

Appendix D Large-Scale Ortho Imagery Programs

State	Large Scale Ortho Program	Coverage Area	Resolution	Type	Update Cycle	Last Update	Small Scale Imagery Program
Delaware	Yes	Statewide	1 ft	CIR	3 year		Yes
District of Columbia	Yes	County		BW	Unknown		NA
Florida	Yes	Statewide	.5 ft - 1.5ft	BW	3 year at 1/3 per year	2001	Ad Hoc
Maine	Yes	Municipalities	.5 Meter or better	True Color			Yes
New York	Yes	Statewide	.5 to 1ft	Both, depending upon county	% year	2002	No
Tennessee	Yes	Statewide	.5 ft to 2 ft	BW	TBD	In progress	No
Vermont	Yes	Statewide	.5 ft to 1.5 ft	BW	5 year		No
Virginia	Yes	Statewide	1:100, 1:200, 1:400	CIR	2 year		Yes
New Jersey	Yes	Statewide	1 ft	CIR		2002	No
Maryland	In Progress	Statewide	26 cm	CIR	As Needed	In Progress	Yes
Michigan	Somewhat	Statewide	.5 ft to 1.5 ft				Yes
Alabama	Ad Hoc	14 Counties	.5 ft to 2 ft		5 year		No
Idaho	Ad Hoc						Yes
Nebraska	Ad Hoc						Yes
Pennsylvania	Ad Hoc	County	1:4,800	BW			Yes
Rhode Island	Somewhat						Ad Hoc

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State	Large Scale Ortho Program	Coverage Area	Resolution	Type	Update Cycle	Last Update	Small Scale Imagery Program
Texas	Ad Hoc	Major urban areas	.5 ft - 1ft	Both	Varies by region	Ongoing	Yes
Wyoming	Ad Hoc						Yes
New Mexico	Local						Yes
Alaska	Local						
Kansas	Local						Yes
Minnesota	Local	Minneapolis – St. Paul - 7 counties	.6 Meter	BW	3 year		No
Montana	Local						Yes
North Carolina	Local	County	.5 ft to 2 ft	BW	2 - 8 years		Yes
Ohio	Local	County		BW & Color	3 - 6 years		Yes
Wisconsin	Local	1/2 State	Varies	BW some Color			No
North Dakota	No						In Progress
Arizona	No						Yes
Arkansas	No						Ad Hoc
California	No						Yes
Colorado	No						No
Connecticut	No						Ad Hoc
Georgia	No						Yes
Hawaii	No						Yes
Illinois	No						Yes
Indiana	No						Ad Hoc
Iowa	No						Yes
Kentucky	No						Yes
Louisiana	No						Yes

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State	Large Scale Ortho Program	Coverage Area	Resolution	Type	Update Cycle	Last Update	Small Scale Imagery Program
Massachusetts	No						Yes
Mississippi	No						No
Missouri	No	Urban and urban fringe	?	BW - counties considering color	Determined by counties	UK	Yes
Nevada	No						Yes
New Hampshire	No						No
Oklahoma	No						Yes
Oregon	No						Yes
South Carolina	No	County	1:200, 1:400				No
South Dakota	No						Yes
Utah	No						Yes
Washington	No						Yes
West Virginia	No						Yes