Using Geospatial Data to Build Better Information at NCES

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National Center for Education Statistics
Education Demographic and Geographic Estimates (EDGE) Program

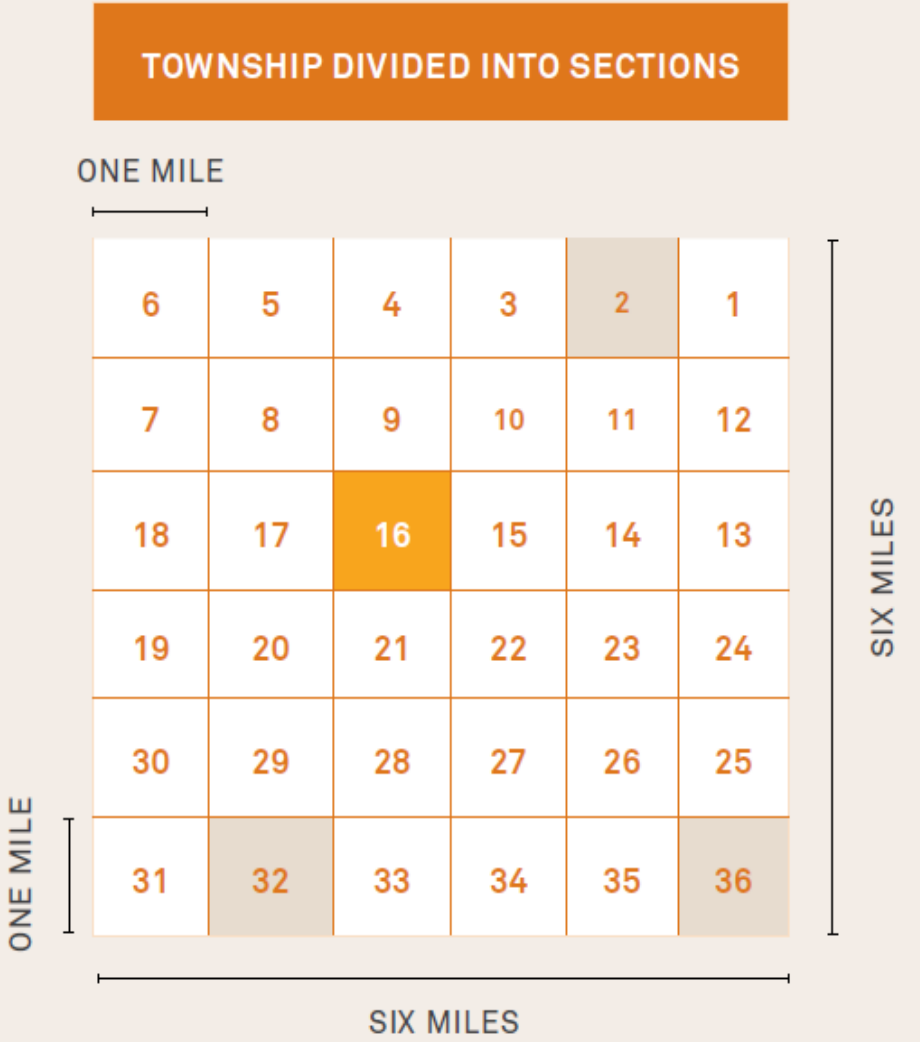
FCSM
October 27, 2022


A MAP of the BRITISH COLONIES in North America, WITH THE Roads, Distances, Limits, and Extent of the SETTLEMENTS, Humbly Inscribed to the Right Honourable The Earl of Halifax, And the other Right Honourable The Lords Commissioners for Trade & Plantations, By their Lordships Most Obliged and very humble Servant Jn. Mitchell.
A NEW MAP of HUDSON'S BAY and LABRADOR
HUDSONS BAY
LABRADOR
NEW BRITAIN
PART OF HUDSONS JAMES BAY
PART OF LABRADOR OR NEW BRITAIN
ISLAND OF NEW FOUND LAND
GULF OF ST. LAURENCE
NEW FRANCE OR CANADA
LAKE SUPERIOR
MESSESAGUES
LAKE HURON
LAKE MICHIGAN
LAKE ONTARIO
LAKE ERIE
IROQUOIS
EASTERN SIOUX
SIOUX OR NADOUESSIANS
WESTERN SIOUX
OUTAGAMIS
MASCOUTENS
COUNTRY OF THE PADOUCAS
PANIS
Extensive Meadows full of Buffaloes
PENSYLVANIA
VIRGINIA
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
CHERAKES
CHICASAWS
CREEK INDIANS
APALACHES
OSAGES
AKANSAS
LOUISIANA
COUNTRY OF THE CENIS
FLORIDA
GULF OF MEXICO
THE ATLANTIC OCEAN

Figure 2

Township Sections Were Reserved for Public Education

The rectangular survey system divides land into 36-square-mile "townships," six miles on a side, that are measured from the intersection of an identified north-south meridian (line of longitude) and a baseline. Each township is divided into 36 "sections" of one square mile, each containing 640 acres. School lands were reserved out of each township; early states received only section 16, while later states received sections 16 and 36 or sections 2, 16, 32, and 36.



Repealing clause.

SEC. 2. *And be it further enacted*, That all acts and parts of acts inconsistent with this act are hereby repealed.

APPROVED, March 2, 1867.

March 2, 1867.

CHAP. CLVIII. — *An Act to establish a Department of Education.*

Department of education established at Washington, D. C. and for what purpose.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be established, at the city of Washington, a department of education, for the purpose of collecting such statistics and facts as shall show the condition and progress of education in the several States and Territories, and of diffusing such information respecting the organization and management of schools and school systems, and methods of teaching, as shall aid the people of the United States in the establishment and maintenance of efficient school systems, and otherwise promote the cause of education throughout the country.

Commissioner of education; his appointment, duties, and salary;

his clerks and their salary;

how appointed and removed.

SEC. 2. *And be it further enacted*, That there shall be appointed by the President, by and with the advice and consent of the Senate, a commissioner of education, who shall be intrusted with the management of the department herein established, and who shall receive a salary of four thousand dollars per annum, and who shall have authority to appoint one chief clerk of his department, who shall receive a salary of two thousand dollars per annum, one clerk who shall receive a salary of eighteen hundred dollars per annum, and one clerk who shall receive a salary of sixteen hundred dollars per annum, which said clerks shall be subject to the appointing and removing power of the commissioner of education.

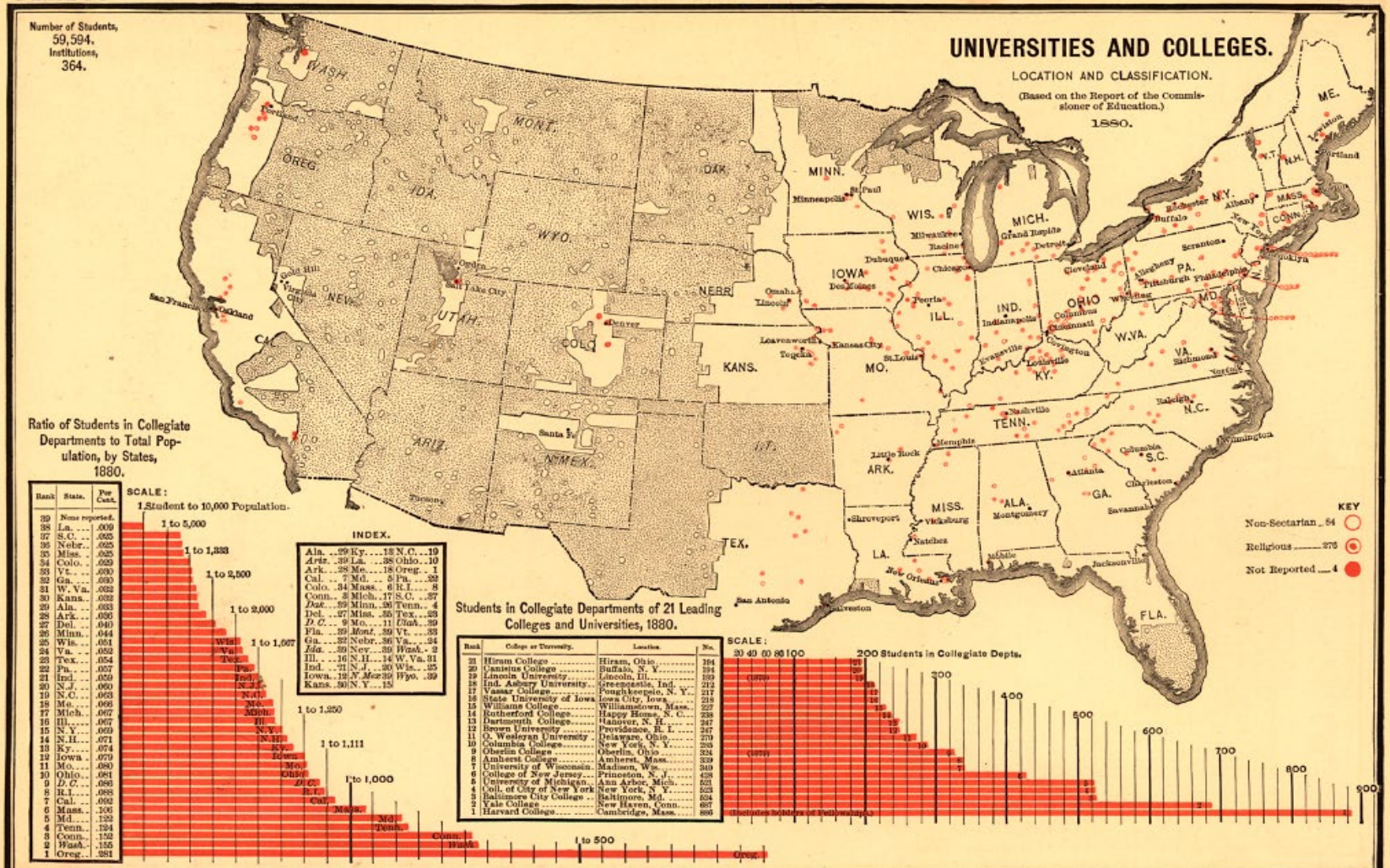
Annual report of the commissioner.

SEC. 3. *And be it further enacted*, That it shall be the duty of the commissioner of education to present annually to Congress a report embodying the results of his investigations and labors, together with a statement of such facts and recommendations as will, in his judgment, subserve the purpose for which this department is established.

First report to present a statement of the land grants by Congress to promote education, their management, &c.

In the first report made by the commissioner of education under this act, there shall be presented a statement of the several grants of land made by Congress to promote education, and the manner in which these several trusts have been managed, the amount of funds arising therefrom, and the annual proceeds of the same, as far as the same can be determined.

EDUCATION



Rank	State.	Per Cent.
39	None reported.	
38	La.	.009
37	S.C.	.025
36	Nebr.	.025
35	Miss.	.025
34	Colo.	.029
33	Vt.	.030
32	Ga.	.030
31	W. Va.	.032
30	Kans.	.032
29	Ala.	.033
28	Ark.	.036
27	Del.	.040
26	Minn.	.044
25	Wis.	.051
24	Va.	.052
23	Tex.	.054
22	Pa.	.057
21	Ind.	.059
20	N.J.	.060
19	N.C.	.063
18	Mo.	.066
17	Mich.	.067
16	Ill.	.067
15	N.Y.	.069
14	N.H.	.071
13	Ky.	.074
12	Iowa	.079
11	Mo.	.080
10	Ohio	.081
9	D.C.	.086
8	R.I.	.088
7	Cal.	.092
6	Mass.	.106
5	Md.	.122
4	Tenn.	.124
3	Conn.	.152
2	Wash.	.155
1	Oreg.	.281

Ala.	29	Ky.	18	N.C.	19
Ariz.	39	La.	38	Ohio	10
Ark.	28	Me.	18	Oreg.	1
Cal.	7	Md.	5	Pa.	22
Colo.	34	Mass.	6	R.I.	8
Conn.	8	Mich.	17	S.C.	37
Dak.	39	Minn.	30	Tenn.	4
Del.	27	Miss.	35	Tex.	23
D.C.	9	Mo.	11	Utah	39
Fla.	33	Mont.	39	Vt.	33
Ga.	32	Nebr.	36	Va.	24
Ida.	39	Nev.	39	Wash.	2
Ill.	16	N.H.	14	W. Va.	31
Ind.	21	N.J.	20	Wis.	25
Iowa	12	N. Mex.	39	Wyo.	39
Kans.	30	N.Y.	15		

Rank	College or University.	Location.	No.
21	Hiram College	Hiram, Ohio	194
20	Canisius College	Buffalo, N. Y.	194
19	Lincoln University	Lincoln, Ill.	199
18	Ind. Asbury University	Greencastle, Ind.	212
17	Vassar College	Poughkeepsie, N. Y.	217
16	State University of Iowa	Iowa City, Iowa	218
15	Williams College	Williamstown, Mass.	227
14	Rutherford College	Happy Home, N. C.	238
13	Dartmouth College	Hanover, N. H.	247
12	Brown University	Providence, R. I.	247
11	O. Wesleyan University	Delaware, Ohio	270
10	Columbia College	New York, N. Y.	295
9	Oberlin College	Oberlin, Ohio	324
8	Amherst College	Amherst, Mass.	329
7	University of Wisconsin	Madison, Wis.	349
6	College of New Jersey	Princeton, N. J.	428
5	University of Michigan	Ann Arbor, Mich.	521
4	Coll. of City of New York	New York, N. Y.	523
3	Baltimore City College	Baltimore, Md.	534
2	Yale College	New Haven, Conn.	687
1	Harvard College	Cambridge, Mass.	886


IES NCES National Center for Education Statistics
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GEOGRAPHIC DATA
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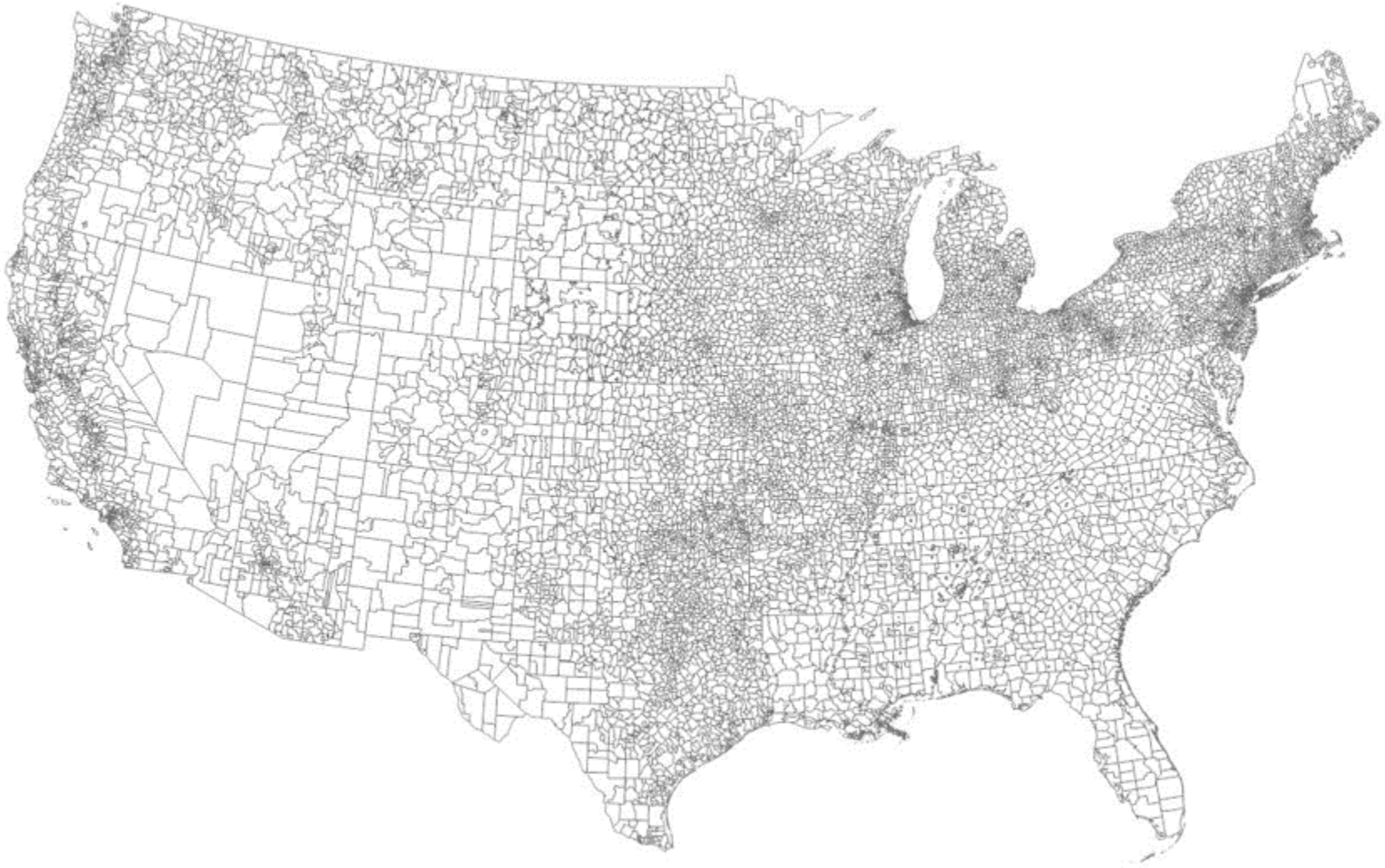
ABOUT
2014–2018 ACS-ED School District Profile for Children
ACS-ED Maps
Locale Lookup
ACS-ED Tables
ACS-ED Dashboard
EDGE Open Data

Ex.1: School District Boundaries

- SAIPE and the School District Review Program (SDRP)
- Annual reimbursable collection/review of school district boundaries
- About 13,000 geographically-defined districts; mostly special purpose local governments

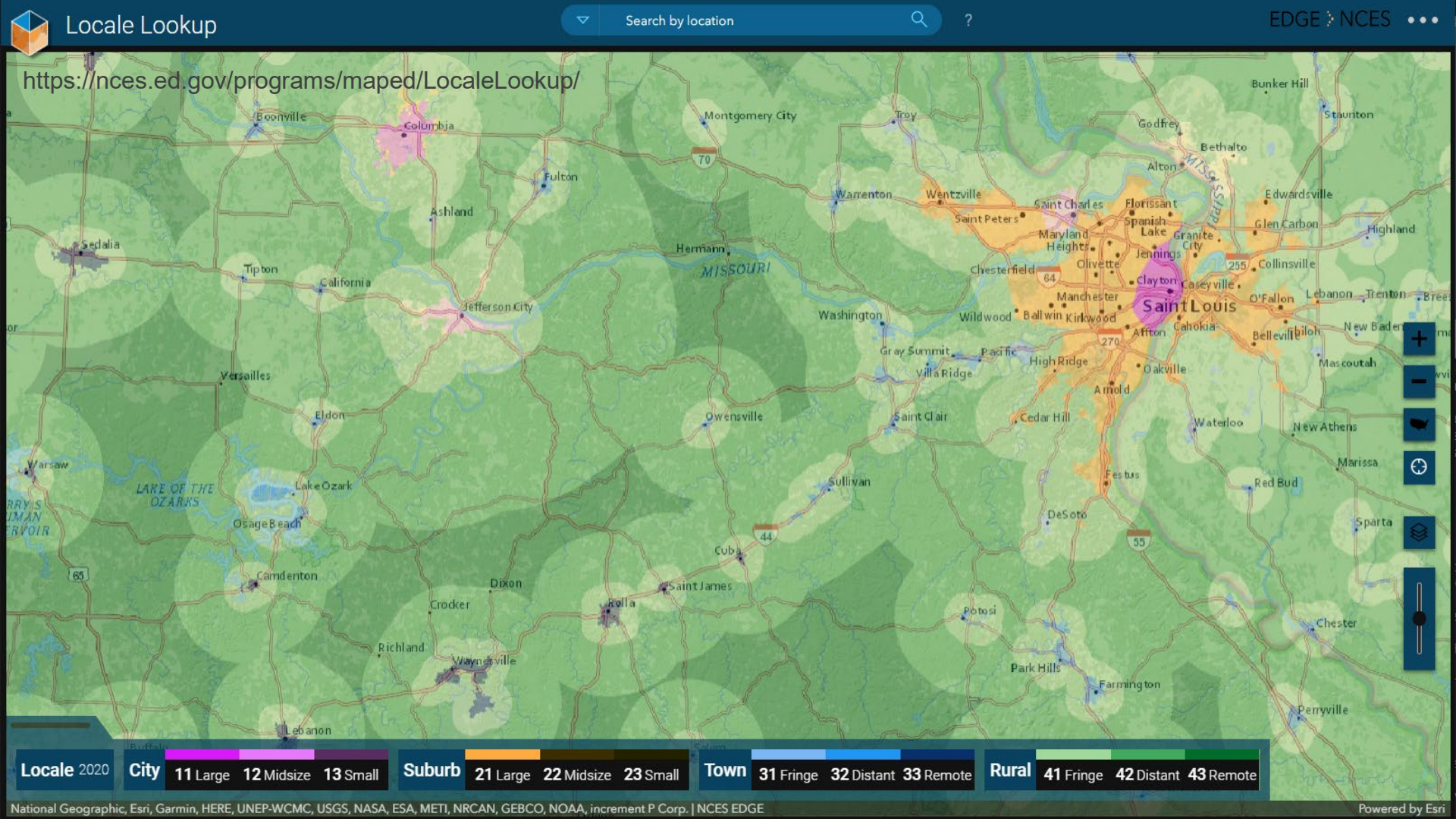


Ex.1: School District Boundaries

- Necessary input for a variety of products/processes:
  - SAIPE poverty estimates for Title I allocations ($17B) and other statutory grants
  - ACS address sampling operations (small area stratification/weighting)
  - ACS school district estimates and ACS – Education Custom Tabulation (ACS-ED)
  - Decennial Census data products (PL, DHC, etc.)
  - District associations with other geographic areas (e.g., Congressional Districts)
  - Geoprocessing options to aggregate/disaggregate spatial features by school district
- Demographic data products depend on the creation and application of geospatial data

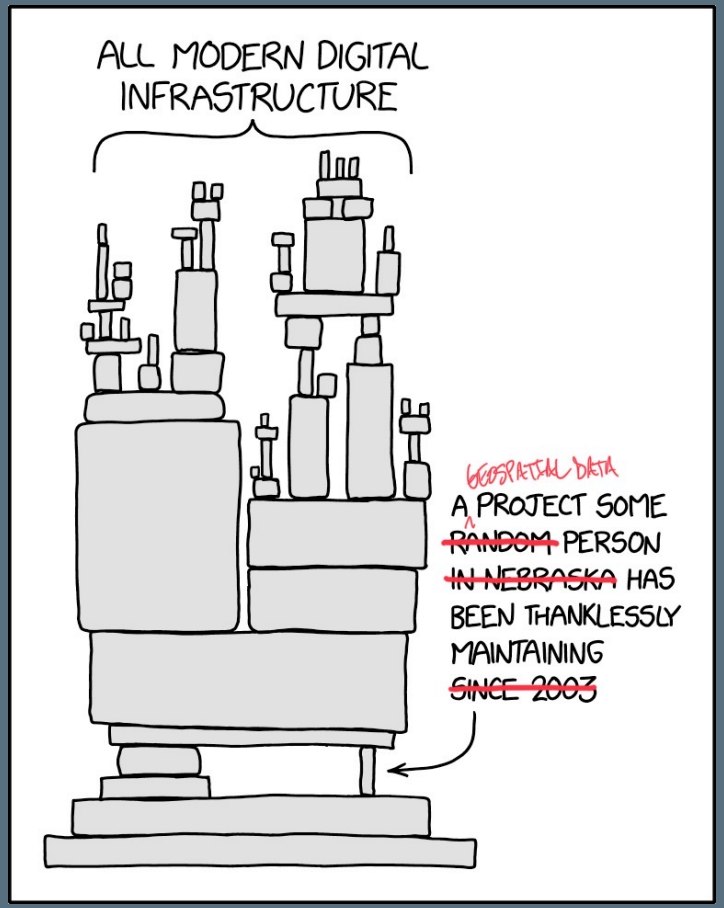
Ex. 2: School Locations and Locale Boundaries

- Locale – 12-category general geographic indicator
- Basic types: City, Suburban, Town, Rural
  - City, Suburban – Large, Midsize, Small
  - Town, Rural – Fringe, Distant, Remote
- Consistent with Census Urban/Rural
  - Urban = City + Suburban + Town
  - Rural = Rural


Locale Lookup
Search by location
EDGE NCES
https://nces.ed.gov/programs/maped/LocaleLookup/
Bunker Hill
Staunton
Godfrey
Bethalto
Alton
Edwardsville
Glen Carbon
Highland
Boonville
Columbia
Montgomery City
Troy
Fulton
Ashland
Warrenton
Wentzville
Saint Charles
Florissant
Saint Peters
Spanish Lake
Maryland Heights
Granite City
Jennings
Sedalia
Hermann
MISSOURI
Tipton
California
Jefferson City
Chesterfield
Olivette
Clayton
Collinsville
Caseyville
Manchester
Saint Louis
O'Fallon
Lebanon
Trenton
Washington
Wildwood
Ballwin
Kirkwood
Affton
Cahokia
Belleville
New Baden
Gray Summit
Pacific
High Ridge
Villa Ridge
Oakville
Mascoutah
Versailles
Arnold
Eldon
Owensville
Saint Clair
Cedar Hill
Waterloo
New Athens
Marissa
Warsaw
LAKE OF THE OZARKS
Lake Ozark
Osage Beach
Sullivan
Festus
Red Bud
DeSoto
Sparta
Cuba
Camdenton
Dixon
Saint James
Crocker
Rolla
Potosi
Chester
Richland
Waynesville
Park Hills
Farmington
Perryville
Lebanon
Locale 2020
City 11 Large 12 Midsize 13 Small
Suburb 21 Large 22 Midsize 23 Small
Town 31 Fringe 32 Distant 33 Remote
Rural 41 Fringe 42 Distant 43 Remote
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp. | NCES EDGE
Powered by Esri

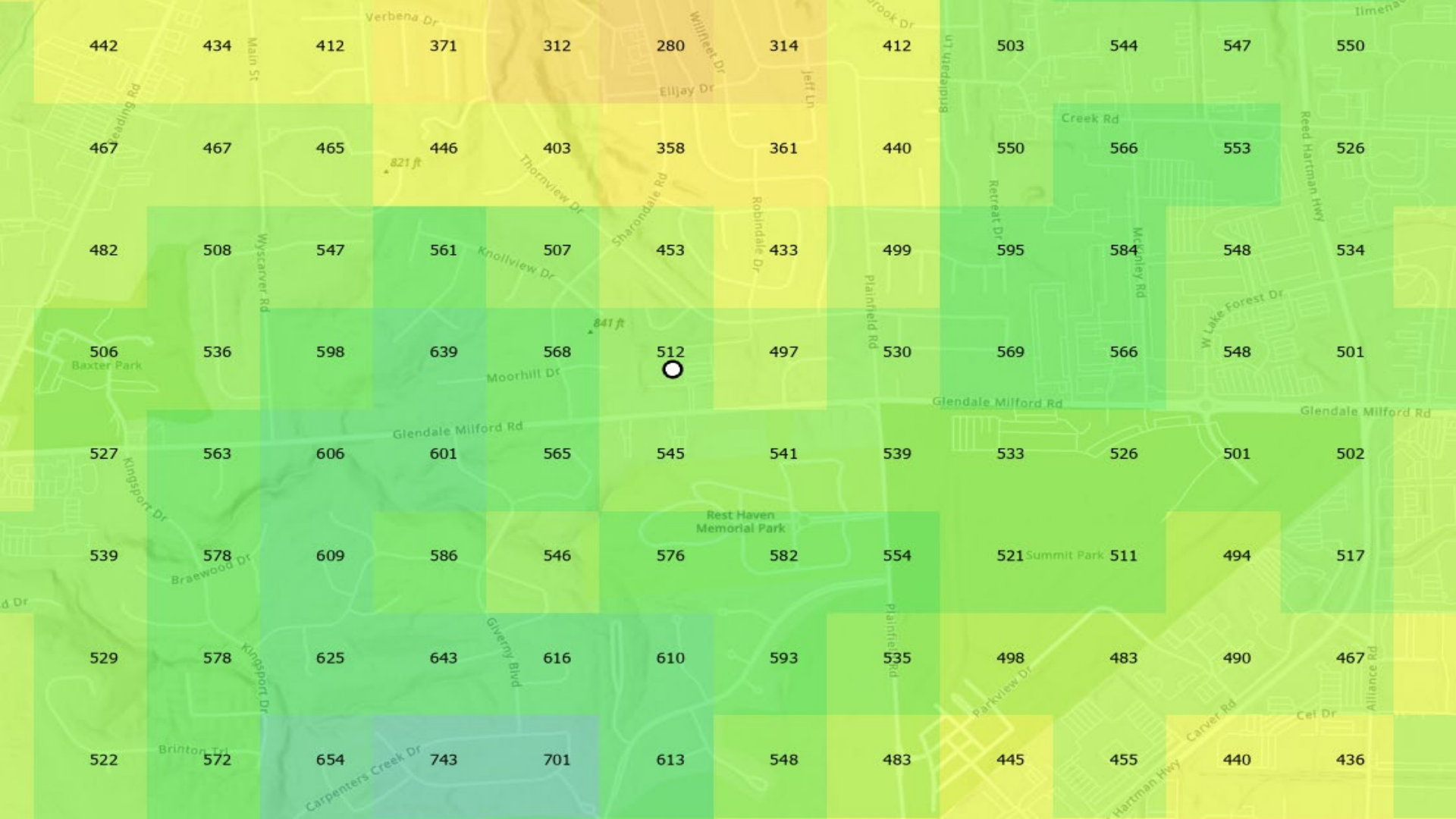
Ex. 2: School Locations and Locale Boundaries

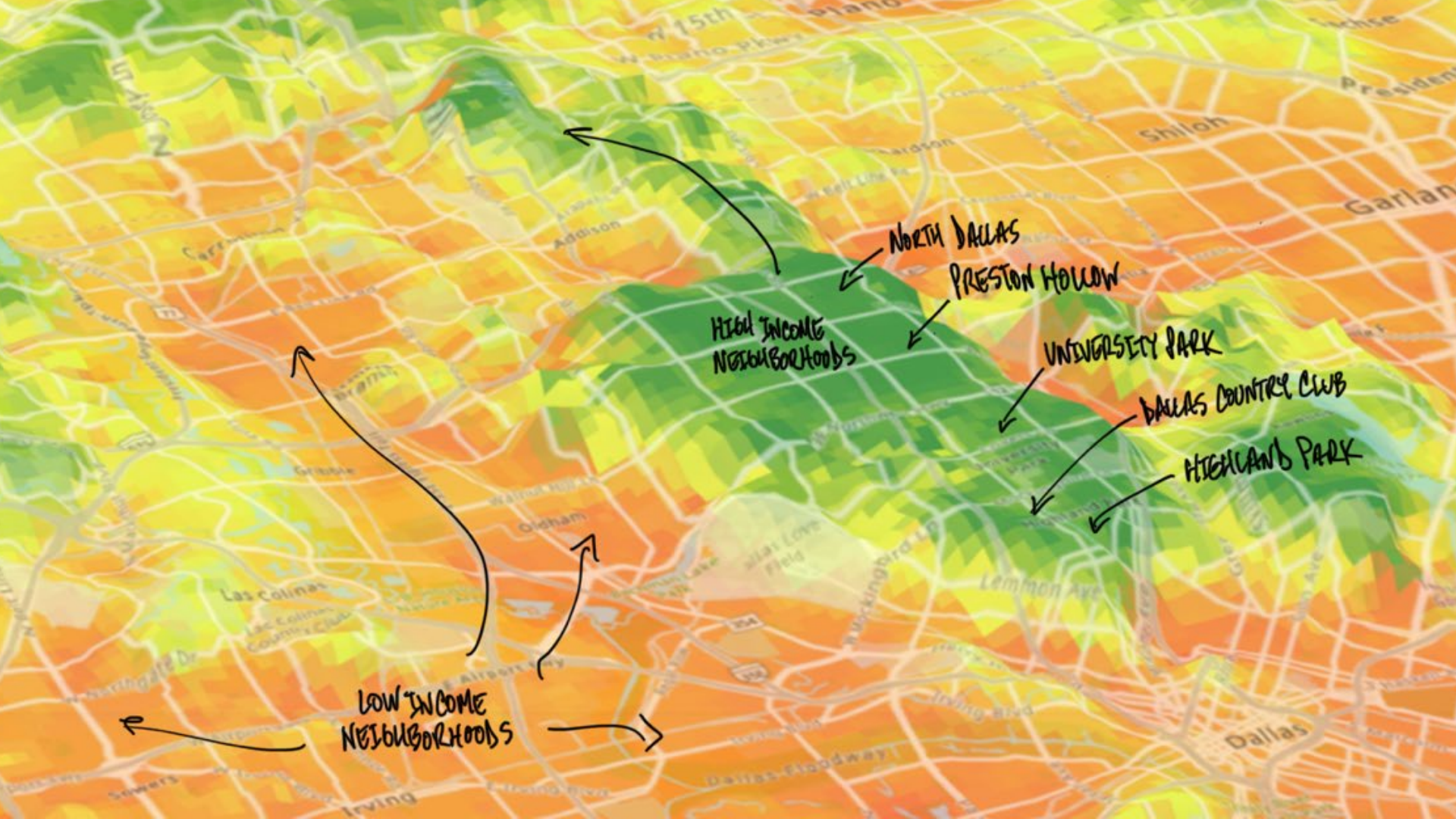
- Locations – Public schools; Private Schools; Postsecondary schools; School district offices
- Necessary input for a variety of products/processes:
  - NCES survey sample stratification and data disaggregation (e.g., NAEP, NTPS)
  - Statutory program eligibility (e.g., Rural Education Achievement Program (REAP))
  - Statutory program priorities (e.g., Clean School Bus, Bipartisan Infrastructure Bill)
  - Geoprocessing options to associate schools with other geographic features
- Demographic data products depend on the creation and application of geospatial data

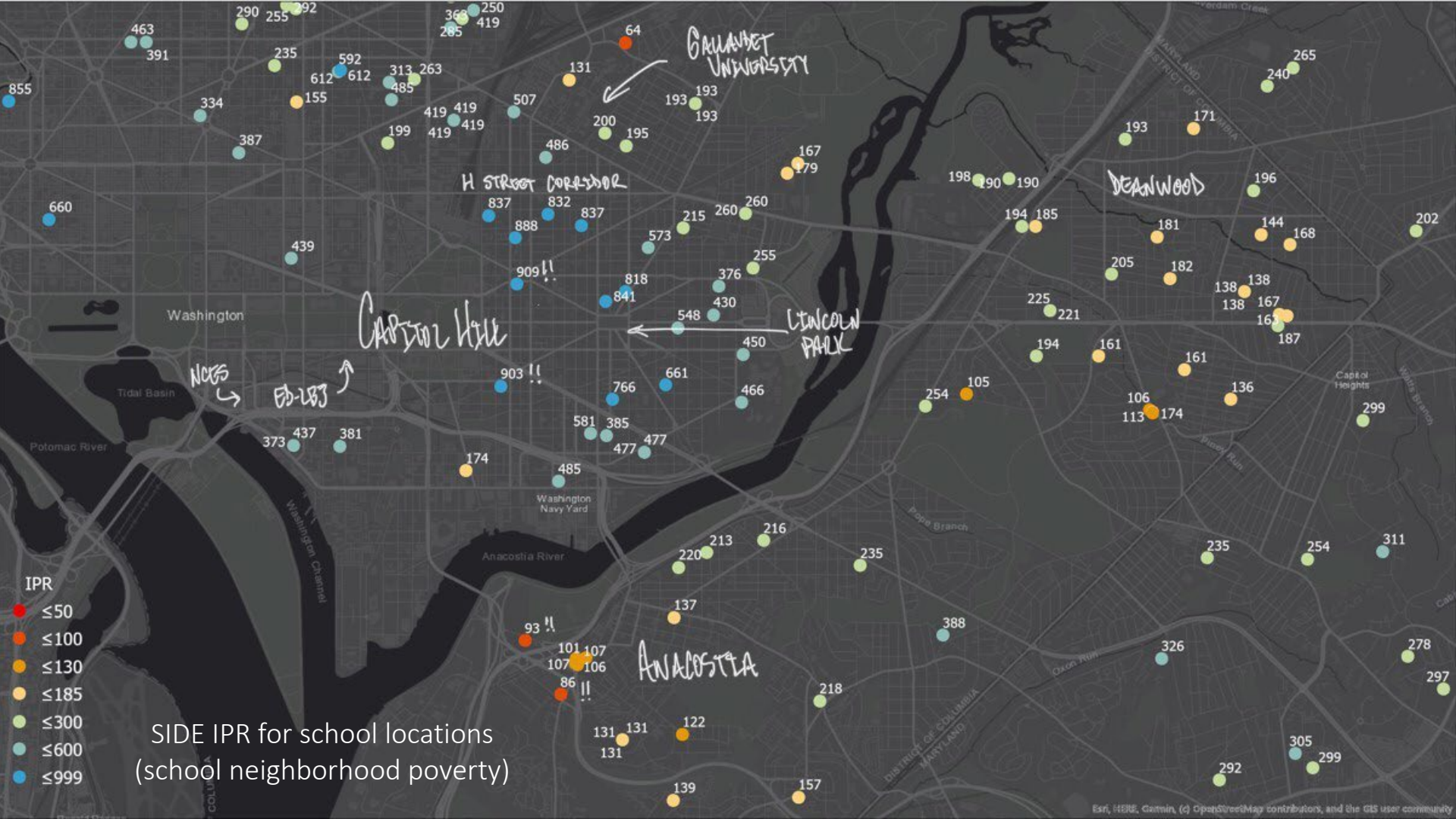

ALL MODERN DIGITAL INFRASTRUCTURE
GEOSPATIAL DATA
A PROJECT SOME ~~RANDOM~~ PERSON ~~IN NEBRASKA~~ HAS BEEN THANKLESSLY MAINTAINING ~~SINCE 2003~~

Ex. 3: Point-optimized poverty estimates

- Create Census-based indicator of student and school poverty to supplement traditional administrative data from the National School Lunch Program
- Apply geostatistical methods to ACS household income at household locations to construct an estimation surface of the income-to-poverty ratio (IPR) for the U.S.
- Test #1: Connect school point locations to IPR prediction surface to produce school neighborhood poverty estimates for all public schools in the U.S.
- Test #2: Connect student address geocodes to IPR prediction surface to produce poverty (IPR) estimates for students and schools (based on student enrollment)


442 434 412 371 312 280 314 412 503 544 547 550
467 467 465 446 403 358 361 440 550 566 553 526
482 508 547 561 507 453 433 499 595 584 548 534
506 536 598 639 568 512 497 530 569 566 548 501
527 563 606 601 565 545 541 539 533 526 501 502
539 578 609 586 546 576 582 554 521 511 494 517
529 578 625 643 616 610 593 535 498 483 490 467
522 572 654 743 701 613 548 483 445 455 440 436
Verbena Dr
Willneet Dr
Elljay Dr
Jeff Ln
Bridlepath Ln
Creek Rd
Reed Hartman Hwy
Main St
Reading Rd
821 ft
Thornview Dr
Sharondale Rd
Robindale Dr
Retreat Dr
Mcginley Rd
Knollview Dr
Wyscarver Rd
Plainfield Rd
W Lake Forest Dr
841 ft
Baxter Park
Moorhill Dr
Glendale Milford Rd
Glendale Milford Rd
Glendale Milford Rd
Kingsport Dr
Rest Haven
Memorial Park
Summit Park
Braewood Dr
Giverny Blvd
Kingsport Dr
Plainfield Rd
Parkview Dr
Carver Rd
Alliance Rd
Brinton Trl
Carpenters Creek Dr


NORTH DALLAS
PRESTON HOLLOW
HIGH INCOME NEIGHBORHOODS
UNIVERSITY PARK
DALLAS COUNTRY CLUB
HIGHLAND PARK
LOW INCOME NEIGHBORHOODS


IPR
≤50
≤100
≤130
≤185
≤300
≤600
≤999
SIDE IPR for school locations
(school neighborhood poverty)
Washington
Capitol Hill
Gallaudet University
H Street Corridor
Lincoln Park
Deanwood
Anacostia
Tidal Basin
Potomac River
Anacostia River
Washington Navy Yard
Washington Channel
Pope Branch
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Conclusions

- Geospatial data infrastructure is essential for supporting ED statistical and statutory programs
- Even more value expected in the future
- Challenges from the Geographic-Demographic collision:
  - Different data cultures and drivers (FCSM vs. FGDC; Evidence Act vs. GeoData Act)
  - Bias/preferences of statistical organizations
  - New geographic areas (or no geographic areas)

Questions?

National Center for Education Statistics

Education Demographic and Geographic Estimates (EDGE) Program