Infrastructure Gaps in the U.S.

December 2, 2013

Topics for Discussion

- Introduction
- Megatrends and precision agriculture
- Infrastructure gaps in the United States
- The road ahead

Who are we and why are we here?

"If we work the land, it needs mobile broadband"

Megatrends & Key Drivers in Agriculture

Today & Tomorrow

Growing demand for more food, feed, and fuel

Global markets and more volatility

Farm size growth and specialization

Environmental sustainability and compliance

Reduced skilled labor

Precision agriculture

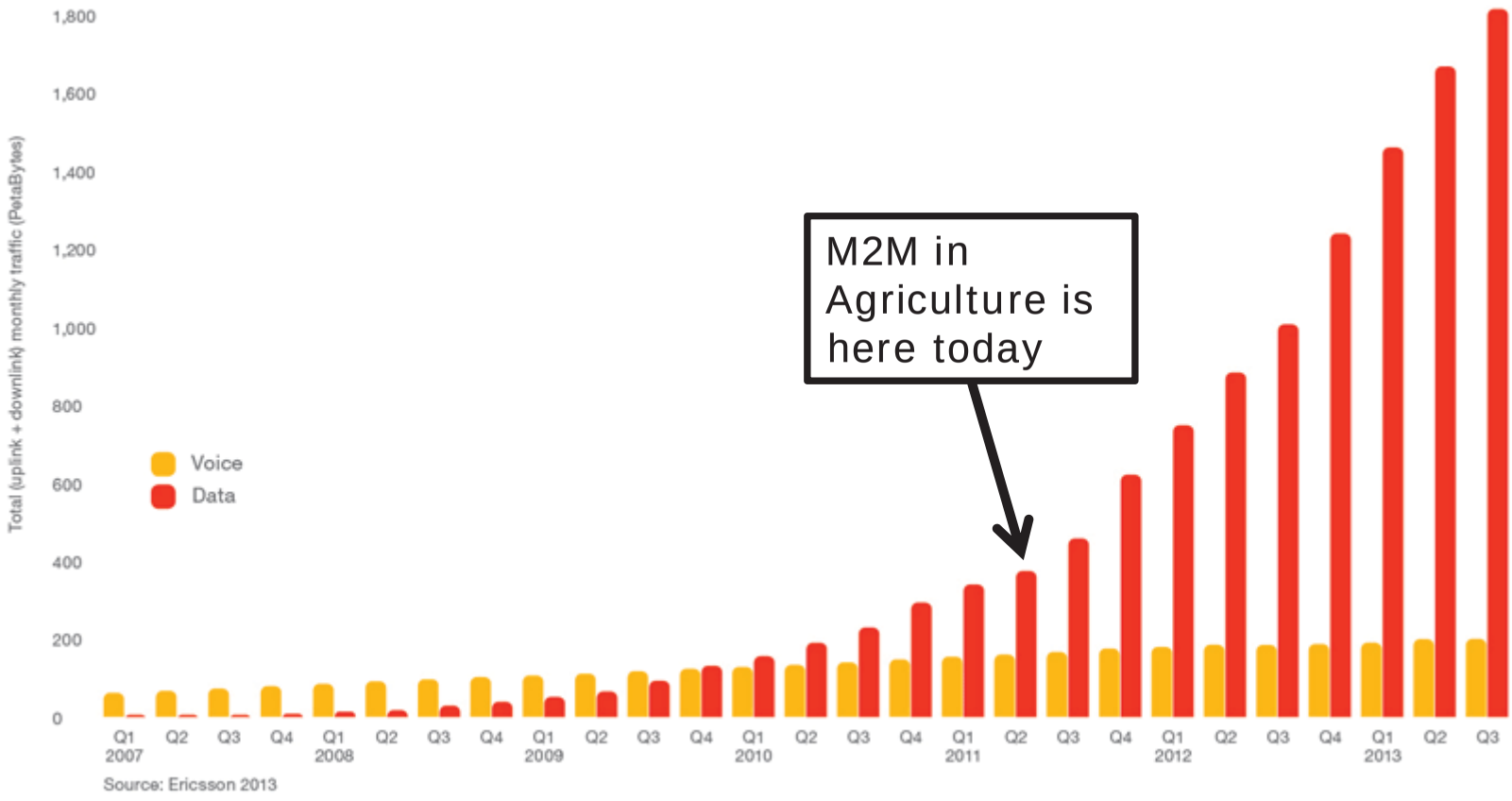
Why Precision Agriculture?

Yield & Cost Optimization

Smart Use of Resources

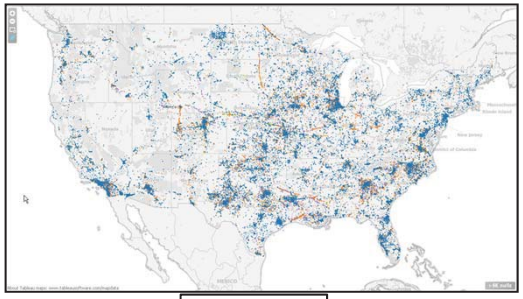
Challenge of Regulation

M2M in Agriculture
Will mirror consumer cell phone growth

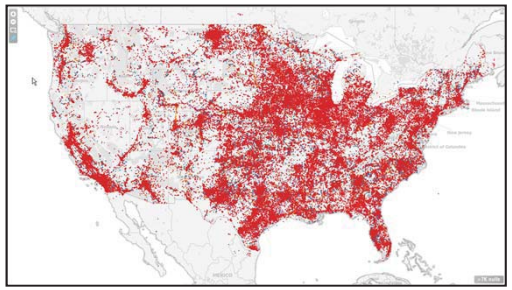


Infrastructure gaps

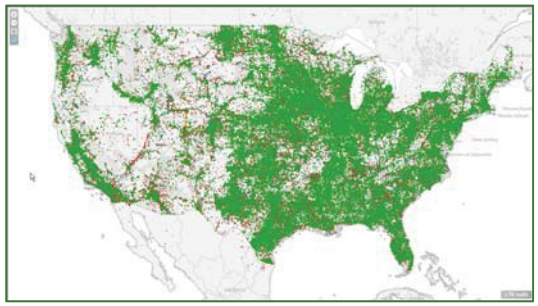
2006



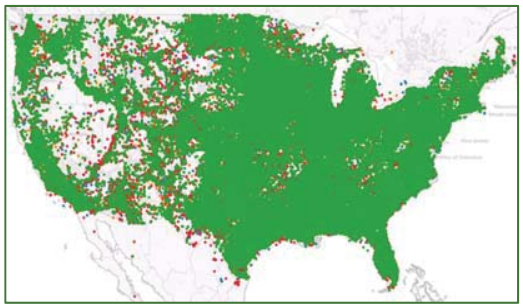
2010



2011



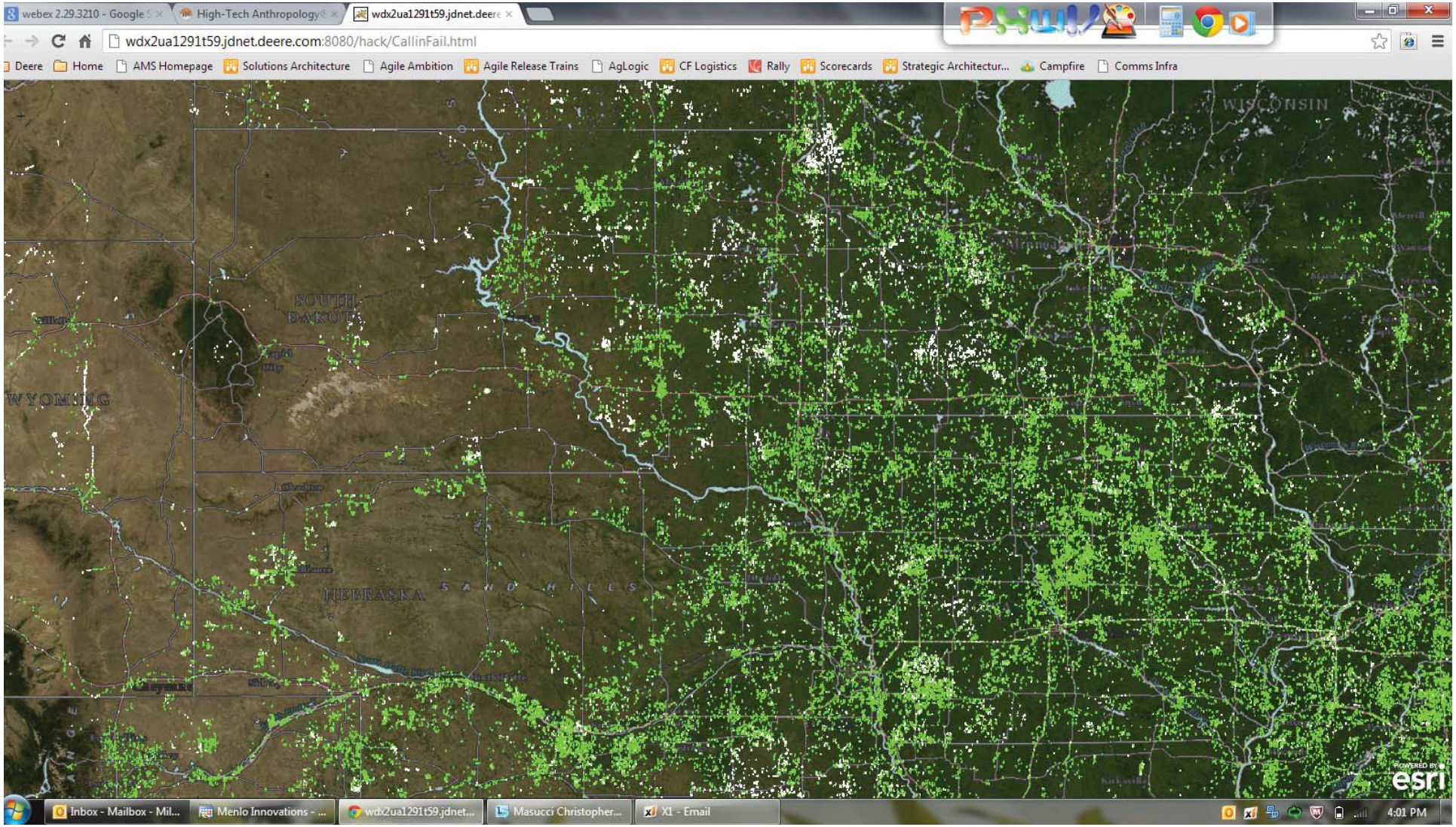
2012



2018
(projected)

Upper Midwest Call Log Map

(Green – Successful, White – Failed)



Internet Access on the Farm

- Sixty seven percent (67%) of U.S. farms had Internet service (DSL, wireless, cable, satellite) in 2013, compared with sixty two percent (62%) in 2011. (USDA, *Farm Computer Usage and Ownership, 2013)*

- Ninety four percent (94%) of AFBF's Young Farmers and Ranchers (AFBF, Informal Survey, 2013)
  - o 65% have High-Speed
  - o 22% have Satellite
  - o 2% percent have Dial-up

- Method to Access Internet (USDA, *Farm Computer Usage and Ownership, 2013)*
  - o DSL = 35% (2013)
  - o Wireless = 24% (2013)
  - o Satellite = 17% (2013)
  - o Cable = 13% (2013)
  - o Dialup = 5% (2013)

Broadband Opportunities for Agriculture

- Manage and operate successful small businesses, the same as small businesses in urban America
- Utilize machine to machine communication
- Follow commodity markets
- Communicate with customers
- Gain access to new markets around the world
- Regulatory compliance
- International competition
  - Developed networks – Europe –> increased efficiency
  - Developing networks – Brazil & Argentina

How Farmers Use Technology

"Technology is a pretty indispensable part of our operation and we're not unique in the farming world in that aspect. We're seeing the benefits of having information wherever we are."
Zach Hunnicutt, AFBF YF&R Chair
(USA Today, "Farmers growing comfortable with mobile devices" March 3, 2013)

New Machine-to-Machine Applications Coming Soon

Recent Rural Telecom article by Masha Zager

"Machine Speak: How the Era of Machine-to-Machine Communications Is Changing Telecom" (March/April 2013)

- Vehicle telematics
  - Agriculture
  - Construction
  - Mining
  - Transportation
- Livestock monitoring
- Personal emergency response
- Silo monitoring
- Machine shed surveillance
- Roaming restrictions
- Employee reminders
- Mobile/tablet computing/live processing of information

Agriculture is one of the most promising M2M applications such as this automated center-pivot irrigation system featuring remote monitoring and 'smart watering"

The Road Ahead

How best to build out broadband infrastructure in rural America?

Three possible avenues:

- Private Sector
  - Develop the business case
  - Working with key associations and partners
  - Adding M2M in rural areas

- Public/private “partnerships” by co-location on geographically-based cell towers
  - Public safety (FirstNet & states)
  - Transportation (cars & trains)
  - Utilities (oil & gas & electric)

- Public programs
  - USF CAF
  - USDA/RUS
  - State level USF in 26 states

Rural broadband deployment must include full range of infrastructure necessary to support innovative solutions in rural areas

Appendix

Attachments

Beginning in 2006, John Deere started equipping its construction fleet with telemetrically enabled systems. Beginning in 2011, we started equipping our large agricultural self-propelled vehicles with it as well. These telematic systems are enabled through JDLink™.

Each dot on the US maps represents a machine successfully calling and connecting thru a cell phone tower to MyJohnDeere.com. The 2018 map is with the current trend continuing of adding thousands of pieces of new equipment per month.

As these machine populations continue to grow and our solutions continue to rely on real time, high speed machine connections, our reliance on rural broadband (RBB) coverage will increase.

Examples of Telematically Enabled Machines — 2012

7R
Tractors

8R
Tractors

9R
Tractors

4940
Sprayer

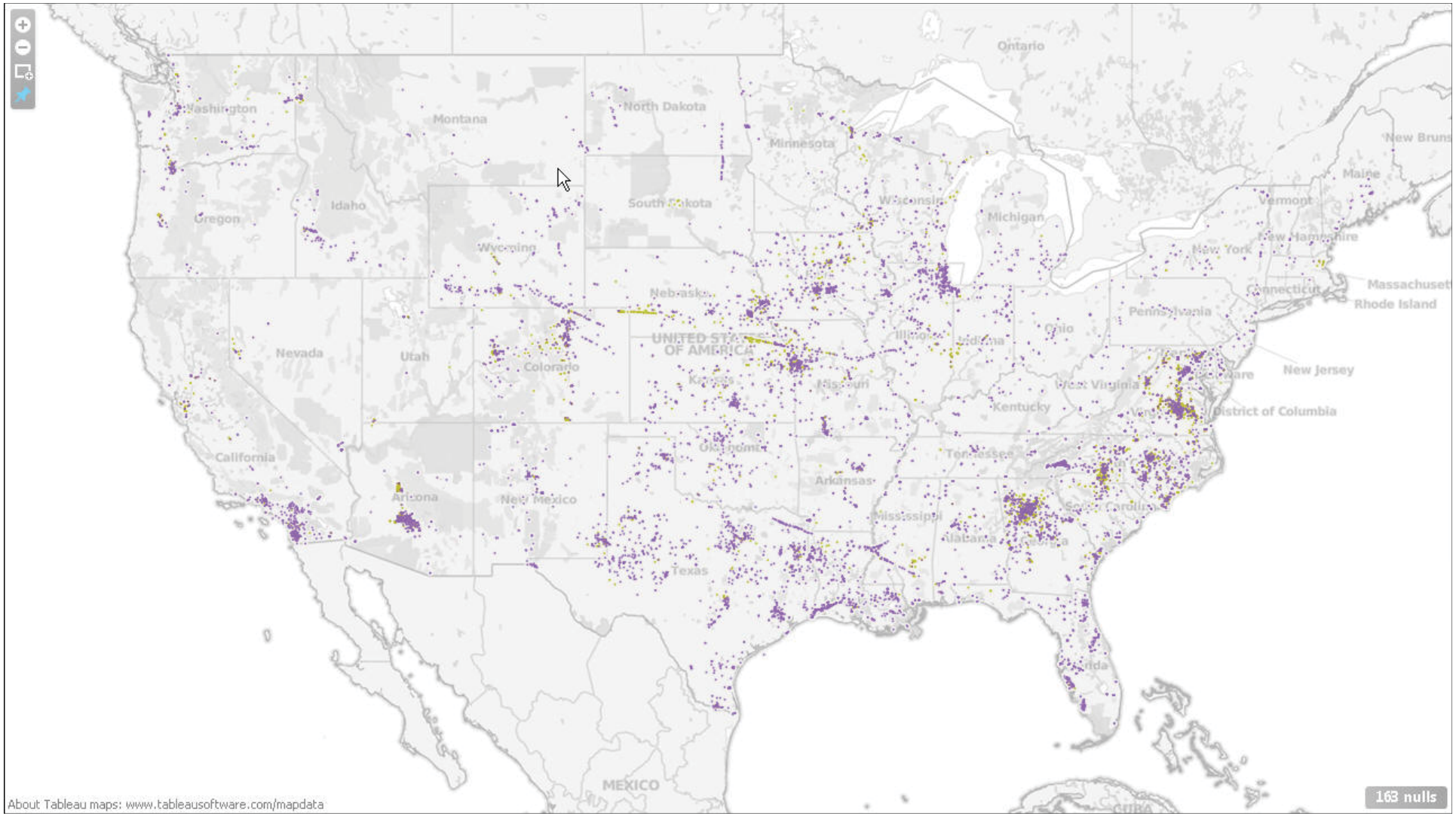
S-Series
Combines

7050 Self-
Propelled Forage
Harvester

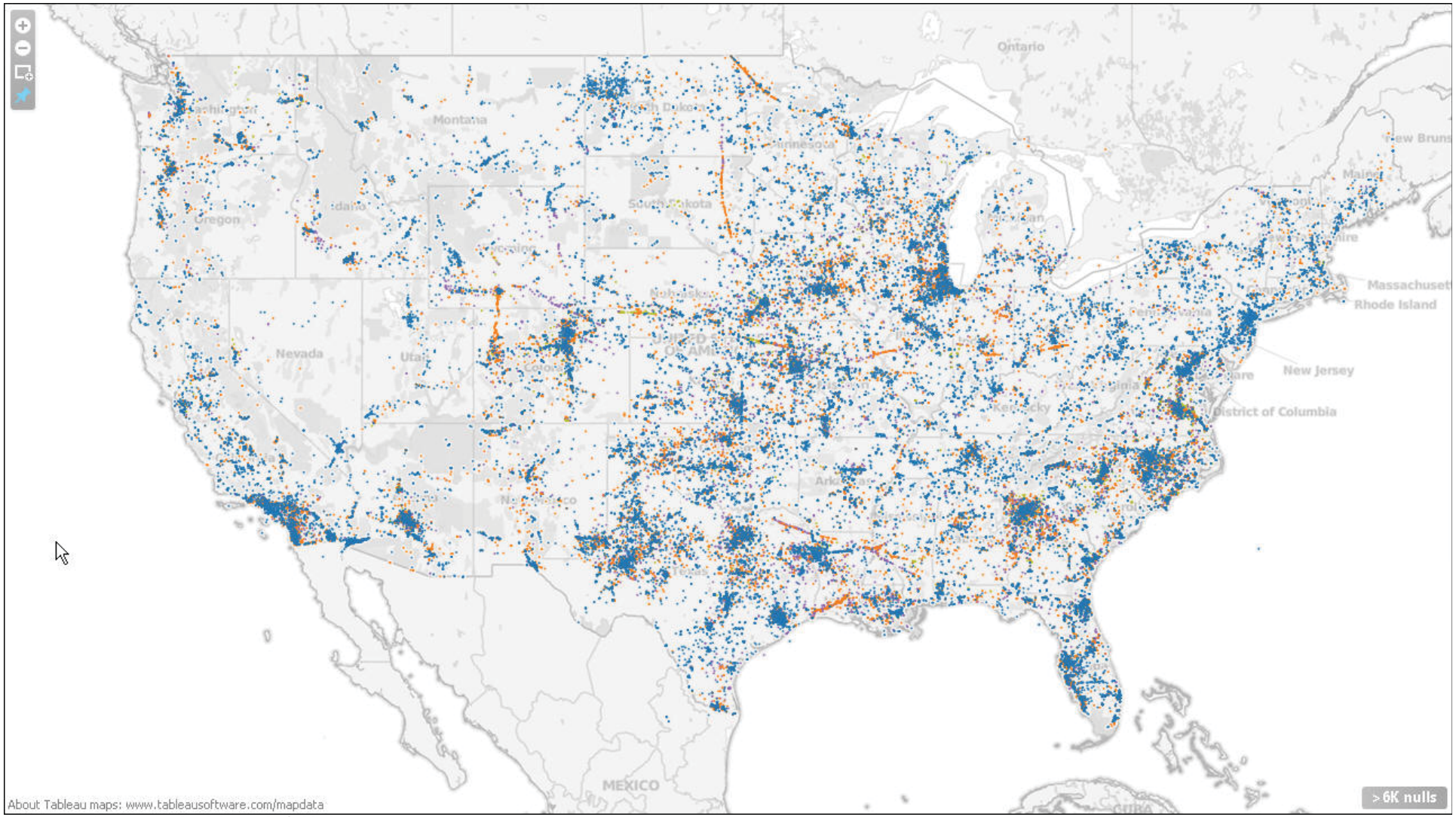
2006

Ontario
Washington
Montana
North Dakota
Minnesota
Maine
Oregon
Idaho
South Dakota
Wisconsin
Michigan
Vermont
Wyoming
New York
New Hampshire
Iowa
Nebraska
Connecticut
Massachusetts
Rhode Island
Pennsylvania
UNITED STATES OF AMERICA
Illinois
Indiana
Ohio
Nevada
Utah
Colorado
Maryland
Delaware
New Jersey
Kansas
Missouri
West Virginia
Kentucky
Virginia
District of Columbia
Oklahoma
Tennessee
California
North Carolina
Arkansas
Arizona
New Mexico
South Carolina
Mississippi
Alabama
Georgia
Texas
Louisiana
Florida
MEXICO
About Tableau maps: www.tableausoftware.com/mapdata
8 nulls

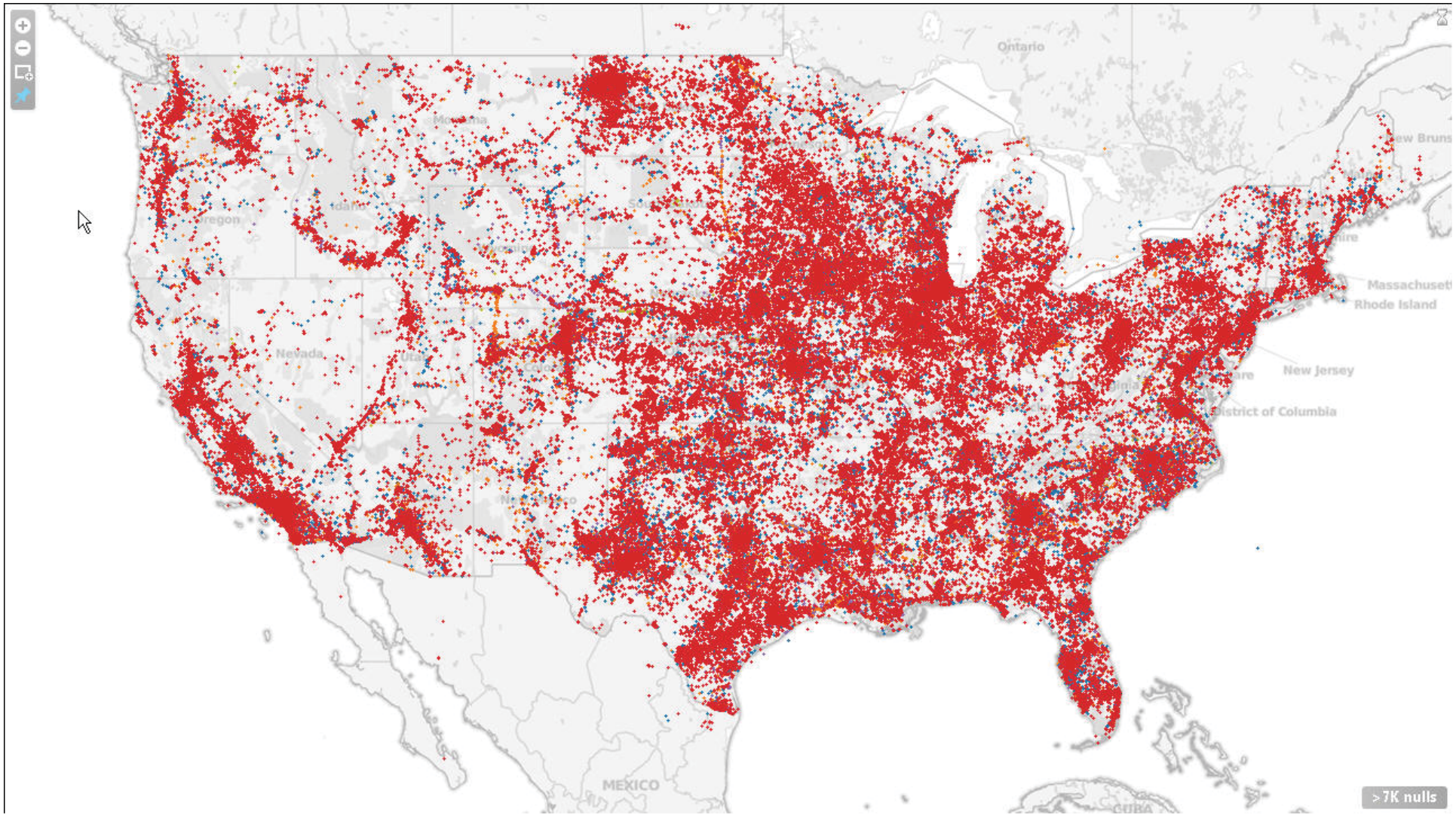
2008


Ontario
Washington
Montana
North Dakota
Minnesota
Oregon
Idaho
South Dakota
Michigan
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Missouri
Kentucky
California
Arizona
New Mexico
Oklahoma
Arkansas
Tennessee
Mississippi
Texas
MEXICO
Maine
Vermont
New York
Massachusetts
Rhode Island
Connecticut
Pennsylvania
Ohio
New Jersey
District of Columbia
About Tableau maps: www.tableausoftware.com/mapdata
163 nulls

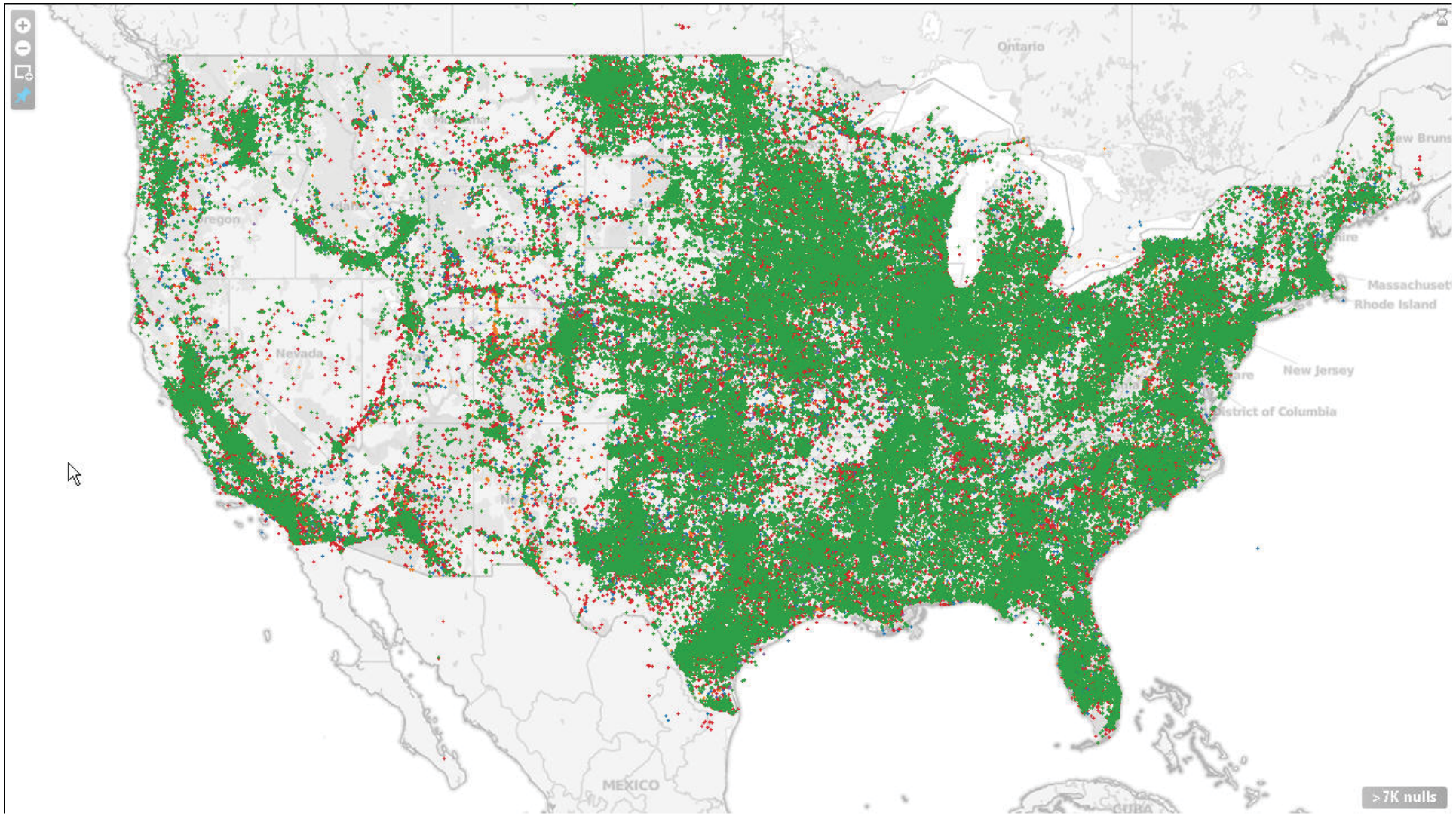
2010


Ontario
Montana
Oregon
Nevada
Massachusetts
Rhode Island
New Jersey
District of Columbia
MEXICO
About Tableau maps: www.tableausoftware.com/mapdata
>6K nulls

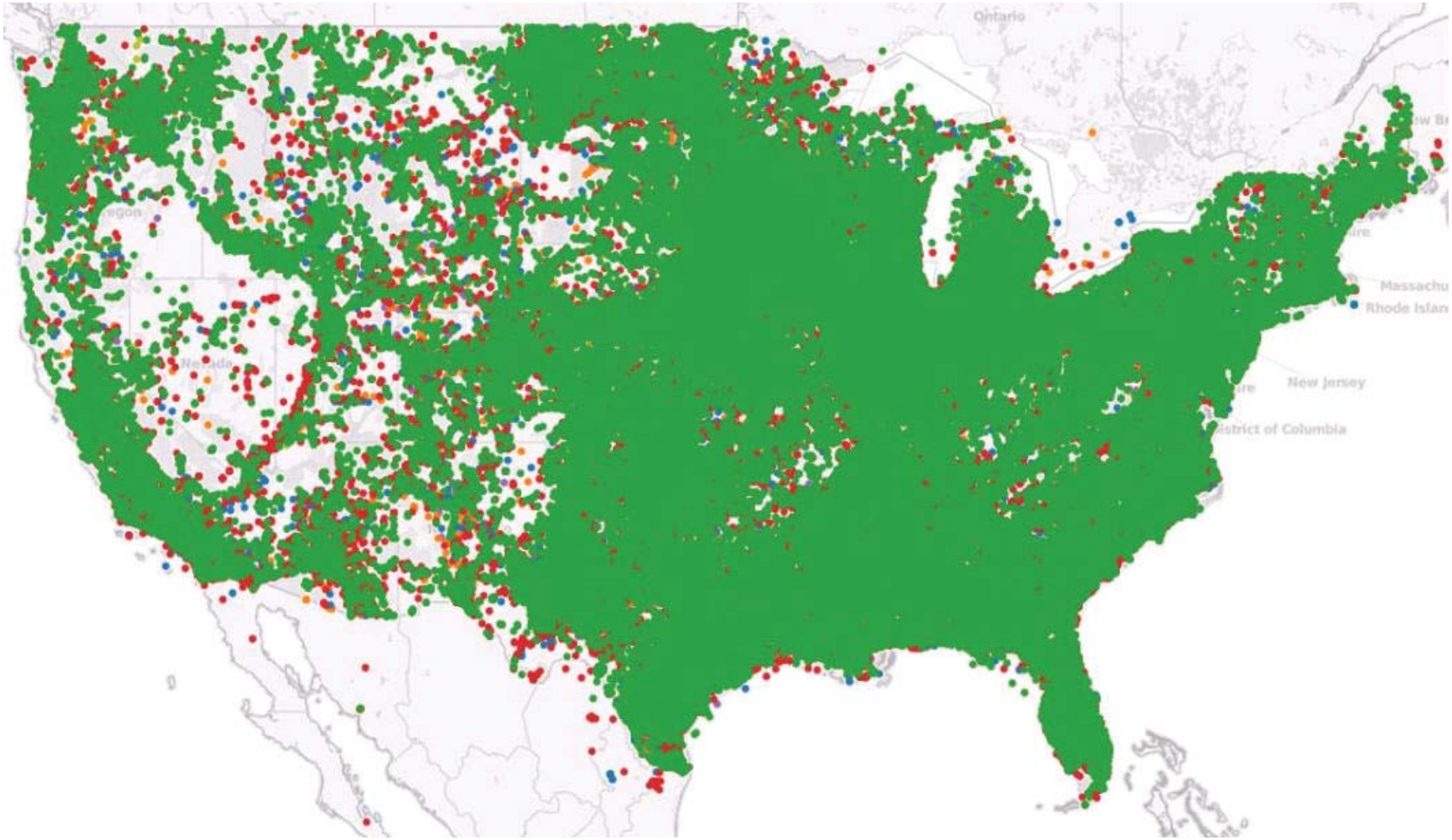
2011


Ontario
Oregon
Nevada
New Jersey
District of Columbia
MEXICO
>7K nulls

2012


Ontario
Massachusetts
Rhode Island
New Jersey
District of Columbia
Nevada
MEXICO
>7K nulls

FUTURE - 2018



RBB WG FCC Dec 2nd, 2013