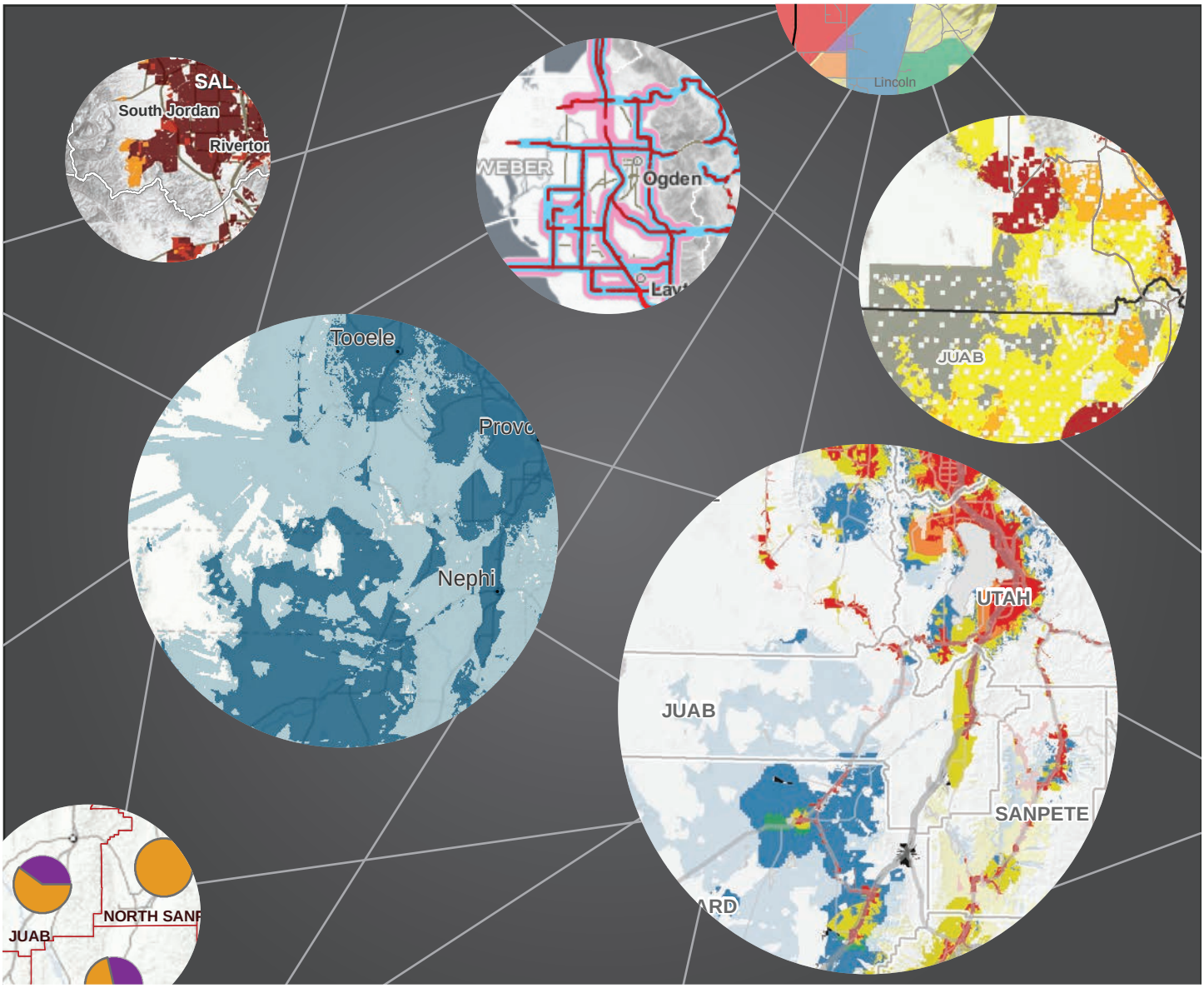
THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

Utah Governor's Office of Economic Development
BUSINESS • TOURISM • FILM



Utah Broadband Atlas

February 2015

UTAH AGRC
Automated Geographic Reference Center

Mobile Drive Test, David Maxson

Utah Office of Tourism

Welcome Letter

The 2015 Utah Broadband Atlas presents an overview of Utah's broadband landscape, while also summarizing the mapping and data resources compiled by the Utah Broadband Project in the past five years. The Utah Broadband Project is a partnership with the Governor's Office of Economic Development, the Utah Automated Geographic Reference Center and the Utah Public Service Commission. The goal of the atlas is to provide broadband stakeholders with a better understanding of broadband services, capabilities and related information across Utah.

Utah Office of Tourism

The Utah Broadband Project's mapping team has collected data updates from local, regional and national broadband service providers, twice a year since Spring of 2010, that details broadband coverage areas, speeds and associated technical information. The data is displayed on the Utah Broadband Map, and the Federal Communication Commission's (FCC) National Broadband Map. The mapping data is also used to support local outreach and provides significant input to broadband policy decisions.

Due to the high quality of services offered by Utah's broadband providers, Utah is recognized as a leader in broadband deployment, especially when Utah is compared to states with similar geographic and rural market challenges. Many factors go into assessing Utah's broadband deployment through mapping, including broadband coverage availability, residential speed access, high capacity availability for businesses and public facilities, and available broadband providers and technologies.

The majority of the broadband mapping information in this atlas was provided by Utah's broadband providers, and processed and verified, to the extent possible, by the Utah Broadband Project. Unless otherwise noted, all broadband mapping information in this atlas is current as of October 1, 2014. The broadband mapping dataset would not be possible without the active participation of Utah broadband providers and other partnering organizations such as the Utah Education Network (UEN). The project greatly appreciates their support.

For more detailed information on the mapping data resources the project has available, see the data section of this document and visit broadband.utah.gov.

Utah Broadband Project Team

Utah Governor's Office of Economic Development
BUSINESS • TOURISM • FILM

Kelleigh Cole
Project Manager

Amie Parker
Project Coordinator

UTAH AGRC
Automated Geographic Reference Center

Bert Granberg
Director

Jessie Pechmann
Mapping Coordinator

Zach Beck
GIS Analyst

Rick Kelson
GIS Analyst

STATE OF UTAH
PUBLIC SERVICE
COMMISSION

Carol Revelt
Utility Technical Consultant

John S. Harvey, PhD
Economist/Technical Advisor

Table of Contents

Utah's Telecommunications Industry....9
- Median Age by U.S. Census Place....10
- Median Household Income by U.S. Census Place....11
- Bachelor Degree Attainment by U.S. Census Place....12
- Broadband Provider Headquarters....13

Fixed Broadband Landscape....15
- Fixed Broadband Coverage by Transmission Technology....16
- Local Telecom Boundaries....17
- Fixed Broadband Provider Count > 3 Mbps....18
- Fixed Broadband Provider Count > 10 Mbps....19
- Fixed Broadband Provider Count > 25 Mbps....20
- Broadband Use Case Available to Addressed Properties....21

Overall Access to Speeds....23
- Advertised Residential Broadband Speeds in Utah....24
- Basic Consumer Broadband....25
- Home Office/Education Broadband....26
- High Capacity Broadband....27

Underserved Areas....29
- Addressed Properties with Basic Consumer Broadband Service or Greater....30
- Addressed Properties with Underserved Broadband Service....31
- Addressed Properties Unserved by Fixed Broadband Service....32
- Addressed Properties Unserved by Wireline Broadband Service....33

Business Services....35
- Broadband Coverage of 100 Mbps+ Download Availability....36
- Fiber-Based Broadband Service Availability....37
- Highest Known Speed and Broadband Market Challenges....38

Community Anchor Institutions....39
- Utah Schools and the Utah Education Network....40
- Utah Libraries and Bookmobile Stops....41

Mobile Landscape....43
- Utah's Mobile Broadband Network Speeds....44
- Utah Highway Corridor Mobile Broadband Coverage....45
- Percent of Mobile Broadband Coverage in Highway Miles by PSAP Jurisdiction....46
- Best Available Mobile Download Speed....47
- Percent Change in Best Available Mobile Download Speed....48

Broadband Growth....49
- Fixed Broadband Change in Maximum Advertised Download Speed....50
- Mobile Broadband Change in Maximum Advertised Download Speed....51
- LTE Broadband Wireless Buildout....52

Data Resources....53

Utah Office of Tourism

Utah's Telecommunications Industry

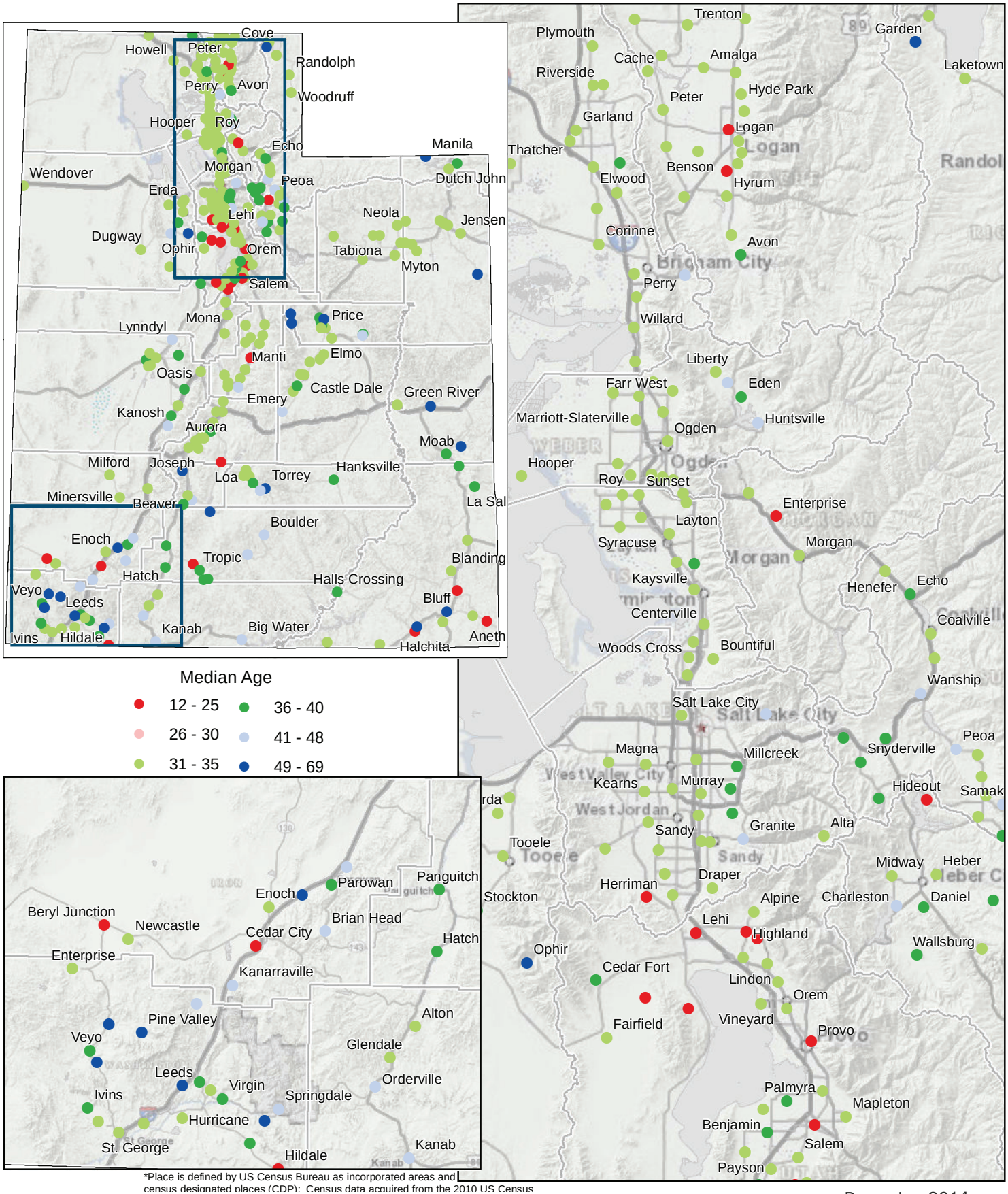
Steve Proctor

As of January 2015, there are 59 identified broadband companies in Utah providing facilities-based (a National Telecommunications and Information Administration (NTIA) defined term that implies ownership or long term lease of the last mile infrastructure) broadband services to end users. Broadband Internet service was defined at the project onset as access to maximum advertised speeds of at least 768 Kbps download and 200 Kbps upload. While these speeds still qualify to be reported to the project, subsequently, the FCC and others have set substantially higher speed targets.

In Utah, broadband companies provide Internet access over DSL, cable, fiber, fixed wireless and mobile transmission technologies. In almost all Utah communities, several of these technologies are available, and are offered through more than one provider.

Utah is a very diverse state, with urban areas along the Wasatch Front and urban clusters in southwestern Utah. While the population is concentrated in these areas, Utah's expansive rural areas occupy the great majority of the state's area and are important contributors to the state's economy and development. Rural public lands make up nearly three quarters of the state's total area and present challenges to broadband deployment in the form of canyons and mountainous terrain, as well as protective management practices and related lengthy permitting processes implemented by federal land management agencies.

Median Age by US Census Place*



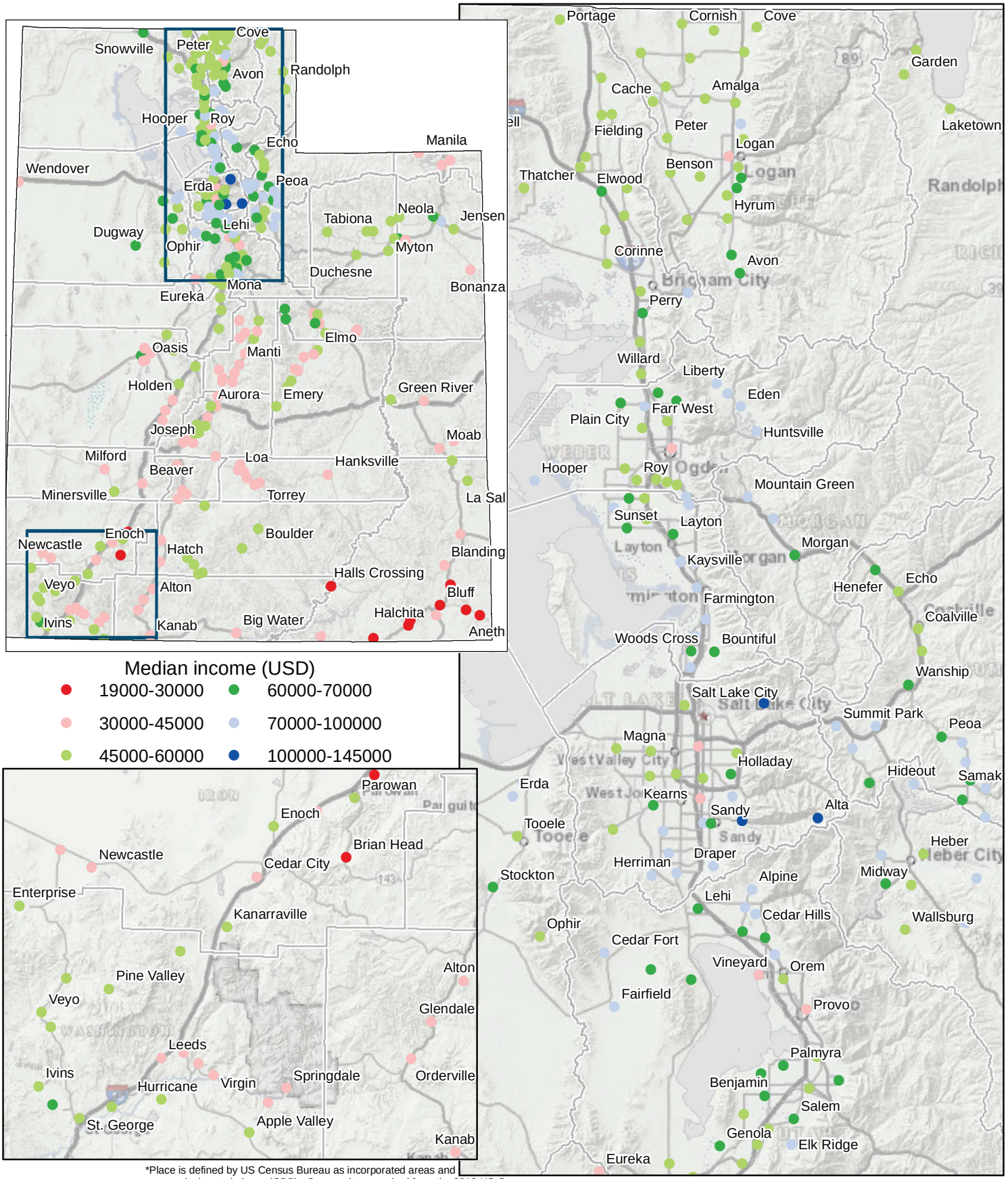
*Place is defined by US Census Bureau as incorporated areas and census designated places (CDP). Census data acquired from the 2010 US Census

December 2014

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

Median Household Income by US Census Place*



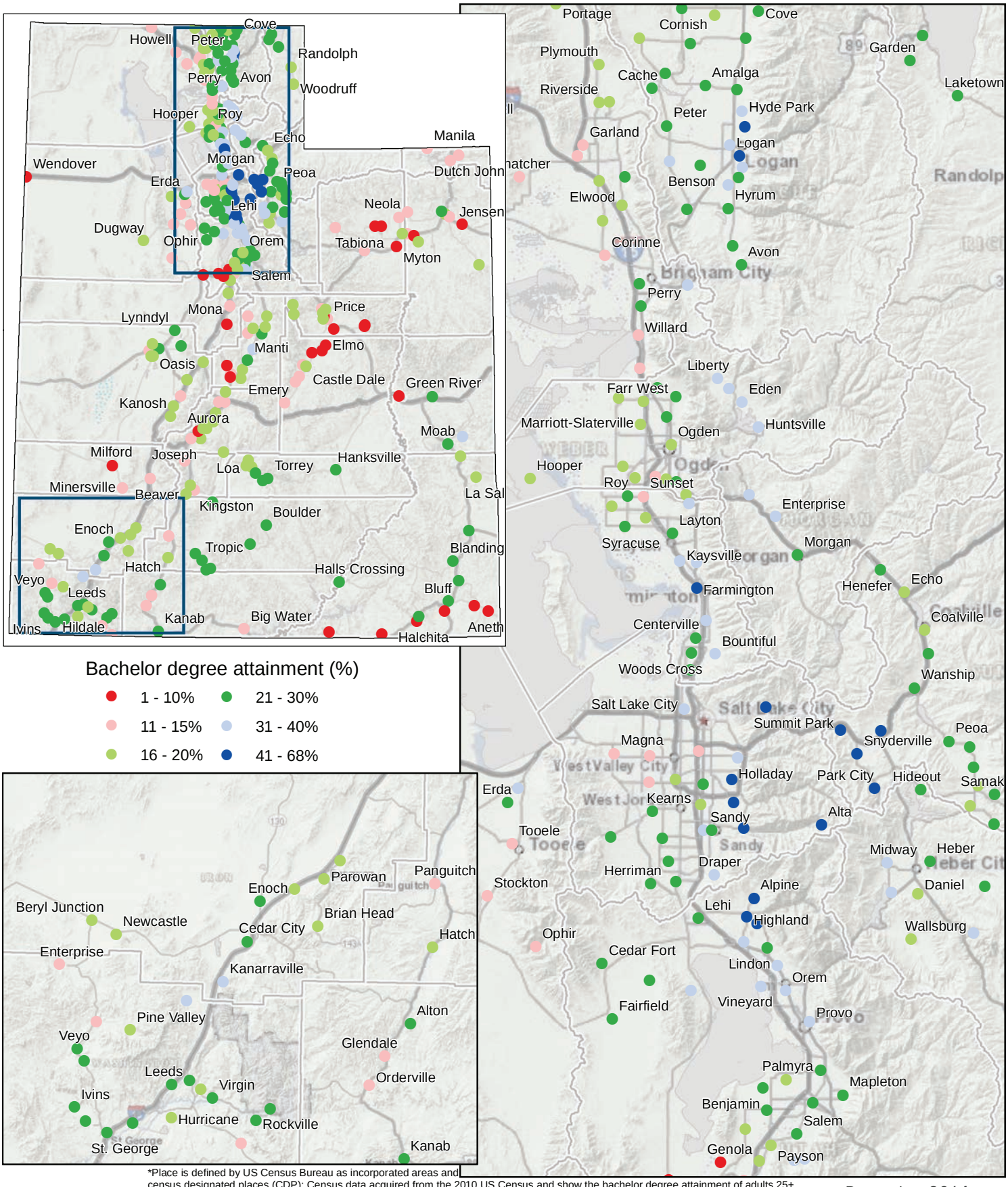
*Place is defined by US Census Bureau as incorporated areas and census designated places (CDP); Census data acquired from the 2010 US Census

December 2014

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

Bachelor Degree Attainment by US Census Place*



Bachelor degree attainment (%)

1 - 10%	21 - 30%
11 - 15%	31 - 40%
16 - 20%	41 - 68%

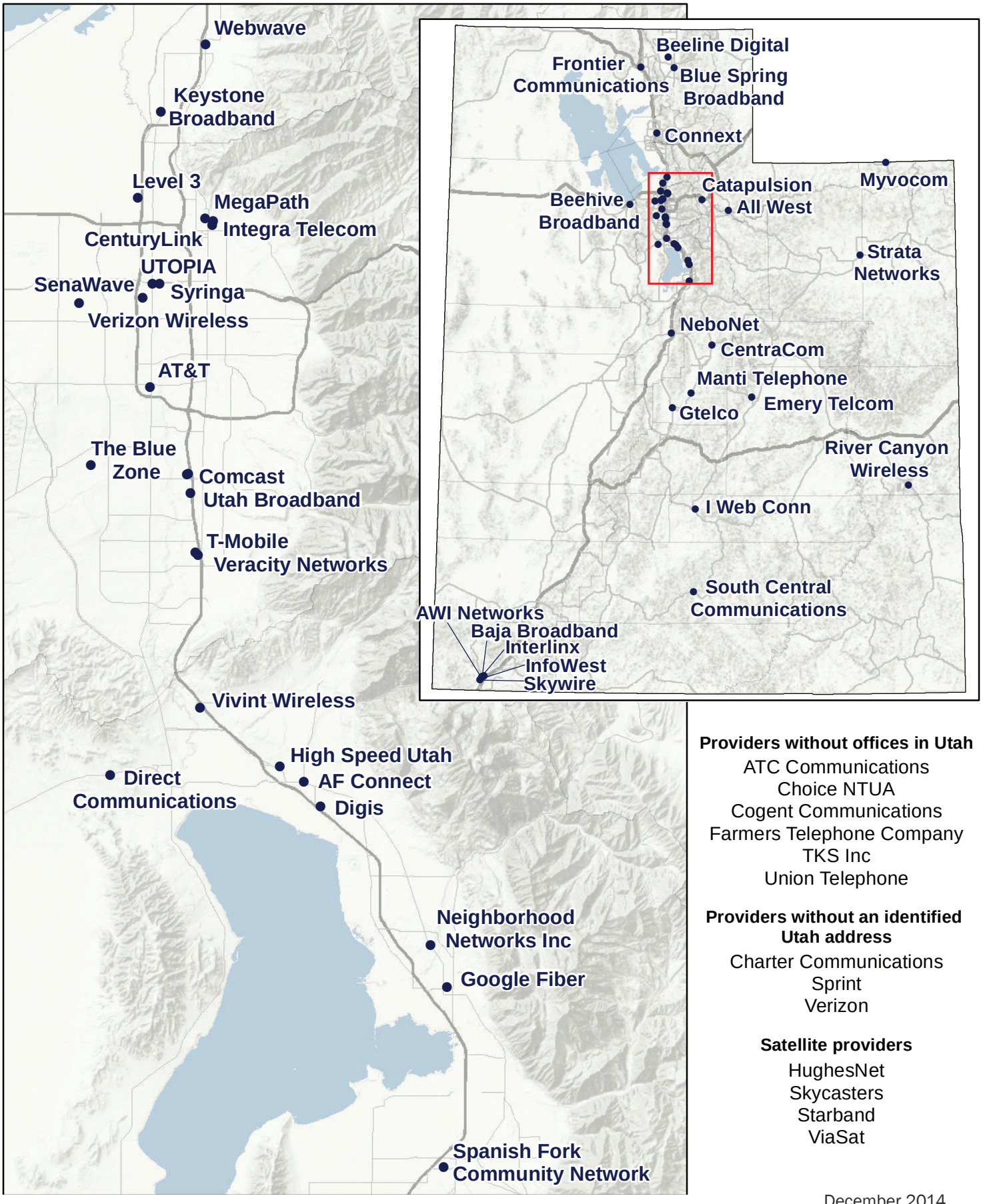
*Place is defined by US Census Bureau as incorporated areas and census designated places (CDP); Census data acquired from the 2010 US Census and show the bachelor degree attainment of adults 25+.

December 2014

THE STATE OF UTAH BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

Broadband Provider Headquarters



Providers without offices in Utah

ATC Communications
Choice NTUA
Cogent Communications
Farmers Telephone Company
TKS Inc
Union Telephone

Providers without an identified Utah address

Charter Communications
Sprint
Verizon

Satellite providers

HughesNet
Skycasters
Starband
ViaSat

December 2014

Utah Office of Tourism

Fixed Broadband Landscape

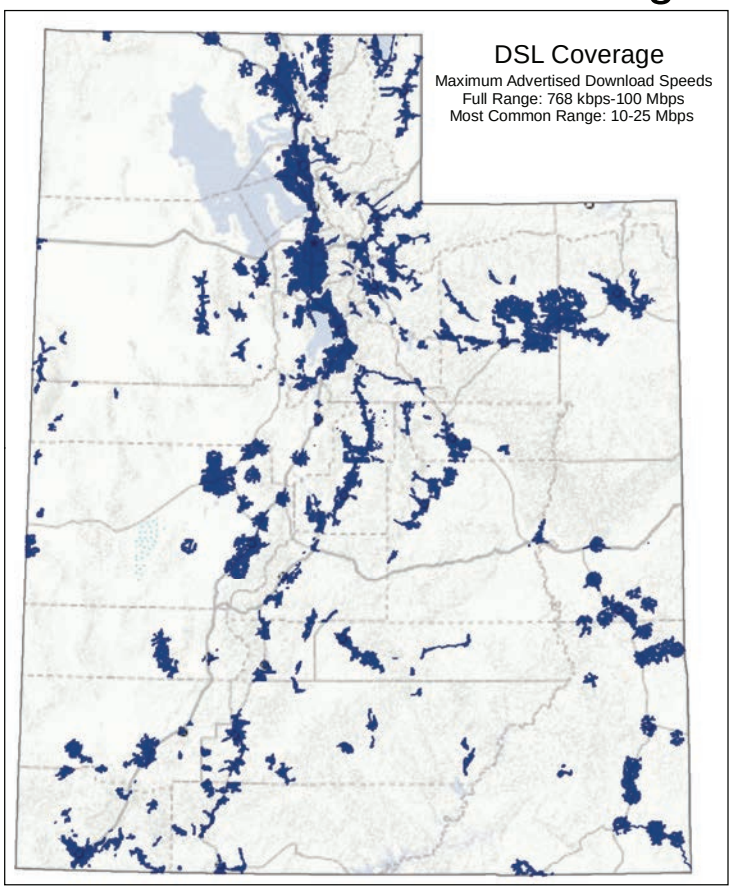
Utah Office of Tourism

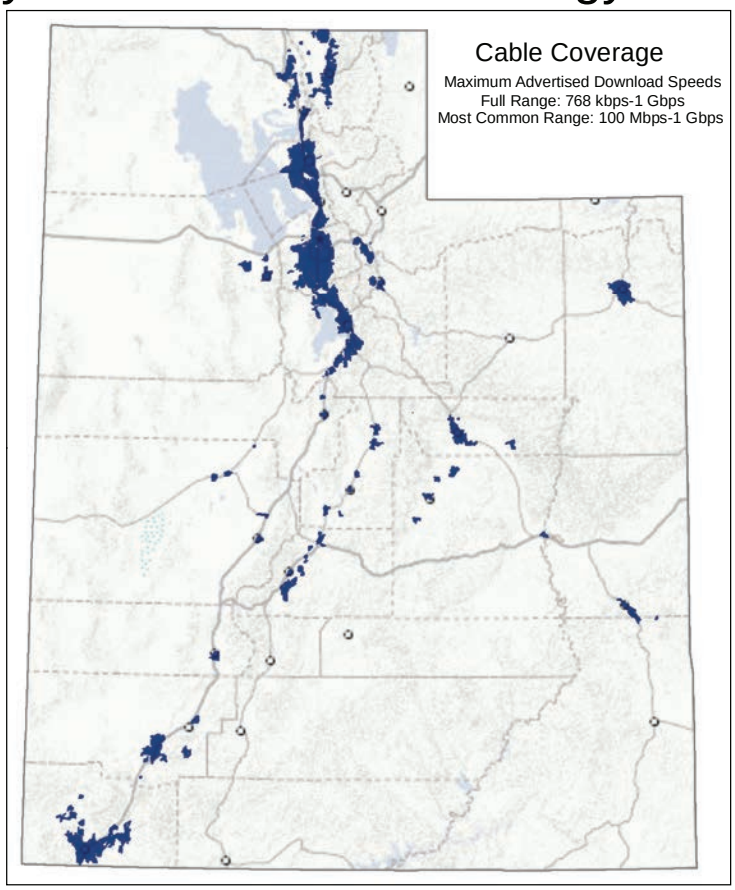
Fixed broadband technologies provide the most common primary home and business connections to the Internet. Fixed broadband service can support connections to multiple devices in a home, and many consumers use it for educational and home business needs. To understand the fixed broadband landscape in Utah, access to broadband coverage, maximum advertised speeds, and available technologies and providers are assessed.

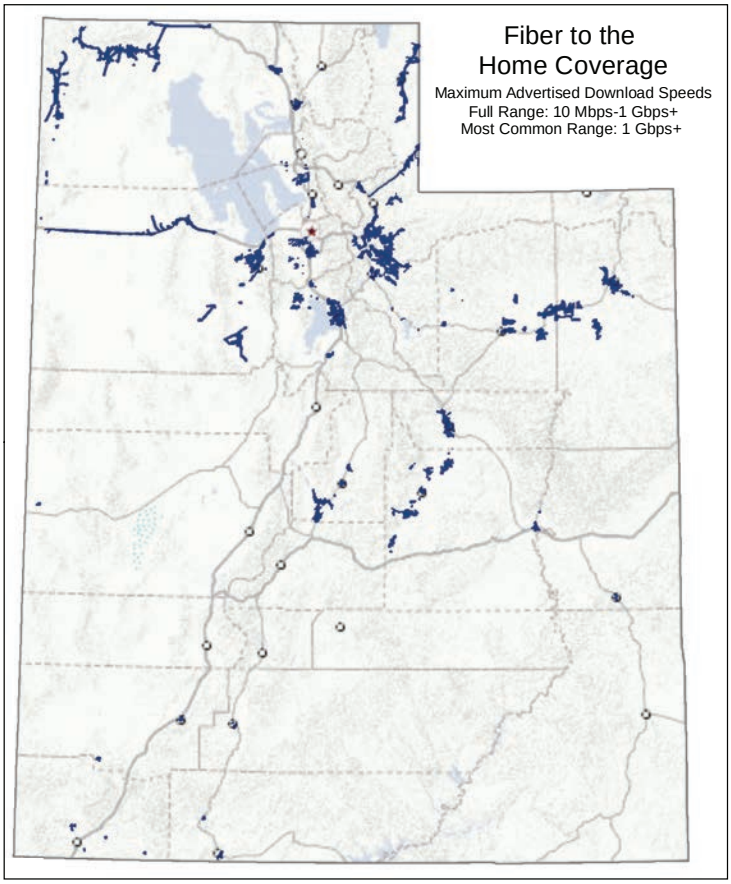
Fixed broadband includes Internet services delivered over DSL, cable, fiber to the premise, and fixed wireless. DSL is provided by telephone companies in association with telephone infrastructure. Therefore, DSL service provision is limited to regulated telecom boundaries. Cable, fiber, and fixed wireless can be provided by telecom and other communication companies. Some communications companies offer one transmission technology, while others offer multiple. When the project looked at the number of providers available in an area, multiple technologies provided by one company were counted as one provider.

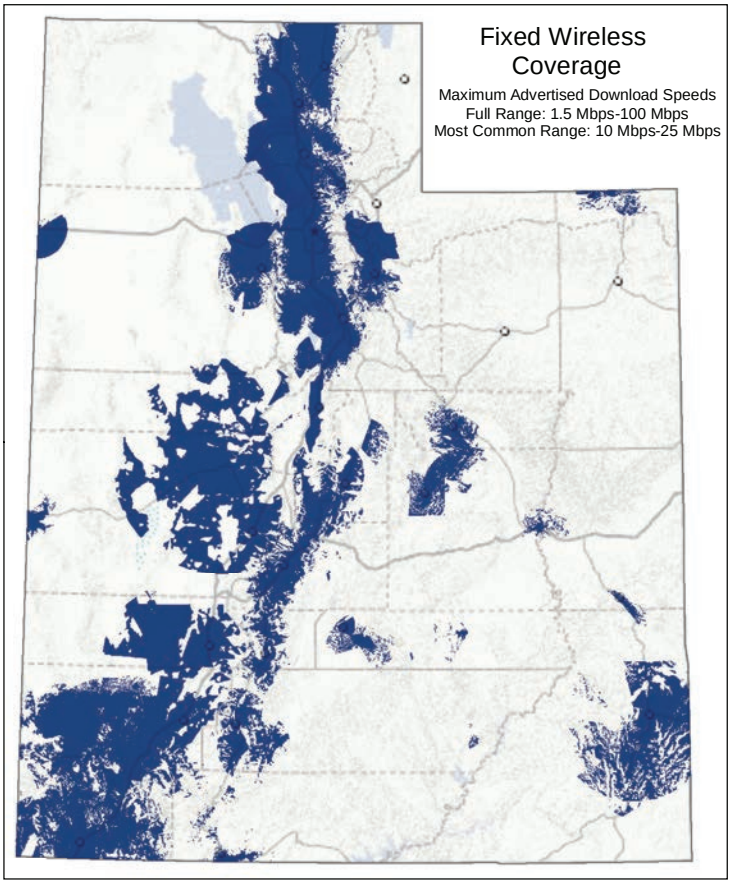
Additionally, fiber optic cable is the backbone infrastructure supporting all other technology types. It provides the long haul and middle mile transport for all these technologies and supports maximum possible speeds to end users. With that said, Utah's broadband providers have leveraged non-fiber technologies to provide cost-effective last-mile connections to residential and business users and the innovative use of cable, DSL and wireless has enabled great increases in coverage and speed to end users. The repurposing of cable and DSL infrastructure to provide broadband is, in large part, why end users are comparatively, so well-served and have benefitted consumers by reducing costs. The use of fixed wireless technologies is very cost-effective for many remote locations and it's presence in many urban areas provides a competitive alternative that likely impacts end user cost for broadband service.

Fixed Broadband Coverage by Transmission Technology



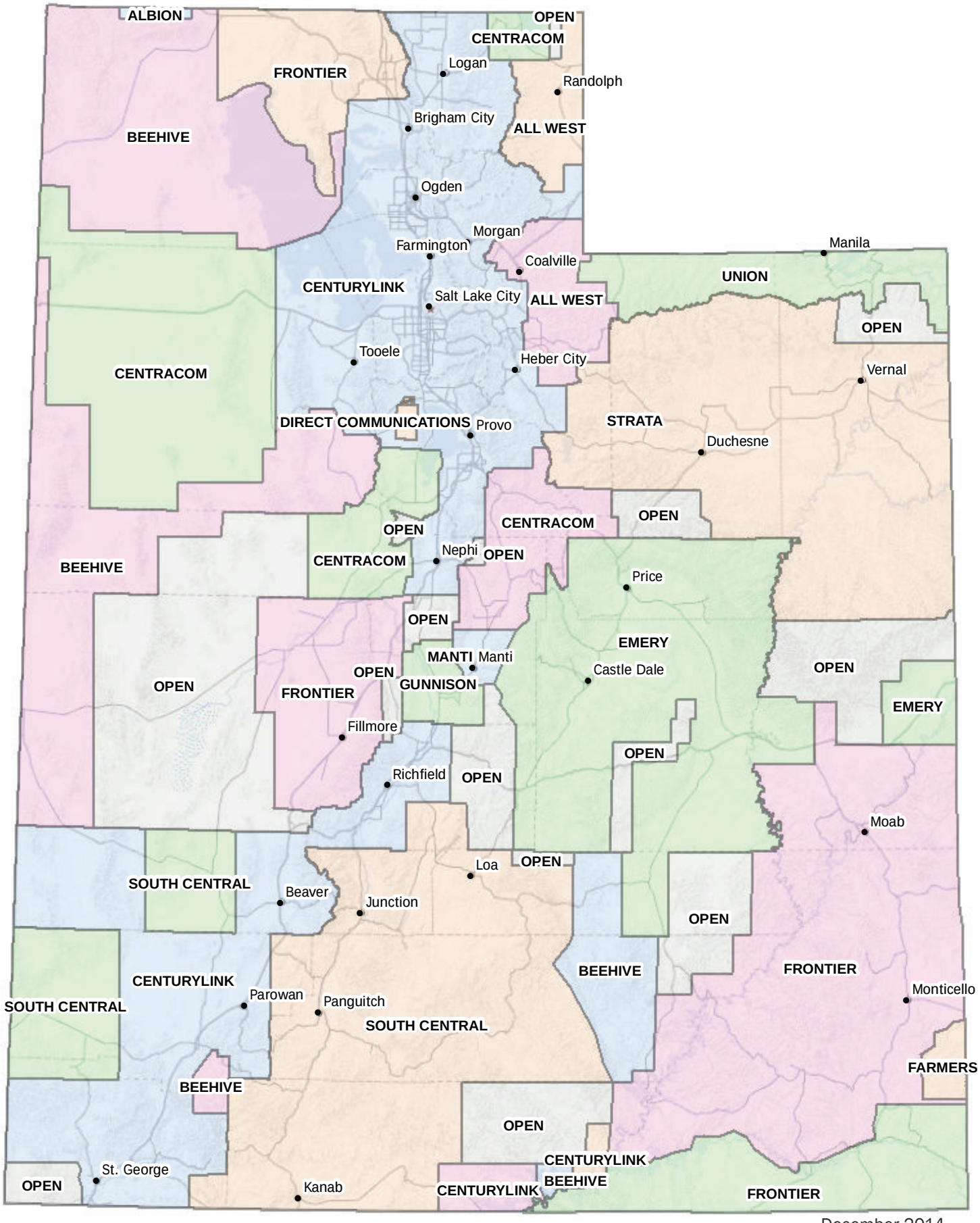






December 2014

Local Telecom Boundaries

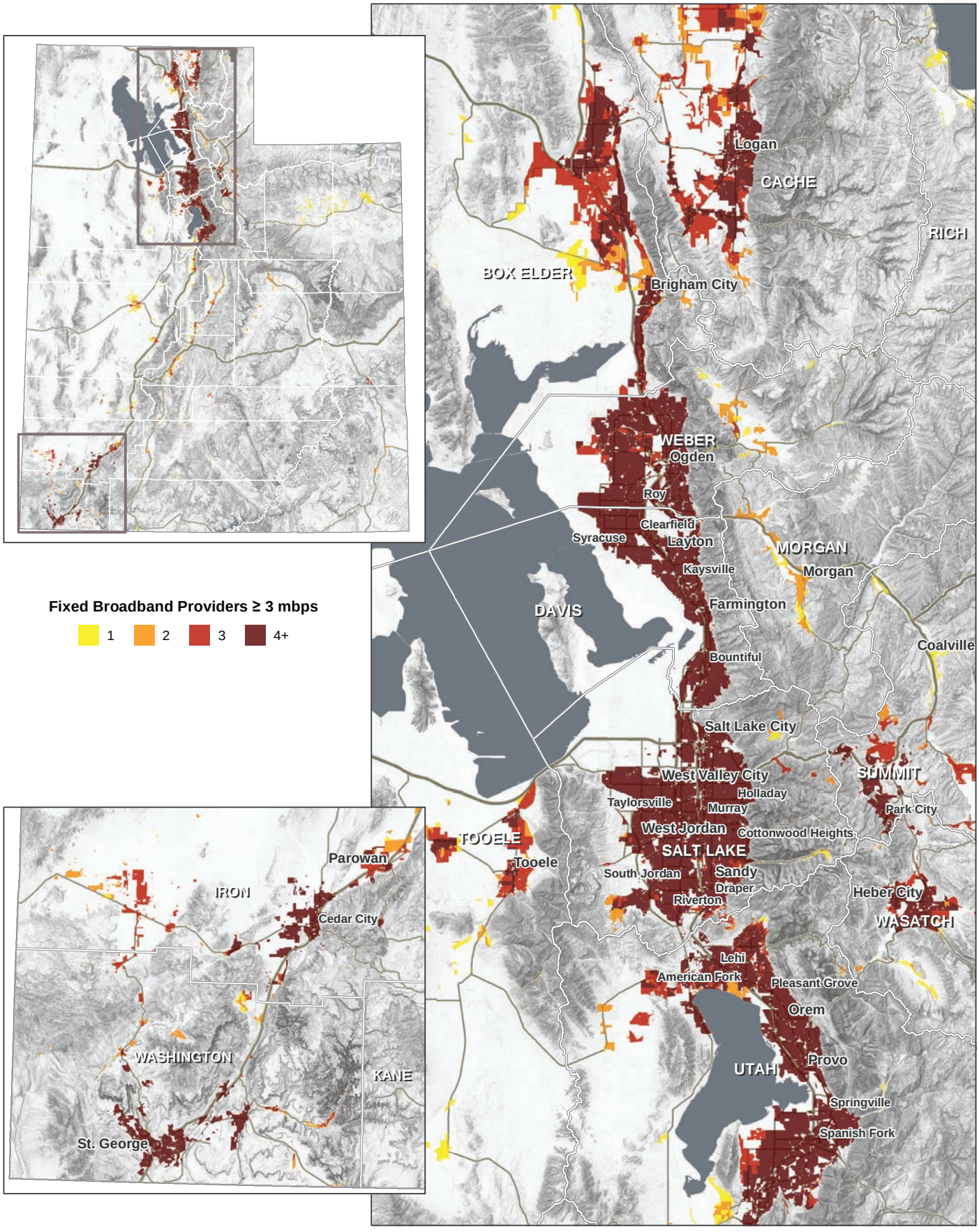


December 2014

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

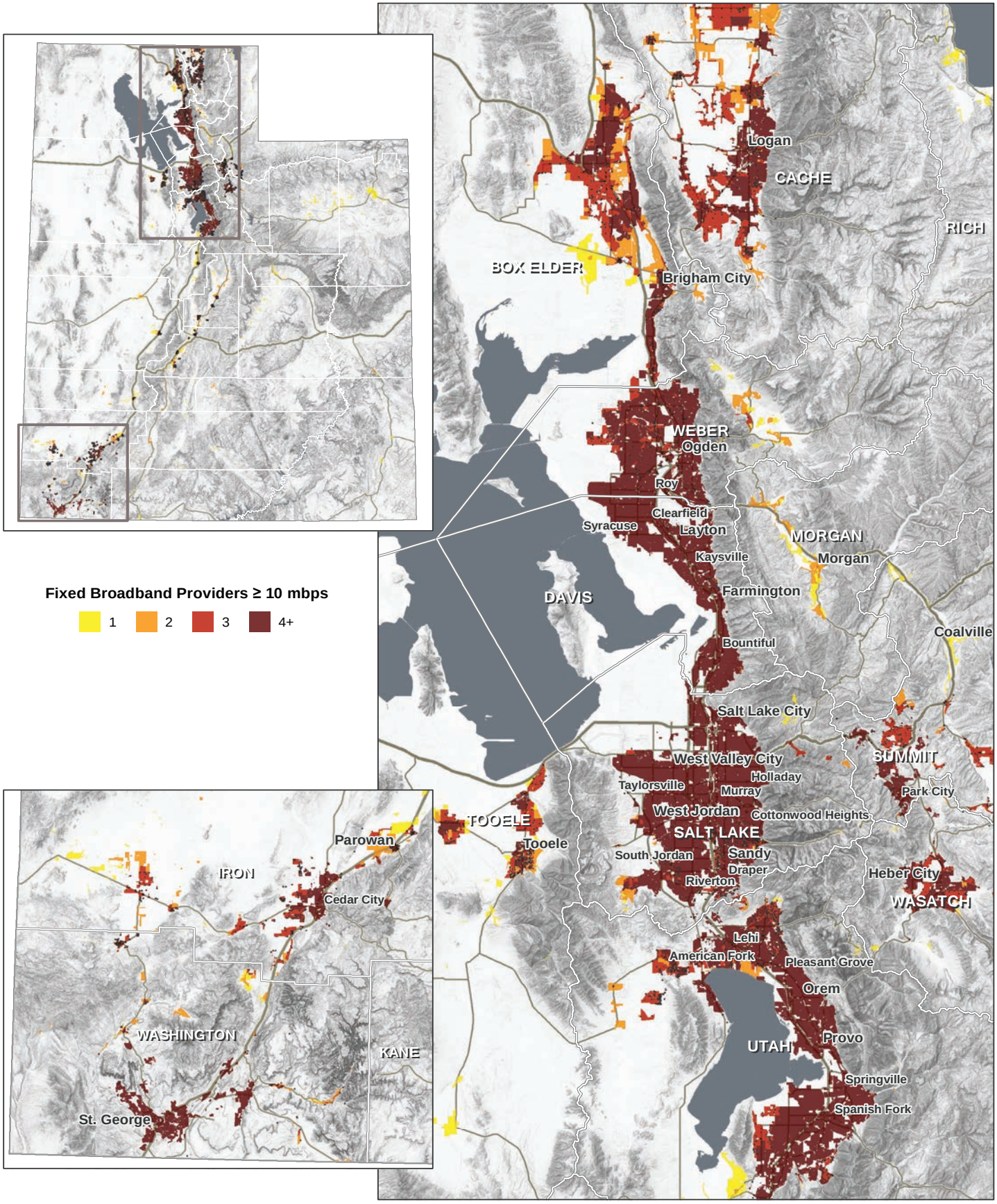
UTAH AGRC
Automated Geographic Reference Center

Fixed Broadband Provider Count

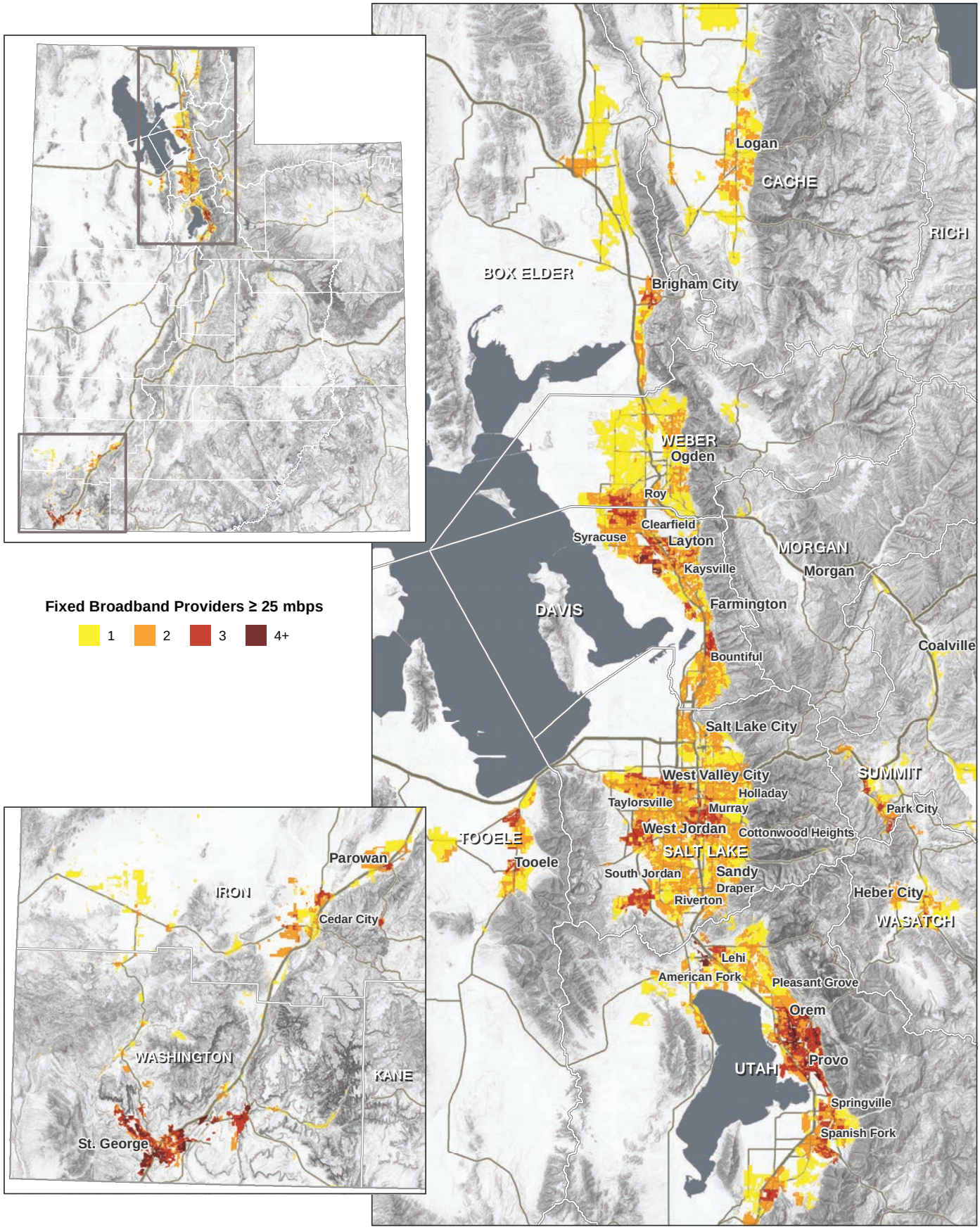


February 2015

Fixed Broadband Provider Count

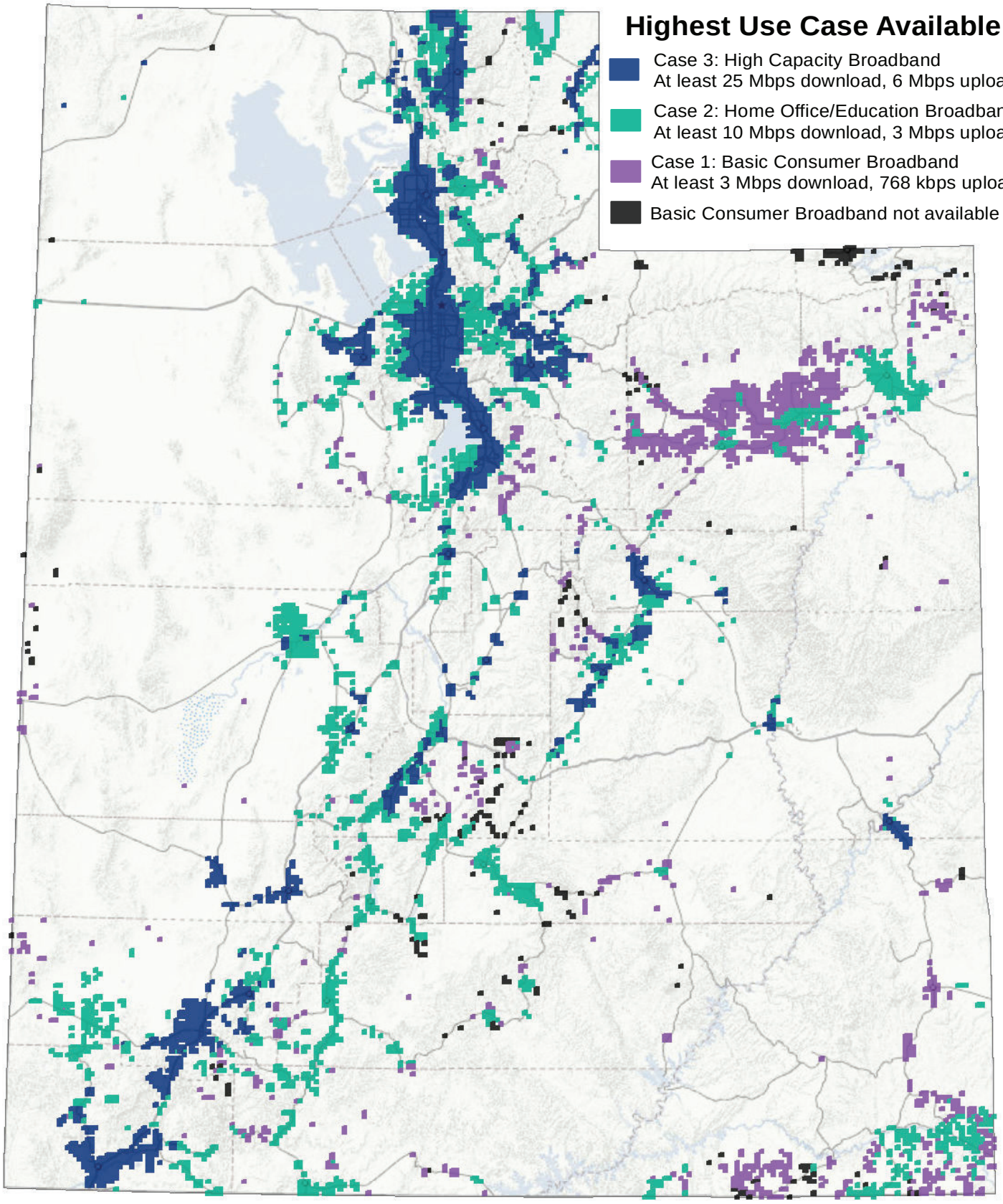


Fixed Broadband Provider Count



February 2015

Broadband Use Case Available to Addressed Properties



Utah Office of Tourism

Overall Access to Speeds

Utah Office of Tourism

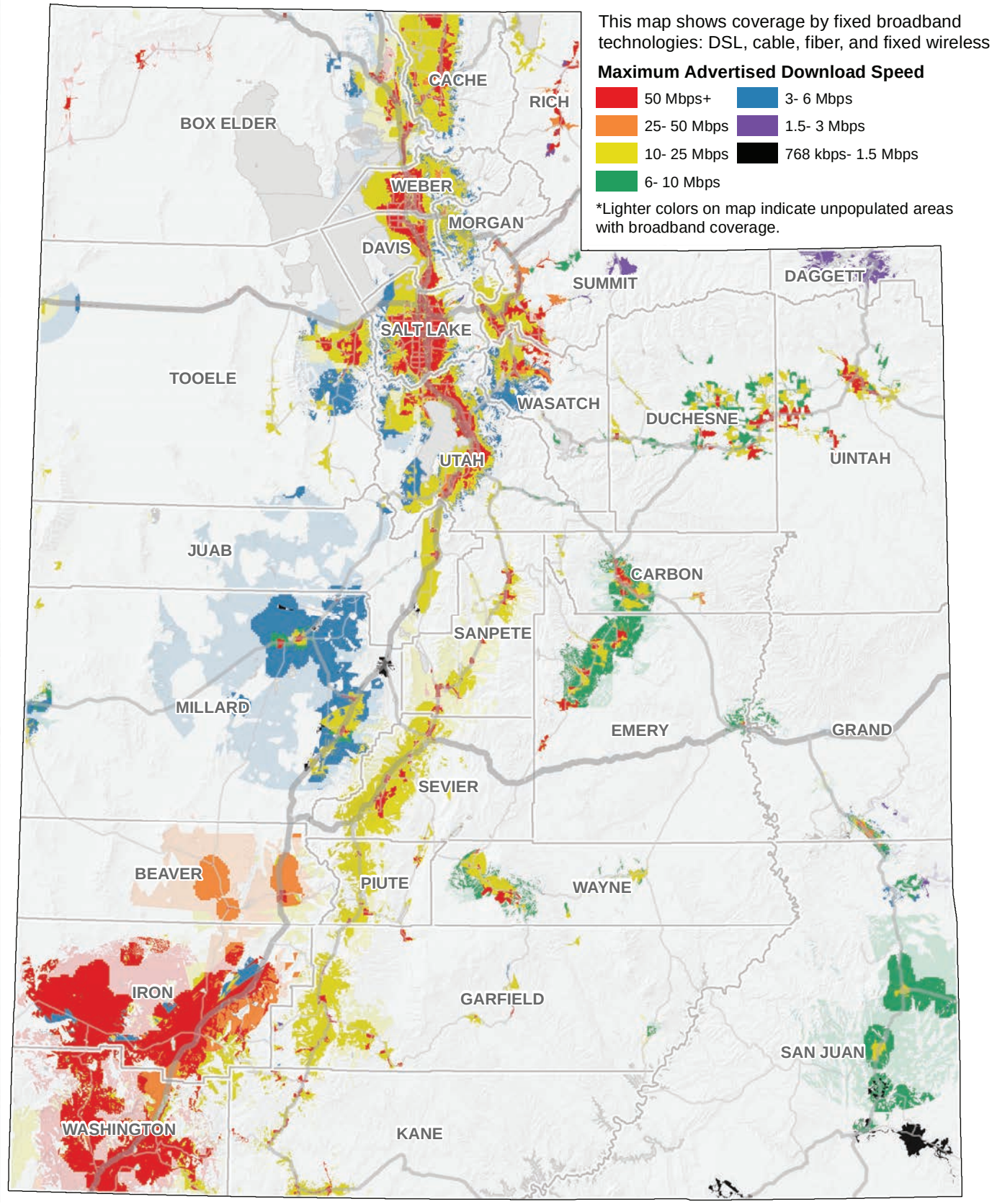
Broadband Internet is defined as maximum advertised speeds of at least 768 kbps download and 200 kbps upload. This definition was created in 2009 to standardized the speed threshold nationwide for what was considered broadband. Since then, the project has created additional speed thresholds to better understand levels of broadband service available throughout the state as compared to the many uses of the Internet today. The three levels are defined below to match three different broadband use cases, defined by the project.

Case 1 Basic Consumer Broadband: Residential availability of at least 3 Mbps download and 768 kbps upload. Allows for basic broadband Internet functionality, such as browsing web pages and checking email.

Case 2 Home Office/Education Broadband: Residential availability of at least 10 Mbps download and 3 Mbps upload. Allows for basic functionality, plus video streaming and photo upload and download.

Case 3 High Capacity Broadband: Residential availability of at least 25 Mbps download and 6 Mbps upload. These speeds allow for residences and small businesses with high volume usage.

Advertised Residential Broadband Speeds in Utah



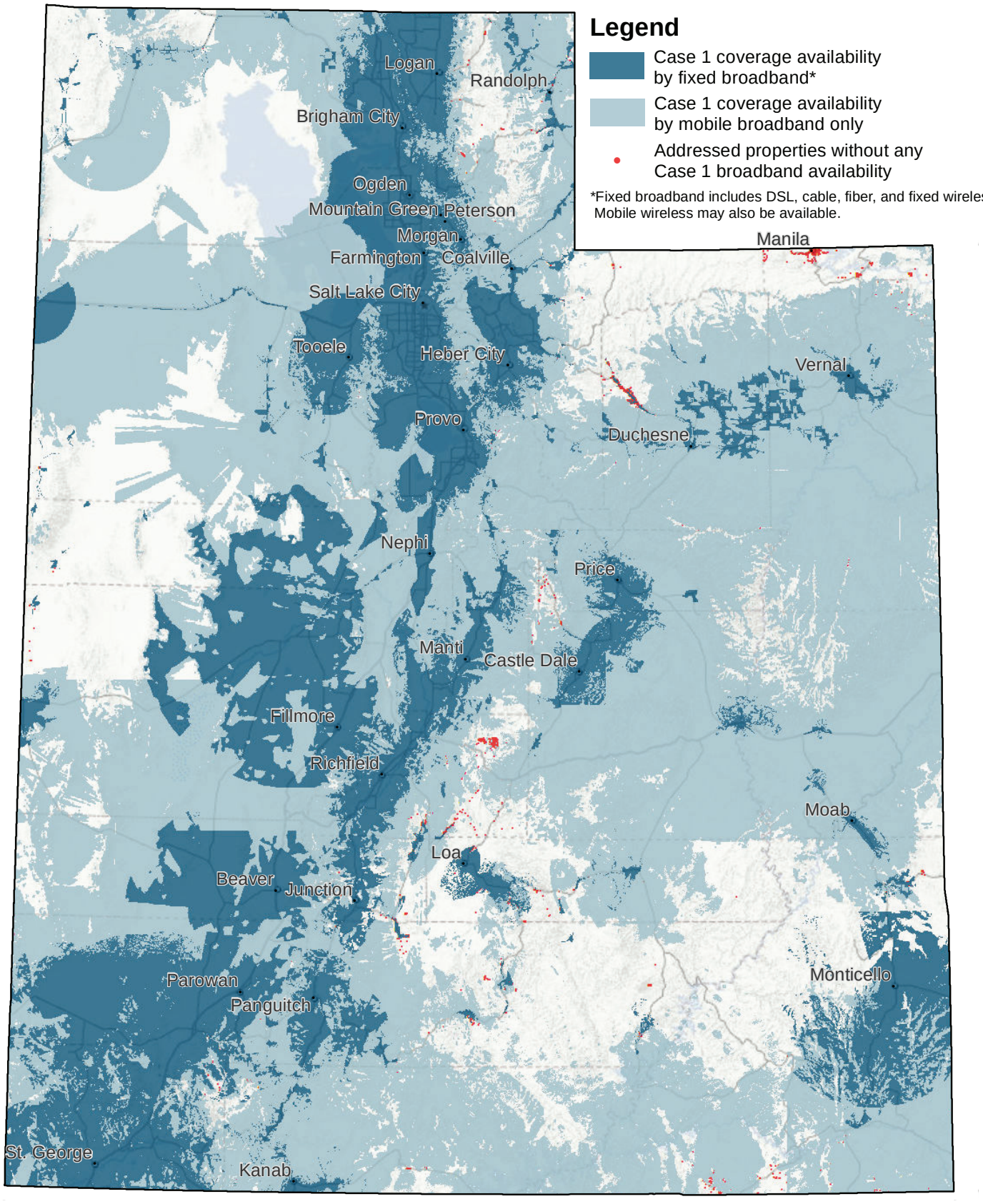
February 2015

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

Case 1: Basic Consumer Broadband

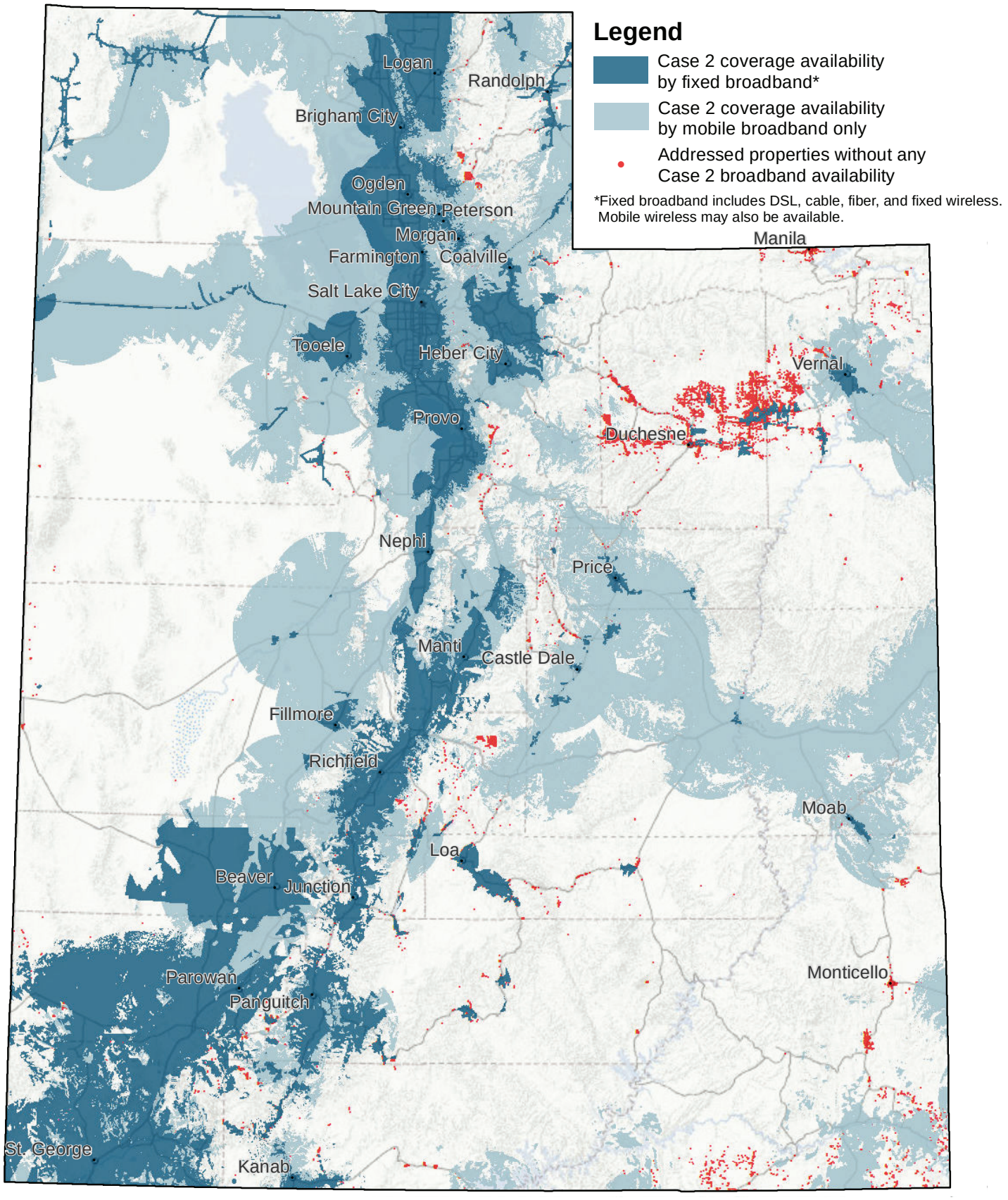
Basic Consumer Broadband is defined by residential availability of at least 3 Mbps download and 768 Kbps upload. Allows for basic broadband internet functionality, such as browsing webpages and checking email.



November 2014

Case 2: Home Office/Education Broadband

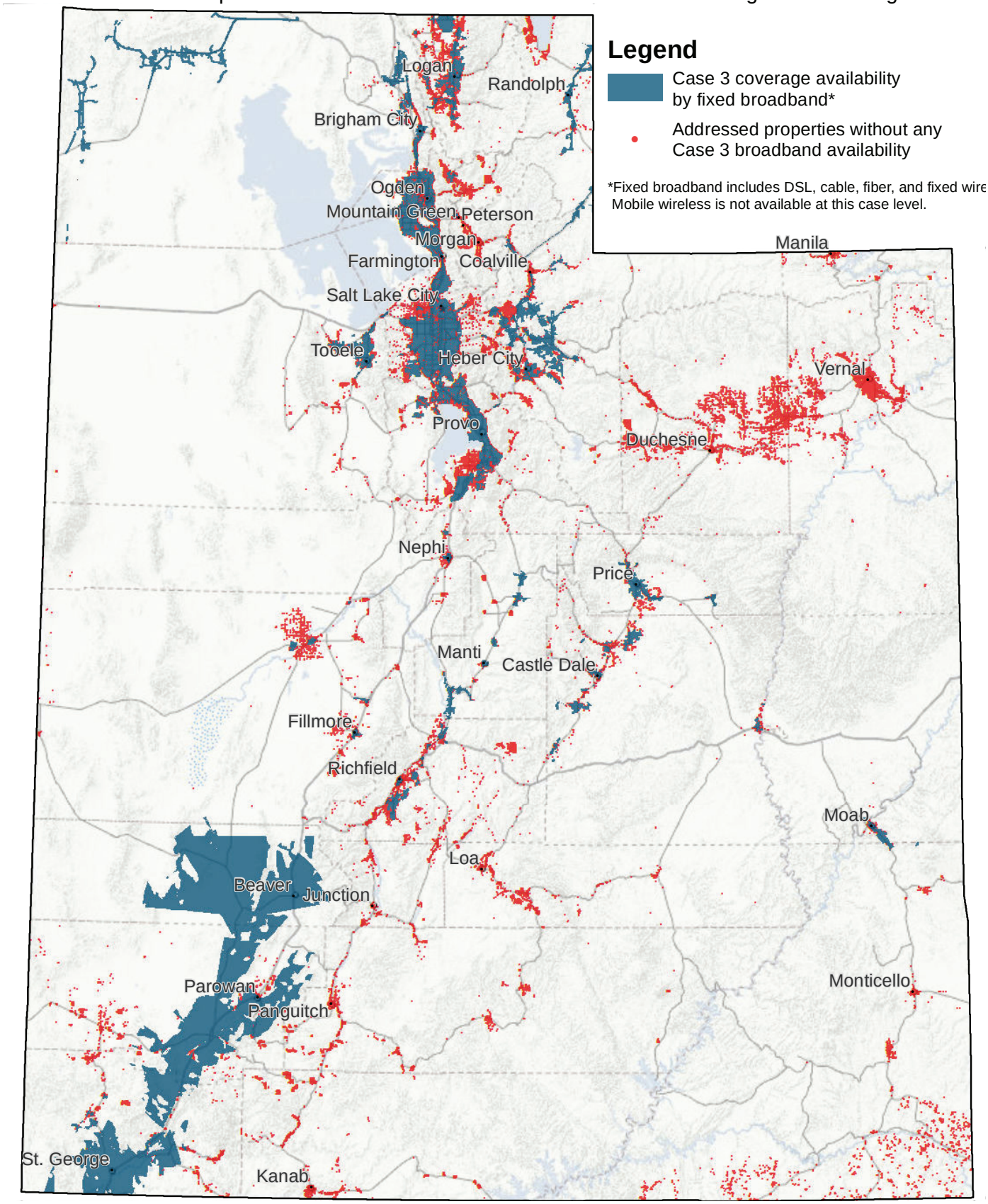
Home Office/Education Broadband is defined by residential availability of at least 10 Mbps download and 3 Mbps upload. Allows for basic functionality, plus video streaming and photo upload and download.



November 2014

Case 3: High Capacity Broadband

High Capacity is defined by residential availability of at least 25 Mbps download and 6 Mbps uploa
These speeds allow for residential and small businesses with high volume usage.



November 2014

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

Utah Office of Tourism

Underserved Areas

Utah Office of Tourism

The broadband landscape in Utah is very strong and successful, thanks to the great service provided by Utah's broadband providers. Many areas in the state, even in the rural areas, have great service. Due to the diversity of the state, and the sometimes geographic and economic challenges faced in various areas, there are still some areas that could benefit from improved fixed broadband access.

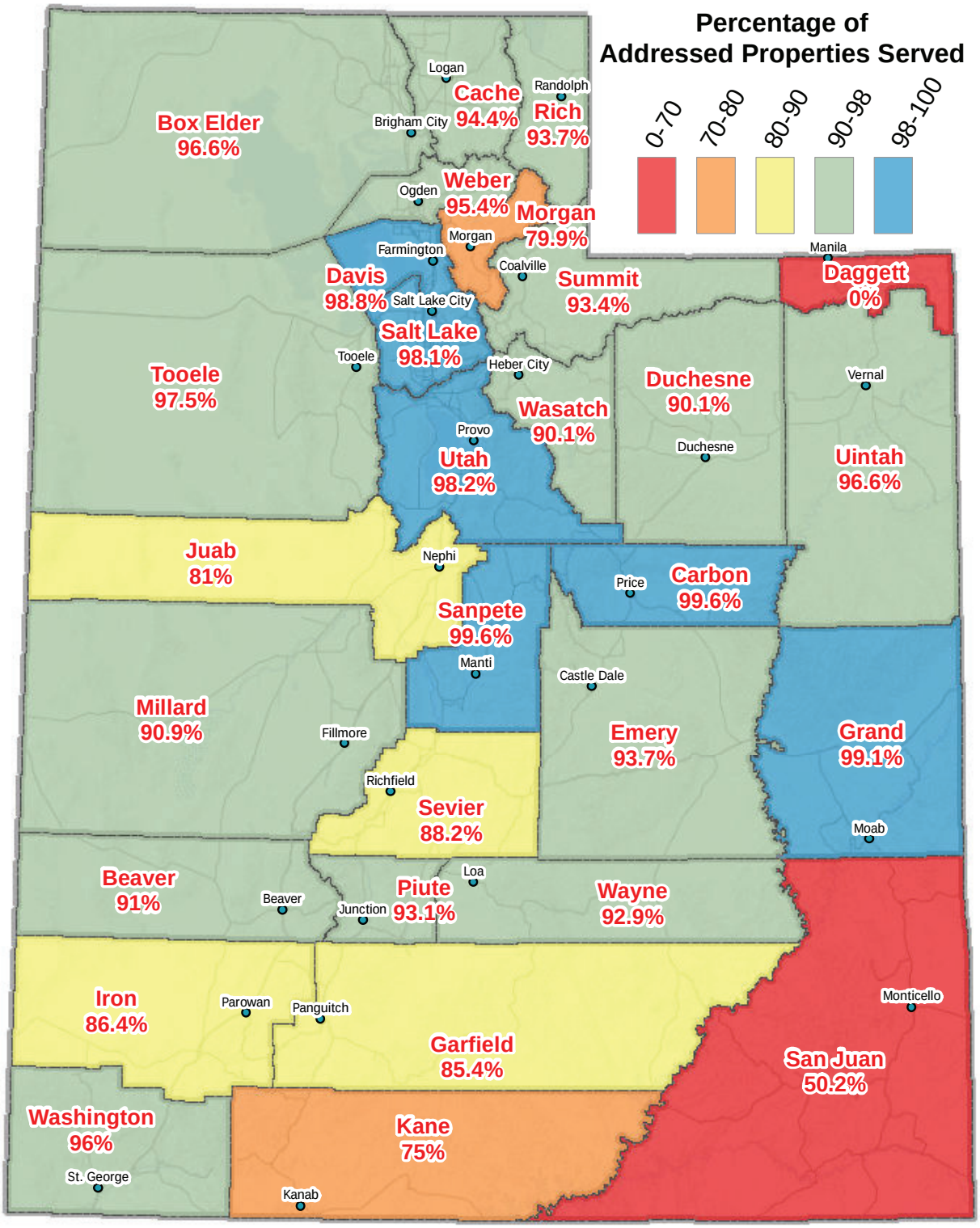
For the purpose of this atlas, being served by broadband requires access to at least basic consumer broadband service, which is at least 3 Mbps download and 768 kbps upload. Access to Internet speeds below basic consumer broadband service, but above 768 kbps download and 200 kbps upload, is considered underserved. Any service below underserved is considered unserved. To discern what areas in Utah are unserved or underserved, the project looked at levels of broadband service at known addressed properties in the state.

Both wireline and fixed wireless providers make up the fixed broadband landscape. Some locations are unserved by wireline, but still served by fixed wireless. To better understand what areas are unserved by just wireline or any fixed wireless, the project split up these two unserved categories in the following maps.

Addressed Properties with Basic Consumer Broadband Service or Greater

Basic Consumer Broadband is defined by residential availability of ***at least 3 Mbps download and 768 kbps upload.*** Allows for basic broadband internet functionality, such as browsing webpages and checking email.

96% of Utah addressed properties are covered by Basic Consumer Broadband.



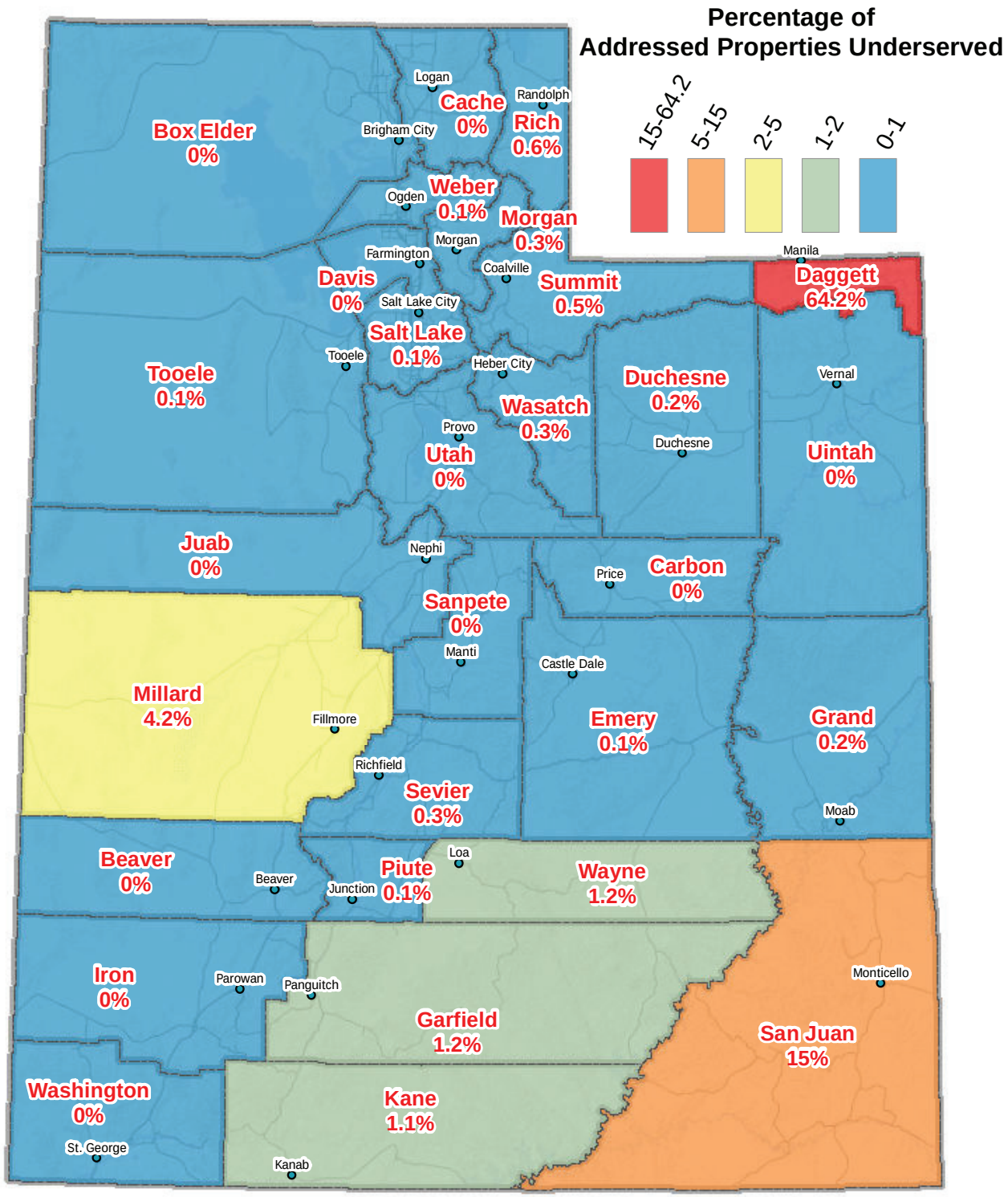
*** Provider data current as of Oct.1, 2014**
*** Addressed properties provided by county government**

December 2014

Addressed Properties with Underserved Broadband Service

Underserved Broadband is defined by residential availability of ***greater than 768 kbps download and 200 kbps upload, but less than 3 Mbps download and 768 kbps upload,*** which is the threshold for Basic Consumer Broadband.

0.34% of Utah addressed properties are underserved.

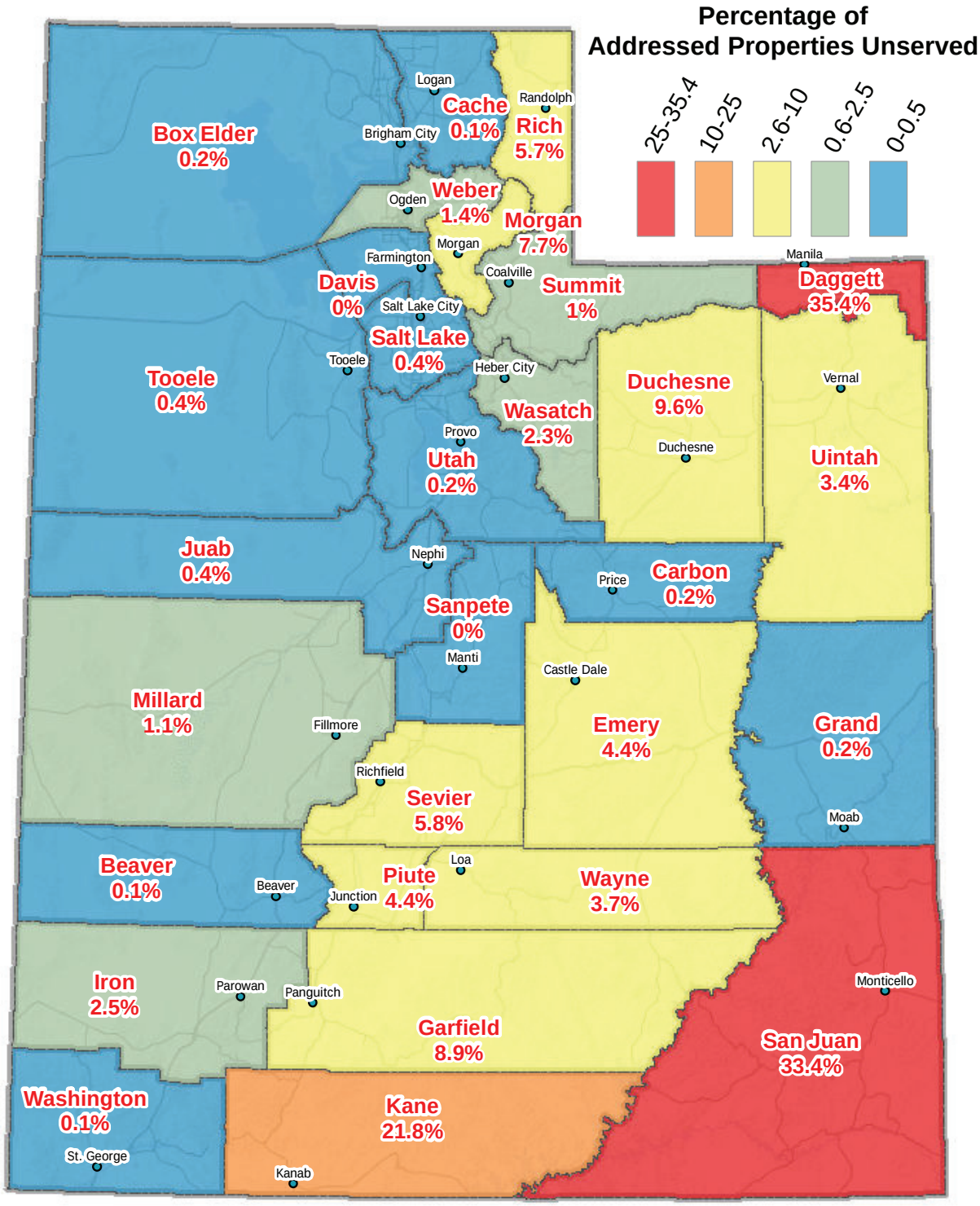


*** Provider data current as of Oct.1, 2014**
*** Addressed properties provided by county government**

Addressed Properties Unserved by Fixed Broadband Service

Fixed Broadband Service is defined by service of ***at least 768 kbps download and 200 kbps upload*** through a fixed connection. A fixed connection can be through cable, DSL, fiber to the home and fixed wireless.

1.2% of Utah addressed properties are not covered by Fixed Broadband.



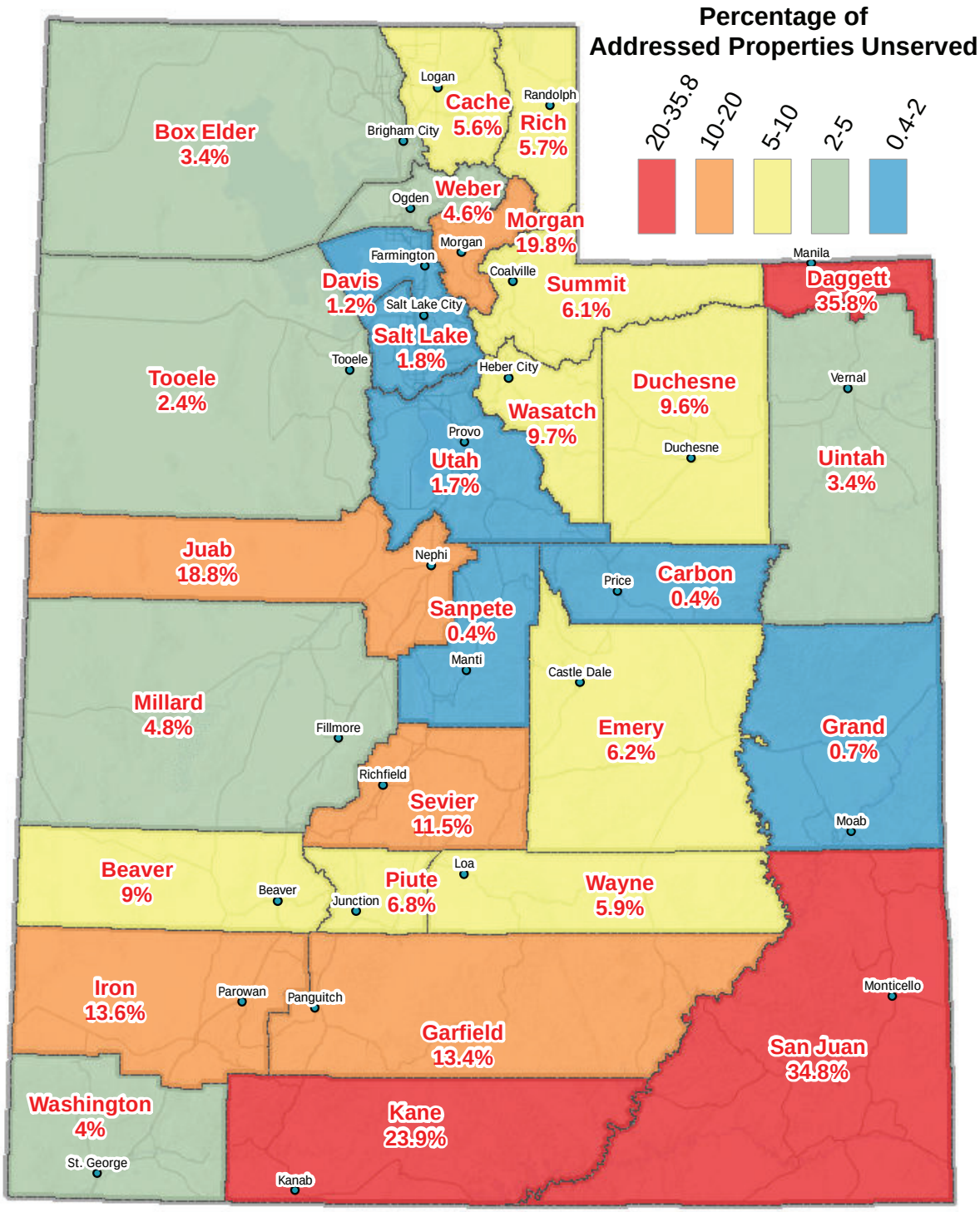
*** Provider data current as of Oct.1, 2014**
*** Addressed properties provided by county government**

December 2014

Addressed Properties Unserved by Wireline Broadband Service

Wireline Broadband Service is defined as service of ***at least 768 kbps download and 200 kbps*** upload through a wireline connection. A wireline connection can be through cable, DSL or fiber to the home.

3.67% of Utah addressed properties are not covered by Wireline Broadband.



*** Provider data current as of Oct.1, 2014**
*** Addressed properties provided by county government**

Utah Transit Authority

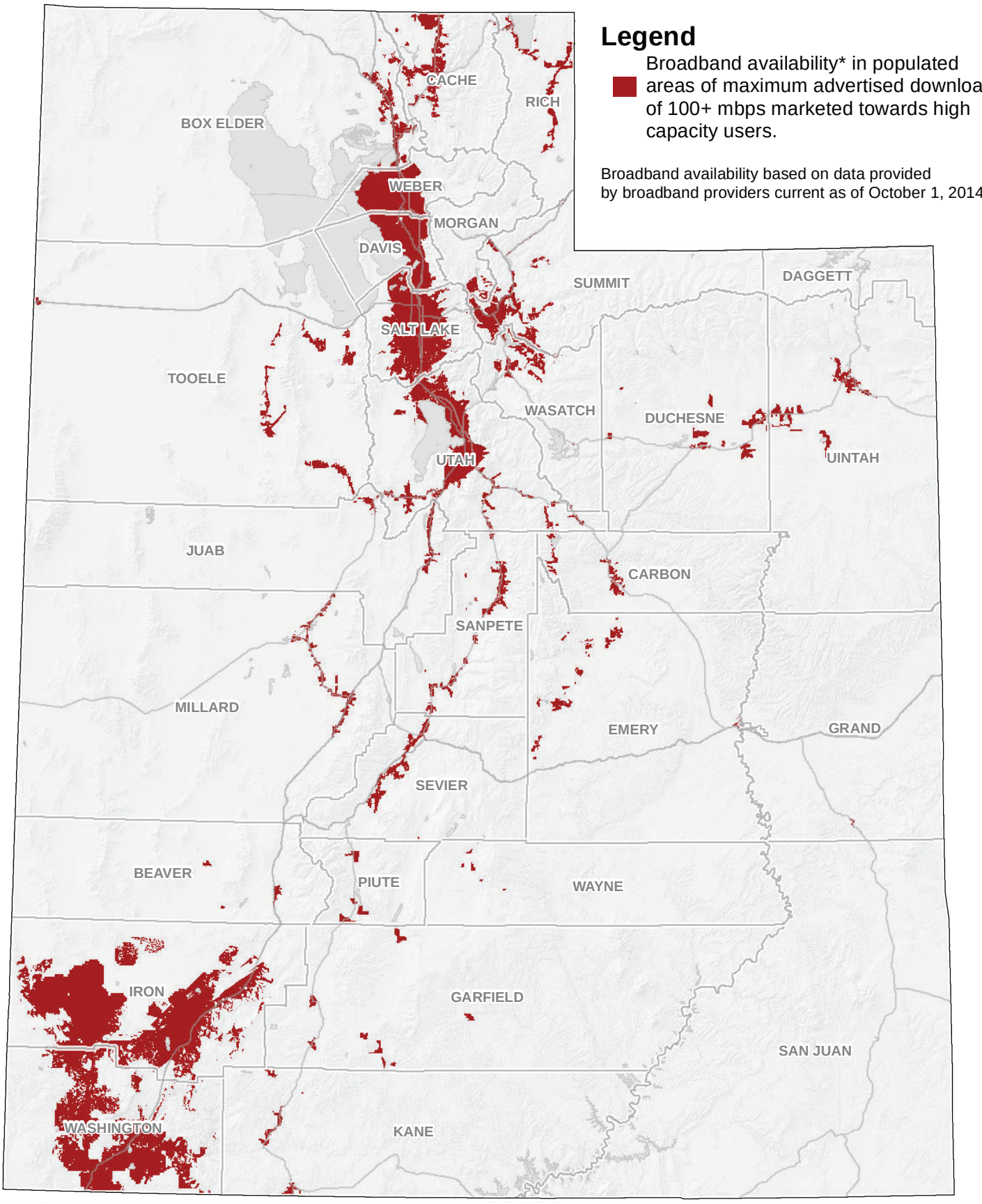
Business Services

Utah Office of Tourism

The focus of the broadband mapping data collection was originally based on residential broadband availability, but the demand for information on business level broadband service has increased over the course of the project. The project allows broadband providers to submit advertised business speeds, and the first map in this section is based on submitted broadband availability of at least 100 Mbps download.

Business broadband services are not always advertised or delivered in the same way as residential services, and in many cases broadband companies take business customers on a case-by-case basis. Therefore, business service is best mapped differently than residential service, and from multiple perspectives. One way to map available business speeds is by mapping the fastest known connection available in an area, regardless of the source. Another way is to look at the availability of fiber. These two factors, along with knowing what broadband providers are in a particular area, can help a business or high capacity customer determine what type of service is likely available.

Broadband Coverage of 100 mbps + Download Availability



Legend

Broadband availability* in populated areas of maximum advertised download of 100+ mbps marketed towards high capacity users.

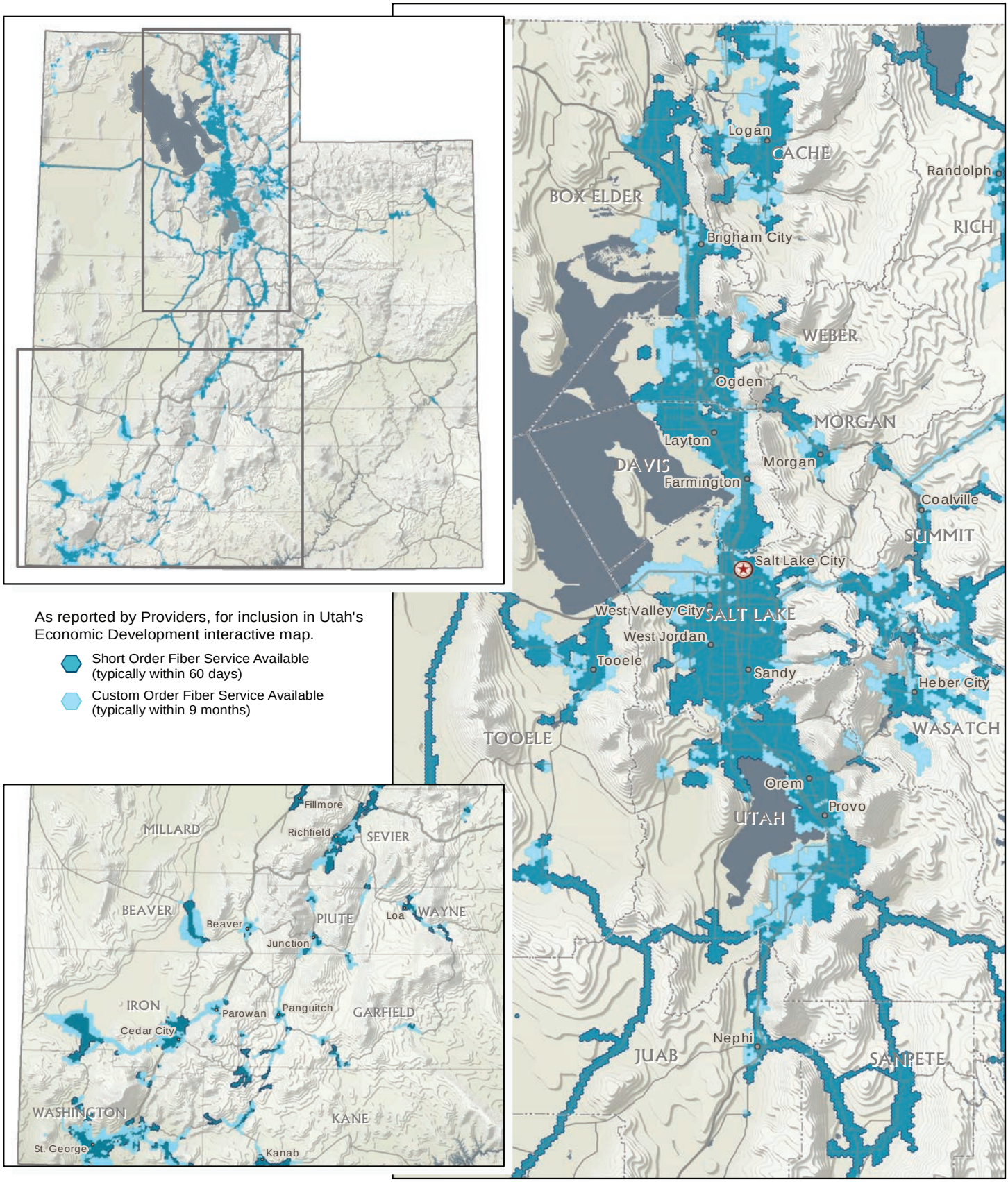
Broadband availability based on data provided by broadband providers current as of October 1, 2014.

December 2014

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

Fiber-Based Broadband Service Availability



As reported by Providers, for inclusion in Utah's Economic Development interactive map.

- Short Order Fiber Service Available (typically within 60 days)
- Custom Order Fiber Service Available (typically within 9 months)

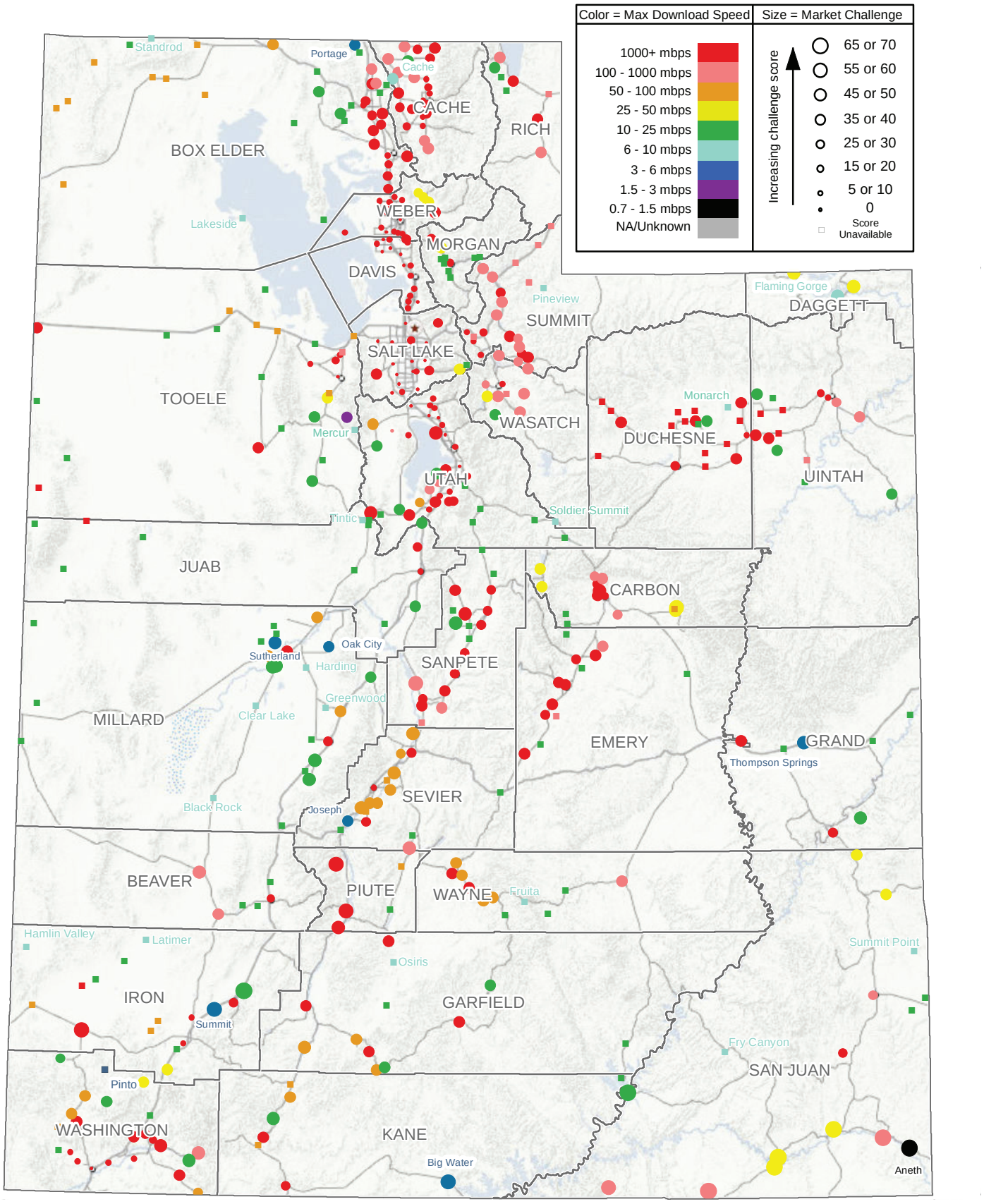
January 2014

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

Highest Known Speed and Broadband Market Challenges

For Utah's Census Designated Communities, Fall 2014



December 2014

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

Community Anchor Institutions

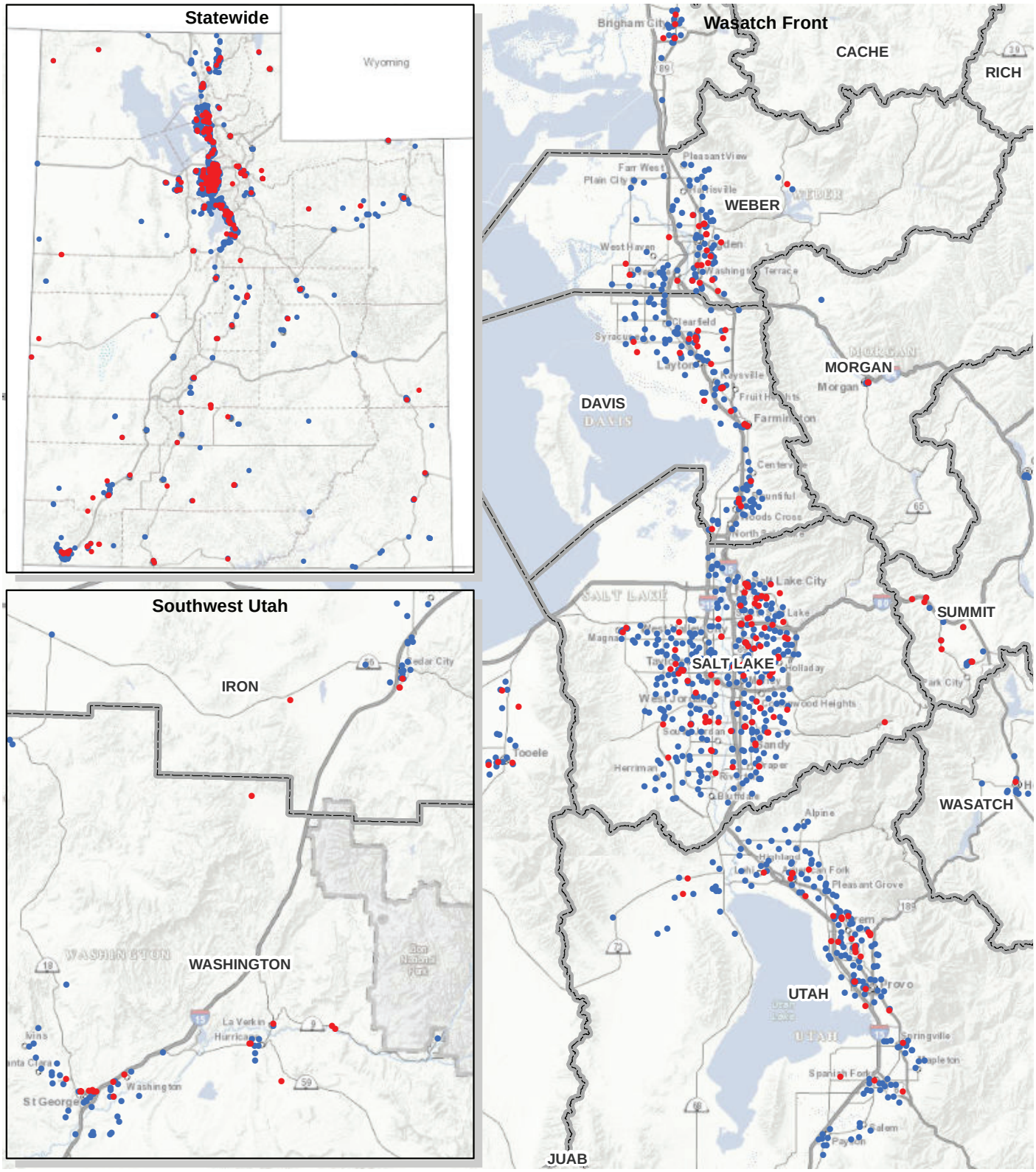
Utah Office of Tourism

Broadband availability at community anchor institutions is crucial to a successful broadband infrastructure. Community anchors institutions include buildings related to public safety, healthcare and education. Under UEN, many schools and libraries provide a place for communities to access high-speed broadband, which allows for a better connected and educated population, and supports the current and future workforce. UEN, which recently merged with the Telehealth Network, has been very successful in deploying high speed services, in many cases via fiber, to most populated areas of the state. Most schools connected to UEN are connected with 100 Gbps.

Utah Schools and the Utah Education Network (UEN)

The Utah Education Network (UEN) facilitates broadband connectivitiy to over 1,000 schools and district offices.

* Over 85% of Utah schools who are provided broadband service through UEN have >= 100 Mbps download and 74% of the locations have >= 1 Gbps download.



● UEN ● Schools

*** Schools and UEN data current as of Fall 2014 and provided by the Utah State Office of Education and UEN**

*** The map data depicts both K-12 and higher education**

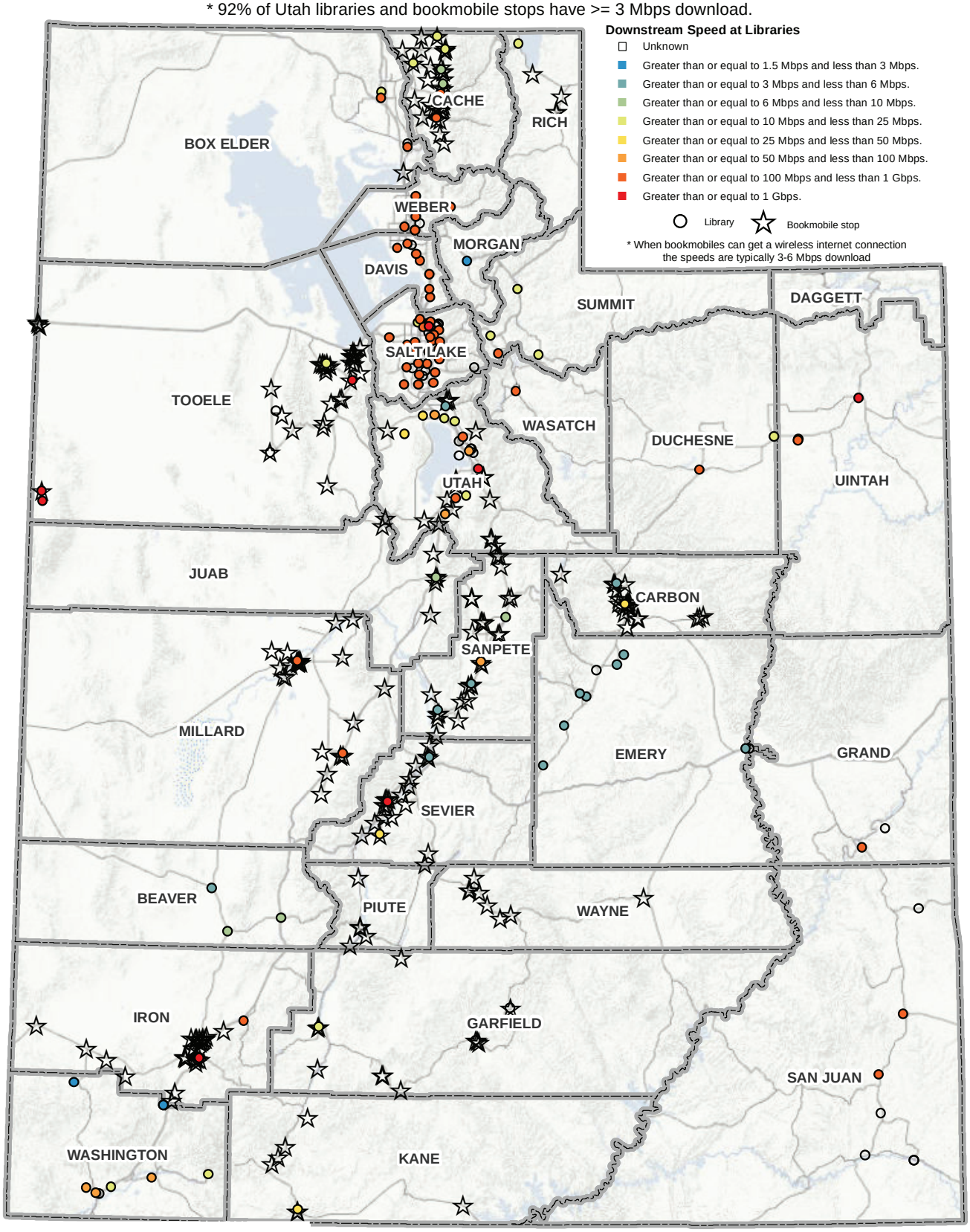
December 2014

THE STATE OF UTAH BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

Utah Libraries and Bookmobile Stops

* 92% of Utah libraries and bookmobile stops have >= 3 Mbps download.



*** Library and Bookmobile data current as of Fall 2014 and provided by the Utah State Library Division**

December 2014

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

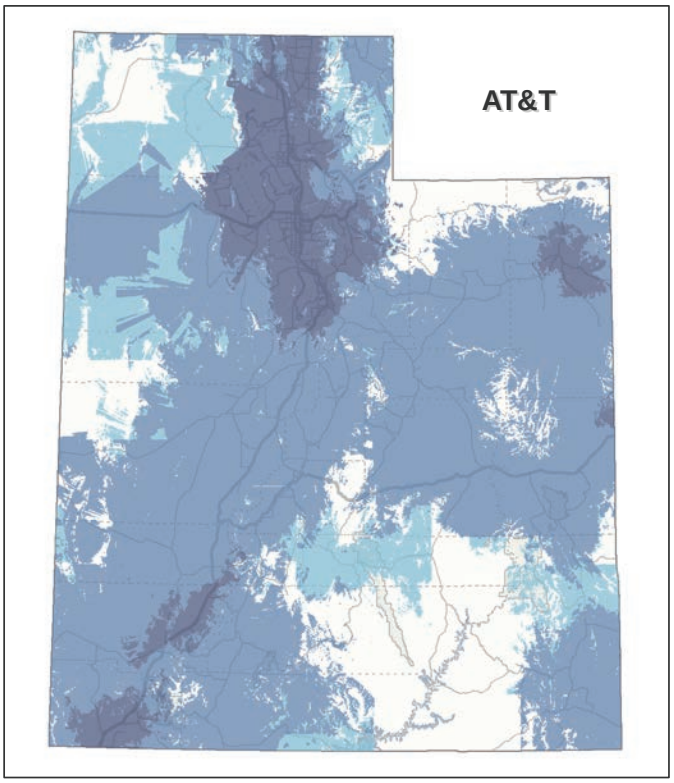
Utah Office of Tourism

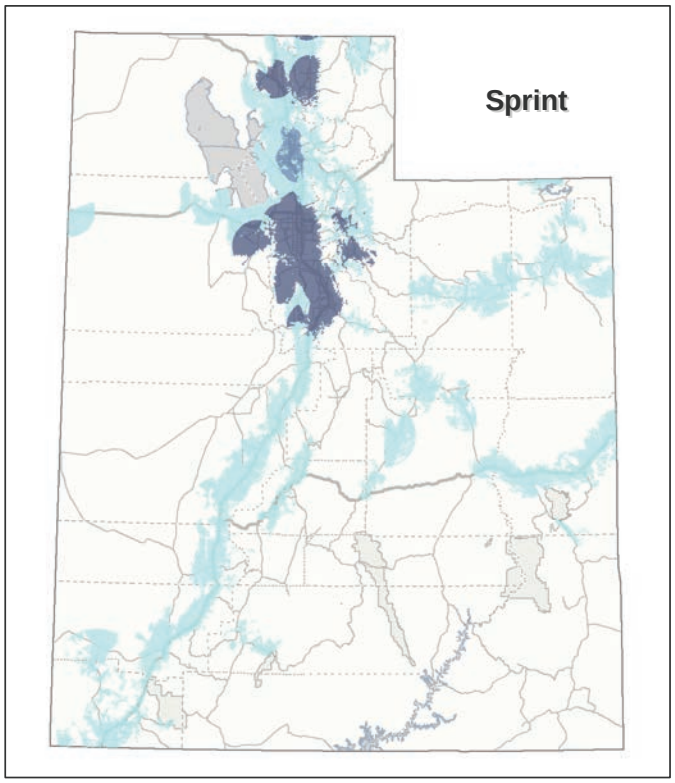
Mobile Landscape

Utah Office of Tourism

The last five years of the project has seen a large increase in the importance of mobile broadband coverage as smart phones and tablets have increased in popularity. Mobile broadband providers have greatly expanded their coverage and capacity as 3G and 4G has been deployed. Good mobile broadband coverage has become a communications and public safety necessity. Mobile coverage is assessed over a greater coverage area than fixed technologies, enabling consumers connect to mobile and while traveling.

In July 2011, and again in November 2013, the project contracted with Isotrope LLC to complete a mobile verification drive test of mobile service in Utah. Both drive tests were very successful and increased the project's confidence in the mobile data, since for the most part the drive test results matched the service coverage and speeds reported by mobile providers. The drive test did provide a dataset that illustrates in greater detail the mobile service a user can expect throughout the state.



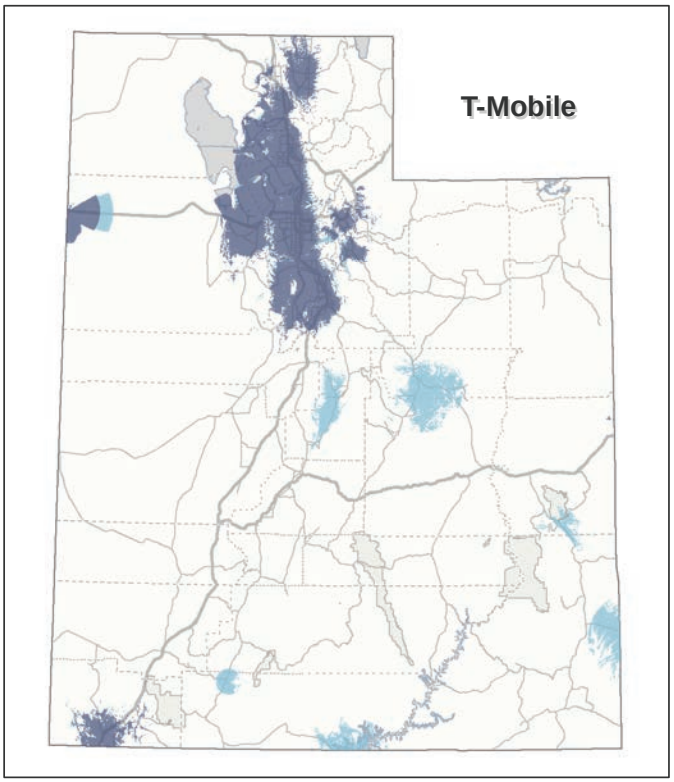


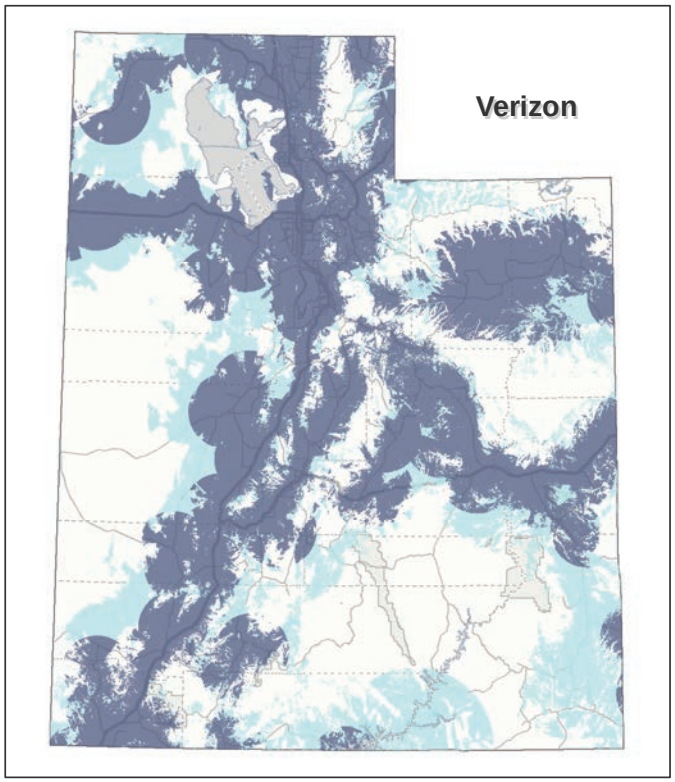
Utah's Mobile Broadband Network Speeds

6+ Mbps | 3 - 6 Mbps | 1.5 - 3 Mbps | Less than 1.5 Mbps

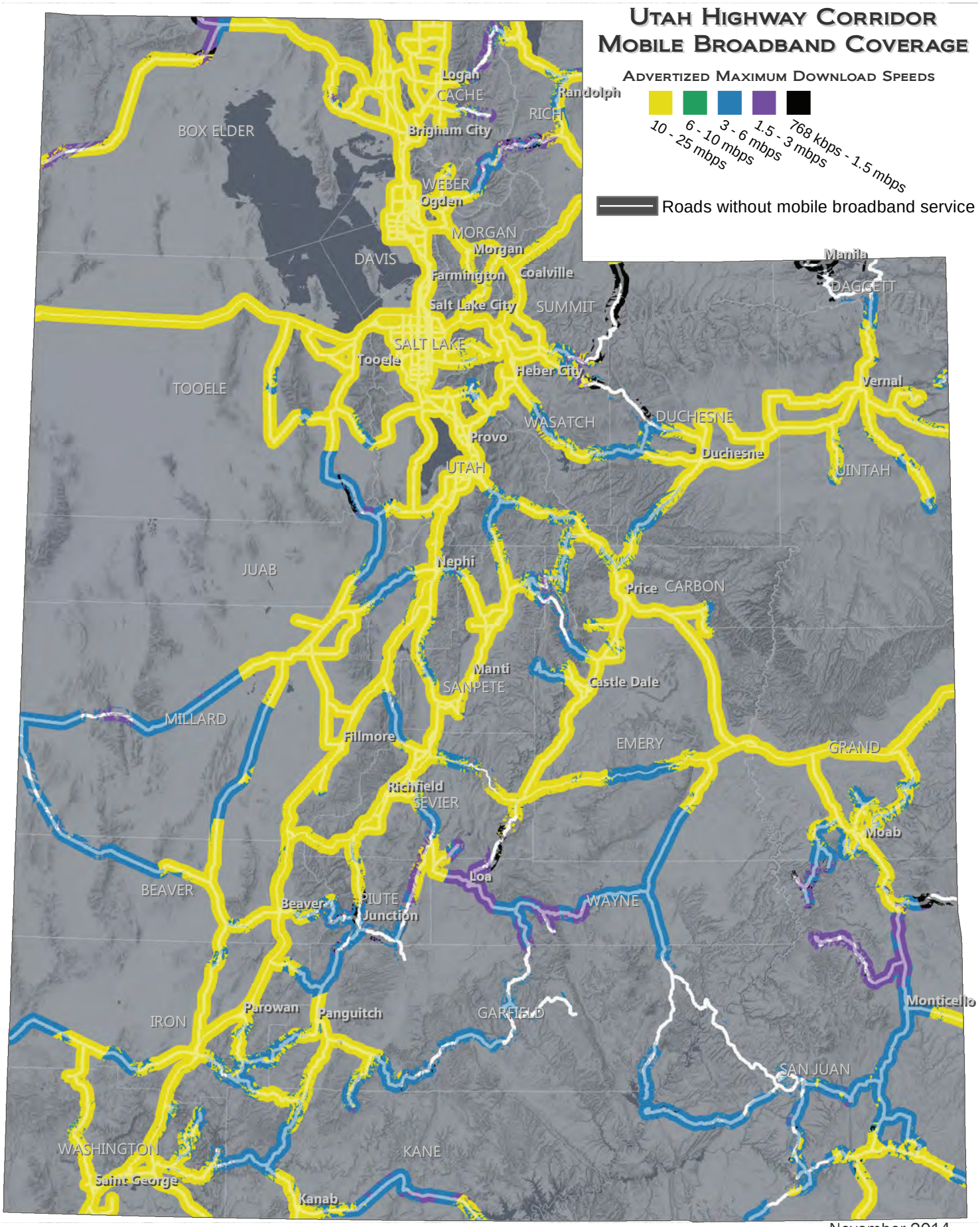
4G | 3G

The terms 3G and 4G are imprecise terms with regard to maximum advertised speeds, and, their usage varies by provider. These terms instead reflect the generation of communication technologies and the back haul that connects antenna sites to high capacity internet transmission lines.





December 2014



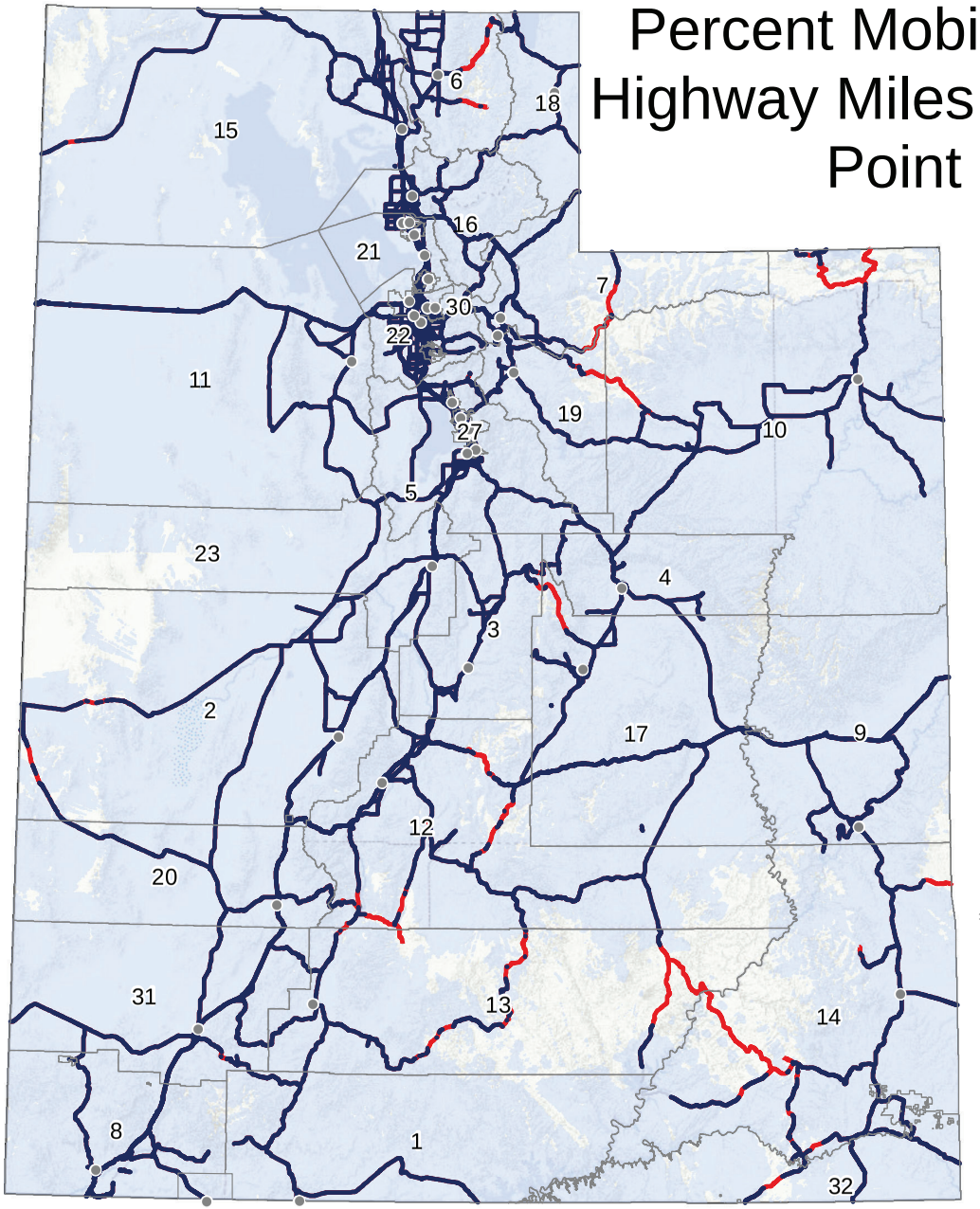
November 2014

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

Percent Mobile Broadband Coverage in Highway Miles by Public Safety Answering Point (PSAP) Jurisdiction

December 2014



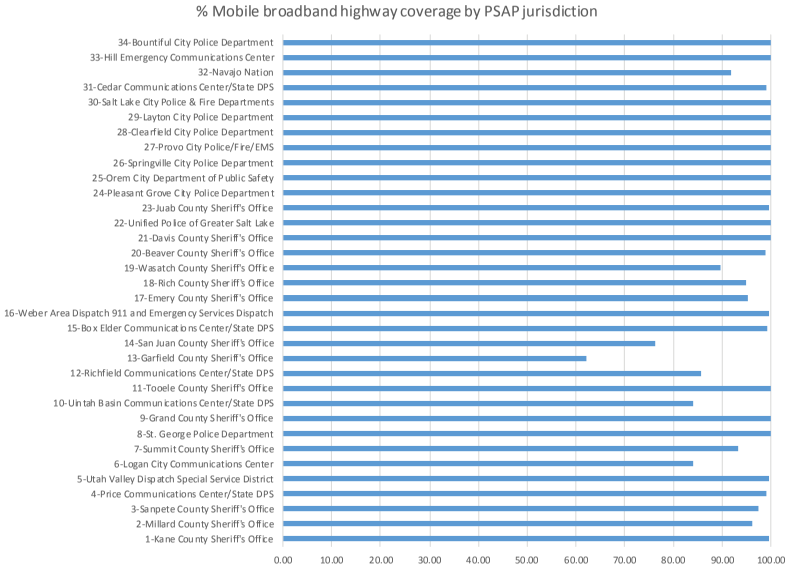
Broadband Covered Highways

Non-Coverage Highways

Mobile Broadband

PSAP Locations

PSAP Boundaries



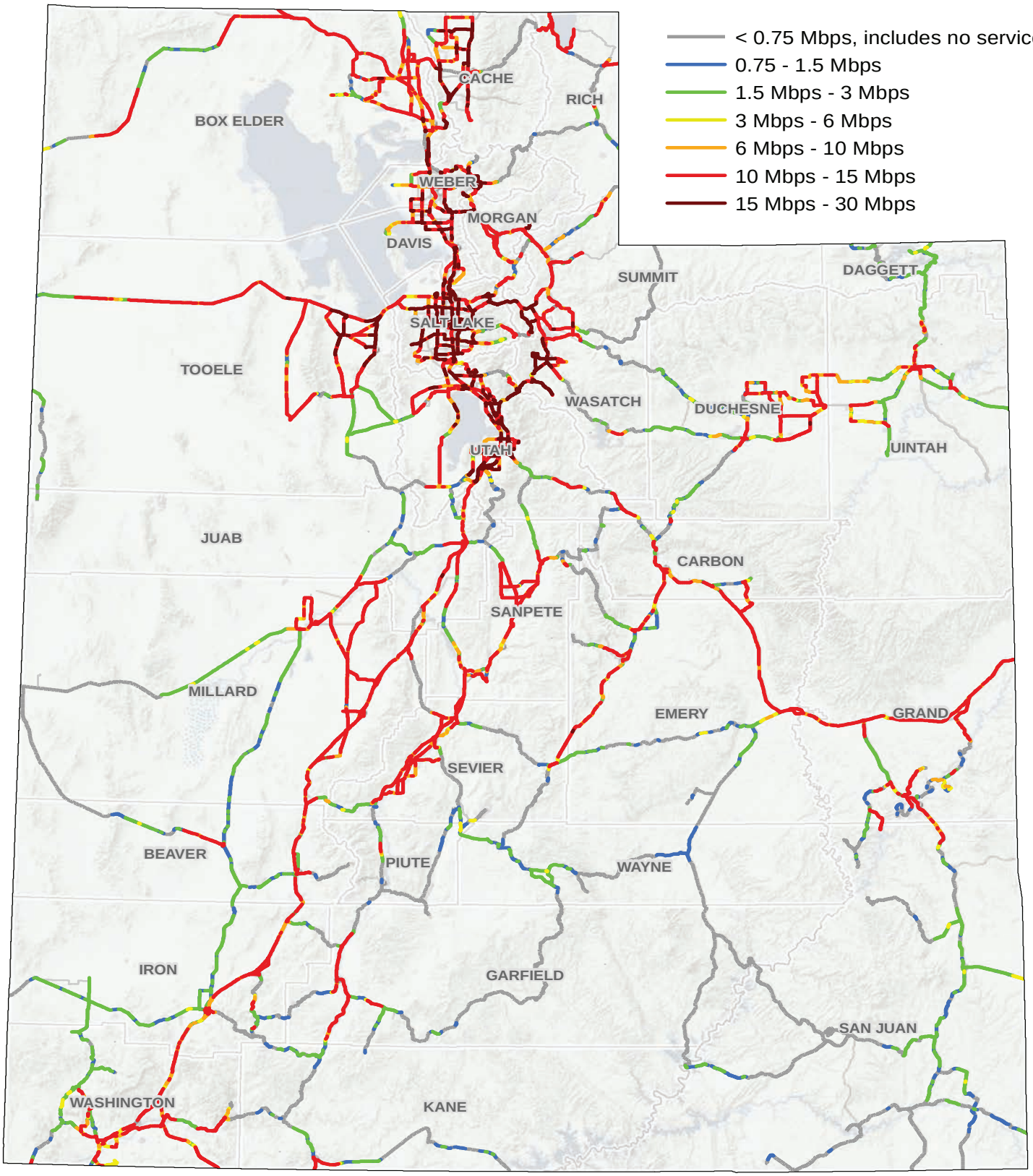
% highway miles covered for all providers of mobile broadband (technology type = 80);
Speeds greater than or equal to 768 kbps and less than 25 Mbps;
Data obtained Fall 2014

UTAH AGRC
Automated Geographic Reference Center

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

Best Available Mobile Download Speed, Any Provider

Statewide Drive Tests: November 2013

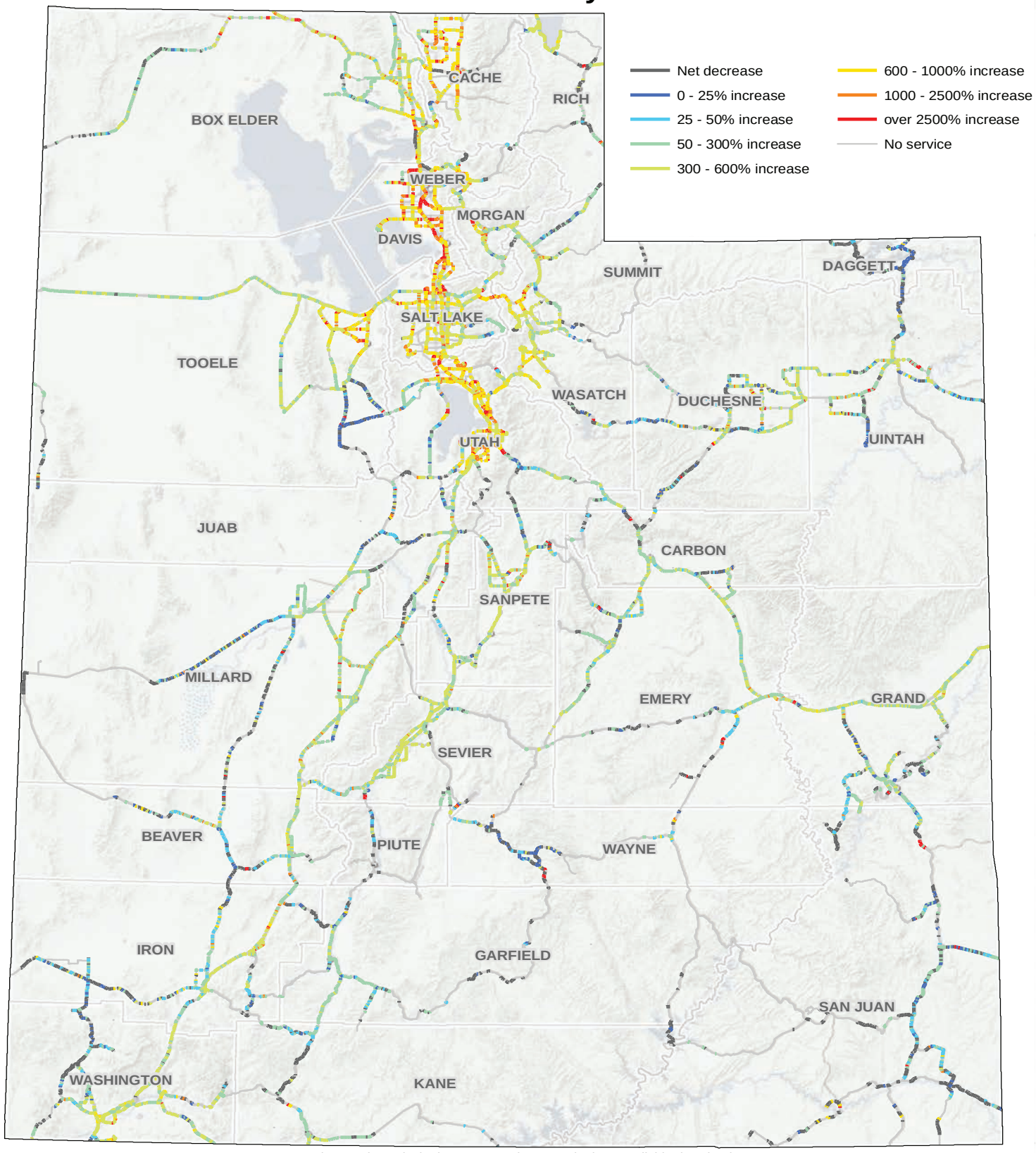


Drive testing was conducted by Isotrope, LLC using consumer grade smartphone
The highest download rate is shown for each half mile road segment.

January 2015

Percent Change in Best Available Mobile Download Speed

Between Statewide Drive Tests: July 2011 to November 2013



Change shown is the improvement between the best available download speed across all mobile services providers, for each half mile road segment.

January 2015

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

UTAH AGRC
Automated Geographic Reference Center

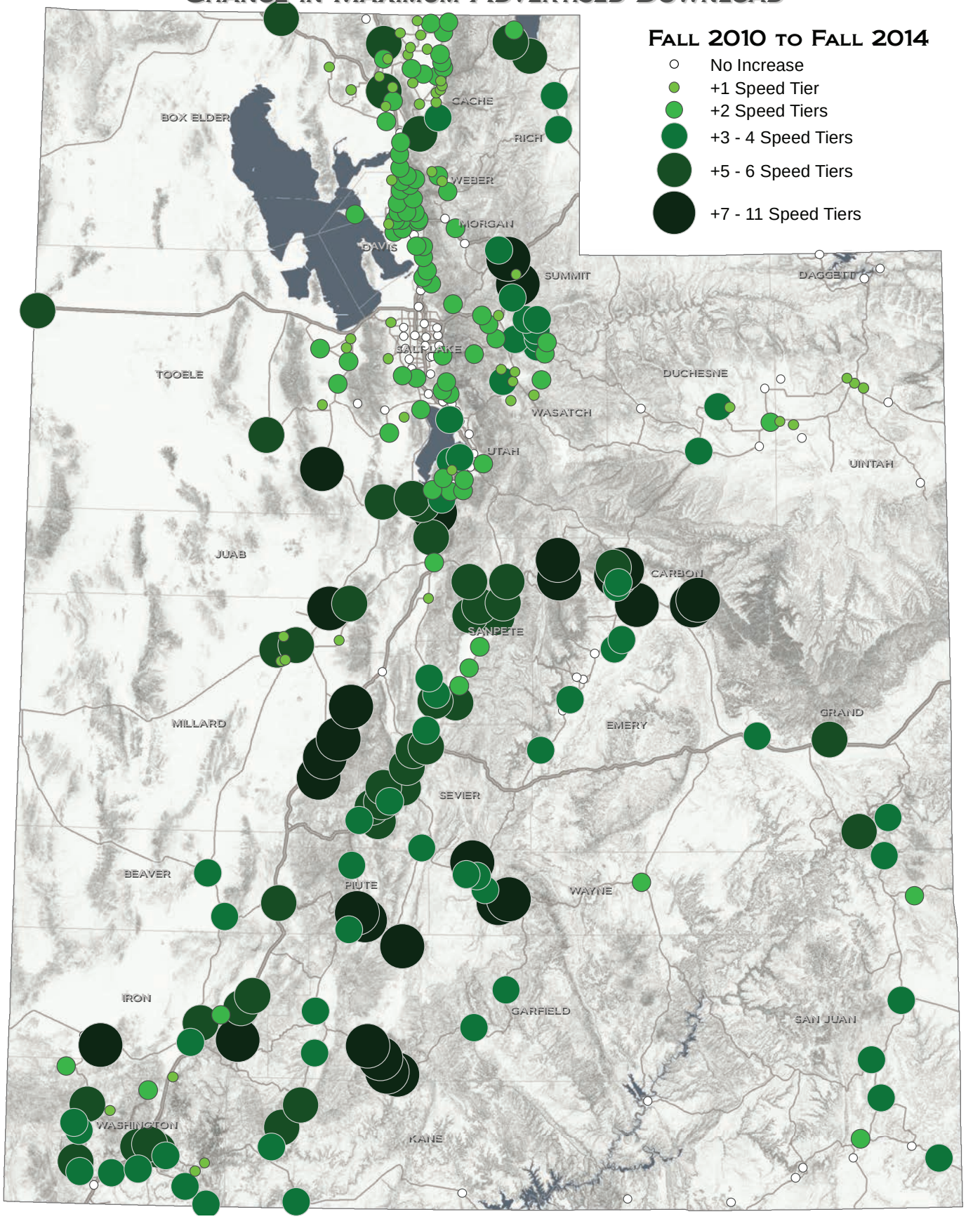
Broadband Growth

Utah Office of Tourism

The Utah Broadband Project has been collecting broadband mapping data from broadband providers since 2010. Over the last four years, the broadband landscape has seen significant growth in Utah. Most areas have seen a sizeable increase in fixed and mobile speeds. Service areas have expanded as well, and some areas that were unserved or underserved are fully served now.

Tracking broadband growth and change is important as it assists stakeholders in understanding where changes have been successful, and what areas are being left behind. Looking at changes statewide over five years is also helpful in understanding the always changing broadband landscape issues.

Fixed Broadband
Change in Maximum Advertised Download

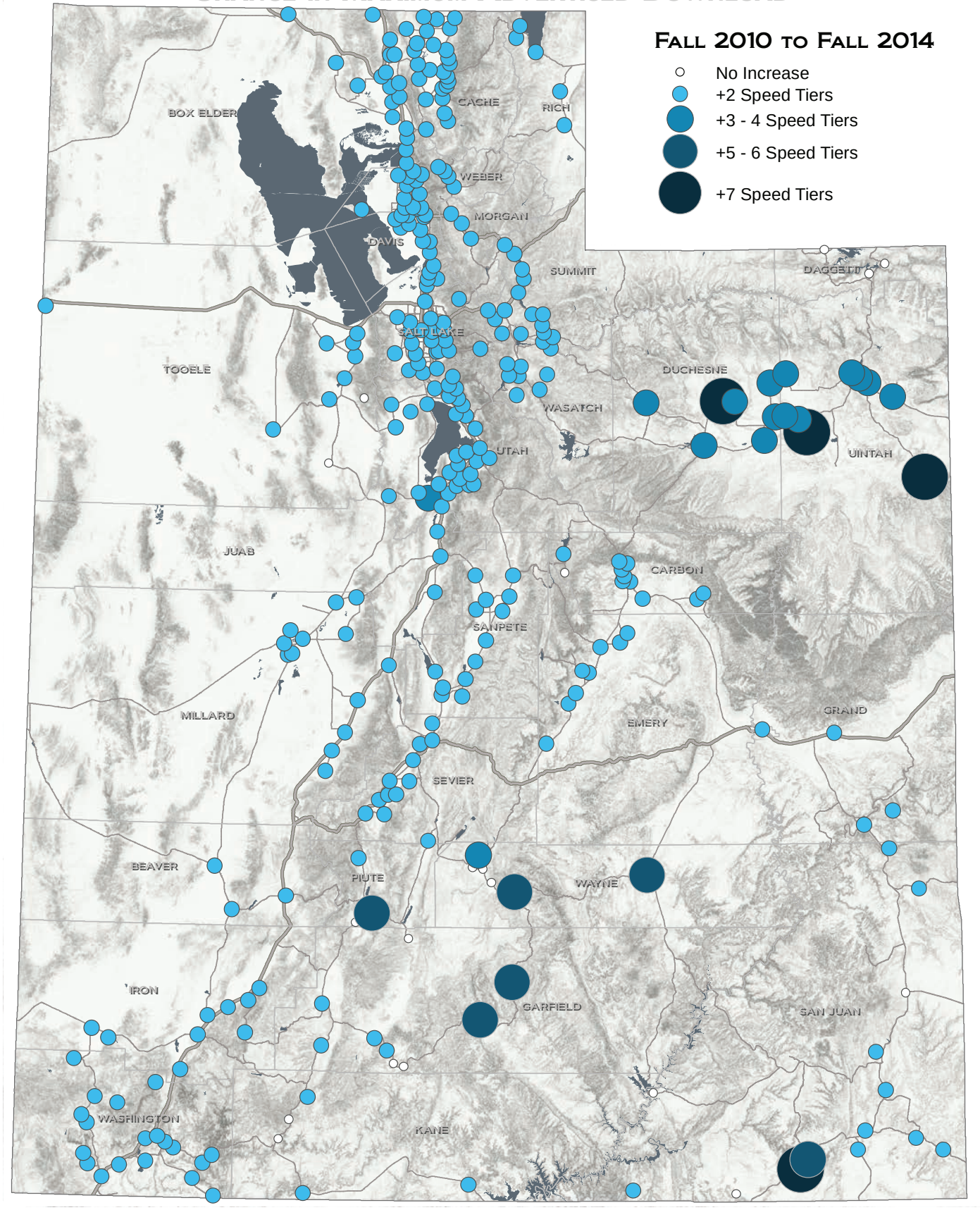


November 2014

THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

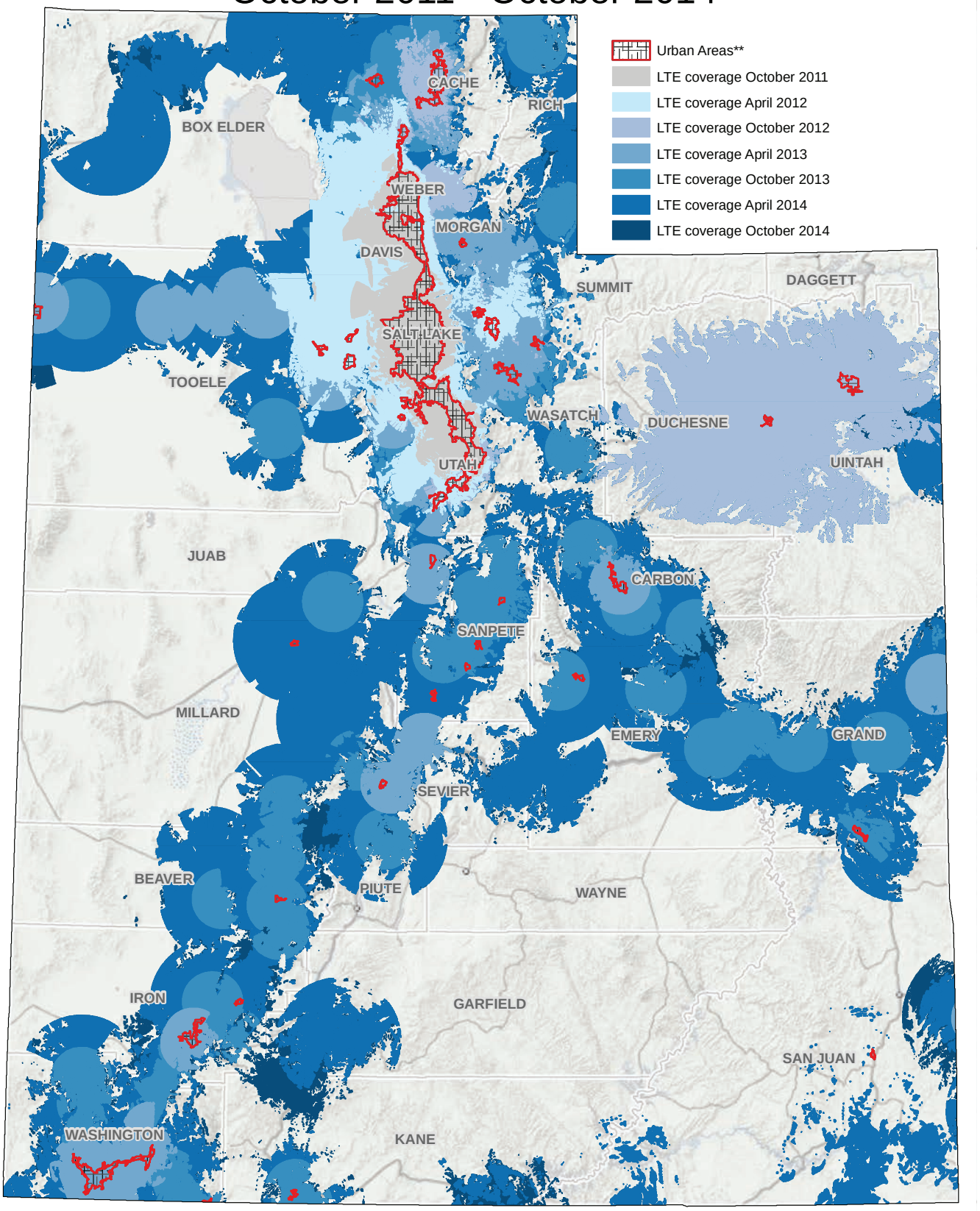
UTAH AGRC
Automated Geographic Reference Center

Mobile Broadband
Change in Maximum Advertised Download



November 2014

LTE Broadband Wireless Buildout
October 2011 - October 2014*



* Broadband LTE Wireless Mobile = Speeds ≥ 6 Mbps (Fall 2014);
*Urban areas/clusters as of 2010 US Census

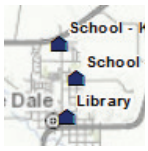
December 2014

Data Resources

The Utah Broadband Project has utilized and/or stewarded multiple GIS mapping data layers in support the Project's mapping, planning, and outreach goals. The major data layers are described below.

Wireline Broadband Data - All data representing wireline broadband service availability (DSL, Cable, Fiber to the home) has been mapped semi-annually over the course of the Project, using United States Census Bureau defined census blocks, and in areas where the census blocks are greater than two square miles, road segments. If a provider has service available to a last mile connection anywhere in a census block, or a long a road segment, the entire block or road segment is marked as served. The source data comes directly from broadband providers in Utah.

Wireless Broadband Data - Wireless broadband coverage, for fixed and mobile broadband technologies, has been mapped by the Project using the actual coverage footprint of the broadband service. Coverage is created by using a signal propagation or viewshed modeling, based on tower locations and digital terrain models. Coverage footprints have been submitted by a provider or created by the Project using information submitted by the broadband provider.



Community Anchor Institutions - This dataset contains the location, name, characteristics, and broadband capabilities for Utah's schools, libraries, major health care facilities, and government offices. Components of this dataset were sourced from the Utah Education and Telehealth Network and local school district affiliates, the State Office of Education, the State Library Division, and the Department of Technology Services.

Address Points - An address point is the full street address of a location together with its longitude/latitude or equivalent geographic coordinates. Through small grants process, the Utah Broadband Project provided seed funding to counties to create an address point dataset and an ongoing data maintenance process. Address points have been aggregated from all 29 counties and these have been used by the project to work with broadband service providers to refine their reported service areas, focusing attention on un- or -underserved addressed properties. Address points also have been useful for setting broadband service area and performance goals across the state. In additio, this dataset is already being put to work in the emergency response (911) and planning realms, and is expected to be a very important resource to support the Census and related demographic analyses in years to come.

Populated Areas - With a dense urban core and expansive frontier-like public lands, Utah is at the same time, both a very urban state and a very rural state. The 2010 census blocks carry demographic information but in many cases are quite large relative to the actual developed area. The populated areas dataset was created by overlaying the census blocks on the latest aerial photography and trimming the blocks to remove the large areas without development where service from fixed broadband technologies is less necessary.

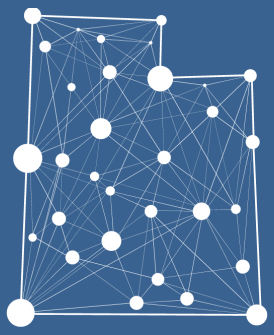
Statewide Roads - In partnership with local government and the Utah 9-1-1 Committee, Utah has maintained a composite statewide roads GIS layer for over a decade. This map layer is published monthly and includes the state highway system as well as local roads and is an important resource for evaluating mobile broadband service capabilities in the state. It was also used to plan out the mobile broadband drive tests.

Mobile Broadband Drive Test Results - Mobile Broadband Drive Test Results. The Project funded mobile broadband drive tests performed in July 2011 and November 2013. These tests were performed to verify maximum advertised mobile broadband speeds and coverage data submitted by Providers. The dataset was also used to assess typical performance from mobile Providers' broadband networks across the state. As these datasets are quite large and complex (over 20 million observations each year), they are available from AGRC in summarized (by half mile road segments) and raw formats, by request.

These and other related GIS data is publicly available from Utah's State Geographic Information Database, maintained by AGRC and accessible at http://gis.utah.gov/data/.


Welcome
U
LIF

Mobile Drive Test, David Maxson



THE STATE OF UTAH

BROADBAND PROJECT

BROADBAND.UTAH.GOV