



## **Program Overview and Status Report:**

### **NH House/Senate Telecom Oversight Committee**

October 4, 2012

# Authority

- Federal

American Recovery and Reinvestment Act (ARRA) through the National Telecommunications and Information Administration (NTIA)

Broadband Technology Opportunities Program (BTOP)



- Term

5-year grant ending December 2014

# Mission

The New Hampshire Broadband Mapping and Planning Program (NHBMP) works to improve broadband access and use in the state by assessing broadband availability, and by engaging communities and other stakeholders in conducting planning, capacity building, technical assistance, and training initiatives.



# Why Broadband?

- For every 10% increase in broadband penetration in a state, employment is projected to increase by 2% to 3% (*Brookings Institution, 2008*)
- For every \$1 invested in broadband, the economic benefit is nearly \$3 (*US Bureau of Economic Analysis*)
- US investment in broadband and related information technology has driven 1/3 or more of the productivity growth of this decade (*US Telecom Analysis*)

# NHBMPP Components

## Mapping

- Broadband Availability, *UNH GRANIT*
- Community Anchor Institutions, *NH RPCs & UNH GRANIT*
- Rural Addressing, *NH RPCs & UNH GRANIT*



## Planning and Technical Assistance

- Broadband Technology, *NH DRED*
- Broadband Capacity Building, *NH DRED, NCIC*
- Broadband Technical Assistance Training, *UNH CE & NH OEP*
- Regional Broadband Planning, *NH RPCs & NH OEP*





# ***Broadband Planning***



# Broadband Planning

Develop nine regional broadband plans that will be consolidated into a statewide broadband plan

- Coordinated by 9 Regional Planning Commissions
- Form Regional Broadband Stakeholder Groups
- Assess community and regional broadband needs and barriers
- Utilize data collected from stakeholders and mapping components to develop strategies for addressing broadband barriers

# Broadband Planning – Status

- Regional Broadband Stakeholder Groups (BSGs) established; meet quarterly
- Identified regional broadband needs and barriers
- Developed outline of regional plan content
- Each region holding first (of three) public forums



**Southwest Region Public  
Broadband Forum**  
*September 27, 2012 at the Dublin  
Public Library*





# ***Broadband Capacity Building***



# Broadband Capacity Building

Leadership Role to increase broadband adoption and deployment on a targeted community-by-community basis, collaborating to create best case practices in:

- Policy
- Management
- Financial Resources
- Advocacy for Business and Residential Broadband



**NH BUSINESS RESOURCE CENTER**  
an office of the NH Division of Economic Development

# Broadband Capacity Building

Working with Northern Communities Investment Corporation (NCIC), assist communities in their development of broadband projects by:

- Establishing Resource Teams (broadband sector experts)
- Utilizing Demand/Aggregation/Planning Tools for Municipalities
- Creating model Broadband Implementation Business Plans



***Broadband  
Technical  
Assistance &  
Training***



# Broadband Technical Assistance & Training

- Assess broadband technical and training needs of targeted sectors
- Develop tools and learning modules relative to broadband
- Deliver technical assistance and training to targeted sectors



# Targeted Sectors

EDUCATION	HEALTH	COMMUNITY SUPPORT / GOV	PUBLIC SAFETY	BUSINESS / ECON DVLPT	RESIDENTIAL
<ul style="list-style-type: none"> <li>•K -12</li> <li>•Higher Ed</li> <li>•Community / Continuing Ed</li> <li>•Museums</li> <li>•Science Centers</li> </ul>	<ul style="list-style-type: none"> <li>• Hospitals</li> <li>•Doctor Offices</li> <li>•Clinics</li> <li>•Nursing / Res Care Facilities</li> <li>•Human Service Agencies</li> <li>•Lab Services</li> <li>•Home Care Services</li> <li>•Adult Day Care</li> </ul>	<ul style="list-style-type: none"> <li>• Town / City Gov Admin &amp; Services</li> <li>• County Gov Admin &amp; Services</li> <li>•State Gov Admin &amp; Services</li> <li>•Libraries</li> <li>•Community Centers</li> <li>•Land Trusts / Open Space</li> </ul>	<ul style="list-style-type: none"> <li>• Fire</li> <li>•Police</li> <li>•Emergency Management</li> <li>•Mutual Aid</li> </ul>	<ul style="list-style-type: none"> <li>•Chambers of Commerce</li> <li>•Economic Development Corporations</li> <li>•Travel &amp; Tourism</li> <li>•Recreation</li> <li>•Food &amp; Agriculture</li> <li>•Arts &amp; Culture</li> <li>•Media</li> <li>•Commerical Real Estate</li> <li>•ISPs / Telecom</li> <li>•Banking / Finance</li> <li>•Industry</li> </ul>	<ul style="list-style-type: none"> <li>•Homeowners</li> <li>•Households</li> <li>•Residential Real Estate</li> <li>•Home Business</li> </ul>

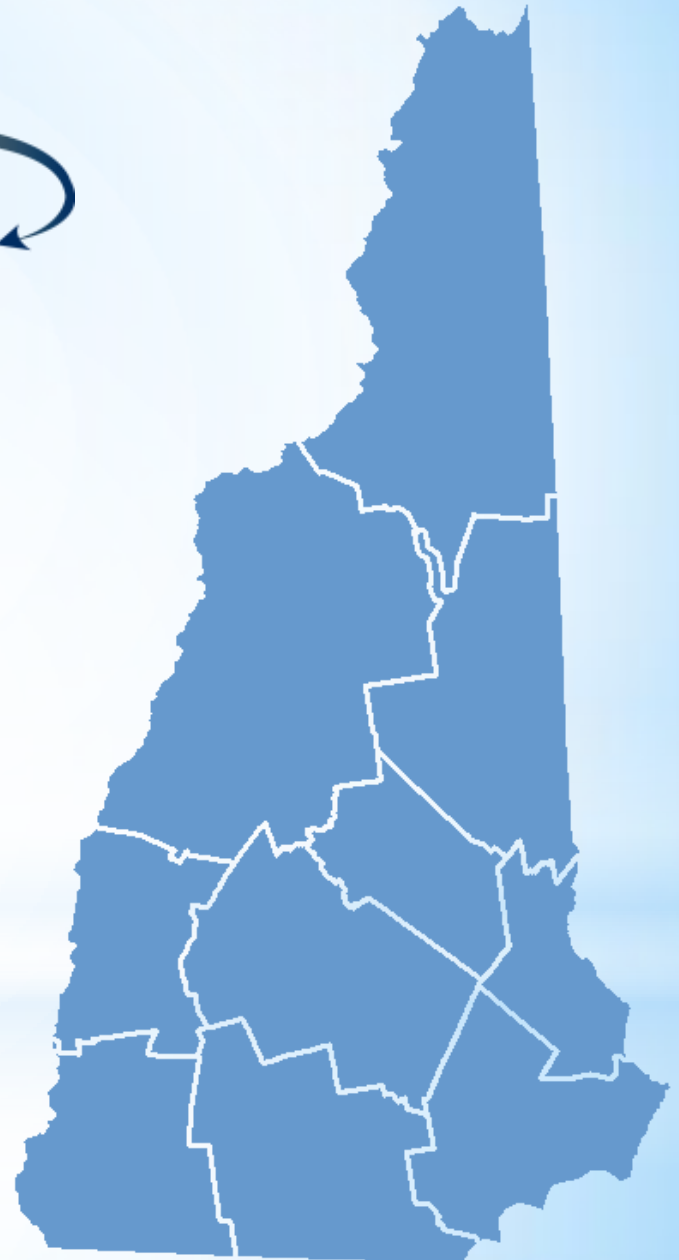
# Broadband Technical Assistance & Training - Status

- Surveys completed for Education, Health, Municipal and Business sectors
- Learning modules being finalized
- Training sessions conducted including: using GIS/GPS technologies; “Putting your Business on the Digital Map”; “Leveraging Broadband for Economic Development”





# ***Mapping Broadband Availability***





# Mapping Broadband Availability – Overview

- Goal – map broadband availability by type of technology and speed, in order to identify areas served, unserved, and underserved in the state
- Broadband defined by NTIA as **768 kbps** downstream and **200 kbps** upstream
- Based on data submitted by broadband providers in the state
- Data aggregated to census block geography for analysis and display
- Multi-source data verification methodology utilized
- Data collected and processed by UNH; submitted to NTIA on a 6-month cycle (March 31, September 30) for inclusion in the National Broadband Map (<http://broadbandmap.gov>)

# What is broadband?

<b>NHBMPP Category</b>	<b>Download Speed</b>	<b>Upload Speed</b>	<b>Typical Uses (additive to level above)</b>
Unserved	< 768 Kbps	< 200 Kbps	<ul style="list-style-type: none"><li>• Email</li></ul>
Underserved	768 Kbps to < 3 Mbps	200 Kbps to < 1.5 Mbps	<ul style="list-style-type: none"><li>• Web browsing and shopping</li><li>• Sending/receiving medium-size files (photos, word processing)</li><li>• Limited streaming content; buffering a concern</li><li>• 1-3 simultaneous internet devices</li><li>• Voice over IP</li></ul>
Served	3 Mbps +	1.5 Mbps +	<ul style="list-style-type: none"><li>• Sending/receiving large files</li><li>• Streaming HD content; buffering not a concern</li><li>• VPN access; where speed of operation critical to job function</li><li>• 5+ simultaneous internet devices</li><li>• Multi-player online gaming</li><li>• HD quality videoconferencing</li><li>• Teleworking</li><li>• Real-time HD medical imaging and consultation</li><li>• “Internet 2” connectivity and applications</li></ul>

# Participating NH Broadband Providers (39 as of Fall, 2012)

## Cable (5)

Argent Communications, LLC (also Fixed Wireless)

Charter Communications Inc.

Comcast Cable Communications, LLC

MetroCast

Time Warner Cable

## DSL (9)

Covad Communications Company (also Other Copper Wireline, Middle Mile)

Dunbarton Telephone Company, Inc.

FairPoint Communications, Inc.

G4 Communications (also Middle Mile)

Granite State Communications (also Fiber)

GWI (also Other Copper Wireline)

OTT Communications (also Middle Mile)

Sovernet Communication

TDS Telecom (also Fiber, Middle Mile)

## Fixed Wireless (9)

Cyberpine Cooperative, Inc.

Great Auk Wireless

IAMNOW.net

Lakes Region Wireless

Spectra Access

Tamworth Wireless Cooperative

Wave Comm, LLC

Wireless LINC of NH and VT

WiValley

## Mobile Wireless (5)

AT&T Mobility, LLC

Sprint

T-Mobile

U.S. Cellular

Verizon Wireless

## Fiber (2)

Level 3 Communications (also Middle Mile)

Topsham Communications

## Middle Mile (5)

DSCI Corporation

Freedom Ring Communications

Lightower Fiber Networks

Oxford Networks

Sidera Networks, LLC

## Satellite (4)

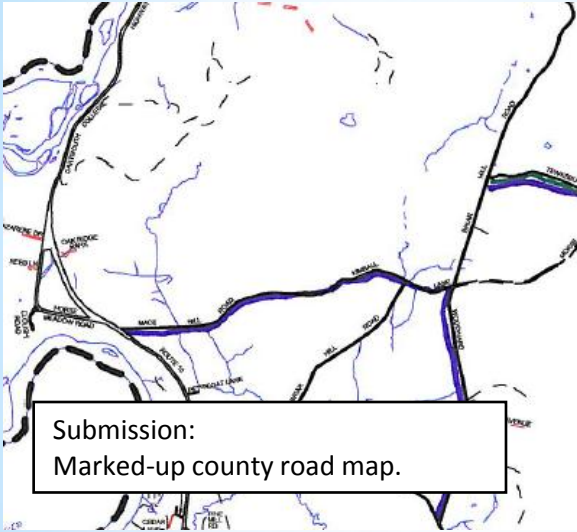
HughesNet

Skycasters

StarBand Communications, Inc.

WildBlue Communications, Inc.

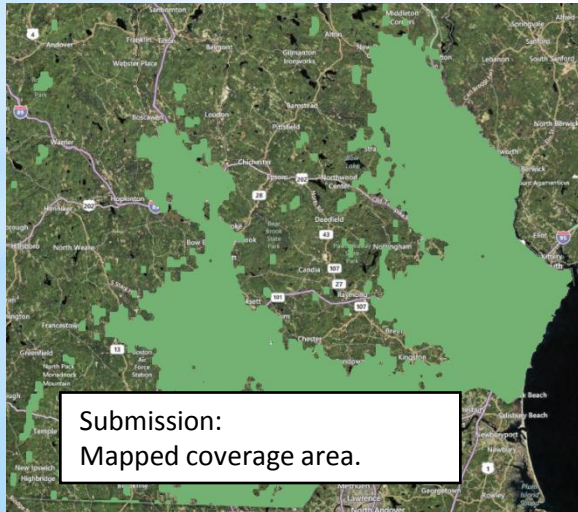
# Processing Provider Data



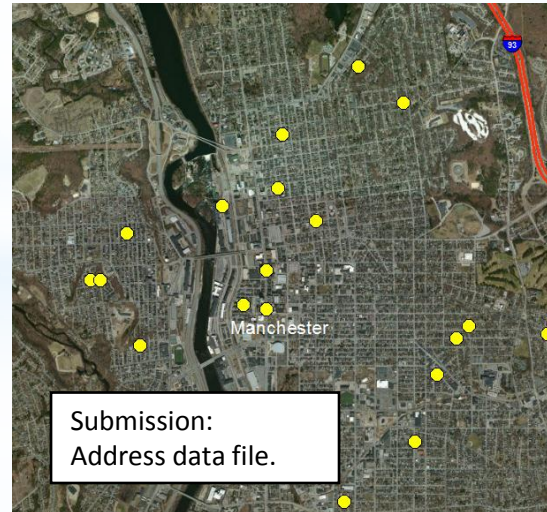
Submission:  
Marked-up county road map.

Name	Spectrum	Freq	Height	AG	Ant Type	Aim (True N)	Gain db	H-BeamW	V-BeamW	Downtilt	Pwr to Ant	Modulation	Chan Wid	SystemPower
NS	2.4G	2.437G	70	120	Sectr	321	14	120	15	3	900 B' (CCK)	20M	29.54243	
CC	2.4G	2.437G	70	120	Sectr	286	14	120	15	3	900 B' (CCK)	20M	29.54243	
LK	2.4G	2.437G	70	120	Sectr	206	17	120	6.5	3	900 B' (CCK)	20M	29.54243	
900NS	900M	914M	65	120	Sectr	321	13	120	15	3	900 B' (CCK)	20M	28.45008	
900OM	900M	914M	55		Omni		8	360	10					
900XR	900M	914M	60		Yagi	12	6	120	70					

Submission: Spreadsheet.  
Cellular Expert software ([www.cellular-expert.com](http://www.cellular-expert.com)) predicts signal strength based on tower data. Note: Map is for display purposes only, and does not represent the coverage of any individual service provider.



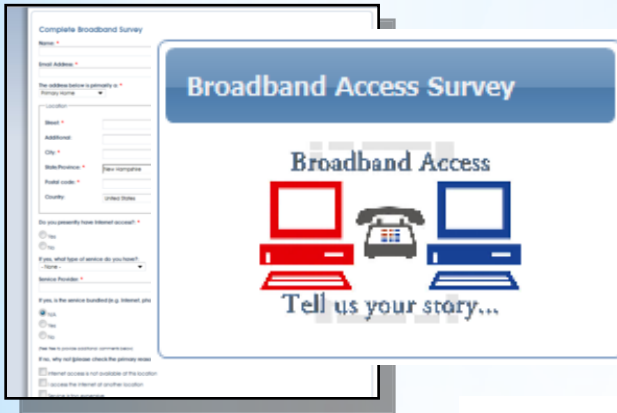
Submission:  
Mapped coverage area.



Submission:  
Address data file.

# Broadband Availability – Data Validation

## Consumer Surveys

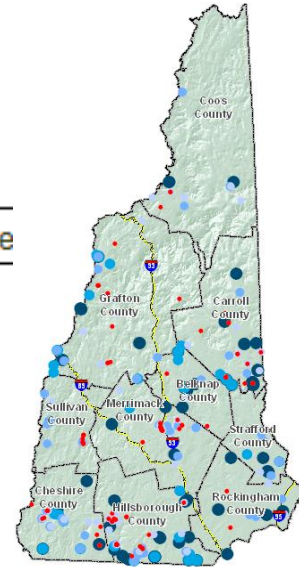


## Speed Tests

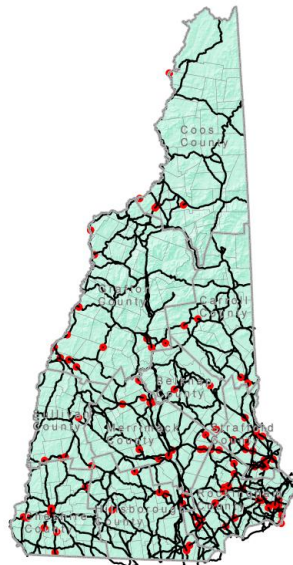
### Speed Test Results

(5320 results as of 9/28/2012)

Download speed	Percentage
4 Mbps or less	60%
<b>- FCC Minimum Broadband Speed -</b>	
4-10Mbps	34%
10-25 Mbps	5%
More than 25 Mbps	1%



## Drive Tests



## Others Data Sources

- Commercial data sets
- Data reported to FCC (477 data)
- Satellite dish inventories
- Community meetings

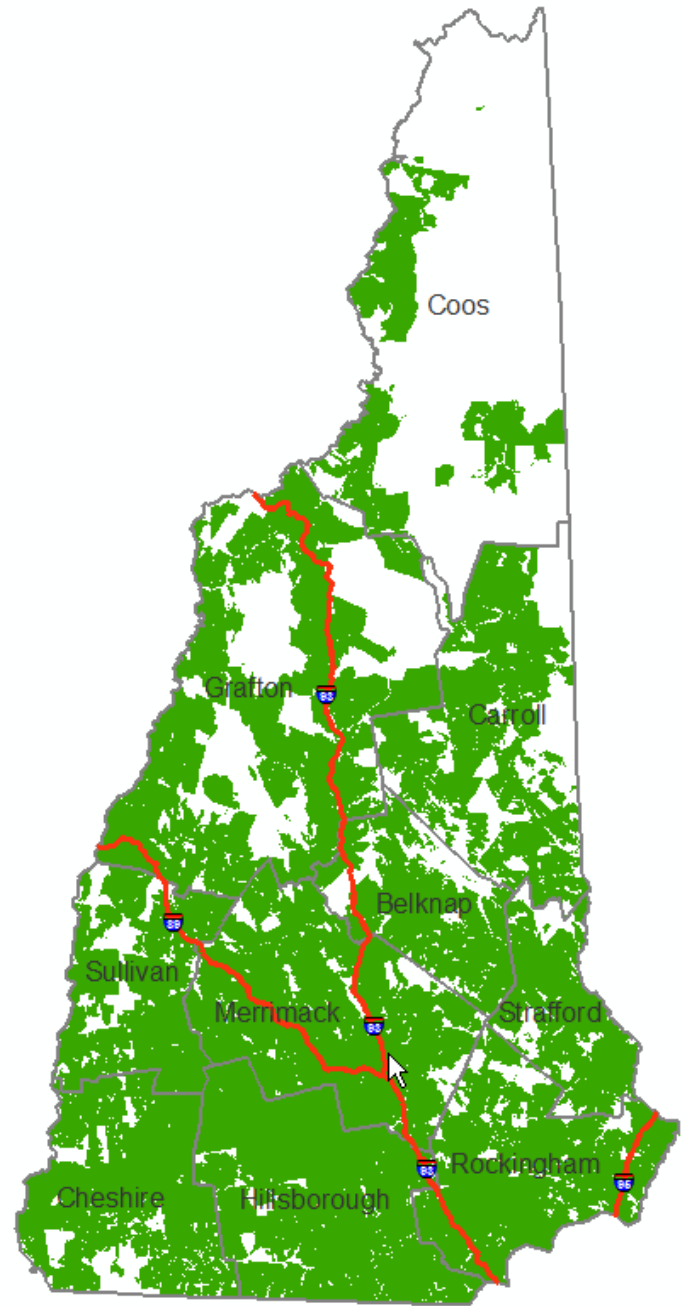
(3500+ miles of Interstates, US & State routes driven)

[iwantbroadbandnh.org](http://iwantbroadbandnh.org)

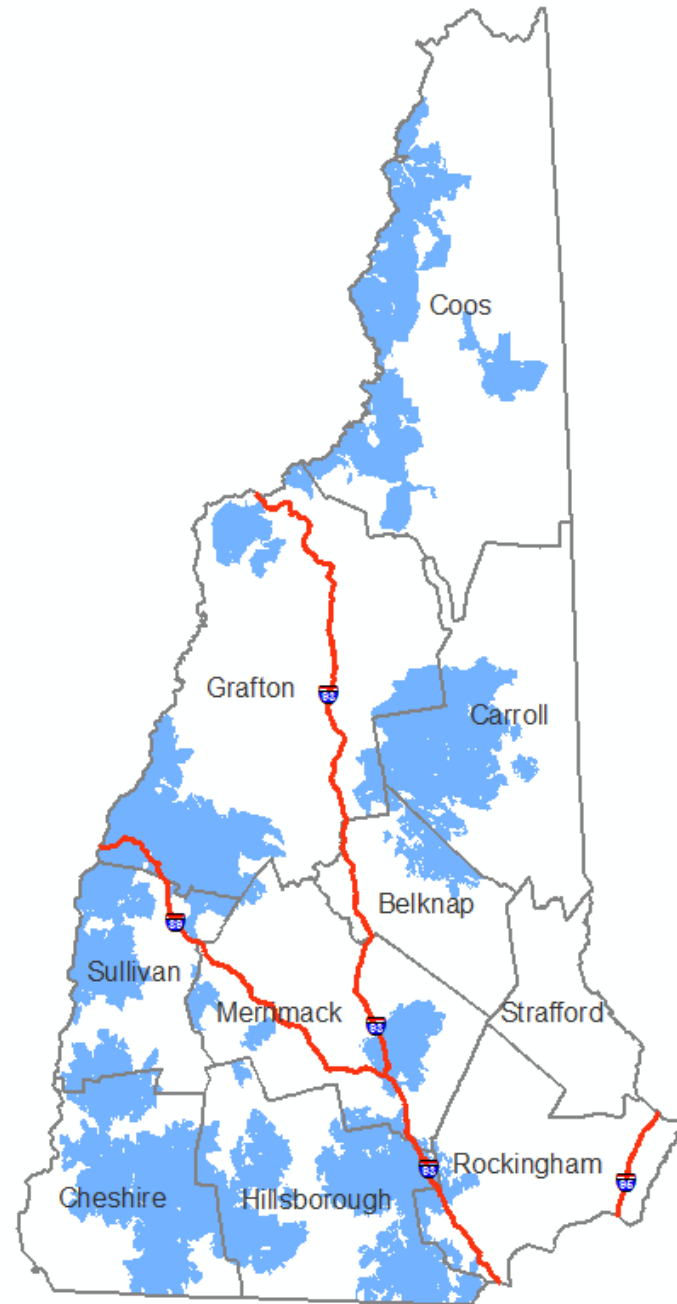
# Cable Service Broadband Availability – March 2012 Results



# DSL Service Broadband Availability – March 2012 Results

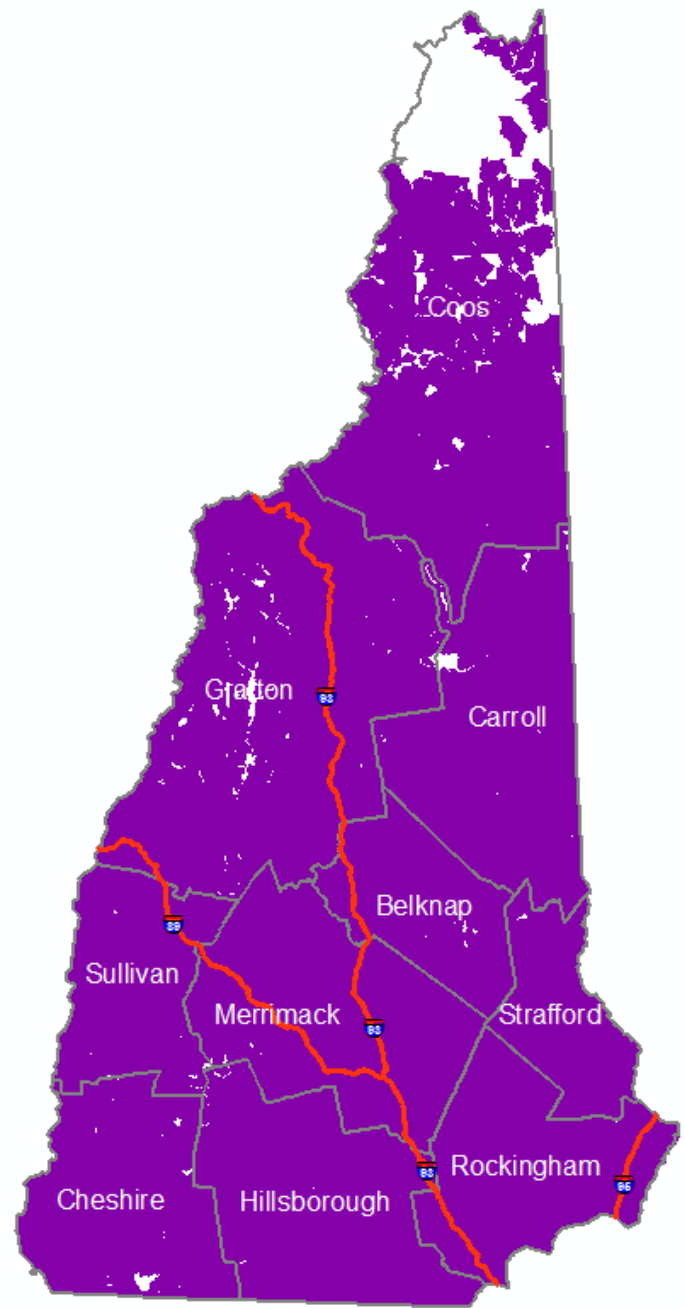


# Fixed Wireless (WISP) Service Broadband Availability – March 2012 Results

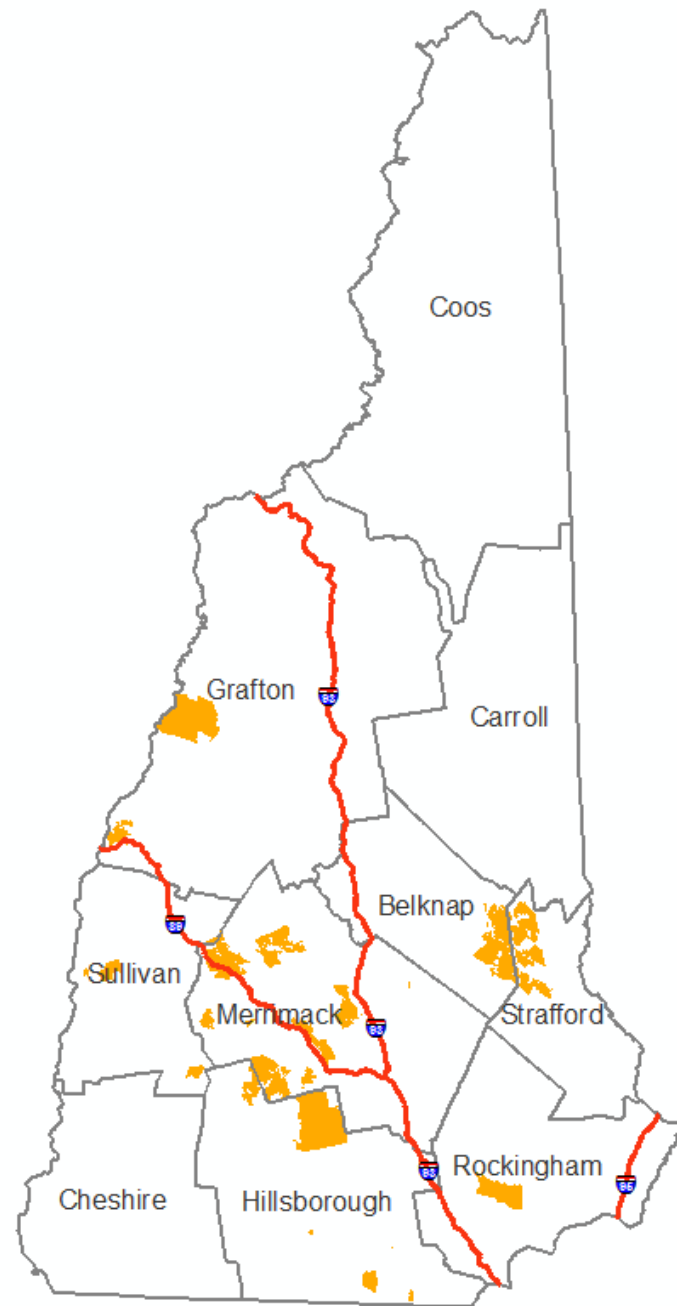




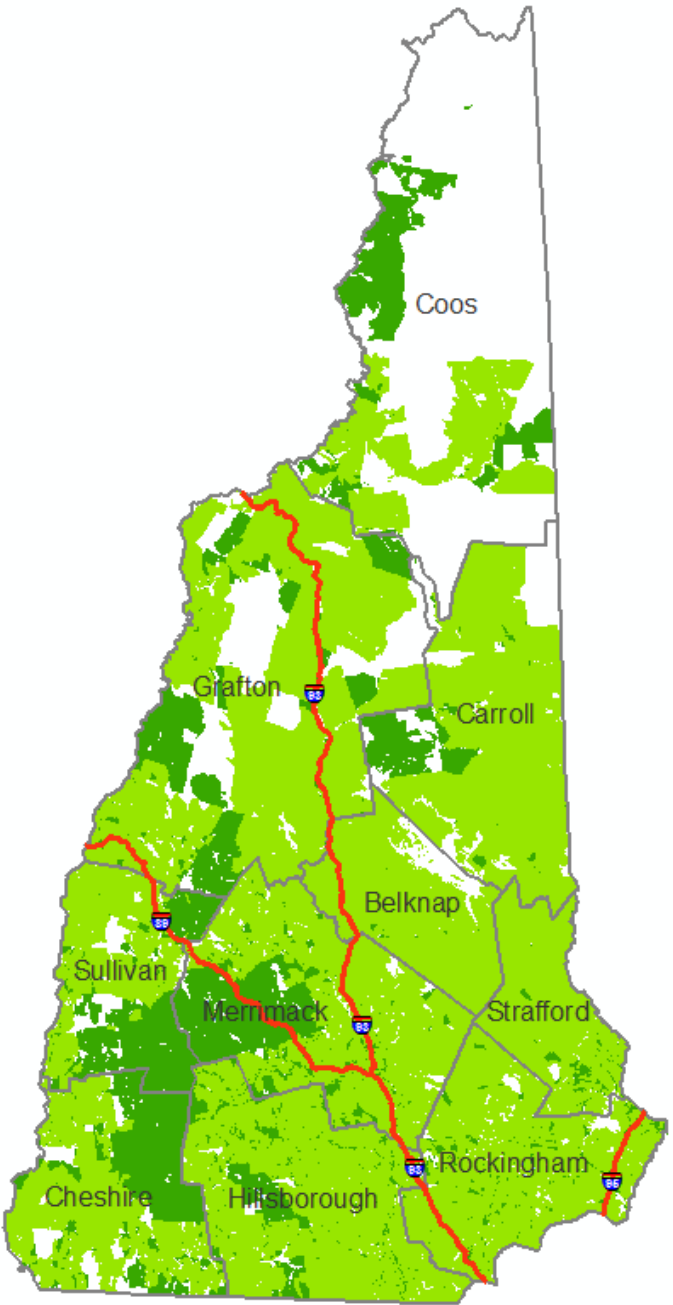
# Cellular Service Broadband Availability – March 2012 Results



# Optical/Fiber Service Broadband Availability – March 2012 Results



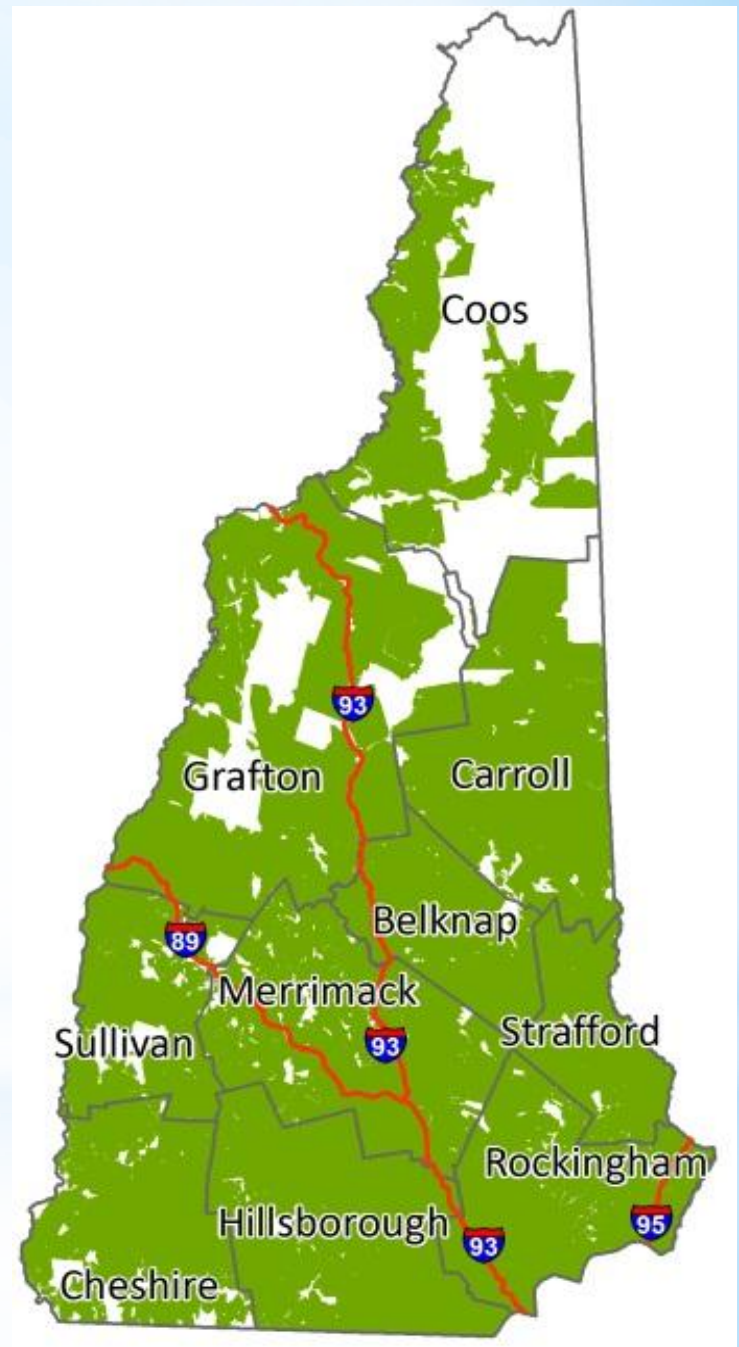
# Wireline Service Broadband Availability – March 2012 Results



# Broadband Availability – Download speed of 3 Mbps+ - March 2012 Results

What you can do:

- Email
- Web browsing and shopping
- Moderate social media use
- Voice over IP
- Limited VPN
- Send/receive medium-size documents



Status as of March 2012

# Broadband Availability – Download speed of 25 Mbps+ - March 2012 Results

What you can do:

- High-definition videoconferencing
- High speed business to business applications
- “Smart homes” and teleworking
- High-definition audio-video streaming
- Real-time medical imaging & consultation
- Send/receive large documents





***Community  
Anchor  
Institution  
Inventory***



# Community Anchor Institutions – Overview

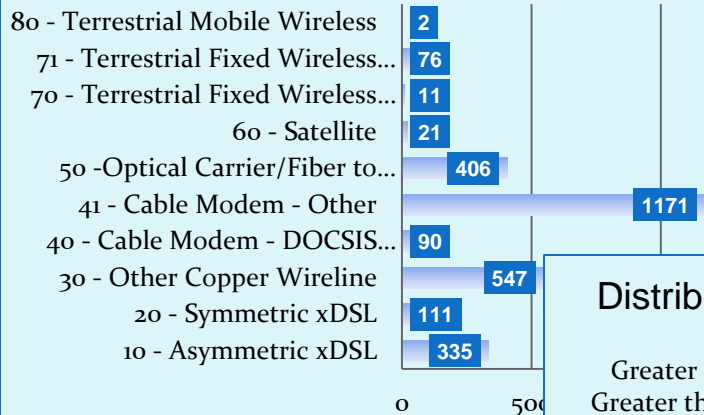
- Goal – statewide layer of community anchor institutions (CAIs) with associated broadband access information
- For October 2012 submission:

Category	No.	% of Total
1. School – K-12	762	19.5%
2. Library	766	19.6%
3. Medical/health care	808	20.7%
4. Public safety	564	14.5%
5. University, college, other post-secondary	64	1.6%
6. Other community support – government	736	18.9%
7. Other community support - non governmental	199	5.1%
TOTAL	3,899	100.0%

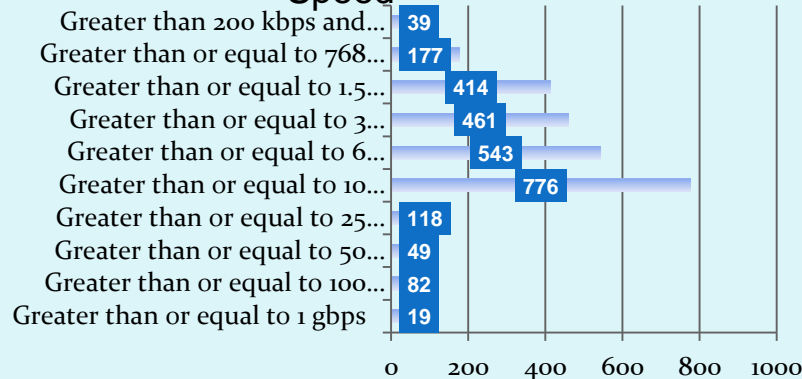
- Six-month update/verification cycle; continuing “gap” analysis to identify new CAIs

# Community Anchor Institutions – October 2012

## Distribution by Type of Technology



## Distribution of Advertised Download Speed



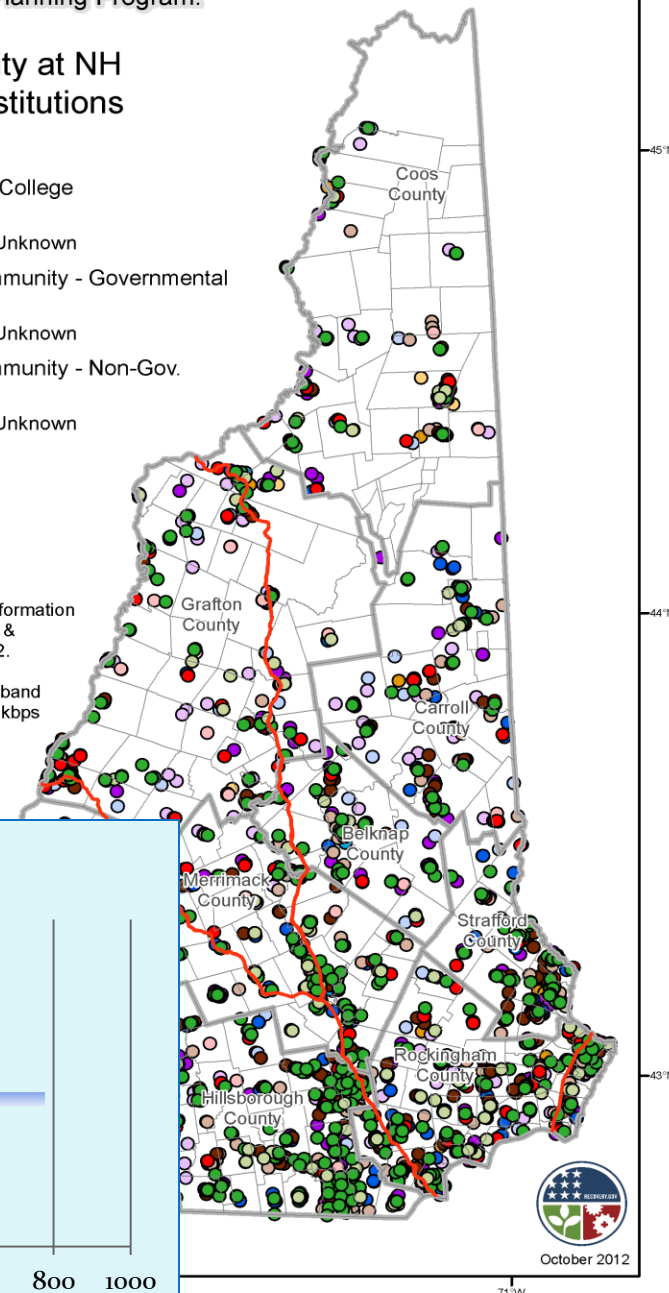
## NH Broadband Mapping & Planning Program:

### Broadband Connectivity at NH Community Anchor Institutions

- |                            |                                       |
|----------------------------|---------------------------------------|
| <b>K-12 School</b>         | <b>University/College</b>             |
| ● Yes                      | ● Yes                                 |
| ○ No/Unknown               | ○ No/Unknown                          |
| <b>Library</b>             | <b>Other Community - Governmental</b> |
| ● Yes                      | ● Yes                                 |
| ○ No/Unknown               | ○ No/Unknown                          |
| <b>Medical/Health Care</b> | <b>Other Community - Non-Gov.</b>     |
| ● Yes                      | ● Yes                                 |
| ○ No/Unknown               | ○ No/Unknown                          |
| <b>Public Safety</b>       |                                       |
| ● Yes                      |                                       |
| ○ No/Unknown               |                                       |

This map displays broadband access information reported to the NH Broadband Mapping & Planning Program as of October 1, 2012.

For the purposes of this program, broadband is defined as access that is at least 768 kbps downstream and 200 kbps upstream.







***Rural  
Addressing  
Data Collection***



# Rural Addressing – Overview

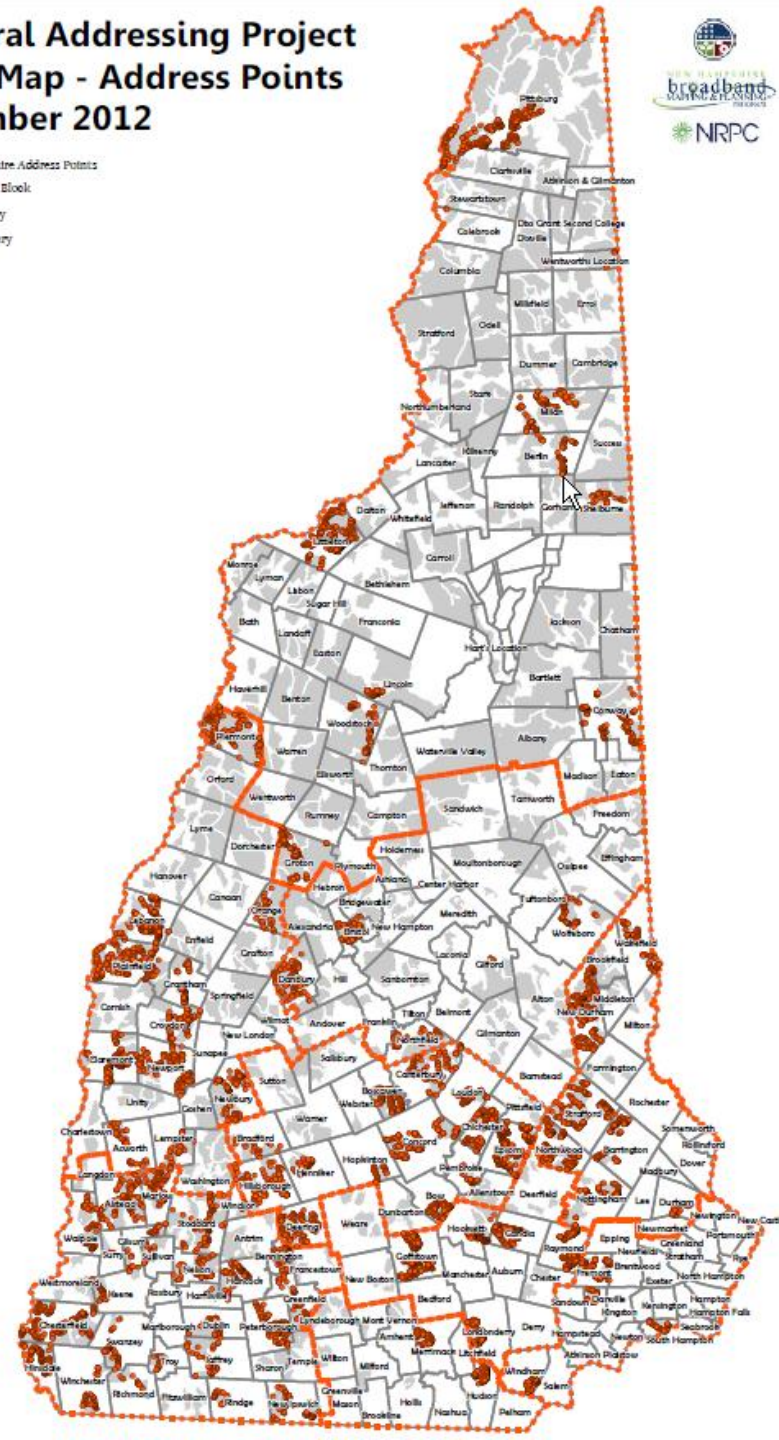
- Goal – statewide GIS point file of addresses in NTIA-designated rural census blocks (2+ sq mi)
- ~40,000 households in rural blocks (Census 2010)
- Existing address datasets either incomplete, or unavailable to the public
- Data collected at the RPC level and coordinated by Nashua Regional Planning Commission and UNH

# Rural Addressing – Status

- 14,600+ addresses collected (36.5% of total)
- 200+ volunteer hours

## NH Rural Addressing Project Status Map - Address Points September 2012

- New Hampshire Address Points
- Rural Census Block
- RPC Boundary
- Town Boundary





# *Supplemental Mapping Activities*



# Broadband Availability – Supplemental Activities

- Public wi-fi location mapping
- Municipal cable franchise agreement inventory
- Enhancement of CAI data collection for additional category types
- Cell tower location updating



**CABLE TELEVISION  
RENEWAL FRANCHISE**

**THE MAYOR AND  
THE BOARD OF ALDERMEN**

**THE CITY OF NASHUA,  
NEW HAMPSHIRE**



**GRANTED TO  
COMCAST OF MASSACHUSETTS/  
NEW HAMPSHIRE/OHIO, INC.**



***Broadband  
Data & Map  
Products***



# Data Sets and Map Products

From GRANIT website, [www.granit.unh.edu](http://www.granit.unh.edu)

- downloadable GIS shapefiles

From NHBMPP website, [www.iwantbroadbandnh.org](http://www.iwantbroadbandnh.org)

- interactive map viewer
- downloadable statewide maps
- downloadable town broadband availability profiles

Aggregate datasets of all 56 state broadband initiatives can be viewed on the National Broadband Map, [www.broadbandmap.gov](http://www.broadbandmap.gov)

# iwantbroadbandnh.org



- Home
- Where Is Broadband?
- Planning & Assistance
- Interactive Map

### Home

The New Hampshire Broadband Mapping and Planning Program (NHBMPP) is a comprehensive program that seeks to understand where broadband is currently available in NH, how it can be made more widely available in the future, and how to encourage increased levels of broadband adoption and usage. We recognize that a vibrant local and state economy requires broadband infrastructure to support economic development, energy efficiency, advances in health care, and improved educational opportunities, as well as the knowledge base and resources to effectively utilize that infrastructure.

Funded by the American Recovery and Reinvestment Act through the National Telecommunications and Information Administration (NTIA), the NHBMPP comprises two main components: a broadband availability inventory and mapping effort, and a suite of planning and technical assistance initiatives. Both components are part of a national effort to expand broadband access and adoption through improved data collection and broadband planning.

The NHBMPP is being managed by the University of New Hampshire's GRANIT System, Earth Systems Research Center, Institute for the Study of Earth, Oceans, and Space.

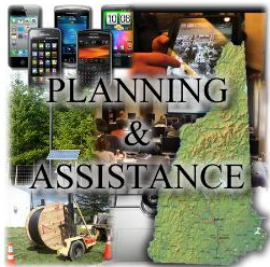
### Questions...

If you have questions regarding the NHBMPP, please contact:

Fay Rubin, Project Director  
Earth Systems Research Center  
University of New Hampshire  
Morse Hall, Room 447  
Durham, NH 03824  
Phone - 603-862-4240  
fay.rubin@unh.edu

Michael Blair, Project Coordinator  
Earth Systems Research Center  
University of New Hampshire  
Morse Hall, Room 252  
Durham, NH 03824  
Phone - 603-862-2589  
michael.blair@unh.edu

Or use the 'Contact Us' option above.



### About NHBMPP

### Mapping Results

### Get Involved

### In The News

### Contact Us

< **October** >

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

### Broadband Survey & Speed Test

#### Broadband Access



Tell us your story...



#### Speed Test Results

(5320 results as of 9/28/2012)

Download speed	Percentage
4 Mbps or less	60%
- FCC Minimum Broadband Speed -	
4-10Mbps	34%
10-25 Mbps	5%
More than 25 Mbps	1%

### Town Profiles

-- Choose the City/Town --





# Broadband Availability – Municipal Profiles

## Service Providers In the Profiled Community:

### Service Provider:

AT&T Mobility LLC  
Comcast  
FairPoint Communications,  
Inc.  
Spectra Access  
Sprint  
T-Mobile  
TDS Telecom  
U.S. Cellular  
Verizon Wireless  
WValley

Providers listed are those that submitted data indicating they offer broadband services via the technologies displayed in the profiled community. They may offer additional broadband technologies in other areas of the state.

## Regional Planning Commission

Nashua Regional Planning  
Commission

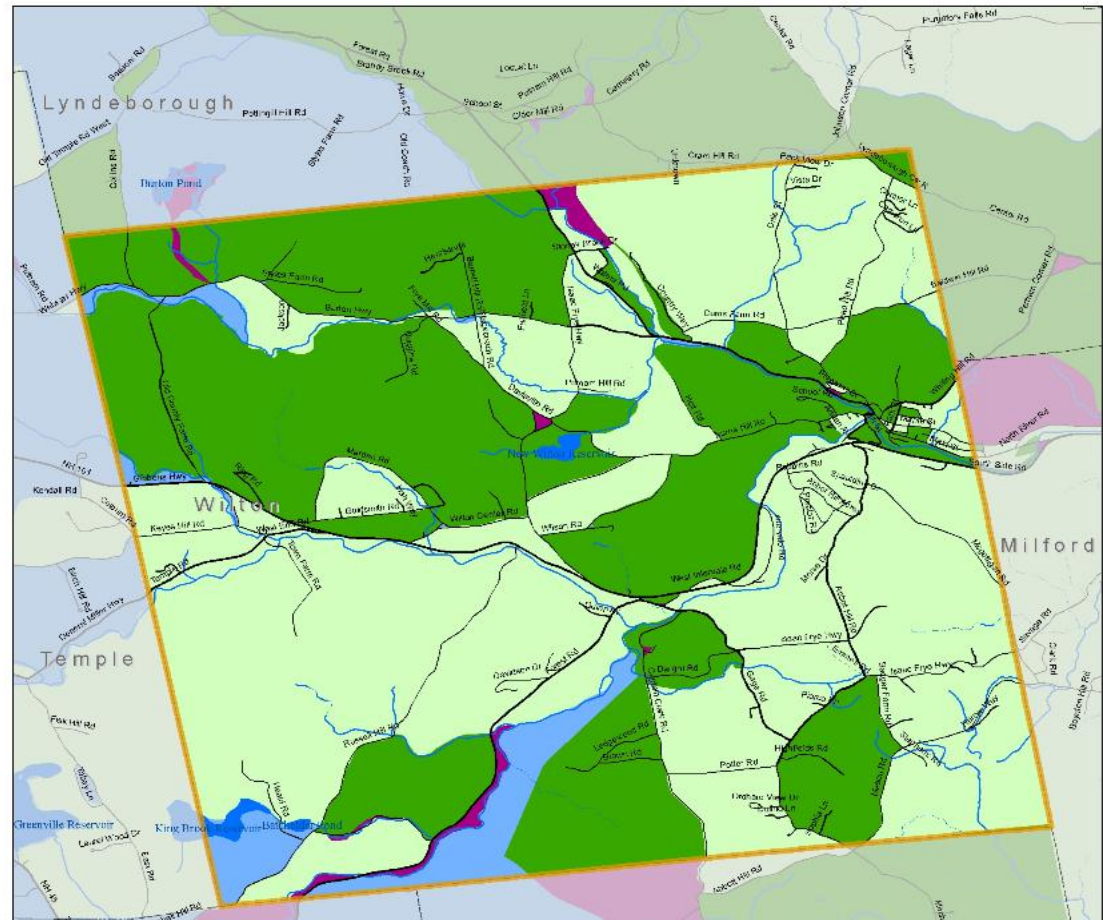
## Broadband Availability Profile: Wilton

### Technology with Fastest Reported Download Speed

■ DSL
 ■ Optical Carrier/Fiber To The End User
 ■ Terrestrial Fixed Wireless

■ Cable
 ■ Other Copper Wireline (T-1, etc.)
 ■ Terrestrial Mobile Wireless

-- Choose another City/Town profile -- ▾



# Broadband Availability – Interactive Map Viewer

**NEW HAMPSHIRE broadband MAPPING & PLANNING PROGRAM**

## Broadband Service Availability Viewer v1.0

[Coverage](#) [Tools](#) [Feedback](#) [Help](#) [About](#)

[Visit the project website at broadbandnh.org](#)

Map Style: [More...](#) [Topo](#) [Aerial](#) [Hybrid](#)

**Coverage**

Layer Visibility

- Community Anchor Institutions
- Wi-Fi and Speed Test Locations
- Boundaries
- Broadband Technology
- Maximum Download Speed
- Degree of Broadband Competition

**Tools**

[Provider Search](#) [Other Tools](#)

Use these tools to quickly navigate to an area of interest, to print, or to identify features on the map. Click on [Help](#) for details.

**Quick Find**

Town

County

Select a region to display

[Print](#) [Bookmarks](#) [Identify](#)

Latitude: 44.546638 Longitude: -73.123596

# Broadband Availability – National Broadband Map (www.broadbandmap.gov)

The screenshot shows the National Broadband Map (NBM) website. At the top left is the NBM logo with the tagline "How connected is my community?". Below the logo is a search bar with the text "Please enter any address" and a "FIND Broadband" button. There are two buttons below the search bar: "Explore the Map" and "Analyze the Data". A navigation menu includes links for "Analyze", "Map", "Developer", "About", and "Native Nations". Below the menu is a small text block: "The National Broadband Map is a tool to search, analyze and map broadband availability across the United States. Created and maintained by the NTIA, in collaboration with the FCC, and in partnership with 50 states, five territories and the District of Columbia." At the bottom of the menu are links for "NTIA", "FCC", "Website Policies and Notices", "Privacy Policy", "Recovery.gov", and "FOIA".

The main content area features a map of the United States with a blue overlay indicating broadband availability. The map is titled "Type of Technology Available" and has a description: "Description: This map displays broadband technologies offered to end users (e.g. DSL, cable, wireless, fiber, etc.)." Below the map are six small thumbnail maps showing different technology types: DSL (blue), Cable (light blue), Fiber (green), Wireless (orange), and others. At the bottom of the page is the text: "The National Broadband Map is a tool to search, analyze and map broadband availability across the United States."

Launched February 17<sup>th</sup>, 2011 by NTIA in collaboration with the FCC, and in partnership with the 50 states, five territories and the District of Columbia broadband mapping programs

# Evolution of Broadband Mapping in NH: 2008

Static

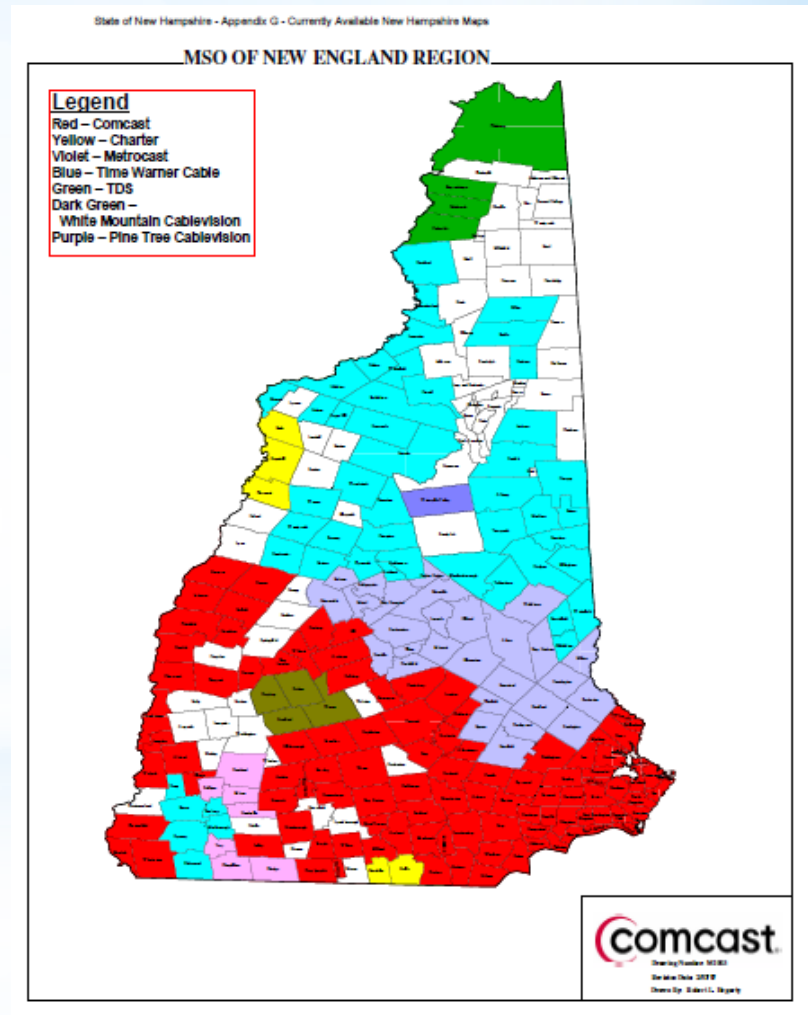
Town-based data

No planned updates

Information for selected technologies (DSL, Cable) on:

- Coverage

From “State of New Hampshire Broadband Action Plan”, Department of Resources and Economic Development and the NH Telecommunications Advisory Board, June, 2008



# Evolution of Broadband Mapping in NH: 2010/2011

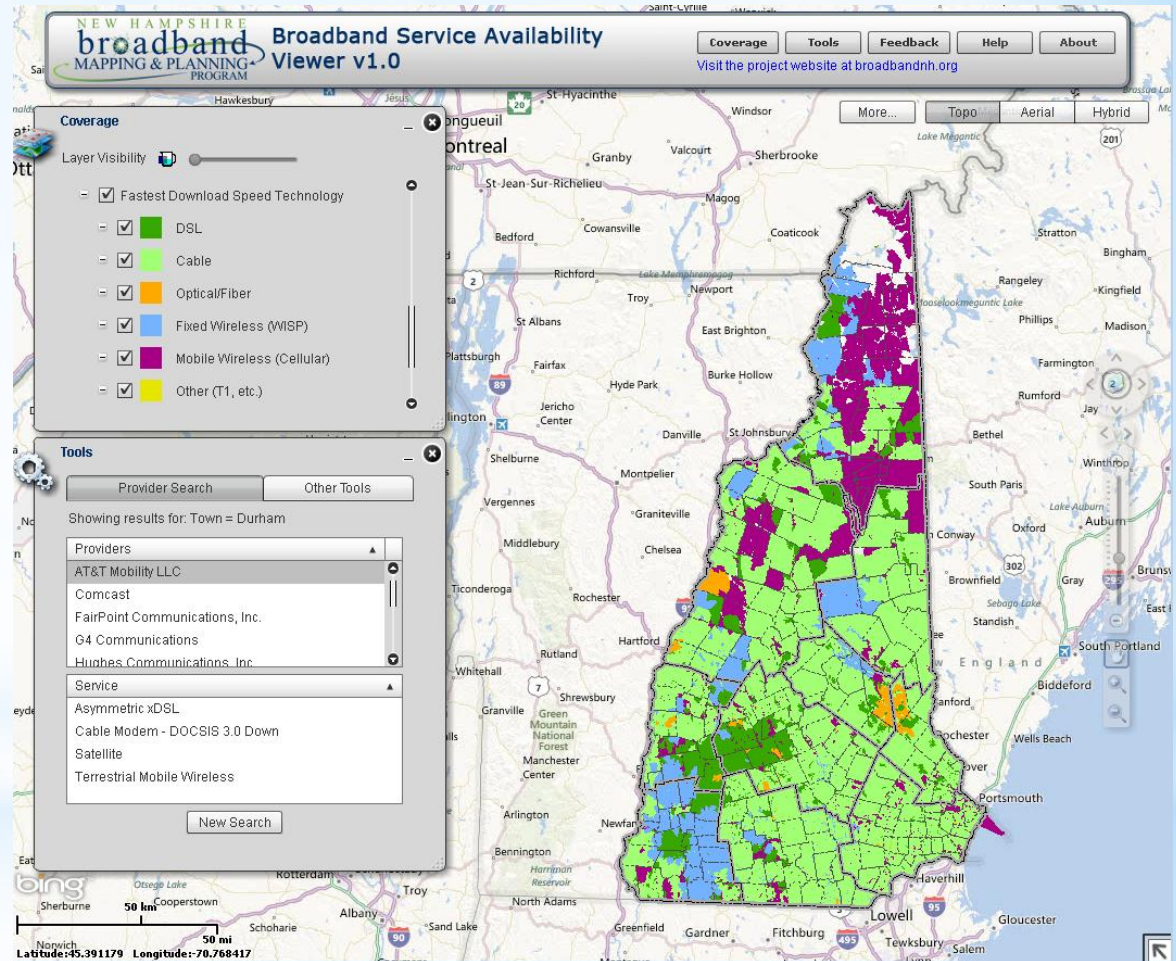
Interactive

Census block resolution

Regularly updated

Information for all technologies on:

- Coverage
- Technology
- Speed tiers
- Links to provider websites to obtain pricing data



Data as of March, 2012

# Key Benefits of NHBMPP Mapping

## 1. Comprehensive mapping capability

- Maintaining and verifying statewide broadband availability coverage map with speed and technology attributes, updated every 6 months
- Exposing unserved and underserved areas of the state
- Verifying unserved and underserved areas - user speed tests, surveys, direct emails, cellular drive testing
- Making extensive use of GIS and web technologies to collect, process, and verify data; to conduct spatial analyses; to present results to the public
- Developing and maintaining additional core data sets - Community Anchor Institutions, public rural address data
- Compiling supplemental data sets - cable franchise agreements inventory, public wi-fi locations

## 2. Strong relationship with internet service providers

- Returning broadband coverage maps to providers, several with limited mapping capability
- Providing feedback on unserved and underserved areas of NH

## 3. Extended broadband community in NH

- Encouraging state broadband initiatives to work collaboratively, sharing data and knowledge
- Promoting public engagement in issues around broadband availability

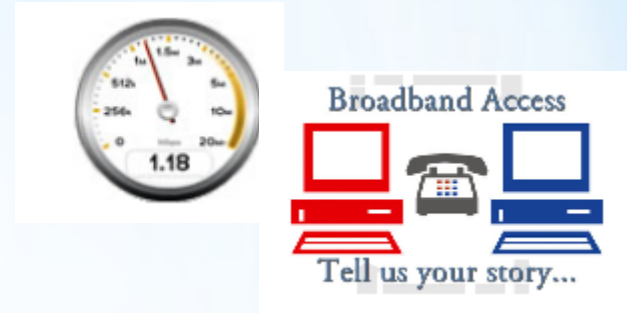
# Evolution of Broadband Mapping in NH: The Future?

## Validation & feedback

- Every user is a potential data collector
- Customer and provider feedback loops

## Better maps

- Address level mapping
- High-capacity maps for economic development
- Direct updates from providers



# How you can help

- Recognize NH needs to expand broadband access and adoption in order to remain competitive with other states
- Spread the word that broadband is essential for economic development and vibrant communities
- Support NHBMPP and a state broadband authority/office, ensuring a continued capacity to deliver support to communities, businesses, schools, libraries, hospitals, etc.



# How you can help

- Encourage data sharing among publically-funded data initiatives
- Incentivize provider participation in the NHBMPP and beyond
- Acquire statewide LiDAR to improve wireless signal propagation modeling capability
- Support UNH GRANIT and RPCs in providing data and technical resources

# How you can help

- Encourage collaboration of public - private partners working together to enhance broadband access and adoption throughout the state
- Support legislation and policy designed to promote broadband access and adoption in NH
- Participate by attending our events; visiting our website at: [iwantbroadbandnh.org](http://iwantbroadbandnh.org)  
*(take the speed test and survey)*

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