

# The Intersection of Wireless and Broadband: Administration Spectrum Policy

**John M. R. Kneuer**

Acting Assistant Secretary for Communications and Information  
National Telecommunications and Information Administration  
U.S. Department of Commerce

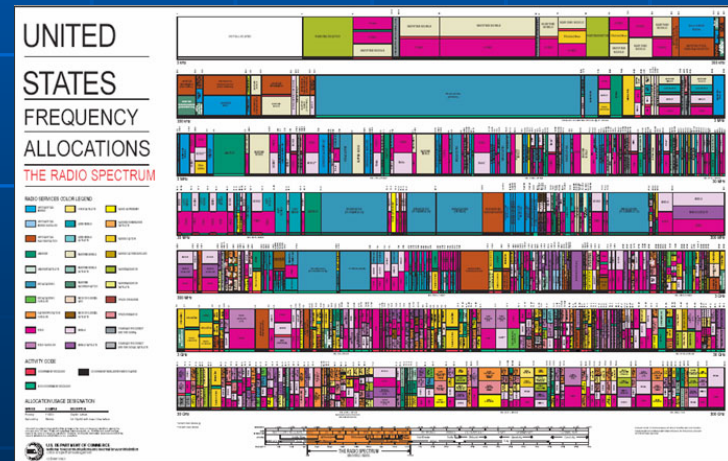


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[www.ntia.doc.gov](http://www.ntia.doc.gov)



# The National Telecommunications and Information Administration (NTIA)

- Principal adviser to the President on telecommunications and information policy issues
- Represents the Executive Branch in international & domestic telecommunications policy activities
- Manages Federal Government use of frequency spectrum
- Performs telecommunications research and engineering for both the Federal Government and the private sector



# State of the Economy

America's economy is strong:

- GDP grew at a strong 5.3% annual rate in 1Q06, and 3.5% in 2005, above the averages of the past 3 decades. During 2005, EU25 GDP grew 1.3% and euro-zone GDP grew 1.2%.
- The economy has shown steady job growth and added nearly 5.3 million new jobs since August 2003 – more than Canada, France, Germany, Great Britain, and Japan combined.
- 75,000 new jobs added in May 2006 – the U.S. unemployment rate is 4.6% (May '06), while the EU25 unemployment rate is 8.2% (Feb. '06).
- Manufacturing activity (ISM index) has been growing for 36 straight months – the longest period of growth in 16 years.
- National homeownership was 68.5% (1Q-06), near its record high of 69.2% in 4Q04.

# We're Number 12!?!?

“ Hold the champagne. Before you start celebrating America’s global dominance in technology...the United States is lagging significantly behind Europe and Japan.”

“The reason for European and Japanese dominance is a stunner: They’ve been helped by coherent government planning...The United States...has been hindered by a chaotic free market.”

“Bureaucratic rule-setting and centralized economic planning – as opposed to US laissez-faire – has enormous economic benefit.”

# Not So Fast!!!

## Status of the 2006 Wireless Market

### GROWTH:

- In 2005, U.S. cell phone subscriptions topped 207.9 million, up 27.95 million from the previous year. Carriers' revenues reached \$113.5 billion in 2005. (CTIA 2006).

### PRICING:

- Cingular Wireless offers a service called BroadbandConnect to compete with Verizon and Sprint for \$60 a month for unlimited use of its services.
- On average, monthly cell phone bills were \$49.98 last year. By comparison, the average monthly bill in December 1988 was \$98.02. (CTIA)

### SPEED & AVAILABILITY:

- Verizon Wireless and Sprint's New Evolution Data Only (EV-DO) offers speeds from 600-700 kbps. Verizon offers service in 180 major U.S. markets. Sprint offers service in 100 major U.S. markets.
- Cingular's High Speed Downlink Packet Access (HSDPA) offers speeds up to one megabit per second in 16 major cities. Even the lowest speed the U.S. companies promise, 400kbps, is faster than the maximum speed of today's common European systems

# US Ranks Number 1

**GDP - \$12.4 trillion**

**Broadband Lines - 49 million**

**Internet Users - 205 million (3/31/06)**

**Wi-Fi Hotspots - 40,007 (6/2/06)**

**Exports (goods & services) \$1.2 trillion**

# The President's Broadband Vision

## Goal

*"This country needs a national goal for broadband technology . . . universal, affordable access for broadband technology by 2007."*

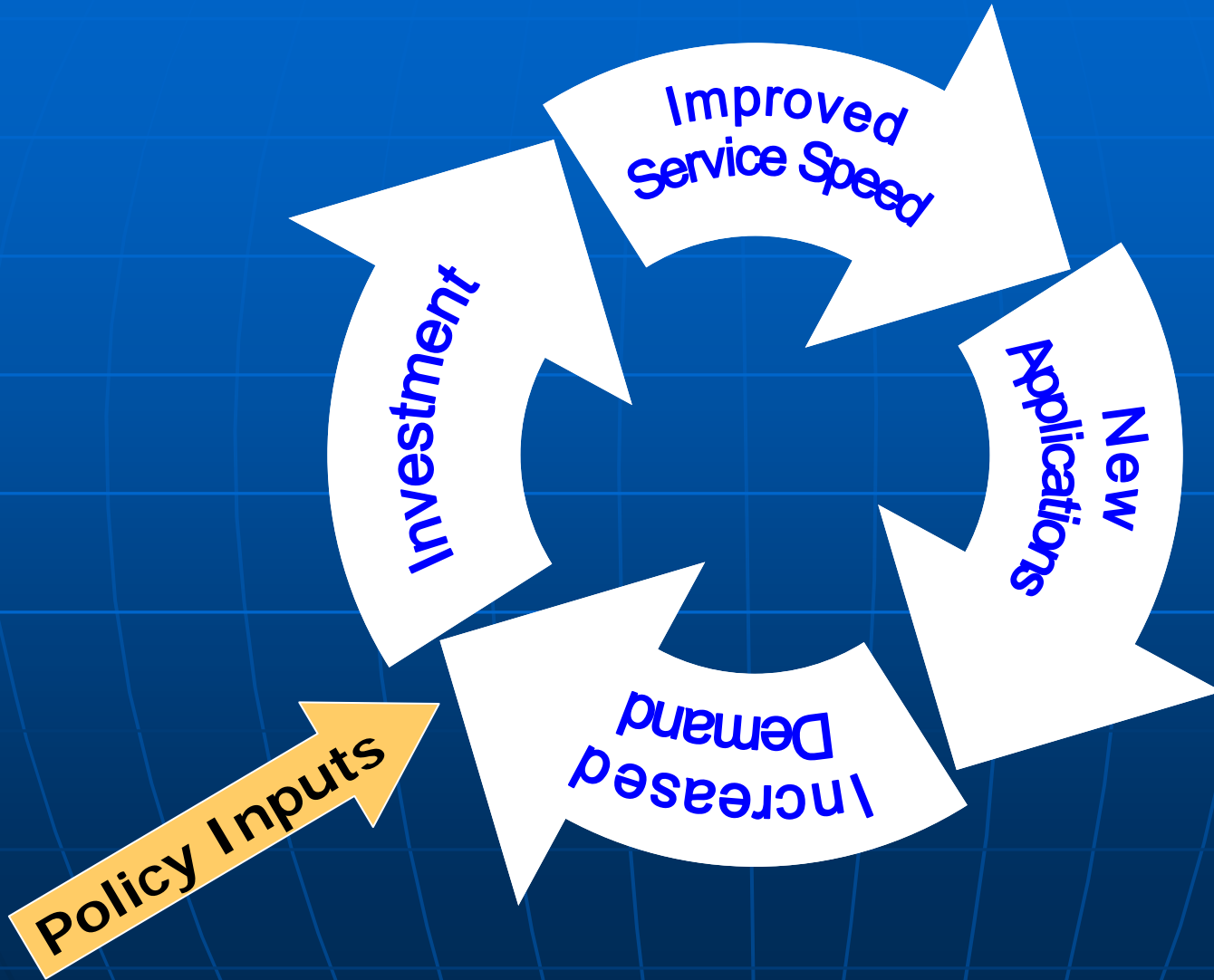
— President George W. Bush, Albuquerque, NM, March 26, 2004

## Government's Role

*"The role of government is not to create wealth; the role of our government is to create an environment in which the entrepreneur can flourish, in which minds can expand, in which technologies can reach new frontiers."*

— President George W. Bush, Technology Agenda, November, 2002.

# The Broadband Flywheel





# AWS Auction

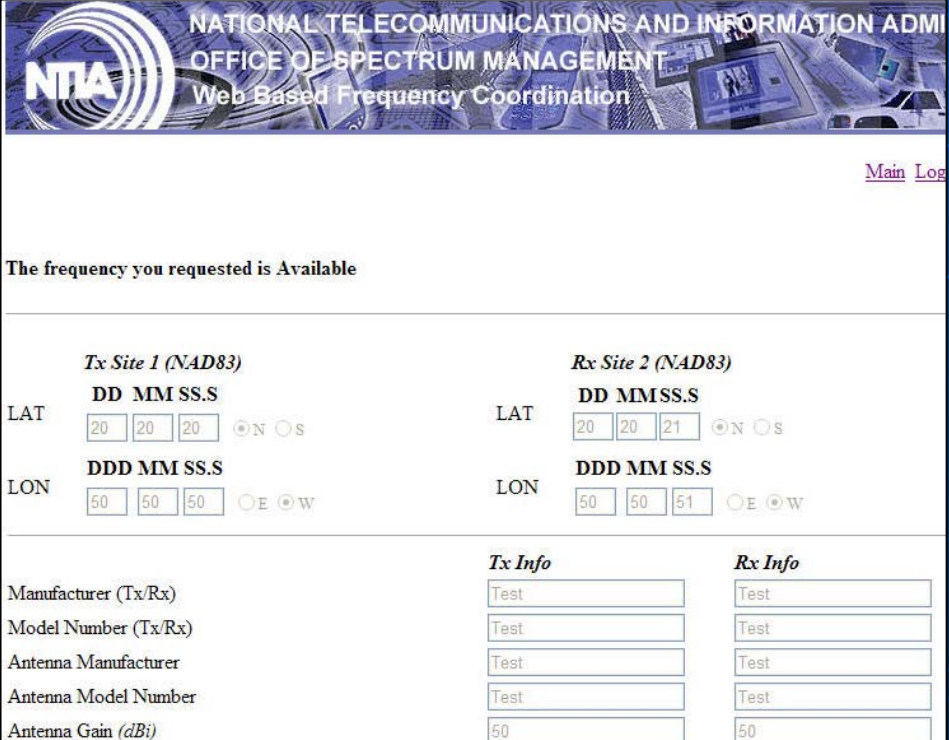
- NTIA helped reallocate 45 MHz of spectrum --1710 to 1755 MHz – from federal use, half of the 90 MHz FCC will auction to commercial licensees starting August 9, 2006.
- NTIA made a viability assessment in 2002, coordinated with the FCC and federal agencies on service rules, and supported legislation to establish a relocation fund, the Commercial Spectrum Enhancement Act.
- Federal agencies will be reimbursed their estimated \$ 936 billion relocation costs through a fund established by this Act. NTIA provided relocation cost and timeline information on December 27, 2005 and has since updated that information.
- The FCC/NTIA released a Public Notice (FCC-06-50) on April 20, 2006 establishing coordination procedures between AWS licensees and incumbent 1710-1755 MHz operations.

# Mobile Wireless Broadband

- Companies including Sprint-Nextel, Verizon Wireless, T-Mobile and Cingular have been rolling out mobile broadband technologies.
- TIA estimates that as of 2005 there were 200,000 mobile wireless broadband (3G) subscribers and forecasts that this will increase to 2 million by 2009 – a 78% compounded growth rate, highest for any type of broadband other than fiber.
- Revenues from wireless data services jumped more than 86% to \$8.58 billion in 2005, up from \$4.60 billion in 2004.

# 70/80/90 GHz Availability

- High-speed wireless links in several spectrum bands may now be coordinated and approved for commercial use in a matter of minutes.
- NTIA develop a web-based mechanism to facilitate real-time coordination of federal and non-federal operations in these frequency ranges.
- Non-federal users can now determine in minutes rather than months whether they have any potential conflict with federal users.
- The system was activated on February 8, 2005.



NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION  
OFFICE OF SPECTRUM MANAGEMENT  
Web Based Frequency Coordination

[Main](#) [Log](#)

The frequency you requested is Available

| Tx Site 1 (NAD83) |                                                                                                                                                                           | Rx Site 2 (NAD83) |                                                                                                                                                                           |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LAT               | DD MM SS.S<br><input type="text" value="20"/> <input type="text" value="20"/> <input type="text" value="20"/> <input type="radio"/> N <input type="radio"/> S             | LAT               | DD MMSS.S<br><input type="text" value="20"/> <input type="text" value="20"/> <input type="text" value="21"/> <input type="radio"/> N <input type="radio"/> S              |
| LON               | DDD MM SS.S<br><input type="text" value="50"/> <input type="text" value="50"/> <input type="text" value="50"/> <input type="radio"/> E <input checked="" type="radio"/> W | LON               | DDD MM SS.S<br><input type="text" value="50"/> <input type="text" value="50"/> <input type="text" value="51"/> <input type="radio"/> E <input checked="" type="radio"/> W |

|                      | Tx Info                           | Rx Info                           |
|----------------------|-----------------------------------|-----------------------------------|
| Manufacturer (Tx/Rx) | <input type="text" value="Test"/> | <input type="text" value="Test"/> |
| Model Number (Tx/Rx) | <input type="text" value="Test"/> | <input type="text" value="Test"/> |
| Antenna Manufacturer | <input type="text" value="Test"/> | <input type="text" value="Test"/> |
| Antenna Model Number | <input type="text" value="Test"/> | <input type="text" value="Test"/> |
| Antenna Gain (dBi)   | <input type="text" value="50"/>   | <input type="text" value="50"/>   |

# 5 GHz Spectrum

- NTIA led the development of technology to allow sharing of this band between military radars and unlicensed mobile broadband (Wi-Fi) devices.
- The 5 GHz industry-government working group under the International Telecommunication Advisory Council developed and validated the dynamic frequency selection (DFS) sharing technique.
- In February 2006, the group reached consensus on certification criteria for Unlicensed-National Information Infrastructure (U-NII) devices using DFS. At the ITU, the working group is seeking worldwide common approaches to defining, testing and certifying DFS.
- The FCC is expected to release testing procedures as soon as this summer.

# Ubiquitous Wireless: Even in Oregon's Onion Fields

- The world's largest wireless hotspot is in rural Oregon, extending over 700 square miles of remote, arid country that supplies many of the nation's red onions.
- This "cloud" provides not only wireless broadband but also electronic surveillance, an intelligent traffic system, telemedicine, and distance education.
- Useful? "Outside the cloud, I can't even get DSL," said a resident farmer. "When I'm inside it, I can take a picture of one of my onions, plug it into my laptop and send it to the Subway guys in San Diego!"

# Promising Technology Solutions to the Rural Challenge

- **Wi-Fi**: Rural Oregon is home to the world's largest Wi-Fi hotspot → **700 miles<sup>2</sup>** Airgo Networks announced plans to sell Wi-Fi chips with data rates up to 240 Mbps by 4th quarter 2005 – 4x the speed of current Wi-Fi chips at 54 Mbps.
- **WiMAX**: With a range of up to 40 miles, WiMAX may be a promising solution for delivering broadband to rural areas. Although WiMAX is still under development, the FCC and FEMA authorized deployment of a WiMAX network (15 mile range with 45 Mbps bandwidth – 30x faster than standard 1.5 Mbps DSL connections) to link Wi-Fi hotspots in an effort to restore communications damaged by hurricane Katrina.
- **BPL**: Manassas , VA -- a suburb of Washington, DC – deployed the nation's first citywide broadband-over-power-line (BPL) system and is available to about 10,000 of the city's 12,500 homes. Central VA Coop, a rural cooperative, also is developing a BPL network in that state.
- **WISPs**: Wireless Internet service providers, approximately 3,000 in the U.S., traditionally provide broadband connectivity in areas not reached by cable or DSL. Now WISPs are expanding into urban areas.

# Ultrawideband

- Ultrawideband has applications from ground-penetrating radar to replacing short range communications (e.g. replacing USB cables) at up to 480 Mbps.
- NTIA helped to make UWB deployment possible by among other things undertaking compatibility studies to develop emissions limits and other rules for UWB operations.
- NTIA also set the stage for the rest of the world by providing guidance on UWB to other countries through the ITU on characteristics of UWB systems, the affect on other services, frameworks for regulations, and measurement techniques.

# President's Spectrum Policy Initiative

*“The existing legal and policy framework for spectrum management has not kept pace with the dramatic changes in technology and spectrum use.”*

- President George W. Bush, Presidential Memorandum,  
May 29, 2003

- Committed the Administration to develop a comprehensive U.S. spectrum policy for the 21<sup>st</sup> century
- The Secretary of Commerce was charged to lead this initiative



# Spectrum Reform Initiative's Key Objectives

From the President's May 2003 Executive Memorandum:

- Modernize and Improve the Spectrum Management System
- Establish incentives for achieving improved efficiencies in spectrum use and for providing incumbent users more certainty of protection from unacceptable interference
- Promote the timely implementation of new technologies and services while preserving national and homeland security, enabling public safety, and encouraging scientific research
- Develop means to address the spectrum needs of critical governmental missions

# Spectrum Policy Initiative Highlight: Test Bed Notice of Inquiry

- One recommendation of the initiative was for NTIA and the FCC to each identify 10 MHz of spectrum for a spectrum sharing innovation test bed, to federal and non-federal users of spectrum to test ideas on new ways to share the finite radio spectrum.
- NTIA published a Notice of Inquiry asking for comment on issues related to creation of a test bed, including on:
  - Technologies and services to be tested;
  - Processes, principles and guidelines;
  - Candidate frequency band (s); and
  - Activation, termination and evaluation of the test bed.
- The Federal Communications Commission also is soliciting public comment through a separate public notice.
- After two years, NTIA and the FCC will report on the results and on appropriate procedures for expanding the test bed as appropriate.

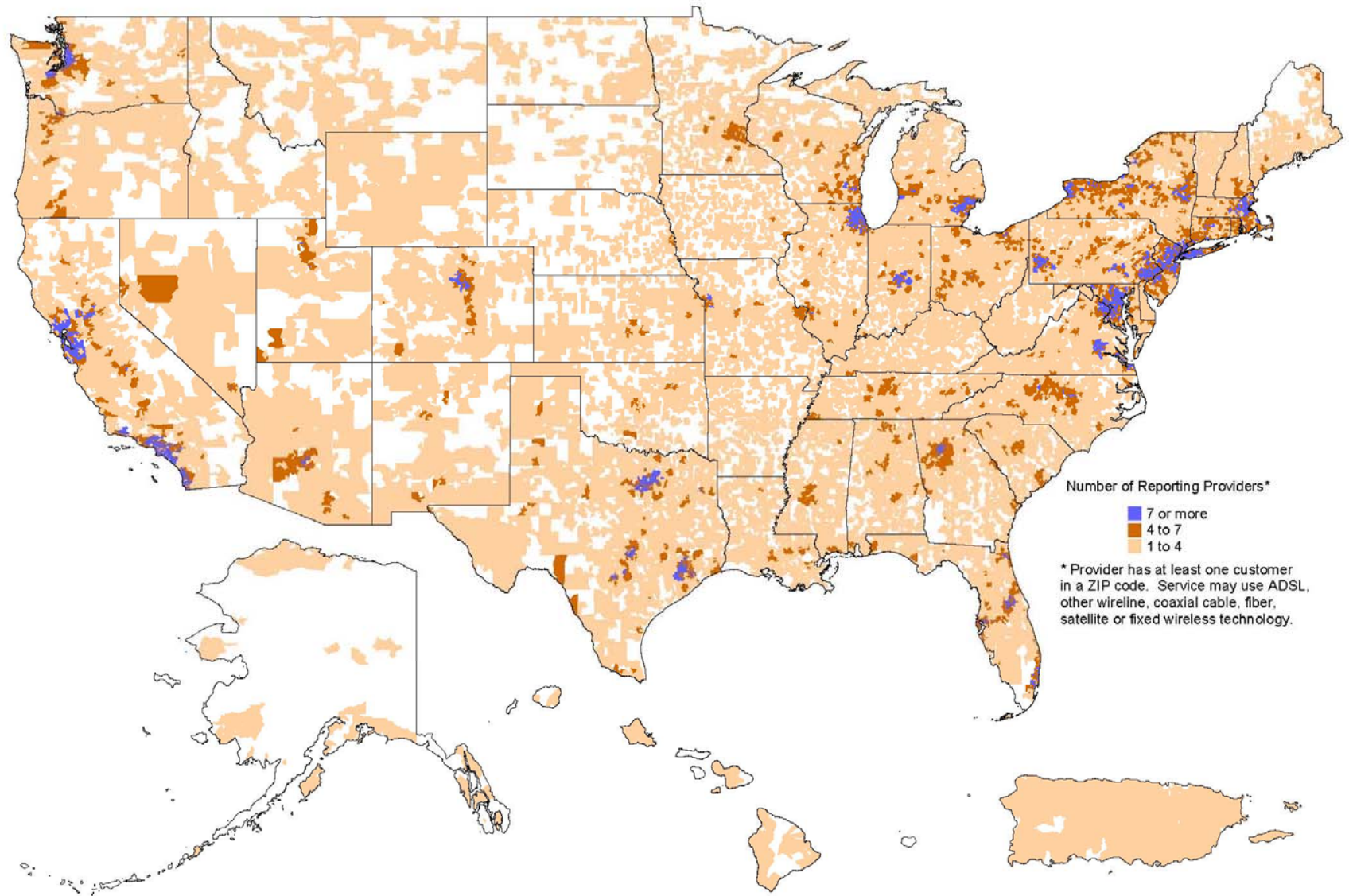
# Spectrum Policy Initiative Highlight: Public Safety Sharing Demonstration Program

- One initiative recommendation was to examine the feasibility of sharing spectrum among commercial, federal and local public safety and critical infrastructure applications.
- NTIA has selected the Washington, D.C. Wireless Accelerated Responder Network (WARN), an interoperable, city-wide, broadband public safety network.
- NTIA plans to report and make recommendations by December 2006.

# Project G. Improve Planning and Increase Use of Market-Based Economic Mechanisms in Spectrum Management

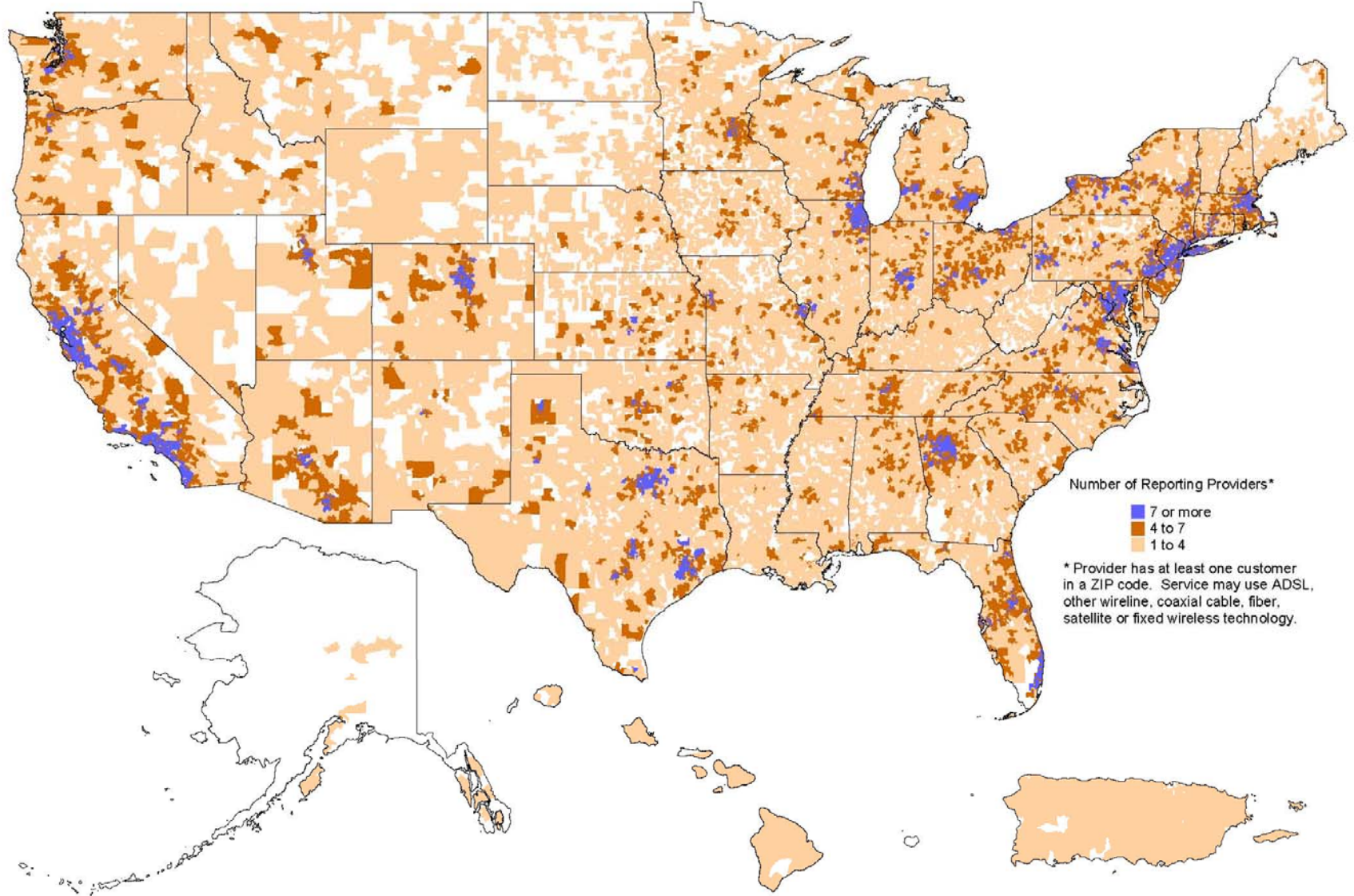
- NTIA will identify and propose economic incentives to encourage efficient spectrum use.
- Economic value of spectrum may be basis for incentives rather than mandates for improved spectrum efficiency.
- The Plan:
  - Information Gathering
  - Spectrum Valuation
  - Studying Feasibility of Federal User Fees
  - Non-Fee Incentives
  - Sharing
  - User Rights & Secondary Markets

# High-Speed Providers by ZIP Code (As of December 31, 2000)



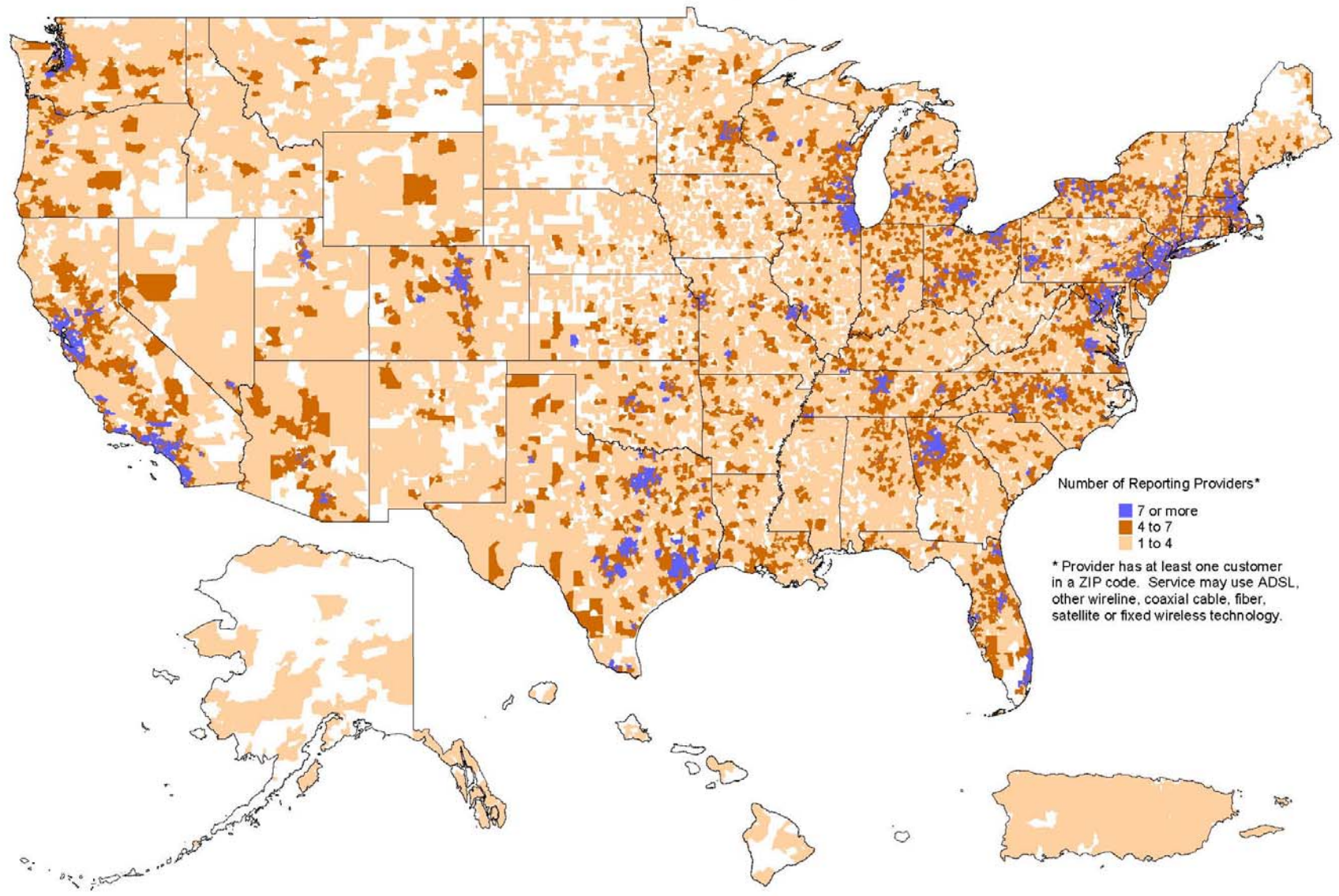
Source: FCC

# High-Speed Providers by ZIP Code (As of June 30, 2001)



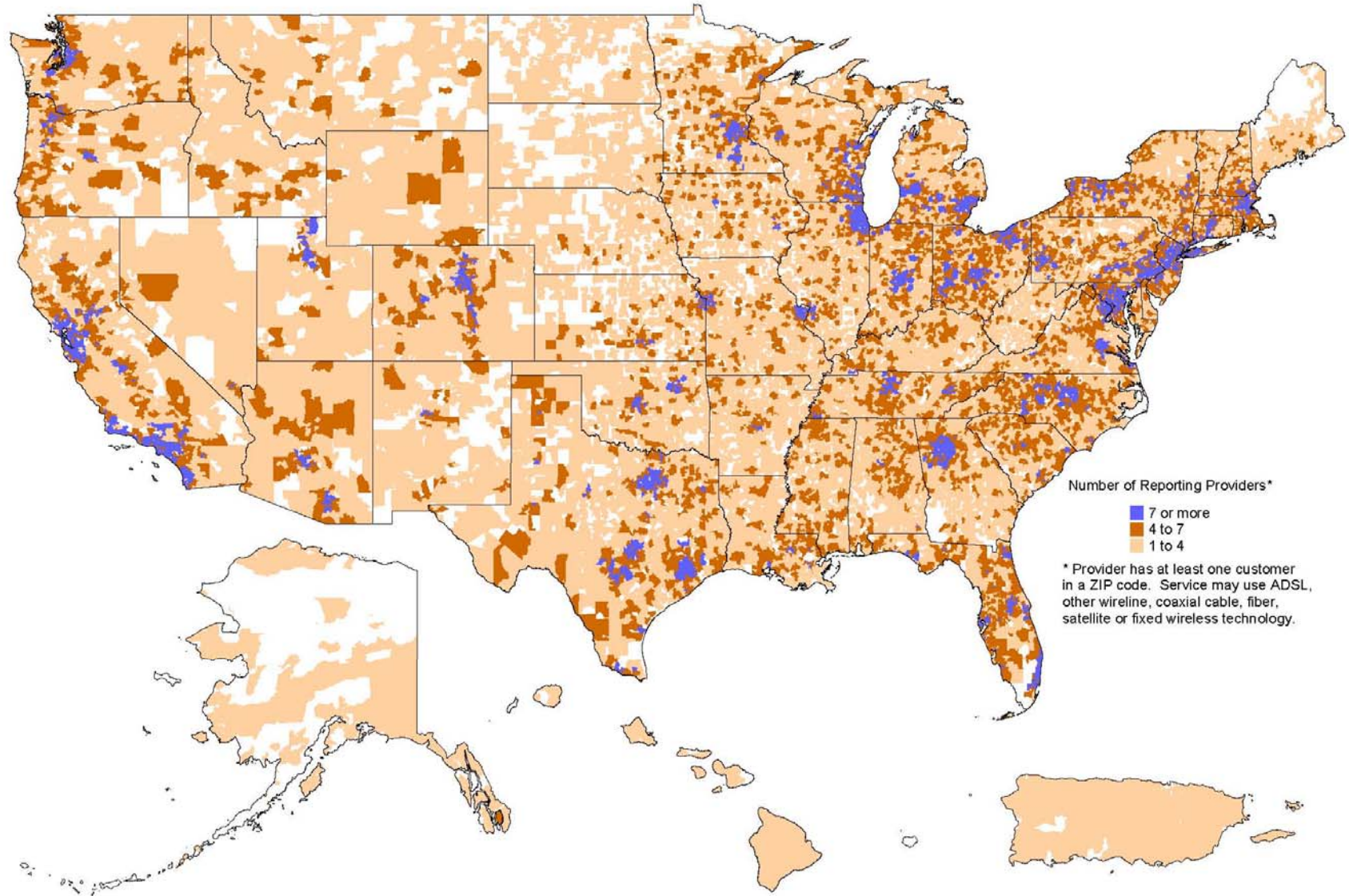
Source: FCC

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Source: FCC

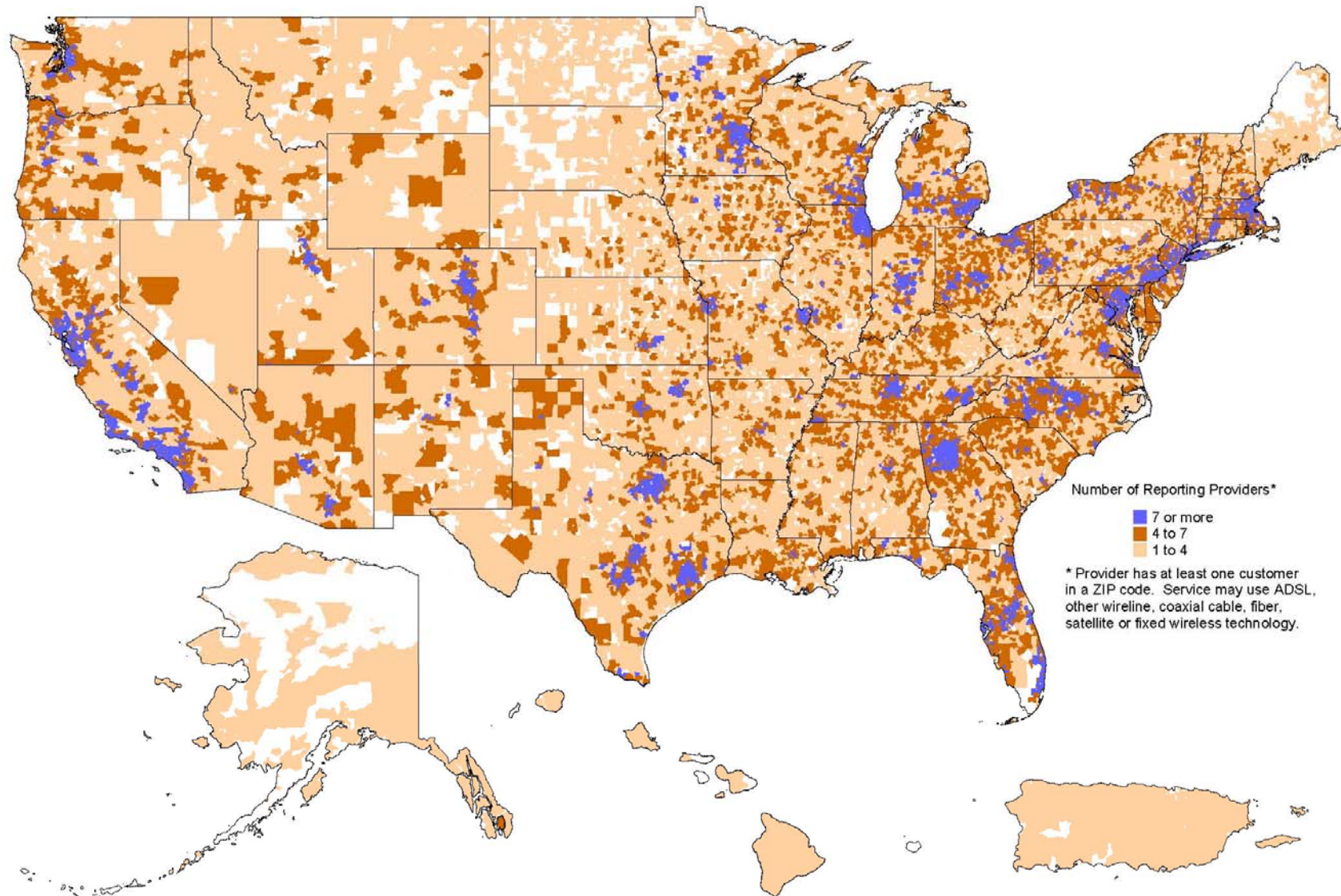
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Source: FCC

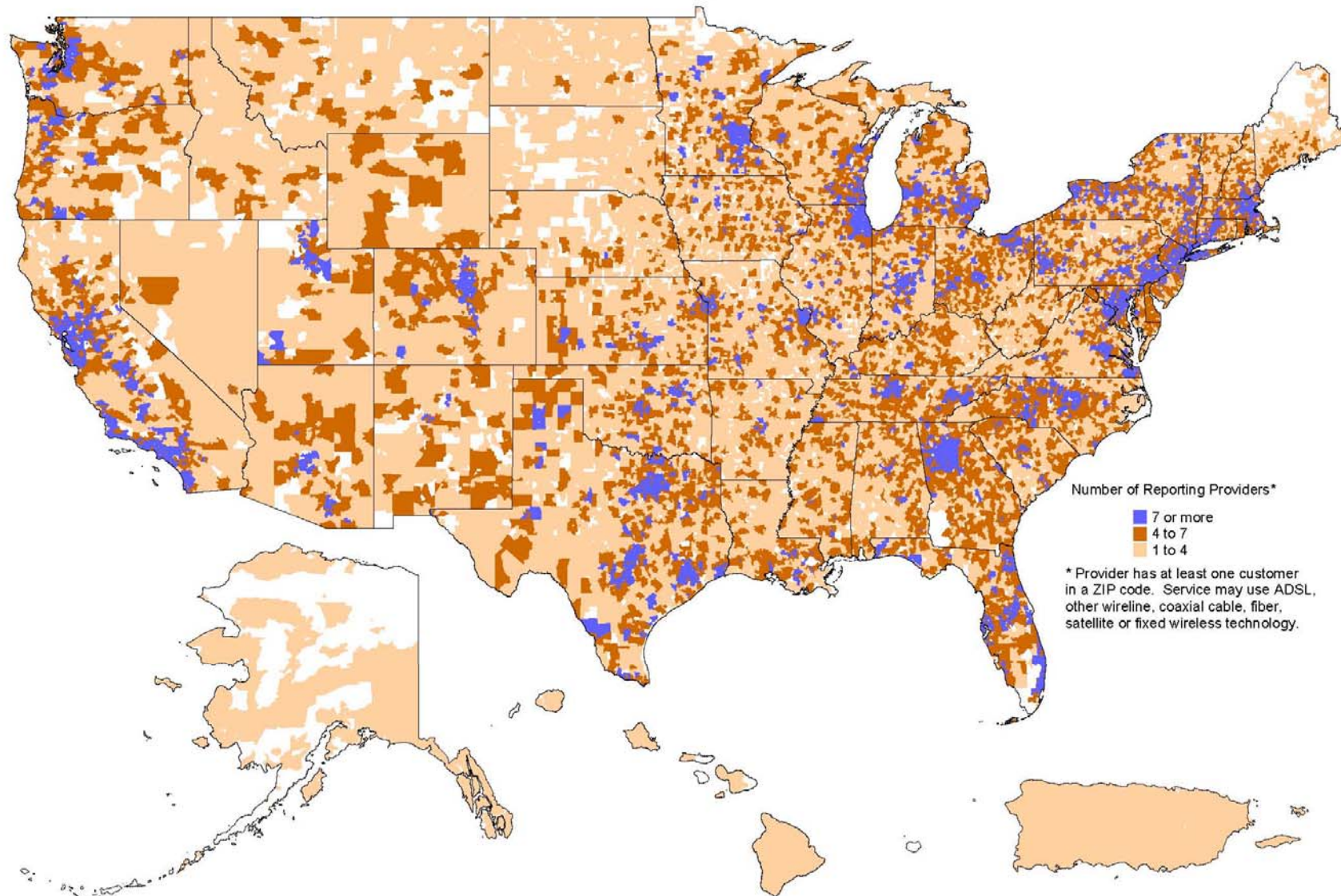


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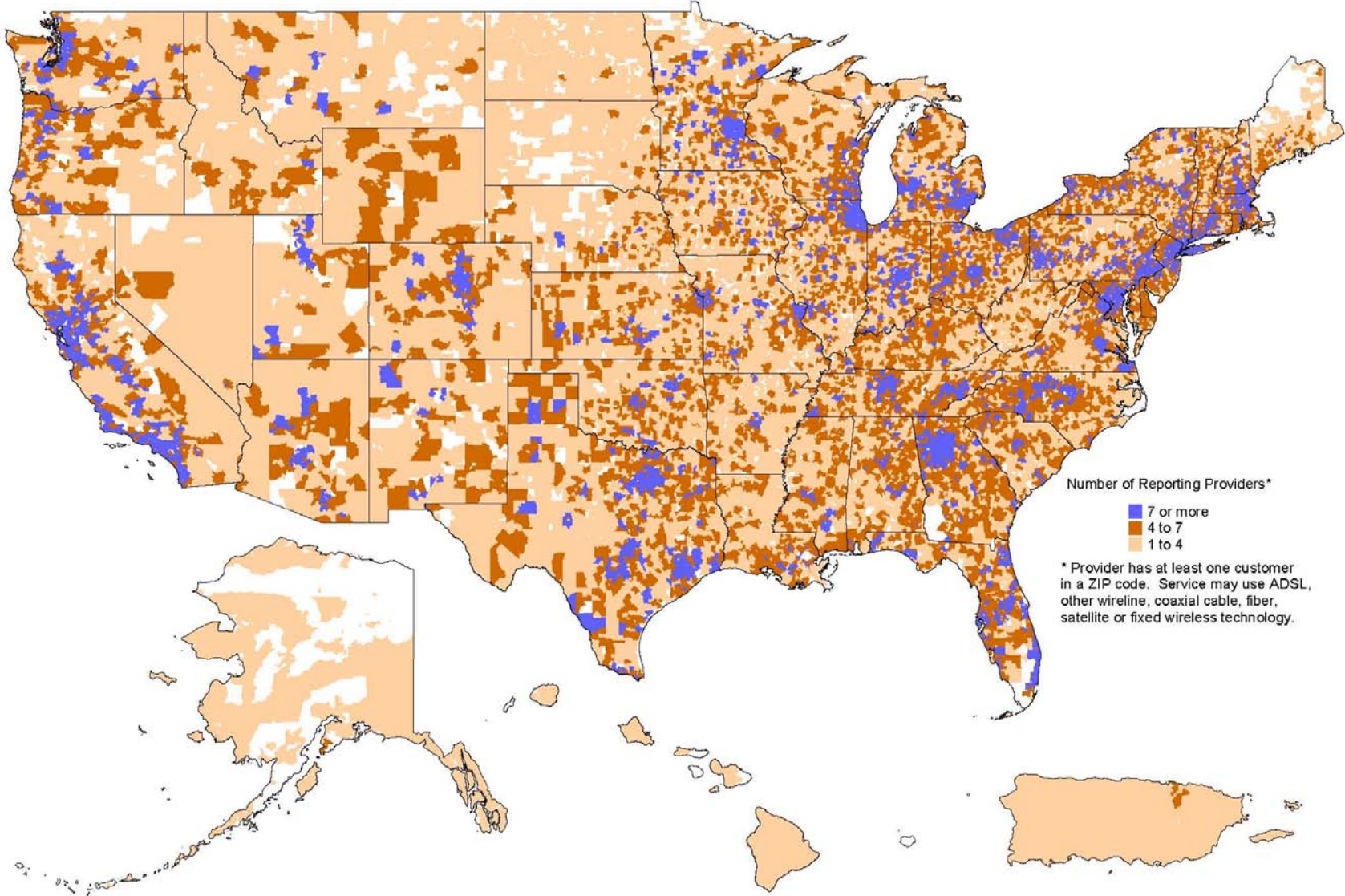


Source: FCC

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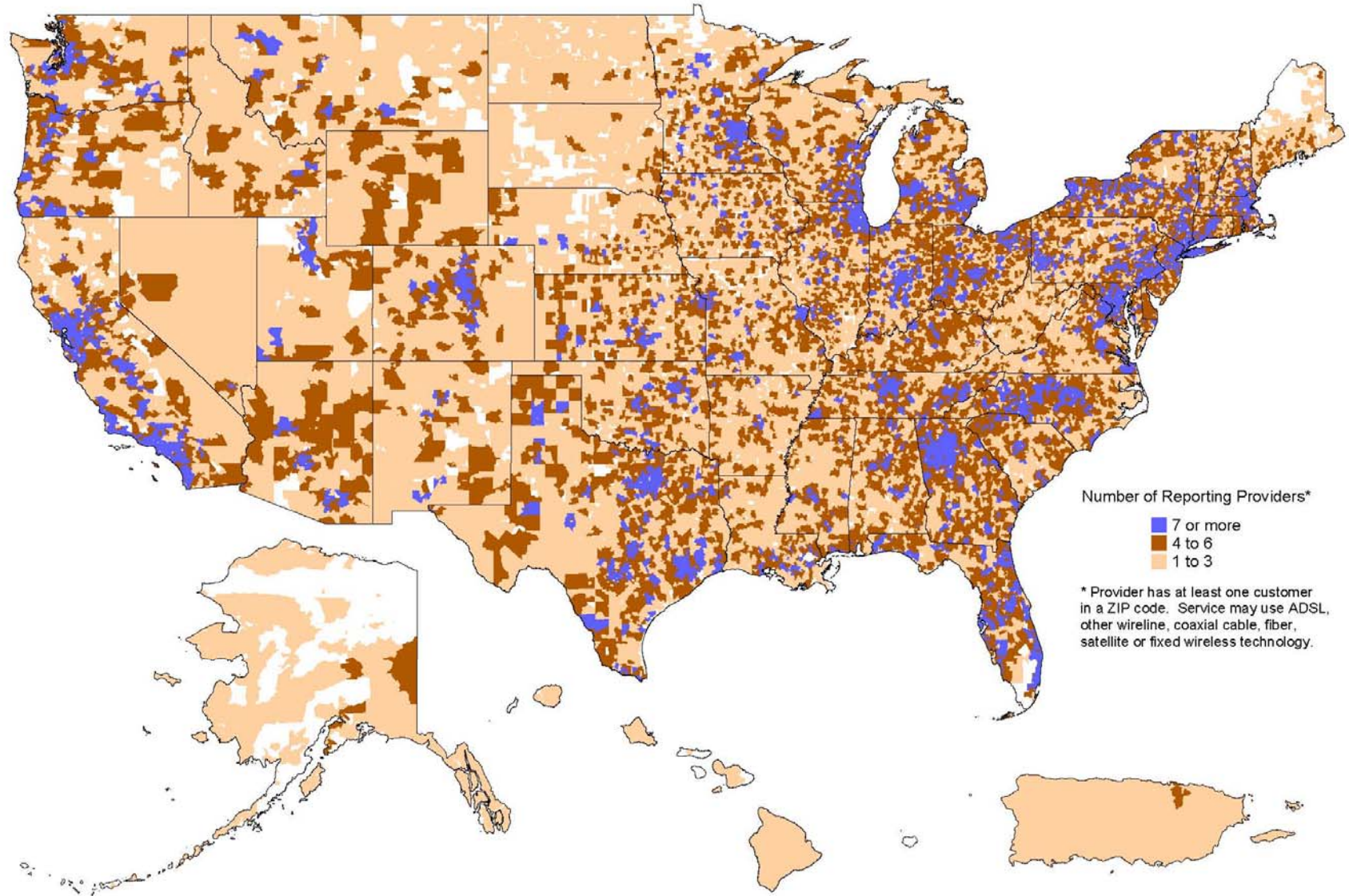


# High-Speed Providers by ZIP Code (As of December 31, 2003)



Source: FCC

# High-Speed Providers by ZIP Code (As of June 30, 2004)

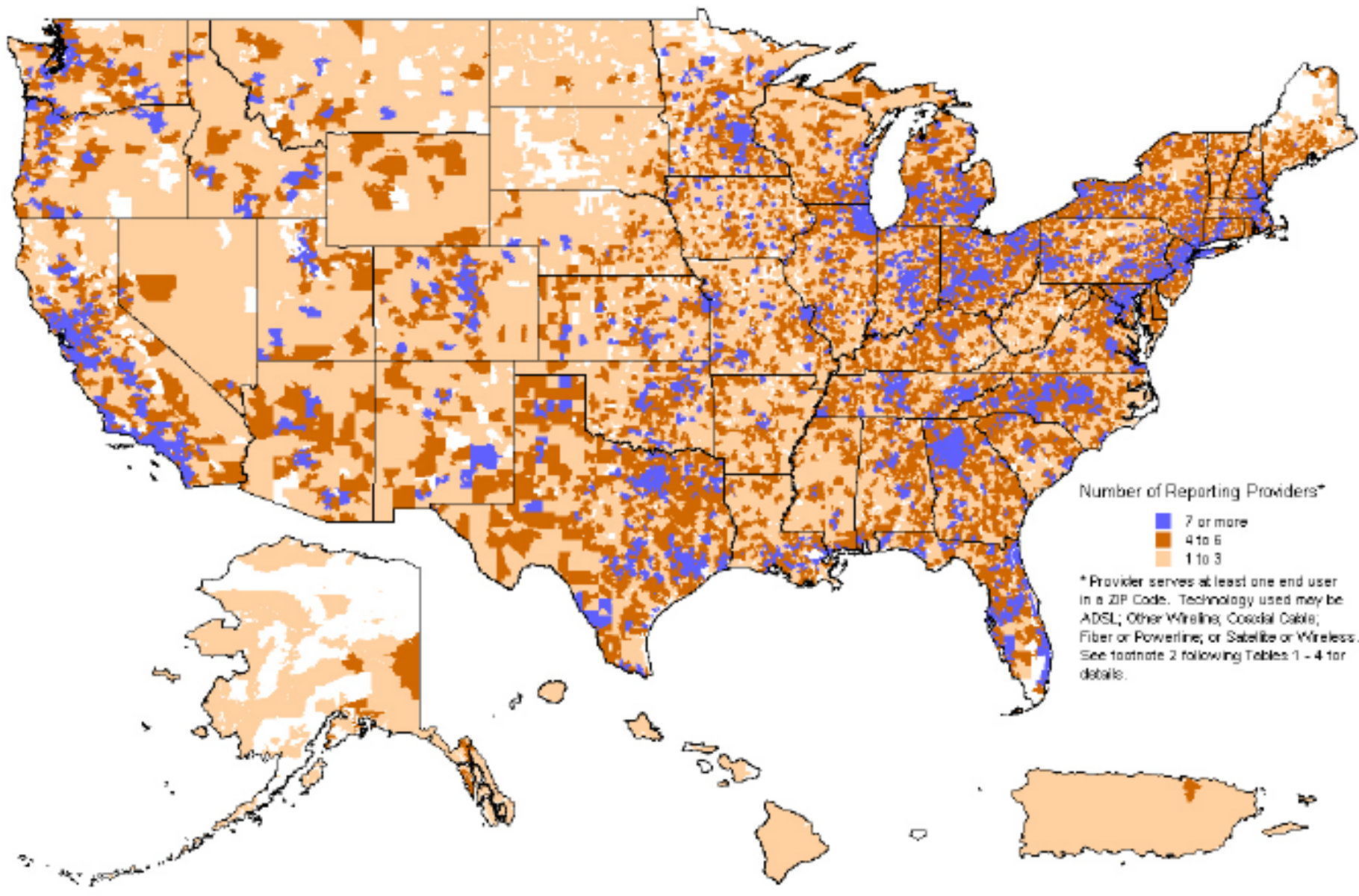


Number of Reporting Providers\*

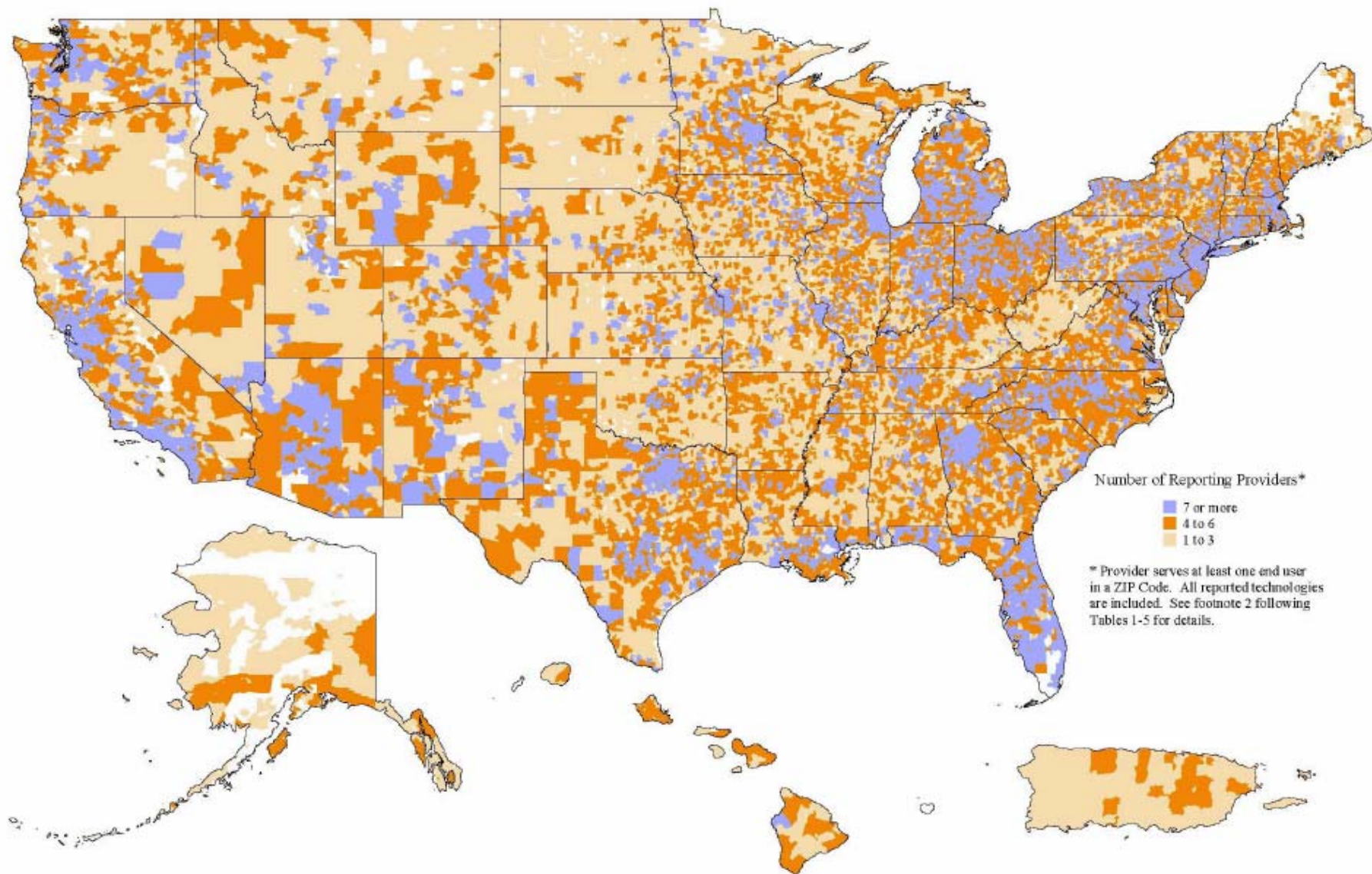
- 7 or more
- 4 to 6
- 1 to 3

\* Provider has at least one customer in a ZIP code. Service may use ADSL, other wireline, coaxial cable, fiber, satellite or fixed wireless technology.

## High-Speed Providers by ZIP Code (As of December 31, 2004)



## High-Speed Providers by ZIP Code (As of June 30, 2005)



# Final Thoughts

- The Administration has shown demonstrable success and leadership in its broadband and spectrum policies.
- There is a strong cause and effect relationship between these policies and the growth of broadband and innovative wireless products and services, and of jobs and economic growth in the country.
- The President's Spectrum Policy Initiative will promote efficiency and lead to further growth in these areas.

# Thank You

**John M. R. Kneuer**  
**Acting Assistant Secretary for**  
**Communications and Information**  
**U.S. Department of Commerce/NTIA**

**[jkneuer@ntia.doc.gov](mailto:jkneuer@ntia.doc.gov)**  
**202-482-1840**