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Lindsey L. Tonsager

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Note

Increasing E-Quality in Rural America: U.S. Spectrum Policy and Adverse Possession

*Lindsey L. Tonsager**

Americans across the country are cutting the cords of their communications devices.¹ In 2004, the wireless telecommunications services industry grew three times faster than the national economy, contributing \$118 billion in revenue and \$92 billion to the gross domestic product.² Meanwhile, wireless “hotspots” are popping up everywhere from coffee shops in New York City to a municipal-wide system in Chaska, Minnesota.³ Consumers increasingly expect their communications services to provide mobility, an always-on connection, and advanced services offering voice, video, and data in one device. Moreover, communications devices are not just for personal communications: the public safety community, local and national businesses, and educational institutions increasingly rely on such services.⁴

Because wireless communications services transmit information over the electromagnetic spectrum, however, a pro-

* J.D. Candidate 2007, University of Minnesota Law School; B.A. 2004, University of Pennsylvania. The author thanks Dean Jim Chen for his thoughtful comments and insight; editors David Leishman, Stephanie Bitterman and Marci Windsheimer for their assistance; and Keith Tonsager for his patience and support. Copyright © 2006 by Lindsey L. Tonsager.

1. See *Wireless Substitution in Full Swing, Says Study*, RCR WIRELESS NEWS, Sept. 19, 2005, at 30 (noting that Americans are increasingly preferring cell phones to land-line phone services).

2. Susan Polyakova, *Study: Wireless Industry Contributes \$92 Billion to U.S. Economy*, COMM. DAILY, Oct. 4, 2005, at 1, 1, available at 2005 WLNR 16027163.

3. *New Technologies*, COMM. DAILY, May 27, 2004, at 1, 3, available at 2004 WLNR 6957999.

4. See, e.g., Kevin J. Martin, *FCC Chairman Martin Comments on Commission's Amendment Emergency Alert System (EAS) Rules to Include Digital Media Technologies*, U.S. FED. NEWS, Nov. 3, 2005, at 1, available at 2005 WLNR 17829277; Amol Sharma, *Web Phones Complicate 9-1-1 Technology Needs*, CQ WKLY, Oct. 10, 2005, at 2704, 2704-05.

vider's services are limited according to whether adequate spectrum is accessible. Unfortunately, spectrum policy in the United States has failed to facilitate deployment of communications networks in rural America,⁵ where network deployment is costly and customers are few.⁶ Consequently, many rural consumers remain unserved or underserved,⁷ while the rest of the country undergoes an advanced wireless services revolution. Even when rural consumers have access to a particular communications service, the quality or speed of that service is often subpar. For example, the percentage of zip codes with broadband lines in service is lowest in rural America.⁸ Although many rural consumers own cell phones, most receive only analog service because digital signal coverage is sparse.⁹ In some

5. See Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, 33 Comm'n's Reg. (P & F) 1162, 1246 (Sept. 27, 2004) [hereinafter Spectrum-Based Services] (statement of Comm'r Michael J. Copps) ("Anyone who lives in rural America knows first hand that rural consumers have fewer choices of carriers, more holes in their coverage, and that there are still areas of our country that have no service at all.")

6. See Comments of the National Telecommunications Cooperative Association, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at 4 (Dec. 29, 2003), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6515383228 [hereinafter Comments of the NTCA 2003]; Comments of the Organization for the Promotion and Advancement of Small Telecommunications Companies and the Rural Telecommunications Group, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at 13 (Dec. 29, 2003), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6515383203 [hereinafter Comments of OPASTCO].

7. See Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets, 30 Comm'n's Reg. (P & F) 2067, 2068-69 (Nov. 27, 2000) [hereinafter Efficient Use of Spectrum 2000] (discussing "the problem of underserved rural areas"); Jillian Lloyd, *Digital Age's Skirts Rural America*, CHRISTIAN SCI. MONITOR, Dec. 31, 1998, at 1.

8. See INDUS. ANALYSIS & TECH. DIV., FCC, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF DECEMBER 31, 2004, at 5 (2005), http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd0705.pdf ("[A]s of December 31, 2004, high-speed subscribers are reported to be present in 99% of the most densely populated zip codes and in 75% of zip codes with the lowest population densities."). The FCC defined "high-speed" as having a transmission delivery rate "to the subscriber at a speed in excess of 200 kbps in at least one direction." *Id.* at 2.

9. See Chet Brokaw, *State Sees Hang-ups with Switch to Digital*, ABERDEEN AM. NEWS (S.D.), July 16, 2005, at A1, available at 2005 WLNR 11168807.

areas, even analog coverage is unreliable.¹⁰ Recognizing this problem, the Federal Communications Commission issued a notice of proposed rulemaking.¹¹ The proceeding seeks to encourage deployment of communications networks and improve access to spectrum in rural America.¹² As of this writing, the proceeding is still open before the Commission.¹³

This Note argues that new and novel policy changes are necessary to ensure that rural residents are not left behind in the communications revolution. Part I discusses characteristics of the electromagnetic spectrum and spectrum management policy in the United States. Part II details why current methods of spectrum allocation fall short of ensuring access to communications services in rural America. Part III argues that the Federal Communications Commission should enact regulations modeled after the doctrine of adverse possession as a means for a communications service provider to obtain a license transfer for spectrum. This Note concludes that adopting such a proposal would establish an economically efficient means of ensuring access to advanced services for consumers who historically have been underserved or not served at all.

I. UNITED STATES SPECTRUM MANAGEMENT POLICY

The Federal Communications Commission is charged with the formulation and enforcement of the nation's spectrum policy,¹⁴ which requires determining how to allocate, allot, and assign spectrum among parties other than the federal government.¹⁵ One must be familiar with the characteristics of spectrum and current United States spectrum management policy to understand how modifications to current policy will increase access to communications services in rural America.

10. Sam Burrish, *Frustrations Build Over Cellular Gaps*, ARGUS LEADER (Sioux Falls, S.D.), July 17, 2005, at 1D, available at <http://www.argusleader.com/apps/pbcs.dll/article?AID=/20050717/BUSINESS/507170344/1003>.

11. Spectrum-Based Services, *supra* note 5, at 1162; see also FCC, Proceedings and Initiatives: Spectrum-Based Services in Rural Areas, http://wireless.fcc.gov/spectrum/proceeding_details.htm?proid=292 (last visited Apr. 10, 2006) (collecting notices and releases related to the proceeding).

12. See Spectrum-Based Services, *supra* note 5.

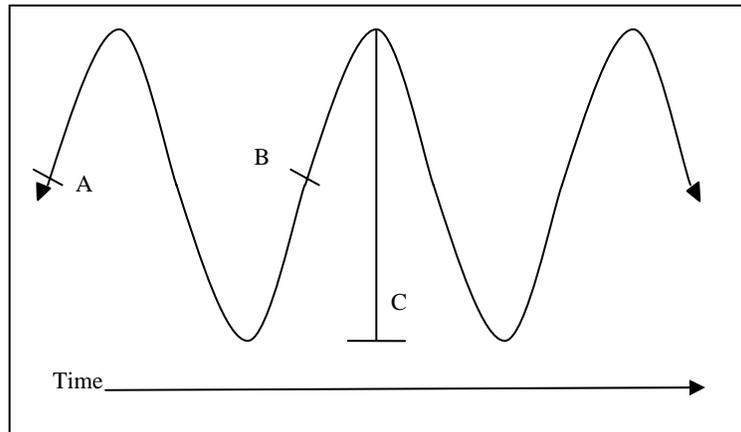
13. For updates and further information, see FCC, *supra* note 11.

14. 47 U.S.C. § 303 (2000).

15. See HARVEY L. ZUCKMAN ET AL., MODERN COMMUNICATIONS LAW 239 (1999). The National Telecommunications and Information Administration (NTIA) manages use of spectrum by the federal government. *Id.* at 238.

A. CHARACTERISTICS OF SPECTRUM

Understanding how and why the federal government manages spectrum use requires an appreciation of the nature of electromagnetic waves and the electromagnetic spectrum, how information is conveyed over electromagnetic waves, and the physical limitations of spectrum. Electromagnetic waves are characterized by their frequency, wavelength, and amplitude.¹⁶ The following diagram represents these concepts.



From point *A* to point *B* is one cycle. Frequency is the number of cycles per second and is measured in hertz; wavelength is the distance the wave travels in one cycle.¹⁷ The distance *C* represents the wave's amplitude, which determines the signal's strength.¹⁸ The electromagnetic spectrum can be conceptualized as a long electromagnetic wave with an ever-increasing frequency, with very low frequency waves at one end and cosmic rays at the other.¹⁹

Communications devices operate using only a small portion of the electromagnetic spectrum, known as the radio spectrum. This portion includes those electromagnetic waves with fre-

16. WALTER B. EMERY, *BROADCASTING AND GOVERNMENT* 99 (1971).

17. *Id.*

18. Kulpreet Singh, *The FCC's Pioneer's Preference Policy: An Innovative Idea Grows Old and Weary*, 22 *RUTGERS COMPUTER & TECH. L.J.* 143, 147 (1996).

19. See EMERY, *supra* note 16, at 100; Nat'l Telecomm. Info. Admin., *United States Frequency Allocations: The Radio Spectrum* (2003), <http://www.ntia.doc.gov/osmhome/allochrt.pdf>.

quencies ranging from 3 kHz to 400 GHz.²⁰ The FCC has divided the radio spectrum into several bands of frequencies that it then allocates for particular services.²¹ Radios and televisions, for example, operate at lower frequencies of the radio spectrum. Mobile phones generally operate somewhere in the middle, and satellite television operates on the higher end of the radio spectrum.²²

Different signal frequencies within this spectrum have different propagation characteristics. Some frequencies rapidly diminish in intensity and therefore are capable of traveling only short distances, whereas other frequencies are capable of traveling thousands of miles.²³ Some frequencies are able to penetrate structures like concrete buildings,²⁴ while tree leaves²⁵ and rain²⁶ easily frustrate others. These propagation characteristics partially explain why a radio station fades out as one drives away from the transmitting tower. They also explain why “bunny-ear” television broadcast receivers work well indoors, while a satellite dish requires placement outside or near a window.

Thousands of wireless communications devices and a wide range of technologies rely on spectrum to transmit information. They include mobile phones, wireless internet, broadcast television, satellites, remote-controlled toys, and even garage door openers. Information in the form of voice, video, or data is transposed onto these electromagnetic waves, allowing for point-to-point and multipoint information transfer.²⁷ After one enters information into an input device, like a microphone,²⁸ a transmitter converts the voice, video, or data into an electronic signal through the process of modulation.²⁹ This signal travels

20. See 47 C.F.R. § 2.106 (2005); NAT'L TELECOMM. INFO. ADMIN., *supra* note 19.

21. 47 C.F.R. § 2.106; NAT'L TELECOMM. INFO. ADMIN., *supra* note 19.

22. 47 C.F.R. § 2.106; NAT'L TELECOMM. INFO. ADMIN., *supra* note 19.

23. See EMERY, *supra* note 16, at 100–02.

24. See Robert K. Morrow Jr. & Theodore S. Rappaport, *Getting In*, WIRELESS REV., Mar. 1, 2000, at 42, 42–44.

25. Tim Kridel, *Foliage Spoilage*, WIRELESS REV., March 1, 2000, at 50, 50–51.

26. Mike Mead, *Propagation Impairment at 28GHz*, AM.'S NETWORK, June 15, 1998, at S-17, S-17 to -19.

27. See ZUCKMAN ET AL., *supra* note 15, at 234–38.

28. See ROGER L. FREEMAN, TELECOMMUNICATIONS TRANSMISSION HANDBOOK 1–2 (4th ed. 1998).

29. Singh, *supra* note 18, at 148.

through the air and a receiver, like a radio, intercepts it. The receiver converts the signal back to voice, video, or data through the process of demodulation.³⁰

Interference, however, frustrates these radio transmissions. Interference manifests as a snowy television channel, a crackling radio station, or a garage door that refuses to open.³¹ It occurs when another signal operates on the same or an adjacent channel and is sufficiently powerful.³² For example, an FM radio station listener sometimes may hear two programs competing against each other—each station fading in and out between unintelligible static. As one station's signal gets sufficiently weaker than the other, the stronger signal is audible. However, when each is relatively equal in strength, the listener hears static.

If the supply of spectrum were infinite, providers would not have to worry about operating too closely to another channel. Spectrum is not an infinite resource, though. Only a limited number of operators may utilize the spectrum at any given time without causing interference.³³ Consequently, spectrum scarcity is different from that of gasoline or water—one user's "consumption of a broadcast signal does not exhaust or reduce what can be received by others."³⁴ Consumption of a broadcast signal thus poses no supply difficulties; however, increased transmission does. It may be useful to think of spectrum as a dance floor. The dance floor can accommodate many dancers, the communications operators. They can move across the floor among each other, each dancer occupying a portion of the floor. However, at some point too many dancers will make the dance floor too crowded, and people will start stepping on each other's feet and bumping into each other.

New technology and compression techniques use existing spectrum more efficiently and increase the range of available spectrum.³⁵ For example, the conversion from analog to digital

30. See FREEMAN, *supra* note 28, at 1–2.

31. See Elizabeth Williamson, *Stuck in the Driveway for Security: New Emergency Radio System Jams Garage Openers*, WASH. POST, Feb. 27, 2005, at C5.

32. See *id.*

33. See Adam Cain, Comment, *Satellite Radio: An Innovative Technology's Path Through the FCC and into the Future*, 25 J. NAT'L ASS'N ADMIN. L. JUDGES 223, 228 (2005).

34. ZUCKMAN ET AL., *supra* note 15, at 228.

35. See *id.*

allows for more content in the same amount of bandwidth.³⁶ Additionally, new devices can operate using higher frequencies than were previously available.³⁷ At the same time, however, demand for spectrum increases as new services and devices emerge.³⁸ Therefore, it is unlikely that interference concerns will subside in the near future. In response, spectrum management policy seeks to encourage the development of spectrum-efficient technologies and to otherwise minimize the risk of interference.

B. THE FCC LICENSING REQUIREMENT

The foundation of spectrum management policy lies in the FCC's licensing scheme. The FCC assigns licenses for the use of the electromagnetic spectrum³⁹ and prohibits persons without a license from transmitting signals over much of the radio spectrum.⁴⁰ The licensing system aims to prevent interference and to protect and promote the public interest.⁴¹ It also allows the federal government to retain control over spectrum management, preventing individual parties from claiming bands of spectrum as private property. The Telecommunications Act states:

It is the purpose of this chapter . . . to maintain the control of the United States over all the channels of radio transmission; and to provide for the use of such channels, *but not the ownership thereof*, by persons for limited periods of time, under licenses granted by Federal

36. See, e.g., Anne Marie Squeo & Joe Flint, *Move to Digital Pits TV Stations Against Cable*, WALL ST. J., Feb. 10, 2005, at B4 (noting that television stations are able to split their current analog signals into as many as six different digital signals).

37. ZUCKMAN ET AL., *supra* note 15, at 228.

38. See *id.*

39. See 47 U.S.C. § 301 (2000).

40. See, e.g., *id.*; FCC v. Sanders Bros. Radio Station, 309 U.S. 470, 474 (D.C. Cir. 1940) ("The fundamental purpose of Congress in respect of broadcasting was the allocation and regulation of the use of radio frequencies by prohibiting such use except under license."). Devices such as garage door openers, and services such as wireless internet, operate on unlicensed spectrum. See 47 C.F.R. §§ 15.301–.323 (2005).

41. Writers Guild of Am. v. ABC, 609 F.2d 355, 362 (9th Cir. 1979) ("[T]he Communications Act makes the interests of the public paramount."); *Todisco v. United States*, 298 F.2d 208, 211 (9th Cir. 1961) ("[T]he purpose of the licensing law is to prevent interference with radio communications."); *WOKO, Inc. v. FCC*, 109 F.2d 665, 667 (D.C. Cir. 1939) ("The underlying policy of the Communications Act is the securing and protection of the public interest.").

authority, and no such license shall be construed to create any right, beyond the terms, conditions, and periods of the license.⁴²

The license is also subject to modification⁴³ and revocation.⁴⁴ Nevertheless, licensees possess several significant property interests in the spectrum, including the right to lease, disaggregate, and partition excess spectrum through secondary markets.⁴⁵ Additionally, incumbent broadcasters have a renewal expectancy, which “is a presumption in favor of license renewal.”⁴⁶ These property interests are commonly referred to as the licensee’s “quasi-property rights.”⁴⁷

The public interest standard guides the Commission’s decision to grant or deny an application for a license. Under this standard, the Commission must “determine, in the case of each application filed with it . . . whether the public interest, convenience, and necessity will be served by the granting of such application.”⁴⁸ In choosing between mutually exclusive applications for a license, the FCC must “grant the license or permit to a qualified applicant through a system of competitive bidding.”⁴⁹ Consequently, the Commission often uses auctions to allocate spectrum licenses and awards the licenses to the highest bidder.⁵⁰ The spectrum license indicates the particular fre-

42. 47 U.S.C. § 301 (emphasis added); *see also id.* § 304 (“No station license shall be granted . . . until the applicant therefor shall have waived any claim to the use of any particular frequency or of the electromagnetic spectrum *as against the regulatory power of the United States* because of the previous use of the same, whether by license or otherwise.” (emphasis added)); *Sanders Bros.*, 309 U.S. at 475 (“The policy of the Act is clear that no person is to have anything in the nature of a property right as a result of the granting of a license.”); *Trinity Methodist Church, S. v. FRC*, 62 F.2d 850, 853 (D.C. Cir. 1932).

43. 47 U.S.C. § 316 (2000).

44. *Id.* § 312.

45. *See* *L.B. Wilson, Inc. v. FCC*, 170 F.2d 793, 798 (D.C. Cir. 1948) (“[T]he right under a license for a definite term . . . is more than a mere privilege or gratuity.”); *Spectrum-Based Services*, *supra* note 5, at 1166 n.20, 1173 (discussing partitioning and disaggregation); *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, 30 *Comm’n Reg. (P & F)* 661, 665 (Oct. 6, 2003) [hereinafter *Efficient Use of Spectrum 2003*] (discussing the right to lease).

46. J. Gregory Sidak, *An Economic Theory of Censorship*, 11 *SUP. CT. ECON. REV.* 81, 98–100 (2004).

47. *See, e.g.*, Joseph M. Ward, Comment, *Secondary Markets in Spectrum: Making Spectrum Policy As Flexible As the Spectrum Market It Must Foster*, 10 *COMMLAW CONSPECTUS* 103, 111 (2001).

48. 47 U.S.C. § 309 (2000).

49. *Id.* § 309(j).

50. *See* Ward, *supra* note 47, at 110 (2001). For an example of how a spec-

quencies, geographic area covered, particular services to be provided, and technologies that may be used.⁵¹ The license is statutorily limited, generally to eight or ten years, at which time the licensee must apply for renewal.⁵² The statute prohibits any unauthorized transmission.⁵³

Under Congressional mandate, the Commission must give particular attention to communications services in rural areas. The Commission's purpose is to ensure access to wire and radio communications "to *all* the people of the United States."⁵⁴ Additionally, the statutory scheme specifically requires the FCC to fashion its licensing system so as to ensure access to communications services in rural America. Section 309 provides:

In identifying classes of licenses and permits to be issued by competitive bidding, in specifying eligibility and other characteristics of such licenses and permits, and in designing the methodologies for use under this subsection, the Commission shall . . . seek to promote . . . the development and rapid deployment of new technologies, products, and services for the benefit of the public, including those residing in rural areas . . .⁵⁵

In light of this responsibility, the FCC has adopted several allocation methods and put forth several proposals to make certain that rural providers not only are able to participate in the spectrum auction, but can also access the capital necessary to compete in the spectrum marketplace.

C. CURRENT AND PROPOSED SPECTRUM ALLOCATION METHODS

The Commission has taken several steps to facilitate rural providers' participation in license auctions. One step has been to grant licenses based on geographic areas.⁵⁶ The Commission

trum auction is conducted, see Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, 36 Commc'ns Reg. (P & F) 648 (Aug. 5, 2005) [hereinafter Service Rules].

51. Evan R. Kwerel & John R. Williams, *Moving Toward a Market for Spectrum*, 16 REG. 53, 53-54 (1993).

52. See 47 U.S.C. § 307(c)(1) (2000) (limiting a license for the operation of a broadcasting station to eight years); 47 C.F.R. § 27.13 (2005) (setting the license period for various frequencies at either eight or "up to ten" years).

53. 47 U.S.C. § 301 (2000).

54. *Id.* § 151 (emphasis added).

55. *Id.* § 309(j)(3)-(4).

56. See Amendment of the Commission's Rules Regarding Dedicated Short-Range Communication Services in the 5.850-5.925 GHz Band (5.9 GHz Band), 31 Commc'ns Reg. (P & F) 2121, 2134-35 (Nov. 15, 2002) [hereinafter Rules Regarding 5.9 GHz Band] (discussing the advantages of geographic licensing).

allocates spectrum at auction by using geographic-area licensing,⁵⁷ which authorizes the licensee to operate on the relevant frequency anywhere within the specified geographic area.⁵⁸ The Commission divides auctioned spectrum into several frequency blocks⁵⁹ and assigns each band a geographic designation.⁶⁰ This designation indicates how many licenses the Commission will auction in each particular band. The designations range from large license areas, like the regional economic area groupings (REAGs), to small areas, such as cellular market areas (CMAs).⁶¹ Under the REAG method, the Commission awards twelve licenses, of which only six are in the continental United States.⁶² In comparison, there are 734 CMA licenses⁶³ and 176 economic area (EA) licenses.⁶⁴ The number of licenses correlates inversely with the size of the area—the more licenses, the smaller the size of each geographic area. The size of a geographic area for a particular frequency block, therefore, can vary significantly depending on its designation.

The Commission offers both large and small geographic service areas at auction, in an attempt to accommodate the needs of both large and small providers.⁶⁵ For example, in the

57. Spectrum-Based Services, *supra* note 5, at 1171.

58. Dave Molta, *Regulating the Airwaves*, NETWORK COMPUTING, Aug. 5, 2004, at G12, G12.

59. For an example of how the FCC divided the broadband PCS band, see John A. Rogovin & Rodger D. Citron, *Lessons from the Nextwave Saga: The Federal Communications Commission, The Courts, and the Use of Market Forms to Perform Public Functions*, 57 ADMIN. L. REV. 687, 697 (2005).

60. For an example of how the FCC divided the AWS band and assigned geographic designations, see Service Rules, *supra* note 50, at 651–59.

61. The Wireless Telecommunications Bureau provides a listing and descriptions of the various geographic licensing schemes the FCC has used in its auctions. Wireless Telecomm. Bureau, FCC, Maps: Geographic Licensing Schemes, <http://wireless.fcc.gov/auctions/default.htm?job=maps> (last visited Apr. 10, 2006).

62. Wireless Telecomm. Bureau, FCC, Regional Economic Area Groupings Map, <http://wireless.fcc.gov/auctions/data/maps/reag.pdf> (last visited Apr. 10, 2006) [hereinafter REAG Map].

63. Wireless Telecomm. Bureau, FCC, Cellular Market Areas Map, <http://wireless.fcc.gov/auctions/data/maps/rsamsa.pdf> (last visited Apr. 10, 2006).

64. Wireless Telecomm. Bureau, FCC, Economic Areas Map, <http://wireless.fcc.gov/auctions/data/maps/ea.pdf> (last visited Apr. 10, 2006) [hereinafter EA Map].

65. Spectrum-Based Services, *supra* note 5, at 1210 (“In recent years, the Commission has continued to embrace geographic area licensing . . . to accommodate licenses encompassing very large service areas as opposed to smaller site-based licenses.”).

upcoming auction for advanced wireless services in the 1.7 GHz and 2.1 GHz band, the FCC is auctioning different bands of spectrum using REAGs, EAs, and CMAs.⁶⁶ Large geographic service areas benefit providers with a national footprint,⁶⁷ because with only one transaction, they are able to cover much of their service area.⁶⁸ There is no need to negotiate aggregation agreements with other bidders or license winners; thus transaction costs are reduced. Conversely, small providers prefer small geographic service areas, which are typically auctioned at lower prices and more closely match their local footprints.⁶⁹ EAs attempt to balance these competing interests. They can be combined to form REAGs,⁷⁰ but are small enough to be relatively affordable for small providers.⁷¹

Moreover, the Commission mitigates the impact of disparate access to capital markets by offering bidding credits to rural telephone companies and small businesses through the designated entity program.⁷² Each particular auction's service rules specify the bidding credit levels available for rural telephone companies.⁷³ The bidding credit level for small businesses varies from 15 to 35 percent; the smaller the company,

66. See Service Rules, *supra* note 50, at 648, 652.

67. A footprint is "that portion of the Earth's surface over which a satellite antenna delivers a specified amount of signal power under specified conditions." INST. FOR TELECOMM. SCIENCES, NAT'L TELECOMM. & INFO. ADMIN., TELECOM GLOSSARY (2000), http://www.its.bldrdoc.gov/fs-1037/dir-016/_2287.htm.

68. See Amendment of Part 1 of the Commission's Rules—Competitive Bidding Procedures, 21 Commc'ns Reg. (P & F) 1231, 1252 (Aug. 14, 2000) (noting that large service areas may be appropriate for satellite-based services).

69. See, e.g., Comments of the National Telecommunications Cooperative Association, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 04-356, at 2-3 (Nov. 23, 2004), http://svartifoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6516883063.

70. Compare EA Map, *supra* note 64, with REAG Map, *supra* note 62.

71. See Service Rules, *supra* note 50, at 648 ("EA licensing areas offer[] realistic opportunities for local, largely rural carriers to afford adequate spectrum for voice and advanced data services in markets of manageable size suited to their existing operations.").

72. See 47 C.F.R. § 1.2110(f) (2005).

73. See *id.*

as defined by statute, the greater the deduction.⁷⁴ A bidding credit is the equivalent of a “payment discount.”⁷⁵ After the bidding process is complete, the FCC deducts this predetermined percentage from the actual bid price. The designated entity pays only this reduced price for the license.⁷⁶

The Commission recognizes that these methods, along with others not discussed here,⁷⁷ have not been sufficiently successful at getting spectrum into the hands of rural providers. Thus, the Commission has increasingly relied on secondary markets as a means to meet the spectrum needs of rural providers.⁷⁸ For example, if a geographic service area exceeds the licensee’s footprint, the licensee may lease, partition, or disaggregate excess spectrum to another provider, often a small rural carrier.⁷⁹ The Commission has also considered whether alternative or supplemental methods are needed to facilitate spectrum access in rural areas.⁸⁰ One approach is the “keep what you use” policy, under which the Commission would reclaim fallow spectrum and relicense it to other providers if not used within a specified time.⁸¹ The Commission has also considered whether to adopt an easement policy or substantial service requirements for license renewal.⁸²

74. *Id.* § 1.2110(f)(2)(i)–(iii).

75. *Id.* § 1.2110(f).

76. *Id.*

77. Other methods include a competitive bidding process for initial licensing, base station power level rules, substantial service and construction requirements, infrastructure sharing limitations, and rural utilities service loan program policies. *See* Spectrum-Based Services, *supra* note 5, at 1164–66.

78. *See Efficient Use of Spectrum 2003*, *supra* note 45, at 663–65 (highlighting “efforts to facilitate secondary markets in spectrum”).

79. *See* 47 C.F.R. § 27.15; Spectrum-Based Services, *supra* note 5, at 1172–74 (“Geographic partitioning and spectrum disaggregation are available to promote efficient spectrum use and economic opportunity by a wide range of applicants, including rural telephone companies.”).

80. Spectrum-Based Services, *supra* note 5, at 1165 (“In December 2002, the Commission released a *Notice of Inquiry* that sought comment on the effectiveness of its existing regulatory tools in promoting service to rural areas and asked how we could modify our policies to further encourage the provision of wireless services in rural areas.”).

81. *Id.* at 1213–16. The FCC has already applied the keep-what-you-use approach to some services. *See id.* at 1174–76 & nn.103–04 (discussing the cellular and PCS approaches).

82. *Id.* at 1216–19.

II. CURRENT AND PROPOSED ALLOCATION METHODS ARE INSUFFICIENT

In some respects, the current and alternative spectrum management methods are a step in the right direction. For example, utilizing diverse geographic-area licensing, designated-entity bidding credits,⁸³ and secondary markets has made great communications inroads into some of the most isolated areas of the country.⁸⁴ Each of these methods, however, has also created more difficulties. Geographic-area licensing results in economic inefficiency; secondary markets are underutilized and often force unfavorable terms onto small rural providers; and a keep-what-you use system is both economically inefficient and would likely fail to increase services in rural areas. This Part explores each of these difficulties.

A. GEOGRAPHIC-AREA LICENSING AND ECONOMIC INEFFICIENCY

It is extremely difficult to structure an auction that both facilitates the provision of rural services and avoids frustrating the footprints of national providers.⁸⁵ The Commission must both determine what size geographic areas to use and in which frequency bands to use them.⁸⁶ Such decisions depend not only on technical factors, like propagation characteristics and service allocations, but also on a prediction of what the providers' future spectrum needs will be. If the Commission errs on the side of making the geographic areas too large, licensees end up with excess spectrum that other bidders may have otherwise used.⁸⁷ Conversely, if the geographic areas are too small, national providers may have difficulty acquiring the spectrum

83. See Service Rules, *supra* note 50, at 648, 660–61 (noting the success of designated entities in winning licenses in several recent spectrum auctions).

84. See Spectrum-Based Services, *supra* note 5, at 1165–68 (referring to the success certain policies have had in providing wireless services in rural areas).

85. See Rules Regarding 5.9 GHz Band, *supra* note 56, at 23,165.

86. For example, in the upcoming Advanced Wireless Services Auction for the 1710–1755 and 2110–2155 MHz bands, frequencies in Block A will be licensed as EAs. Blocks B, C, and E will be licensed as REAGs. Only Block D will be licensed using CMAs. Service Rules, *supra* note 50, at 648, 651.

87. See Comments of Rural Cellular Association, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at 12 (Dec. 29, 2003), http://svartifoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6515383162 (“The effect of excessively large or inefficiently sized geographic license areas is a lost opportunity to allow spectrum to reach an entity that would make better use of it.”).

necessary to cover their footprint.⁸⁸ Mutually destructive bidding—where a bidder is left with an incomplete license set that has a total price greater than its value—may occur.⁸⁹ Although EAs attempt to balance the needs of national and rural providers, they do not offer an efficient solution because aggregation by large providers and partitioning by small providers involve transaction costs.⁹⁰

B. SECONDARY MARKETS

Secondary markets provide the means of correcting some of these inefficiencies by allowing re-allocation of fallow spectrum.⁹¹ Under this method, large providers partition or disaggregate small portions of their geographic area to rural providers.⁹² Leasing portions of the spectrum is also an option.⁹³ However, these transactions raise several difficulties.

First, each secondary market transaction involves significant transaction costs,⁹⁴ which the national provider may not

88. See Peter Cramton, *The Efficiency of the FCC Spectrum Auctions*, 41 J.L. & ECON. 727, 730–31, 733–34 (1998) (discussing how large providers aggregated licenses in nine FCC spectrum auctions from 1994 to 1996). The author recognizes that some providers had to pay more in order to acquire spectrum needed in adjacent bands and that it is sometimes difficult to convince the neighboring licensee holder to transfer the spectrum rights. *Id.* at 730–31.

89. Lawrence M. Ausubel et al., *Synergies in Wireless Telephony: Evidence from the Broadband PCS Auctions*, 6 J. ECON. & MGMT. STRATEGY 497, 499–500 (1997).

90. See Comments of the National Telecommunications Cooperative Association, *Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services*, WT Docket No. 02-381, at 6 (Jan. 14, 2005), http://svartifoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6516887645 [hereinafter Comments of the NTCA 2005] (“There are costs involved with negotiating with another carrier to make spectrum available in secondary markets and the financial gain may not be worth the trouble for the large carrier.”).

91. See *Efficient Use of Spectrum 2000*, *supra* note 7, at 2067 (noting that “enabling the development of more robust secondary markets will help promote spectrum efficiency and full utilization” by facilitating the use of “spectrum [that is] used inefficiently by its current licensees or . . . lie[s] fallow”); Ward, *supra* note 47, at 104.

92. See *Efficient Use of Spectrum 2000*, *supra* note 7, at 2068–71 (summarizing various leasing arrangements).

93. See Ward, *supra* note 47, at 104.

94. Peter Cramton, *Spectrum Auctions*, in HANDBOOK OF TELECOMMUNICATIONS ECONOMICS 605, 609 (Martin Cave, Sumit Majumdar, & Ingo Vogelsang eds., 2002) (“[T]ransaction costs are not zero. Postauction transactions often are made difficult by strategic behavior between parties with private information and market power The problem is that the license holder exer-

be willing to absorb⁹⁵ and the rural provider may not be able to afford. Second, large providers may be unwilling to partition spectrum, based on an economic calculation that it could be the “beachfront” property of the future, even though it currently is not profitable. The communications industry is constantly changing. New technologies and federal regulations, like band-clearing⁹⁶ and relocation,⁹⁷ alter the way providers make decisions. These changes potentially could make spectrum in even rural areas extremely profitable.

Third, large providers may be unwilling to partition because they believe large spectrum areas will be more attractive to future buyers, increasing the purchase price.⁹⁸ Fourth, rural providers may be unwilling to lease spectrum. Because providing communications services involves significant capital investment, a rural provider may hesitate to take on such investment without some assurance the lease will be renewed, and on favorable terms. The statutory limits on the length of FCC licenses⁹⁹ frustrate the possibility of long-term leases. Even if the licensee and the rural provider could agree on a long-term lease based on the licensee’s renewal expectancy, the licensee likely would be cautious to do so because encumbered spectrum will be difficult to sell to future buyers, or will at least fetch a lower price. Put differently, the longer the lease terms, the more likely that problems associated with partitioning will arise. Finally, with respect to both partitioning and leasing, when large providers obtain licenses that cover areas larger than their own footprint and overlap the service areas of rural providers, the parties have vastly unequal bargaining power when it comes to negotiating the terms of the deal.¹⁰⁰

cises its substantial market power in the resale of the license.”).

95. Comments of OPASTCO, *supra* note 6, at 11.

96. See Neil Roland, *Deadline Set for Digital-TV Conversion*, PHILA. INQUIRER, Dec. 20, 2005, at E1 (discussing legislation requiring television broadcasters to move to digital signals so that emergency service workers could use the analog waves).

97. See Peter Cramton et al., *Efficient Relocation of Spectrum Incumbents*, 41 J.L. & ECON. 647, 647–48 (1998).

98. Comments of OPASTCO, *supra* note 6, at 11.

99. See 47 U.S.C. § 307(c)(1) (2000) (limiting the license for operation of a broadcasting station to eight years); 47 C.F.R. § 27.13 (2005) (setting the license period for various frequencies at either eight or ten years).

100. See Comments of Rural Cellular Association, *Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services*, WT Docket No. 02-381, at 3 (Jan. 13, 2005), <http://gullfoss2.fcc.gov/>

These concerns present real barriers to participation in the secondary markets. Although some rural providers claim that the secondary market rules have increased their access to spectrum,¹⁰¹ such instances typically involve rural providers forming cooperative ventures with a national company.¹⁰² For various reasons, few rural providers desire to be in such a position. Some providers fear losing their designated entity status if they enter into such an agreement.¹⁰³ Rural providers may wish to avoid the unfavorable terms included in such deals, such as disadvantageous roaming or pricing provisions, and limits on the types of technology they can use.¹⁰⁴ One commenter noted that “[t]he small operator also must accept the large carrier’s imposition of complexity in the transaction and the ongoing operating standards, all of which exacerbate the expense for the small company.”¹⁰⁵ Providers who prefer a small size and community focus simply may want to remain independent from the large, national providers. Others may be unable to enter into such partnerships because of various antitrust or cross-ownership limitations.

prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6516887547
[hereinafter Comments of RCA].

101. For example, Nextel Partners, Inc. noted that these rules “allowed Nextel Partners to obtain hundreds of partitioned spectrum blocks [and] spectrum usage rights to thousands of station licenses under Commission-approved leasing arrangements.” Comments of Nextel Partners, Inc. on Further Notice of Proposed Rulemaking, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at iii (Jan. 14, 2005), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6516887636 [hereinafter Comments of Nextel Partners].

102. *Id.* at 3, 6 (“Nextel Partners has undertaken this buildout in major part using economic area (EA) licenses originally purchased by Nextel Communications at auction from the Commission.”). Sprint has formed similar alliances. *See* Sprint Reply Comments, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at 7–8 (Feb. 14, 2005), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6517288314.

103. *See* 47 C.F.R. § 1.2110 (2005). Depending on the service rules for the particular auction, either a rural provider or a provider claiming to be a small business may be ineligible for a bidding credit due to the increased financial support from a large provider. *See id.*

104. Comments of RCA, *supra* note 100, at 3 (“Roaming rates are specified by the large carrier in a ‘take it or leave it’ fashion because the large carrier has little or nothing to lose if no deal is reached.”).

105. *Id.*

Absent a partnership with a larger provider, many rural providers claim they face difficulties when trying to acquire additional spectrum through the secondary markets.¹⁰⁶ They argue that the secondary market method is “lengthy, burdensome, and often, unsuccessful.”¹⁰⁷ Large carriers often fail to answer a small provider’s inquiries or refuse to do business with them.¹⁰⁸ In at least one documented instance, a small, rural provider was told that it did not have enough customers to make an agreement worthwhile.¹⁰⁹ The Organization for the Promotion and Advancement of Small Telecommunications Companies and the Rural Telecommunications Group claim that providers have partitioned or disaggregated “far less than a quarter of one percent of all the licenses sold at auction.”¹¹⁰

C. KEEP WHAT YOU USE

Perhaps the most controversial proposal is the keep-what-you-use method,¹¹¹ under which the Commission reclaims fallow spectrum and relicenses it to other providers if not used within a specified time.¹¹² This allocation method is the most inefficient and the least likely to facilitate the provision of communications services in rural areas. It is highly inefficient because it requires the FCC to determine through field testing what spectrum a licensee is using and what spectrum lies fallow.¹¹³ The Commission must then determine which providers

106. See, e.g., Comments of the NTCA 2005, *supra* note 90, at 3.

107. *Id.*

108. *Id.*

109. *Id.*

110. Comments of OPASTCO, *supra* note 6, at 10.

111. Compare Comments of the NTCA 2005, *supra* note 90, at 4–8 (supporting the keep-what-you-use approach), with Reply Comments of Cingular Wireless, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at 2–6 (Feb. 14, 2005), http://svartifoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6517288274 (arguing that a keep-what-you-use approach is “draconian regulation”), and Reply Comments of AT&T Wireless Services, Inc., Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at 4–9 (Jan. 26, 2004), http://svartifoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6515583742 [hereinafter Reply Comments of AT&T] (arguing that a keep-what-you-use approach is unnecessary).

112. Spectrum-Based Services, *supra* note 5, at 1213–16 (summarizing keep-what-you-use relicensing measures).

113. See *id.* at 1214 (discussing the difficulties of assessing spectrum use).

should receive access to the unused spectrum instead.¹¹⁴ Such oversight is likely to be time- and resource-intensive because both of these procedures involve high transaction costs.¹¹⁵

Moreover, the benefits to be gained from such a reclamation policy are likely minimal. Rural providers face the same high economic hurdles to deployment as do national providers, and they lack the advantages of economies of scale. Consequently, although keep-what-you-use increases rural access to spectrum, rural providers working under this method will not necessarily be able to deploy rural communications networks and provide advanced services to rural consumers any more quickly than do current licensees.¹¹⁶ Given these circumstances, it is preferable to avoid high enforcement costs and leave the spectrum in the hands of the licensee, who may decide to deploy networks in the future.

Complex problems demand complex answers. Geographic-area licensing and secondary markets are appropriate for some services, but no currently accepted or proposed method offers a comprehensive solution to the inadequate provision of communications services in rural America. Rather, a multipronged approach that balances the needs of both large and small providers is necessary. Because different communications services present different technical and geographic obstacles, approaches will inevitably vary according to the service being provided. Therefore, the more tools the FCC has available in its spectrum toolbox, the more likely it is to successfully fix the leaks in the system. The remainder of this Note proposes an FCC regulation modeled after the doctrine of adverse possession, as an additional tool for increasing communications services in rural areas.

III. THE DOCTRINE OF ADVERSE POSSESSION AS A MODEL FOR FCC REGULATIONS

A. THE COMMON LAW DOCTRINE OF ADVERSE POSSESSION

Under the common law doctrine of adverse possession, a person may acquire another person's interest in a property by

114. *See id.*

115. *See id.* (stating that "adopting the 'keep what you use' approach may result in numerous administrative and legal costs").

116. *See, e.g.,* Reply Comments of AT&T, *supra* note 111, at 2.

possessing it for a specified time.¹¹⁷ To bring a successful claim, the adverse possessor must establish that the possession is actual, open and notorious, exclusive, hostile, and continuous.¹¹⁸ Each element must have existed concurrently for the requisite duration, and failure to prove one element is fatal to the claim.¹¹⁹ The adverse possessor also must intend to claim title to the property possessed.¹²⁰

The adverse possessor can establish the first element, that the possession is actual, by entering onto the land¹²¹ and asserting that “dominion which owners usually exercise over similar lands in the same locality.”¹²² For example, actions like building fences,¹²³ living on the land,¹²⁴ and improving the property¹²⁵ are all factors the court may take into consideration when determining whether possession was actual. Mere constructive possession or a subjective belief that the adverse possessor is in possession is insufficient.¹²⁶ The open and notorious element requires that the true owner have either actual or constructive knowledge that the property is possessed by another.¹²⁷ The element recognizes that it would be unreasonable to take away the rights of those owners who were unable to assert a claim because the adverse possession was undiscoverable.

In order to prove exclusivity, the adverse possessor must “us[e] and enjoy[] the land as his own.”¹²⁸ In other words, the true owner cannot be in joint possession of the property, whether the joint possessor be the true owner,¹²⁹ a cotenant, a third person, or the public.¹³⁰ Additionally, the adverse possessor must exercise dominion over the land, making those efforts

117. See 7 RICHARD R. POWELL & PATRICK J. ROHAN, *POWELL ON REAL PROPERTY* § 1012 (Michael Allan Wolf ed., 2005).

118. See, e.g., *In re Connor*, 302 B.R. 509, 515 (Bankr. W.D. Pa. 2003); *Pascoag Reservoir & Dam, LLC v. Rhode Island*, 217 F. Supp. 2d 206, 211 (D.R.I. 2002); 2 C.J.S. *Adverse Possession* §§ 29, 65 (2005).

119. See, e.g., *Belotti v. Bickhardt*, 127 N.E. 239, 241 (N.Y. 1920).

120. 2 C.J.S. *Adverse Possession* § 30 (2005).

121. *Id.* § 35.

122. *Id.* § 37.

123. See *id.* § 40.

124. *Id.* § 39.

125. *Id.* § 41.

126. *Id.* § 34.

127. *Id.* § 55.

128. *Ward v. Cochran*, 150 U.S. 597, 606 (1893) (internal quotations and citations omitted).

129. 2 C.J.S. *Adverse Possession* § 59 (2005).

130. *Id.* § 60.

expected of a reasonable owner to eject trespassers and otherwise use the land.¹³¹

Jurisdictions differ on what an adverse possessor must do to establish hostility. Some jurisdictions require merely that the adverse possessor claim ownership over the property to establish that the possession is hostile to the rights of the true owner.¹³² In such jurisdictions, it is irrelevant whether the adverse possessor subjectively believes he has title to the property.¹³³ Other jurisdictions, however, refuse to reward individuals who know they are acting wrongfully. These jurisdictions require that the adverse possessor have color of title, often a court judgment or document (such as a defective deed) that purports to give title, but is deficient in some respect.¹³⁴ Still other jurisdictions allow for a shorter statutory time period if the adverse possessor has color of title.¹³⁵ The final element, requiring that possession be continuous, merely reaffirms that the possession must last for the entire statutory period,¹³⁶ which varies from jurisdiction to jurisdiction.¹³⁷

These requirements generally are meant to encourage the true owner to take legal action to protect her rights if someone is trespassing on her property.¹³⁸ The doctrine applies to both real and personal property;¹³⁹ however, a person cannot adversely possess property of the federal government.¹⁴⁰

Several different policy justifications support the adverse possession doctrine.¹⁴¹ First, insofar as an adverse possessor may use the doctrine defensively to prevent the true owner from bringing an action against him, it operates as a statute of limitations and saves courts from having to decide “stale

131. *See id.* § 58.

132. *See id.* § 64.

133. *See* Per C. Olson, Comment, *Adverse Possession in Oregon: The Belief-In-Ownership Requirement*, 23 ENVTL. L. 1297, 1298 (1993) (“The majority of states disregard the claimant’s actual belief in ownership.”).

134. *See, e.g.*, *Weldon v. Heron*, 432 P.2d 392, 393 (N.M. 1967).

135. *E.g.*, *Field Measurement Serv., Inc. v. Ives*, 609 S.W.2d 615, 620 (Tex. Civ. App. 1980).

136. 2 C.J.S. *Adverse Possession* § 149 (2005).

137. Compare COLO. REV. STAT. § 38-41-101 (2004) (eighteen-year period), with KAN. STAT. ANN. § 60-503 (2004) (fifteen-year period).

138. *Ottavia v. Savarese*, 155 N.E.2d 432, 435 (Mass. 1959); 2 C.J.S. *Adverse Possession* § 29 (2005).

139. 2 C.J.S. *Adverse Possession* §§ 10, 315 (2005).

140. *Id.* § 12.

141. *See* Thomas W. Merrill, *Property Rules, Liability Rules, and Adverse Possession*, 79 NW. U. L. REV. 1122, 1127–28 (1984).

claims.”¹⁴² This justification recognizes that “the quality and quantity of evidentiary material deteriorates over time,” making judicial resolution of claims more expensive, time-consuming and inefficient.¹⁴³ It also serves a repose function for potential defendants.¹⁴⁴ Second, the doctrine quiets property titles and thereby facilitates property transfers.¹⁴⁵ Limiting the time in which persons may lay claim to property decreases transaction and information costs involved in transferring property.¹⁴⁶ For example, the doctrine limits the necessary scope of title searches.¹⁴⁷

Third, from the possessor’s perspective, the doctrine protects any reliance interest she may have from development of and investments in the property over time.¹⁴⁸ The adverse possessor “gains title because she has justifiably relied on the true owner’s failure to eject her while she made obvious and lasting investments. The wrongfulness of her conduct diminishes in light of the titleholder’s complete failure to act.”¹⁴⁹ Fourth, the doctrine recognizes that a true owner who fails to initiate action against the adverse possessor has neglected to assert his rights and, in effect, has abandoned the property.¹⁵⁰ Historically, the doctrine also recognized a societal interest in the development of land.¹⁵¹ If another party was able to put fallow land to use, it was considered more valuable for society to have title in that person.¹⁵²

142. *Hewes v. Bruno*, 424 A.2d 1144, 1145 (N.H. 1981); Merrill, *supra* note 141, at 1128.

143. Merrill, *supra* note 141, at 1128.

144. *Id.*

145. *Id.* at 1129.

146. *Id.*

147. *Id.*

148. *Id.* at 1131.

149. Olson, *supra* note 133, at 1297.

150. See Merrill, *supra* note 141, at 1130; 2 C.J.S. *Adverse Possession* § 1 (2005).

151. See *Meyer v. Law*, 287 So. 2d 37, 41 (Fla. 1973), *superseded by statute*, FLA. STAT. § 95.16 (1974). As people have come to realize the value of green space and environmental conservation, this justification has lost favor. See, e.g., John G. Sprankling, *An Environmental Critique of Adverse Possession*, 79 CORNELL L. REV. 816 (1994).

152. See, e.g., *Chaplin v. Sanders*, 676 P.2d 431, 435 (Wash. 1984) (“The doctrine of adverse possession was formulated at law for the purpose of, among others, assuring maximum utilization of land”); Sprankling, *supra* note 151, at 874 (noting Richard Posner’s claim that “adverse possession maximizes the combined utility of both the true owner and the claimant by shifting property—whether wild or developed land—to a higher-valued use”);

B. ADVERSE POSSESSION AS A MEANS OF LICENSE TRANSFER

The Federal Communications Commission should enact regulations, modeled after the common law doctrine of adverse possession, as a means of license transfer between a licensee and an adverse possessor actually providing communications services in rural America. A rural provider can argue that the licensee, by allowing the spectrum to be adversely possessed, has effectively abandoned his rights to use the spectrum and any quasi-property rights he may have in the spectrum, even though that provider is unable to obtain fee simple title to the spectrum from the government.¹⁵³ Under such a regulatory regime, the adverse possessor could argue for a license transfer from the FCC for the portion of the spectrum adversely possessed. In effect, the FCC would create a new license for the adverse possessor over the relevant area and would modify the existing license to reflect changes in its geographic reach. The adverse possessor would not acquire private ownership rights in the spectrum; rather, he would obtain the rights to use the spectrum acquired under the license under terms negotiated with the FCC.

As under traditional adverse possession doctrine, the regulatory scheme would require the rural communications provider to prove its possession was actual, open and notorious, hostile to the true owner's claim of right, exclusive, and continuous for a statutorily prescribed amount of time.¹⁵⁴ Actual possession likely would be the most difficult requirement to prove. The rural provider would show actual possession by proving its signal has covered a particular geographic area. Because factors such as atmospheric conditions and receiver quality affect the distance a signal travels,¹⁵⁵ it may be difficult for the service provider to establish the boundaries of the area it actually served. In the alternative, an adverse possessor could demonstrate actual possession through customer locations. Under such an approach, the license would reflect the area covering just past the reach of the customers served. The FCC could allow for a reasonable area of expansion as part of the new license terms.

William B. Stoebuck, *The Law of Adverse Possession in Washington*, 35 WASH. L. REV. 53, 53 (1960).

153. See 2 C.J.S. *Adverse Possession* § 12 (2005).

154. See *supra* notes 117–37 and accompanying text.

155. See EMERY, *supra* note 16, at 100–01.

The rural communications provider would have an easier time proving “open and notorious” possession. By broadcasting a signal, the provider puts the licensee on notice that another party is using its spectrum because the provider’s signal would interfere with the licensee’s signal and the licensee could pick up the signal by tuning into the relevant frequency. Similarly, because interference results when two signals are broadcast on the same frequency, broadcasting a signal free from interference would prove exclusivity.

Since only one user may successfully transmit information simultaneously over the same frequency without causing interference,¹⁵⁶ the regulations would presume hostility. In order to counter the presumption, the licensee would need to prove that the rural provider had permission to use the signal. The FCC regulations would stipulate that proof of continuous possession will vary according to the service provided. For example, because a broadcast radio signal may go off air during the late night hours, a rural provider may satisfy the continuous element even though it operates only between the hours of six a.m. and ten p.m. A rural provider of mobile phone services, however, would need to prove the services are available at all times, since phone service is needed around the clock. As more and more adaptive devices, like cognitive radios,¹⁵⁷ are developed and enter the market, the continuous and uninterrupted use of spectrum will become, in a sense, impossible. Such adaptive devices are able to interact “with [their] environment to determine transmitter parameters such as frequency, power, and modulation,”¹⁵⁸ and consequently can use various frequencies as they become available. However, because such technology will allow for spectrum sharing without resulting interference, these technologies should not be considered interruptions in the possession. Rather, insofar as the rural communications service provider utilizes the spectrum in the same manner as would the prudent spectrum licensee for the requisite duration, it would meet the continuous possession requirement.

Having proven each requirement, the rural provider would be granted a presumptive claim against the licensee for a license transfer. The licensee would have the opportunity to ar-

156. See ZUCKMAN ET AL., *supra* note 15, at 100.

157. Michael J. Marcus, *Unlicensed Cognitive Sharing of TV Spectrum: The Controversy at the Federal Communications Commission*, IEEE COMM. MAG. May 2005, at 24, 24.

158. *Id.*

gue that the adverse possessor is not operating in the public interest, or to provide other arguments against transfer. The regulations would provide, however, that the licensee's payment for the license at auction does not defeat the rural provider's claim because payment for the license does not satisfy the public interest standard.¹⁵⁹

Through the license transfer, the rural provider would acquire rights to use the portion of the spectrum adversely possessed. The regulations would also provide that the Commission may modify the terms of the license to better serve the public interest, convenience, and necessity. Allowing these types of adjustments to the terms of the license is a divergence from traditional adverse possession, which limits the title acquired to that which the owner had.¹⁶⁰ However, this regulatory provision would allow for flexibility and innovation in the types of services provided in rural areas. For example, modifications to the license might permit the adverse possessor to provide different services and use other technologies or could extend the length of the license period.

C. THE STATUTORY PERIOD MUST ALLOW ENOUGH TIME FOR THE LICENSEE TO DEVELOP A PRIMARY FOOTPRINT

The most problematic aspect of an adverse possession method would be determining how long the rural provider must adversely possess the spectrum before he can claim a license transfer. On the one hand, national providers need enough time to build networks in both urban and rural areas. It is economically inefficient for them to build in rural areas first, since they generally recover the costs associated with rural deployment through urban customers' subscription charges.¹⁶¹ Instead, these providers often plan on expanding their primary footprints into rural areas at a later date, or when technologies make deployment cheaper.¹⁶²

159. The public interest standard is established in 47 U.S.C. § 309(a) (2000).

160. See POWELL & ROHAN, *supra* note 117, § 1012.

161. See Comments of Nextel Partners, *supra* note 101, at 4 ("While the company initially focused on building out the more populated areas in order to achieve sufficient customer numbers and hence the cash flow needed to arrive at a level of financial sustainability, Nextel Partners is now actively pushing coverage into more and more areas of low population density.")

162. See *id.* at 4–5.

On the other hand, delays in providing rural service threaten not only economic development, education, and personal convenience, but also public safety. Any formulation of the public interest standard ought to support a regime that encourages deployment by one who can do it *now*, even if at the expense of someone who could do it *later*. Congress's mandate to facilitate deployment in rural areas supports this conclusion.¹⁶³ While immediate deployment may not make keen financial sense for national providers, the Commission is not at liberty to deal with rural areas as an afterthought.¹⁶⁴ Therefore, the statutory period should allow the provider sufficient time to build out its primary footprint. Filed comments indicate that five years is a sufficient period.¹⁶⁵

Critics will likely argue, as they do against spectrum reclamation policies in general, that such a short statutory period would encourage uneconomic investment.¹⁶⁶ Licensees would have to "choose between making uneconomic investments or losing spectrum in rural areas."¹⁶⁷ It is true that they would have to make that choice, but a rational, profit-motivated licensee will never choose an uneconomic investment. Not all spec-

163. See 47 U.S.C. §§ 151, 301 (2000).

164. See Reply Comments of Dobson Communications Corporation, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at 7-8 (Feb. 14, 2005), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6517288353 ("[C]arriers serving rural areas need additional time to successfully implement their business plans, so while spectrum may go unused today, there is no reason to believe, with advances in technology and service offerings, that such spectrum will not be needed tomorrow as part of a company's overall business plan."). Unlike corporations, the FCC is prohibited from basing its licensing decisions on the likelihood of increased federal revenues. 47 U.S.C. § 309(j) (7)(b) (2000).

165. Comments of Nextel Partners, *supra* note 101, at 4 (claiming that Nextel Partners was able to complete deployment of its primary footprint within five years and that after those first five years, it then started the expansion phase of its footprint).

166. See, e.g., Reply Comments of Verizon Wireless, Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at 4 (Feb. 14, 2005), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6517288322.

167. Reply Comments of Nextel Partners, Inc., Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at 2 (Feb. 14, 2005), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6517288298 [hereinafter Reply Comments of Nextel Partners].

trum is created equal.¹⁶⁸ To the extent that the geographic area bid upon exceeds the provider's footprint, there would be steeply diminished marginal returns on the "unused" spectrum during the time it is being adversely possessed. Therefore, losing the rights to use such spectrum through a license transfer would not diminish the current rate of return of the remaining spectrum license for the licensee.

Moreover, even if the rural area spectrum did seem nominally valuable, the licensee would still invest first in utilizing urban area spectrum, for which deployment costs are lower and the number of potential consumers is higher. The provider would always choose to deploy in urban markets first because those markets are more profitable. Therefore, allowing adverse possessors to gain the rights to rural spectrum still would not encourage national providers to make unsound investments.

D. THE COST OF PROVIDING SERVICES IN RURAL AMERICA: SOLVING AN UNBALANCED EQUATION

Even though it is extremely expensive to deploy communications networks in rural areas where there are few paying customers, rural providers will build networks and provide services to rural America. Small rural companies do not use the same economic calculus that national providers use. Many of these small rural providers are cooperatives,¹⁶⁹ formed because members of the community realize that access to advanced communications services not only improves the quality of life for rural residents, but also ensures the survival of the community.¹⁷⁰ On an individual level, some members may want digital cell phone services so they can effectively dial 9-1-1 in case of an emergency; others may need broadband in order to keep a small business afloat. On a community-wide level, the availability of advanced communications services in small towns is a significant factor in attracting a business to an otherwise deserted Main Street.¹⁷¹ Recognizing the necessity of these ser-

168. See EMERY, *supra* note 16, at 100–02.

169. See Comments of the NTCA 2005, *supra* note 90, at 1, 5 ("Half of NTCA's [560+] members are organized as cooperatives."); Comments of OPASTCO, *supra* note 95, at 2 ("OPASTCO is a national association of over 550 small telecommunications carriers serving rural areas of the United States. Its members, which include both commercial companies and cooperatives, collectively serve over 3.5 million consumers.").

170. See Comments of the NTCA 2005, *supra* note 90, at 5; Comments of the NTCA 2003, *supra* note 6, at 3.

171. See Lloyd, *supra* note 7, at 1.

VICES, cooperatives may be willing to provide these services even if they are able to make only a small profit or break even.¹⁷²

Even if the rural provider is operating for profit, the economic calculation varies from that of a national provider. Because rural companies operate at a local, rather than national level, they likely have a better sense of who their customers are, what services they need, and what price they can afford. This knowledge ought to reduce their need to invest in consumer research and market testing. They may also be able to rely on word-of-mouth advertising to attract customers, rather than multimillion dollar campaigns.¹⁷³

Additionally, rural providers do not have the same opportunity costs as national providers. For the national provider, investment in a rural area involves the opportunity cost of not investing in more profitable urban markets. However, because the urban markets are not a part of the rural provider's portfolio, this opportunity cost is nonexistent. Finally, what seems like a small profit to a national provider may likely seem like significant cash to a small rural provider.¹⁷⁴

It is true that there is a risk that the licensee may defeat the rural provider's adverse possession claim by bringing an interference action against the provider at the FCC. To mitigate the potential for lost investment, the FCC could implement mechanisms to counter this threat. For example, the FCC could waive penalties for unauthorized transmission if the adverse possessor provided communications services in an unserved or underserved rural area.¹⁷⁵ Additionally, new regulations could require that the licensee compensate the rural provider for improvements made to utilize the spectrum, like the building of towers and other construction. While the common law refuses

172. See, e.g., Comments of the NTCA 2005, *supra* note 90, at 3–5.

173. In the first nine months of 2005, Verizon spent about \$247 million on advertising, while Comcast spent near \$220 million. See *AT&T Kicks Off Its Biggest Ever Ad Campaign*, Reuters.com, Dec. 29, 2005, <http://today.reuters.com/business/newsArticle.aspx?type=telecomm&storyID=nN295198>.

174. For example, Cingular Wireless, L.L.C., the largest wireless provider in the United States, had 2004 sales of \$19,436,000,000. Cingular Wireless L.L.C., Hoover's In-Depth Company Records, Oct. 12, 2005, 2005 WLNR 16521676. Meanwhile, Midwest Wireless Holdings, L.L.C., serving rural areas in Minnesota, Iowa, and Wisconsin, had 2004 sales of only \$36,800,000. Midwest Wireless Holdings, L.L.C., Hoover's In-Depth Company Records, Aug. 17, 2005, 2005 WLNR 12928974.

175. For a discussion of penalties, see 47 U.S.C. §§ 501–04 (2000).

restitution when the trespasser has knowledge of a superior title to the property,¹⁷⁶ the proposed regulatory regime could differ. The former concerns private property, while the latter involves usage rights contingent on promoting the public interest.¹⁷⁷ Thus, insofar as the rural provider's use of the spectrum was for the provision of communications service to unserved consumers, the Commission could require compensation for such investments, despite the rural provider's knowledge that its use is unlicensed. It is possible that the rural provider's investments would not enrich the licensee. For example, the technology the adverse possessor invested in could be incompatible with that of the licensee. In such cases, the licensee and rural provider could negotiate a leasing or disaggregation agreement in lieu of restitution. Together, these regulatory provisions would protect the licensee's interests in the spectrum and encourage rural providers to take the initial risk to serve ignored areas.

License transfer by adverse possession secures the rural provider's investment. Unlike a spectrum lease, which the licensee may not renew, a license transfer under the regulations would provide the adverse possessor with the licensee's renewal expectancy.¹⁷⁸ The FCC would renew the license as long as the transferee could demonstrate that its services met the public interest standard.¹⁷⁹ Guaranteed license renewal¹⁸⁰ would encourage rural providers to build out networks and provide services in rural areas.

E. ADVANTAGES OF THE ADVERSE POSSESSION APPROACH

A regulatory adverse possession scheme would complement the statutorily mandated "public interest, convenience, and necessity" framework.¹⁸¹ Because the doctrine would more effi-

176. See, e.g., *Canal Bank v. Hudson*, 111 U.S. 66, 80–81 (1883); *James v. Bailey*, 370 F. Supp. 469, 470–72 (D.V.I. 1974).

177. See *supra* Part I.B.

178. *Sidak*, *supra* note 46, at 98–100.

179. *Cowles Broad., Inc. (WESH-TV)*, 86 F.C.C.2d 993 ¶¶ 60–74 (1981).

180. T. BARTON CARTER ET AL., *THE FIRST AMENDMENT AND THE FIFTH ESTATE* 121 (6th ed. 2003) ("The FCC was generally reluctant to deny renewals except in egregious cases."); Reed E. Hundt, Keynote Address, *A New Paradigm For Broadcast Regulation*, 15 J.L. & COM. 527, 533 (1996) ("[T]he Commission for at least fifteen years has not taken away a single one of the approximately 1500 Television licenses or 10,000 radio licenses in this country for failure to serve the public interest.").

181. 47 U.S.C. § 309(a) (2000).

ciently allocate spectrum to providers who have demonstrated a desire and ability to provide communications services to otherwise unserved or underserved rural residents, it meets the statutory standard.¹⁸²

Additionally, an adverse possession approach to spectrum aligns with many of the doctrine's policy justifications. The historical justification—that the law should encourage property use and development¹⁸³—applies with particular force to spectrum. Spectrum use, unlike land use,¹⁸⁴ cannot degrade the quality of or “pollute” the spectrum. Indeed, the purpose of spectrum management policy is to encourage the efficient allocation of spectrum so as to maximize the number and types of communications services available to the public.¹⁸⁵ Applying the adverse possession doctrine to spectrum would encourage the use and development of licensed spectrum.

The reliance¹⁸⁶ and the abandonment¹⁸⁷ justifications for adverse possession are also important in the spectrum context. Adverse possessors of spectrum usage rights likely would have to make some capital investment in order to provide rural services.¹⁸⁸ The proposed regulatory scheme would protect this re-

182. See *id.* §§ 151, 309(j)(3)–(4); Due Diligence Announcement for the Upcoming Auction of Licenses in the Lower 700 MHz Band Scheduled for July 20, 2005, 20 F.C.C.R. 9986 (2005) (“In considering such regulatory requests, the Commission will consider whether grant of the request would result in public interest benefits, such as making new or expanded public safety or other wireless services available to consumers or deploying wireless service to rural or other underserved communities.”); Federal-State Joint Board on Universal Service, 35 Comm’n Reg. (P & F) 958, 972 (Mar. 17, 2005) (“The public interest . . . must be analyzed in a manner that is consistent with the purposes of the Act itself, including . . . promoting the deployment of advanced telecommunications and information services to all regions of the nation, including rural and high-cost areas.” (citations omitted)).

183. See *Meyer v. Law*, 287 So. 2d 37, 41 (Fla. 1973), *superseded by statute*, FLA. STAT. § 95.16 (1974).

184. See Sprankling, *supra* note 151, at 854–62.

185. 47 U.S.C. § 151; see also Federal-State Joint Board on Universal Service, 31 Comm’n Reg. (P & F) 586, 607 (Dec. 31, 2003) (separate statement of Comm’r Adelstein) (“We cannot afford to let spectrum lie fallow. It is not a property right, but a contingent right to use a public resource—it should be put to use for the benefit of as many people as possible.”) For some services, the FCC even mandates the level of service that must be provided under the license. 47 C.F.R. § 27.14(a) (2005).

186. Merrill, *supra* note 141, at 1131.

187. See *id.* at 1130; 2 C.J.S. *Adverse Possession* § 1 (2005).

188. These investments would be relatively small in low-cost markets, like radio, but would be potentially quite high in others, like mobile phones. Consequently, the proposed scheme anticipates that existing providers are the

liance interest by rewarding rural providers for the investments they make during the statutorily defined time period.¹⁸⁹ As in the land context, the spectrum licensee who failed to assert his rights against the adverse possessor would in effect abandon those rights. Such abandonment suggests that the adverse possessor should receive the rights to the spectrum instead.

National providers argue that insofar as rural providers face the same high investment costs to deploy networks in rural areas, rural providers will be no more able to serve rural areas than the licensee and thus do not deserve a license transfer.¹⁹⁰ However, the adverse possession approach defeats this argument. By definition, maintaining the adverse possession claim would require that the rural provider be capable of deploying a network in an area the licensee has ignored.

Unlike keep-what-you-use programs, which arguably may force national carriers to make “uneconomic investment[s] in rural areas,”¹⁹¹ the adverse possession approach only penalizes licensees when investment in the rural area would have provided an economic benefit from the *public’s* perspective. In other words, the rural communications service provider arguing for a license transfer has proven that deployment is economically viable. This demonstrates that the licensee’s decision not to deploy there, although potentially a sound decision from the company’s perspective, was *not* economically sound from the public interest perspective.

Contrary to the keep-what-you-use method, which requires extensive FCC oversight, adverse possession is a hands-off, market-based system. The adverse possessor would discover fallow spectrum, find a way to use it in an economically feasible fashion, and enforce the regulations by bringing a transfer

most likely to pursue adverse possession claims. In those instances, adverse possession would allow existing providers, who have already made significant capital investments, to expand their existing services or coverage area.

189. Or, as discussed in Part III.D, the regulations would protect the reliance interest by compensating an adverse possessor for his investment if the licensee brings an interference action before the adverse possession claim ripens.

190. Reply Comments of AT&T, *supra* note 111, at 6; Comments of Nextel Partners, Inc., Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, WT Docket No. 02-381, at 18–19 (Dec. 29, 2003), http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6515383231.

191. Reply Comments of Nextel Partners, *supra* note 167, at 2.

claim before the FCC. Such a market mechanism would supplement spectrum management policy when the secondary markets fail.

Finally, an adverse possession method would strike a fair balance between large, national carriers and small, rural providers. On the one hand, national providers could retain access to their spectrum rights simply by being responsible stewards of those rights. Even if a national provider were initially unable to deploy in rural areas, he would always have the opportunity to protect his spectrum license by bringing an interference action at the FCC. On the other hand, where national providers neglect their public interest duties, a rural provider would be able to answer the call and ensure that all consumers, including those in remote rural regions, have access to the latest communications services.

CONCLUSION

Rural Americans rely as heavily on advanced communications services for everyday needs and public safety as those who reside in large cities. Inadequate communications services in rural areas also affect people who travel through those areas. The wireless communications industry is undergoing great change, with many technologies making the leap from analog to digital services. The FCC must take every care to advance Congress's command that rural Americans not be left behind in the digital communications revolution.

To fulfill this mandate, the FCC should adopt regulations based on the common law doctrine of adverse possession as a means of spectrum license transfer. Such a regime would offer many benefits, including greater efficiency in spectrum allocation and the potential for increased communications services in rural America. The adverse possession approach would supplement existing federal spectrum management policy to create a comprehensive solution to the problem of inadequate access to spectrum in rural areas.