

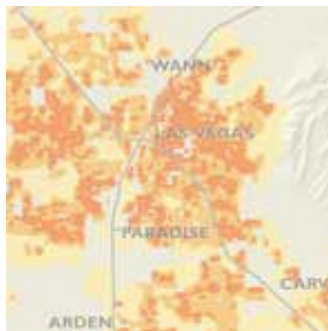
# THE PORTLAND EXCEPTION

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A COMPARISON OF SPRAWL, SMART GROWTH, AND RURAL LAND LOSS IN 15 US CITIES

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*[www.northwestwatch.org](http://www.northwestwatch.org)*



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## THE PORTLAND EXCEPTION

A new analysis of growth patterns in 15 US cities shows that Oregon's land-use policies have excelled in protecting rural lands around greater Portland from sprawling suburban development. Person for person, new development between 1990 and 2000 in greater Portland consumed less than half as much land as the average city in the study. If greater Portland had sprawled like Charlotte, North Carolina, over the decade, for example, it would have lost an additional 279 square miles of farmland and open space—an area more than twice as large as the city of Portland itself.

This report expands on Northwest Environment Watch's (NEW) investigations in the 2004 edition of Cascadia Scorecard of growth and development patterns in the seven largest cities in the Pacific Northwest. Comparing Northwest cities with similar cities across the United States provides an informative gauge of how well the region has fared in controlling runaway sprawl and protecting open space from development.

## SPRAWLING NEIGHBORHOODS AND COMPACT COMMUNITIES

*Portland  
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For this analysis, NEW selected three previously studied Northwest cities—Portland, Seattle, and Boise—and 12 cities from the continental United States with comparable features, such as absolute size, growth rates, or growth management policies. For each city, NEW analyzed data from the US Censuses of 1990 and 2000, including all of the counties that make up the census-defined statistical areas for each city (see Methods and Analysis). NEW also reanalyzed data for the Portland, Seattle, and Boise regions; as defined by the US Census, these cities' statistical areas include a larger area than NEW covered in previous reports. For this report, greater Portland includes seven Oregon counties—Multnomah, Washington, Clackamas, Marion, Polk, Yamhill, and Columbia—as well as Clark County, Washington.

As commonly understood, the term “sprawl” refers to areas that share three linked traits: low population density; strict segregation of housing, stores, and businesses; and branching, rather than grid-like, street patterns. Of these, population density is the most crucial. Studies of more than a hundred cities on four continents have shown that residential density is the leading determinant of how much people rely on their cars—more important than factors such as street layout and the proximity of residences to commercial areas.

Residential density also serves as a rough proxy for other environmental effects of housing development. Person for person, for example, low-density suburbs create more pavement and impervious surface than do more compact urban neighborhoods. At densities of one house per acre (a low-density suburb), impervious surface typically covers from 10 to 15 percent of the landscape, and streams begin to deteriorate. For example, the Northwest's coho salmon rarely

*Portland's urban growth policies have helped protect rural lands and open space*

inhabit watersheds where impervious surface exceeds this level. Many municipalities and states have adopted measures to curb low-density sprawl, not simply because sprawl consumes farmland and affects water quality, but more importantly because low-density development creates additional expenses for roads, sewers, fire and ambulance service, schools, and other infrastructure than does denser development.

For each of the 15 cities, NEW built a fine-grained database of site-specific population densities in 1990 and 2000. NEW then calculated site-by-site changes in population over the decade and derived the share of the population of each metropolis living in three broad categories: low-density suburbs (between 0.5 and 5 residents per acre), mid-density suburbs (between 5 and 12 residents per acre) and compact communities (12 or more residents per acre). For illustration, these population densities are typified by, respectively, detached houses on lots that range in size from 0.5 acres to 5 acres; detached houses on lots from 0.2 acres to 0.5 acres; and detached houses on small lots, plus townhouses, duplexes, and multifamily buildings (see Table 1).

Table 1. Defining density

	Population density	Typical housing
Rural	Less than 0.5 people per acre	Houses on lots >5 acres
Low-density suburb	0.5–5 people per acre	Houses on lots of 0.5 to 5 acres
Mid-density suburb	5–12 people per acre	Houses on lots of 0.2 to 0.5 acres
Compact neighborhood	12 or more people per acre	Detached houses on small lots, plus townhouses, duplexes, accessory apartments, and dense urban developments

NEW also estimated the area of rural land or open space that was converted to suburban development, by tabulating the area in each city for which population density crossed the threshold between “rural” (residential densities less than 0.5 person per acre) to “low-density suburb, or greater” (at least 0.5 person per acre). (See Appendix for more details of the analysis.)

NEW’s analyses found wide variations in how cities developed over the decade. But they also quite clearly demonstrate that greater Portland’s urban growth policies—particularly Oregon’s 30-year-old land use laws but also Washington’s more recent Growth Management Act—have helped protect rural lands and open space on the urban fringe, and prevent the spread of low-density, sprawling development.

For every 100 new residents added to metropolitan Portland's cities and suburbs between 1990 and 2000, about 10 acres of rural land or open space were converted to suburban or urban development. In contrast, new residential development in Charlotte, North Carolina, consumed 49 acres of land for every 100 new residents, nearly 5 times as much as in Portland. Overall, in limiting the loss of rural land and open space to new development, Portland ranked third among the 15 cities studied, just behind Salt Lake City, Utah, and Sacramento, California (See Table 2).

Table 2. Portland ranked third at limiting loss of rural land and open space from 1990–2000

	"Rural" land converted to housing, (acres per 100 new residents)	"Rural" land saved by Oregon's growth policies vs. this city's record (square miles)
1. Salt Lake City, UT	9	N/A
2. Sacramento, CA	10	N/A
3. Portland, OR	10	N/A
4. Riverside/San Bernardino, CA	13	22
5. Denver, CO	14	28
6. Las Vegas, NV	15	32
7. Phoenix, AZ	16	43
8. Seattle, WA	22	88
9. Boise, ID	23	92
10. Orlando, FL	26	112
11. Austin, TX	26	116
12. Madison, WI	29	134
13. Minneapolis/St. Paul, MN	29	135
14. Nashville, TN	42	234
15. Charlotte, NC	49	279

## THE NATURAL URBAN GROWTH BOUNDARY: WATER SCARCITY

Greater Portland's strong record in controlling sprawl is all the more remarkable because its climate makes it especially prone to grow outward across the landscape.

Among the 15 cities studied, rainfall was the strongest single predictor of how much each city sprawled. Cities with less than 18 inches of average annual

rainfall were 35 percent denser—and had 75 percent more people in compact neighborhoods—than rainier cities. And between 1990 and 2000, low-rainfall cities channeled twice as much of their growth into compact neighborhoods, and consumed half as much rural land to accommodate each newcomer, as did rainier cities (see Figures 1 and 2).

Figure 1. Cities with abundant water consumed twice as much open space for new development

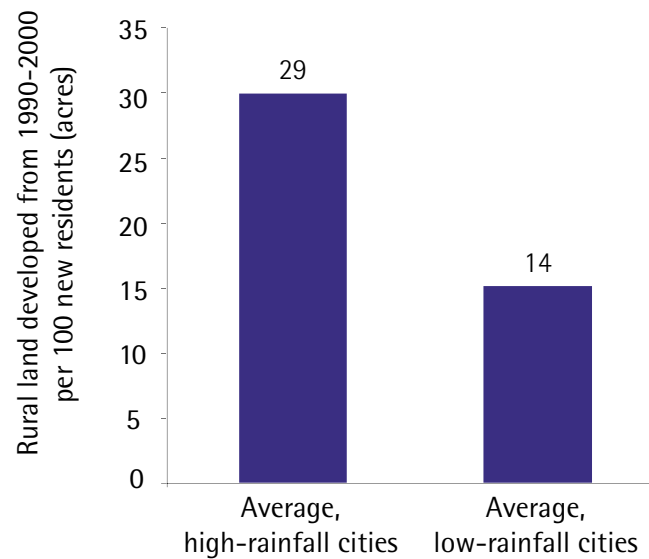
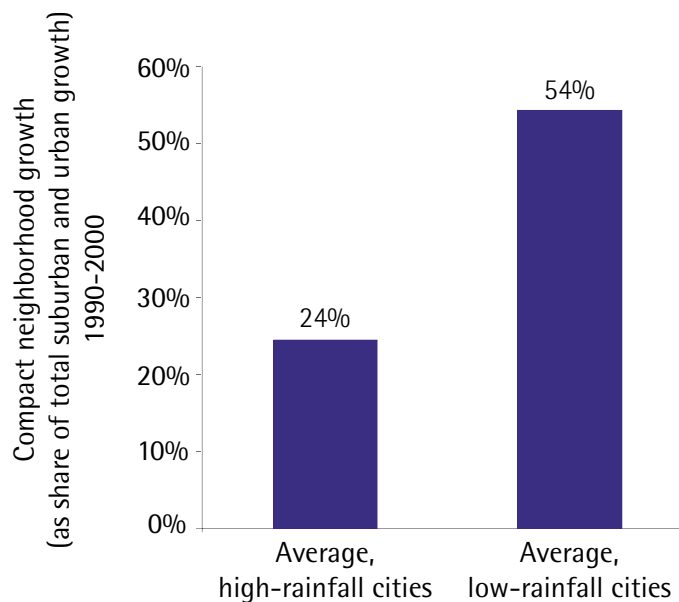


Figure 2. In cities where water is scarce, more than twice as much growth took place in compact neighborhoods



Apparently, water scarcity serves as de facto urban containment. Arid and semi-arid cities such as Las Vegas and Denver are typically served by centralized water systems and rely on scarce surface water. In such cities, new development is largely dependent on the extension of water mains, which limits far-flung, low-density development. In regions with more rainfall, however, development is less constrained: there are more, and more abundant, sources of water, and local water systems can tap into groundwater and surface water supplies with less legal wrangling over water rights.

And Portland is a metropolitan area with plenty of water—36 inches a year of rainfall. Greater Portland’s third-place finish in protecting its rural lands from development among all 15 cities turns into a first-place finish, when the comparison is limited to the eight high-rainfall cities in the study. If greater Portland had sprawled as greater Seattle did during the 1990s, for example, an additional 88 square miles of rural land would have been converted to suburban or urban development. Likewise, if greater Portland had mirrored the development patterns of metropolitan Charlotte, new suburban growth would have overtaken an additional 279 square miles of rural land and open space.

Compared with the average for the other high-rainfall cities, Oregon’s growth policies—and, to a lesser extent, Washington’s fledgling ones—preserved more than 150 square miles of rural land over the decade in the greater Portland area. (Because Oregon’s land use policies apply to every city in the state, they also preserved additional rural land, including lands used for agriculture and forestry, elsewhere in the state.)

## A C C L O S E R   A N A L Y S I S

Greater Portland’s record for protecting rural land is a function of its success at limiting the spread of low-density suburbs (those areas with between 0.5 and 5 residents per acre). Over the decade, greater Portland added nearly half a million new residents, yet the number of people living in low-density suburbs actually declined. Greater Portland’s growth went mostly into already established mid-density suburban neighborhoods. Every other city in this study except Sacramento saw rising numbers of people in low-density suburbs—particularly Charlotte and Nashville. There, low-density suburbs accounted for 69 percent and 52 percent, respectively, of all new metropolitan growth (see Appendix for all data in this study.)

Still, despite Portland’s success in protecting rural land and open space over the decade, greater Portland is still not a particularly dense metropolitan area. It is far less dense than many cities of similar size in the western United States. Among the 15 cities studied, metropolitan Portland ranked sixth in the average density of all lands with at least 0.5 residents per acre, behind Las Vegas, Denver, Phoenix, Sacramento, and Salt Lake City.

Similarly, greater Portland ranked seventh among the 15 cities in the share of residents living in compact neighborhoods (those in which residential density is at least 12 people per acre). About half of greater Portland's residents live in mid-density suburbs (with between 5 and 12 people per acre). Only one-fourth of Portland residents live in a compact neighborhood. In contrast, half of all residents of greater Las Vegas do, as do more than one-third of the residents of Denver, Phoenix, Sacramento, and Riverside, California. (See Maps 1, 2, and 3 for comparisons of metropolitan density in Portland, Las Vegas, and Charlotte. And see [www.northwestwatch.org/scorecard/portland04.asp](http://www.northwestwatch.org/scorecard/portland04.asp) for animations of sprawl in these three cities from 1990 to 2000.)

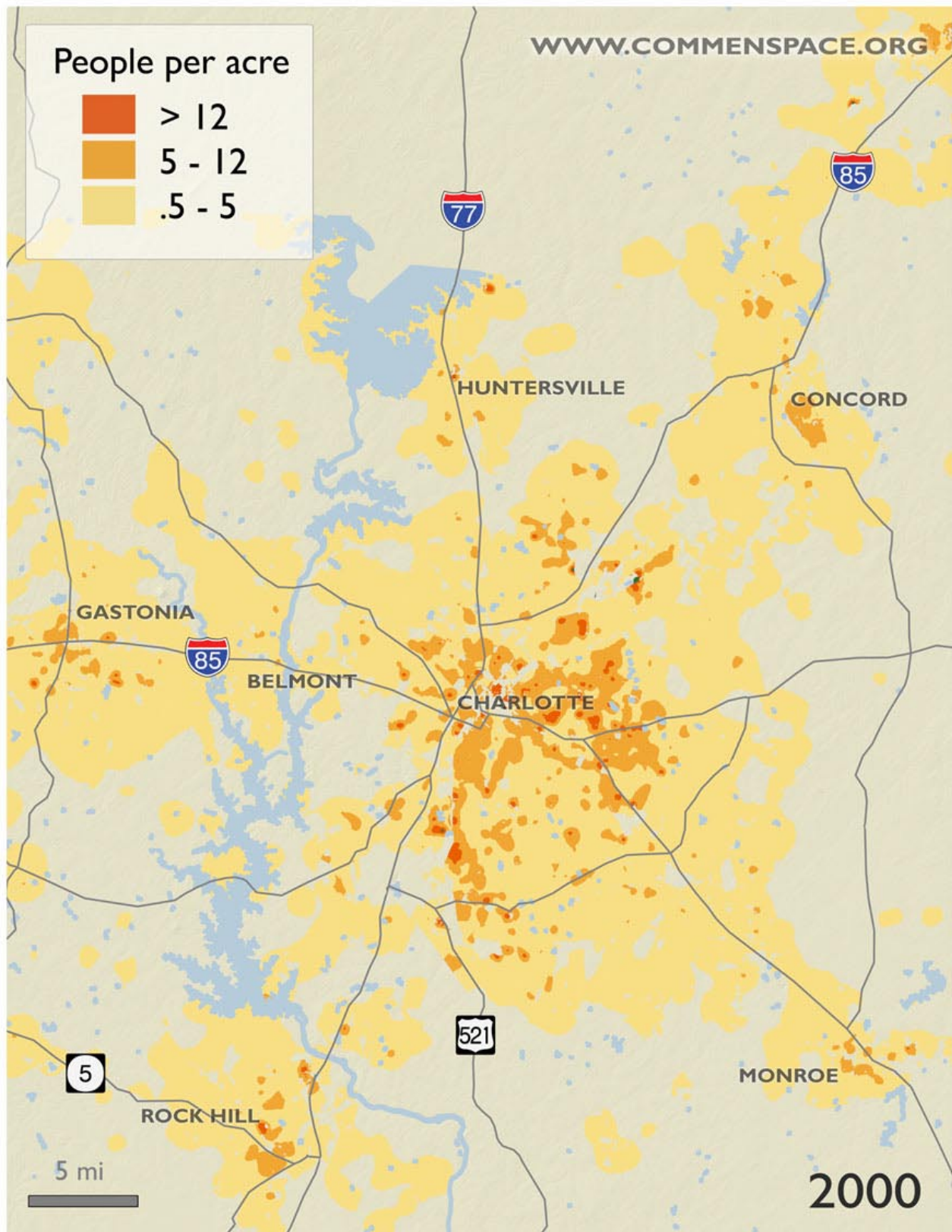
Metropolitan Portland is only now, after nearly three decades of experience with Oregon's growth management laws, approaching the residential densities common throughout the arid west. Still, the city's success in limiting the spread of suburban development outside its urban growth boundaries is impressive. Although Portland's natural environment—abundant rainfall and ample open space at the urban fringe—tends to facilitate sprawl, Oregon's policies have worked to protect rural lands.

## CONCLUSION

Oregon's systems of urban containment were effective at protecting rural land and open space from unchecked, low-density sprawl in greater Portland. If effective growth management policies had not been in place in greater Portland, it probably would have sprawled as much as comparable US cities that have plenty of water—losing between 88 and 279 square miles of rural land, farmland, and open space in the process.

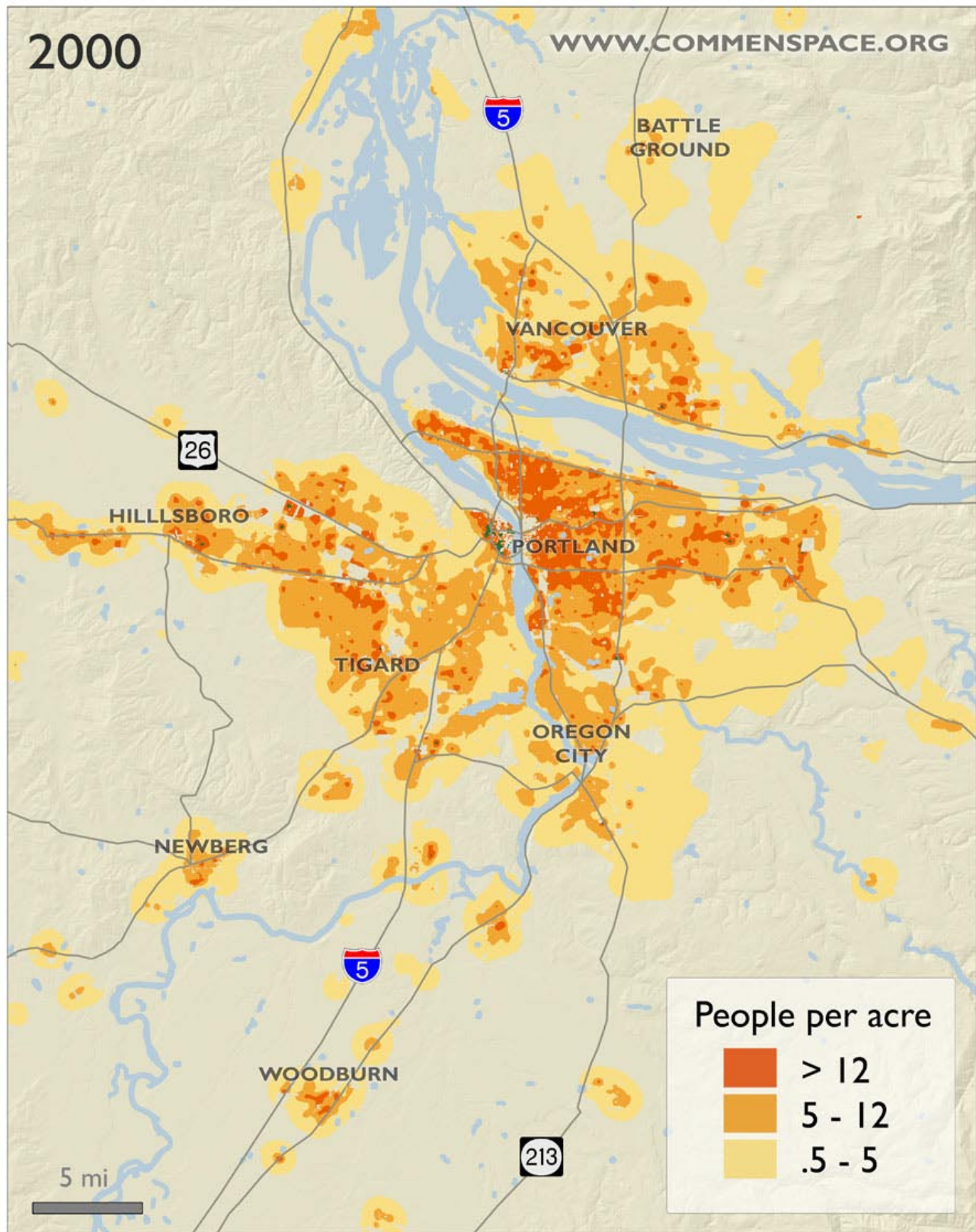
In cities where water supplies are scarce, the natural environment itself limits sprawl. In metropolitan Portland, the natural environment has not imposed such constraints; but the policy environment has. Weakening Oregon's growth management policies would probably lead to the rapid loss of open space and rural land surrounding metropolitan Portland.

Map 1. Charlotte, North Carolina, has the lowest population density and the smallest share of residents living in compact communities of any of the 15 cities studied.

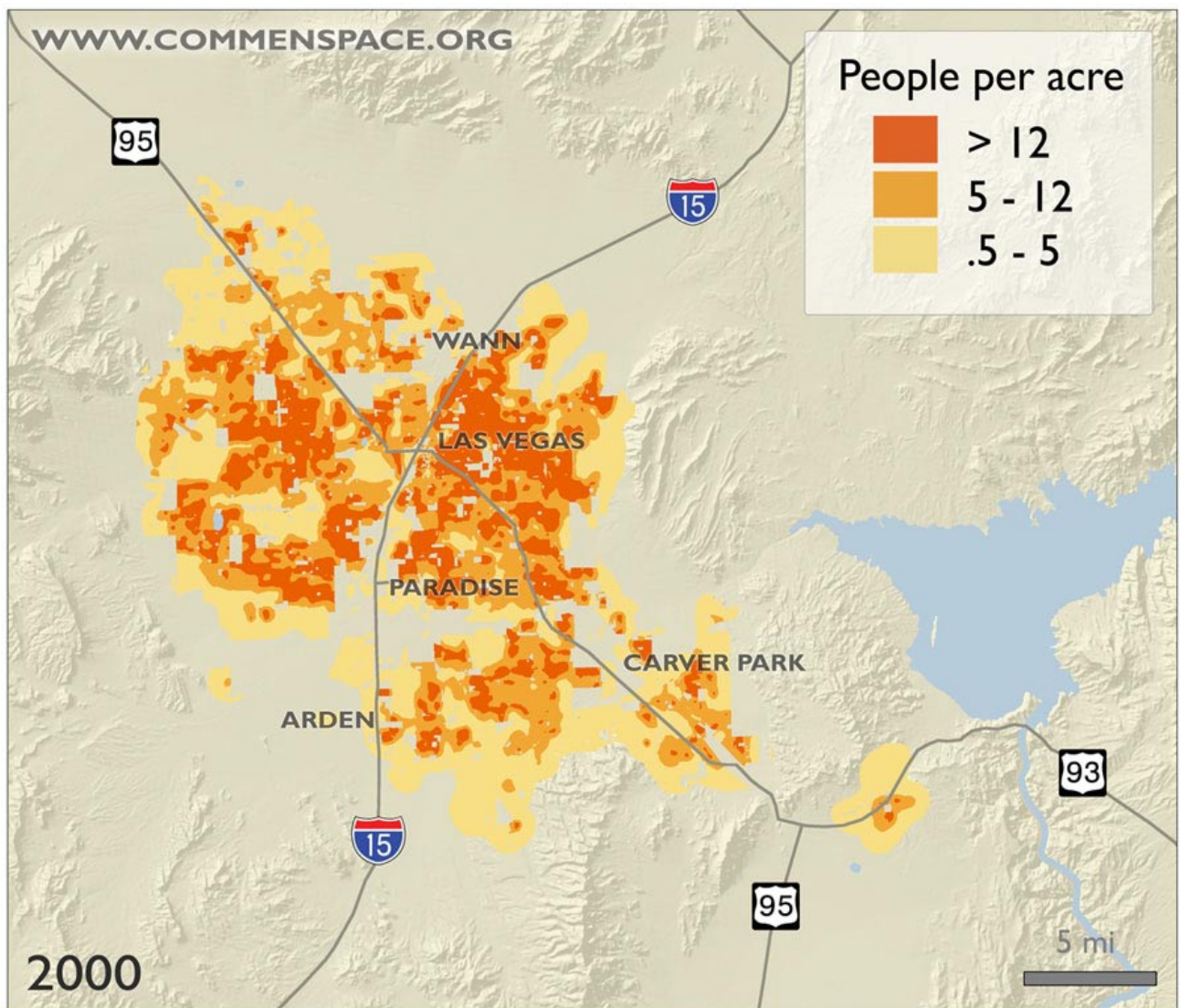




Map 2. Oregon's land use laws protect rural land from low-density sprawl. But overall, Portland still isn't as dense as many other cities in the US west.



Map 3. Las Vegas—the densest of the 15 cities studied—channeled two-thirds of its growth into compact neighborhoods between 1990 and 2000.



## METHODS AND ANALYSIS

Northwest Environment Watch and CommEn Space examined population and residential density trends using data from the 1990 and 2000 US Censuses. NEW selected 12 US cities that have some features—absolute size, growth rates, growth management policies, or overall residential density patterns—comparable to metropolitan Portland, Seattle, and Boise. NEW analyzed the following Census-defined regions:

- Austin-San Marcos MSA
- Boise MSA
- Charlotte-Gastonia-Rock Hill MSA
- Denver-Boulder-Greeley CMSA
- Las Vegas MSA
- Madison MSA
- Minneapolis-St. Paul-St. Cloud CSA
- Nashville MSA
- Orlando MSA
- Phoenix-Mesa MSA
- Portland-Salem CMSA
- Riverside-San Bernardino MSA
- Sacramento-Yolo CMSA
- Salt Lake City-Ogden MSA
- Seattle-Tacoma-Bremerton CMSA (minus Island County)

To analyze population trends, NEW divided each metropolitan area into a 30-by-30 meter grid, and determined the resident population of each grid cell using data from the corresponding census block or blocks. (Each census block typically represents one urban or suburban block.) For both 1990 and 2000, NEW calculated the population density of the neighborhood surrounding each grid cell, based on the smallest circle centered on that cell that contained at least 500 residents.

## ABOUT NORTHWEST ENVIRONMENT WATCH

Northwest Environment Watch (NEW) is a Seattle-based independent nonprofit research and communication center that promotes an environmentally sound economy and way of life in the Pacific Northwest. The Pacific Northwest is a bioregion that includes Washington, Oregon, Idaho, British Columbia, and adjoining parts of Alaska, Montana, and California.

In 2004, NEW launched the Cascadia Scorecard, a new gauge of regional progress that monitors seven key trends shaping the future of the Northwest: health, economy, population, energy, sprawl, forests, and pollution. This report is one of NEW's regular updates on the Cascadia Scorecard. Authors include Clark Williams-Derry, NEW research director, and Jocelyn Hittle, research intern. Jocelyn Hittle conducted geographic analysis with the assistance of analytical tools designed by Tim Schaub and Josh Livni of CommEn Space, a nonprofit GIS center based in Seattle. Josh Livni also designed the maps used for this report. For more information about NEW and our publications, please see [www.northwestwatch.org](http://www.northwestwatch.org).

NEW gratefully acknowledges the Contorer Foundation for its generous sponsorship of this report and related research. Special thanks also goes to the Jubitz Family and Doris Duke Charitable Foundations for underwriting the internship of Jocelyn Hittle, whose research made this report possible. Additional financial support comes from nearly 1,000 individual supporters of NEW and more than a dozen private foundations. Special thanks go to members of the Cascadia Stewards Council, a new society of major donors who have made a minimum three-year commitment of at least \$1,000 per year to NEW; and to NEW's patrons, individuals and foundations who have donated \$25,000 or more during the period this research was performed. NEW's patrons include the Bullitt Foundation, the Contorer Foundation, John and Jane Emrick, the Glaser Progress Foundation, the Horizons Foundation, Ethan Meginnes and Alex Loeb, the Russell Family Foundation, and Social Venture Partners.

Appendix. Selected statistics on urban and suburban density and growth in 15 US metropolitan areas, 1990–2000

	Total population 2000	Percent population growth 1990–2000	Average annual precipitation (inches) 1961–1990	"Rural land" in 1990 converted to "suburban" or "urban" in 2000 (net acres per 100 new residents)		Average metropolitan density ("urban" and "suburban" areas) 2000		Growth in "compact neighborhoods," as share of total population growth	
				<i>Rank</i>		<i>Rank</i>		<i>Rank</i>	
Austin, TX	1,249,735	48%	31.9	26	11	4.4	11	36%	8
Boise, ID	432,342	46%	12.11	23	9	4.2	12	13%	13
Charlotte, NC	1,499,171	29%	43.1	49	15	2.9	15	7%	15
Denver, CO	2,581,477	30%	15.4	14	5	6.6	2	71%	1
Las Vegas, NV	1,563,272	83%	4.1	15	6	6.6	1	65%	2
Madison, WI	426,493	16%	30.9	29	12	4.8	8	19%	11
Minneapolis/St. Paul, MN	3,136,148	17%	28.3	29	13	4.6	10	14%	12
Nashville, TN	1,230,736	25%	47.3	42	14	3.1	14	11%	14
Orlando, FL	1,644,544	34%	48.1	26	10	4.1	13	28%	10
Phoenix, AZ	3,251,866	45%	7.7	16	7	6.2	3	55%	5
Portland, OR	2,265,214	26%	36.3	10	3	5.6	6	45%	7
Riverside/San Bernardino, CA	3,254,708	26%	10.0	13	4	5.0	7	63%	3
Sacramento, CA	1,796,796	21%	17.5	10	2	6.0	4	62%	4
Salt Lake City, UT	1,333,908	24%	16.2	9	1	5.8	5	52%	6
Seattle/Tacoma, WA	3,483,190	20%	37.6	22	8	4.7	9	36%	9

(continued)

	Share of residents living in "compact neighborhoods" 2000		Growth in "low-density sprawl," as share of total population growth		Share of residents living in "low-density sprawl" 2000	
		<i>Rank</i>		<i>Rank</i>		<i>Rank</i>
Austin, TX	24%	8	25%	11	28%	10
Boise, ID	6%	14	18%	9	28%	9
Charlotte, NC	5%	15	69%	15	57%	15
Denver, CO	36%	3	6%	5	12%	1
Las Vegas, NV	50%	1	11%	6	16%	3
Madison, WI	24%	9	20%	10	25%	8
Minneapolis/St. Paul, MN	22%	11	36%	13	30%	11
Nashville, TN	8%	13	52%	14	47%	14
Orlando, FL	15%	12	27%	12	37%	13
Phoenix, AZ	36%	4	13%	7	17%	5
Portland, OR	25%	7	-4%	1	18%	6
Riverside/San Bernardino, CA	34%	5	5%	4	24%	7
Sacramento, CA	37%	2	-2%	2	16%	2
Salt Lake City, UT	26%	6	1%	3	17%	4
Seattle/Tacoma, WA	23%	10	16%	8	30%	12

Notes:

See Table 1 for definitions of "compact neighborhoods," "rural land," and "low-density sprawl."

"Suburban" and "urban" densities refer to areas with more than 0.5 people per acre.

"Average metropolitan density" refers to areas with at least one resident per acre.

"Rank" refers only to the cities studied.

All figures derived from US Census data; see Methods and Analysis for details.