Bicycle Urbanism

Reimagining Bicycle Friendly Cities

Edited by
Rachel Berney

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Over recent decades, bicycling has received renewed interest as a means of improving transportation through crowded cities, improving personal health, and reducing environmental impacts associated with travel. Much of the discussion surrounding cycling has focused on bicycle facility design—how to best repurpose road infrastructure to accommodate bicycling. While part of the discussion has touched on culture, such as how to make bicycling a larger part of daily life, city design and planning have been sorely missing from consideration.

While interdisciplinary in its scope, this book takes a primarily planning approach to examining active transportation, and especially bicycling, in urban areas. The volume examines the land use aspects of the city—not just the streetscape. Illustrated using a range of case studies from the USA, Canada, and Australia, the volume provides a comprehensive overview of key topics of concern around cycling in the city including: imagining the future of bicycle-friendly cities; integrating bicycling into urban planning and design; the effects of bike use on health and environment; policies for developing bicycle infrastructure and programs; best practices in bicycle facility design and implementation; advances in technology, and economic contributions.

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Urban Planning and Environment
Series Editors: Donald Miller and Nicole Gurran

Maintaining and enhancing living conditions in cities through a combination of physical planning and environmental management is a newly emerging focus of governments around the world. For example, local governments seek to insulate sensitive land uses such as residential areas from environmentally intrusive activities such as major transport facilities and manufacturing. Regional governments protect water quality and natural habitat by enforcing pollution controls and regulating the location of growth. Some national governments fund acquisition of strategically important sites, facilitate the renewal of brownfields, and even develop integrated environmental quality plans. The aim of this series is to share information on experiments and best practices of governments at several levels. These empirically based studies present and critically assess a variety of initiatives to improve environmental quality. Although institutional and cultural contexts vary, lessons from one commonly can provide useful ideas to other communities. Each of the contributions are independently peer reviewed, and are intended to be helpful to professional planners and environmental managers, elected officials, representatives of NGOs, and researchers seeking improved ways to resolve environmental problems in urban areas and to foster sustainable urban development.

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The right to the city is far more than the individual liberty to access urban resources: it is a right to change ourselves by changing the city. It is, moreover, a common rather than an individual right since this transformation inevitably depends upon the exercise of a collective power to reshape the processes of urbanization.

David Harvey, "The Right to the City"

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Contributors

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Preface

This book emerged from the Bicycle Urbanism Symposium held at the University of Washington in Seattle in June 2013. Both the symposium and the book ask the question "How do we design cities for bicycles?" Over 200 participants joined the symposium from around the world, coming from Australia, Canada, China, Denmark, Hong Kong, Ireland, the Netherlands, New Zealand, the United Kingdom, and the United States. The symposium brought together practitioners, academics, policy makers, and advocates with diverse backgrounds including urban design, planning, transportation, engineering, landscape architecture, public policy, and advocacy.

The overarching premise of the symposium was to bring together top experts and advocates with the goal of creating useful scholarship. In the symposium, participants explored the ways that cities can best encourage and accommodate bicycle travel in the future. Speakers led sessions on topics ranging from imagining the 20–30-year future of bicycle friendly cities, integrating bicycling into urban planning and design, and studying the effects of bike use on health and environment to policies for developing bicycle infrastructure and programs, best practices in bicycle facility design and implementation, advances in bicycle and gear technology, economic considerations, and implementing bicycle policies and plans. This book emerged from this exploration of new research and is built from a select number of papers solicited to cover a range of topics.

The authors in this book explore dimensions of how best to redevelop cities so that they support bicycling. They use the concept of bicycle urbanism in several different ways. First, they use the presence of bicycles in the city as a measure of the "fitness" of the built environment to perform well physically and to support human relationships and health. Second, they use the desire for a bikeable city to guide urban design and development decisions that help us move toward equitable access to transportation options—a crucial component of personal mobility—as well as to shape cities that are human scaled and connected to the human experience. Third, they look at streets as the democratic medium that they are and attempt to design our rights-of-way to help build cities that work well for all people.

Acknowledgments

Advancing Bicycle Urbanism

Rachel Berney

Over the past several decades, bicycling has received renewed interest as a mode of affordable transportation and a means to improve health as well as to reduce the environmental impacts associated with transportation. Much of the discussion surrounding cycling has centered on bicycle facility design—how to best repurpose road infrastructure to accommodate bicycles. And, while part of the discussion has touched upon the culture of cycling and making it a part of everyday life, urban design and city planning considerations have not yet fully entered the conversation. This volume presents a departure: it is focused on the city, not just the streetscape or the infrastructure.

Rather than addressing the best ways to build roads and trails to accommodate bicycling, this book asks how best to design and build cities for bicycles. One part of the response to that question is to focus on the quality of the built environment and how it is designed; another part is to look at how cyclists use the fabric of the city, how well it serves them, and how we can evaluate it to make it better; and yet another part is to consider how well the city supports people's mobility, how well it provides equitable access to bicycling as a safe, pleasurable, and useful transportation option.

By prioritizing a bikeable city, we allow bicycling to serve as a standard in urban-development processes; that is, we use the quantity of bikers and their cycling habits as benchmarks for the "fitness" of the built environment to serve their needs. Through this practice, we can guide and evaluate urban-development decisions and changes to the built environment to better align the city with the human scale and human experience as well as to ensure equitable access to transportation options. We can also better integrate larger-scale changes, such as land-use designations and urban planning and design projects, into the right-of-way network.

By doing this, bicycle urbanism also contributes, overall, to better-designed active transportation networks that support human-powered transportation modes and promotes better facilities for walking and rolling, among other uses. Advancing bicycle urbanism also recognizes that many people are multi-modal on a daily basis and helps to promote networks and facilities

that support easy transitions from walking and biking to light rail and other modes. Bicycle urbanism supports good city design.

While this volume is about cities overall, I should of course highlight the special role of streets, one of the most important ingredients of good neighborhoods and cities. They are the most durable and adaptable urban spaces. In U.S. cities, the public rights-of-way frequently take up 20 to 30 percent of the land area—a major piece of a city. By considering bicycling to be one of the primary uses of street space, planners can more effectively build cities for everyone.

This book joins an ongoing conversation of distinct but interwoven voices on cycling in cities. Some researchers look holistically at bicycling, presenting case studies from many different places. John Pucher and Ralph Buehler's seminal *City Cycling* (2012) is an excellent example. Other books help promote bicycling by dealing with infrastructure, including exploring ideas on transforming existing transportation infrastructure to better accommodate bicycling as well as discussing best practices for bicycle infrastructure design. Representative volumes include Elly Blue's *Bikenomics: How Bicycling Can Save the Economy* (2016) and Stefan Bendiks and Aglaée Degros's *Cycle Infrastructure* (2013).

Also complementary to the discussion around building cities for bicycles are books on facility design, as exemplified by John Forester's *Bicycle Transportation: A Handbook for Cycling Transportation Engineers* (1994) and the National Association of City Transportation Officials' *Urban Guideway Bike Guide* (2014). Yet other volumes inspire us through history, cultural expression, and design futures. Peter Jordan's memoir *In the City of Bikes: The Story of the Amsterdam Cyclist* (2013) combines a personal account with the local biking history of Amsterdam. There is Carleton Reid's *Roads Were not Built for Cars: How Cyclists Were the First to Push for Good Roads and Became Pioneers of Motoring* (2015). Luis A. Vivanco's 2013 book *Reconsidering the Bicycle: An Anthropological Perspective on a New (Old) Thing* brings an anthropological viewpoint to the resurgence of bicycling in recent years. Steven Fleming's 2012 *Cycle Space: Architecture and Urban Design in the Age of the Bicycle* focuses on the relationship between architecture and bicycling.

The authors in this book hope to contribute to the conversation on improving urban biking by looking at the issue from new angles and exploring forward-looking ideas that engage the technologies available now to lead city dwellers into a more resilient and healthier future.

The state of Seattle's bicycle urbanism

Given that the University of Washington hosted the Bicycle Urbanism Symposium, it seems appropriate to use the state of Seattle's bicycle urbanism as an example for consideration of ways to make all cities more bikeable. In the 1990s, Seattle was *the* biking city, arguably the burgeoning center of

bicycle urbanism in the United States. At that time it boasted a bike-commute rate of 1.5 percent, versus just 1 percent in Portland, Oregon (Pucher 2013). In 2007 the city approved its first Bicycle Master Plan, setting in motion a ten-year process of studying Seattle's cycling infrastructure and setting out plans for improvements. By 2013, when the symposium was held, however, other cities had surpassed Seattle in terms of numbers of people biking as well as amount of infrastructure built. Portland's bike-commute rate was up to 6.9 percent, while Seattle's had only risen to 3.7 percent (Pucher 2013). And big city mayors from around the country, such as Chicago's Rahm Emanuel, were eyeing Pacific Northwest cities with the hope of attracting their tech workers back east—with better bicycling facilities! Emanuel said, "I want [PNW cities] to be envious because I expect to not only take all their bikers, but I'll take their jobs that come with this, all the economic growth that comes with this and the opportunities that come with this" (Schlabowske 2013). Seattle's current Bicycle Master Plan, which reaches completion in 2017, acknowledges that "to compete and attract talent, Seattle has to be a better biking city" (Seattle DOT 2014, 1).

Seattle has some major challenges when it comes to becoming a truly bikeable city. Its biking environment can be dangerous, especially in the frequently rainy conditions and during the winter, when the area experiences low levels of morning and evening light. The city is also hilly and punctuated with water bodies; these geographical constraints limit where people can ride (see Figure 0.1).

Some of Seattle's bicycle infrastructure is not well designed and ought to be better. The city is overly dependent on sharrows (streets that have bike icons and arrows painted on the pavement to remind drivers and bicyclists to share the road) and unprotected bicycle lanes. And, in comparison to other biking cities, it has relatively few women cycling. Other cities, such as Vancouver, British Columbia, and Portland, have inclusive bicycle programs, some targeted specifically to female riders. This is important because women are the "indicator species" of a cycling community; that is, "the proportion of cycling trips made by females is an important indicator to measure how safe cycling conditions are perceived to be" (Vancouver Metro Translink 2011, 27).

While in Seattle for the Bicycle Urbanism Symposium, John Pucher, the keynote speaker, was interviewed by the *Seattle Times* on the state of bicycling in the city. Pucher said he found Seattle unpleasant, even dangerous to cycle in, noting that Second Avenue downtown is "as bad as a major avenue [in] Manhattan . . . I think it's maybe even worse, because I think here, there's more left and right turns, there's more doors that are being opened, more cars that are trying to park." He went so far as to call his trip down Second Avenue "death defying." Citing design faults with the bike lane—encroachments by cars crossing the lane to enter or leave parking spaces, car doors protruding into the bike lane, and vehicles making left turns across the lane—Pucher said Second Avenue is "an egregious example of a

Figure 0.1 Seattle's geography and topography reduce options for routes and create pinch points. Bicyclists from neighborhoods, represented by circles proportional to their population, are channeled into the downtown through a limited number of routes that provide for safer travel and account for hills, bridges, and existing canal crossings. The lines in this image represent the convergence of bicyclists from multiple neighborhoods and the paths bicyclists are likely to take to reach downtown.

Source: Image created by Alta Planning + Design.

poorly designed bike lane" (in Lindblom 2013). Fifty-six bicycle accidents were recorded along Second Avenue between 2007 and 2013 (Lindblom 2013). And in 2014, the death of a young attorney, who left behind her partner and child, was especially poignant as it happened within weeks of the start of a complete design overhaul of the lane (Lindblom 2014). The overhaul transformed the Second Avenue bike lane to a protected lane, or cycle track—typically a single- or dual-way lane that is painted, signed, signalized, and buffered from traffic.

Outside of downtown, Seattle is highly reliant on sharrows, which account for 34 percent of its network (see Table 0.1). But sharrows are most appropriate for neighborhoods rather than for travel across a city. In addition, Seattle's unprotected bicycle lanes and signed routes account for 30 percent of its network. Seattle tripled its mileage of bike lanes to 78 miles between 2007 and 2013, but much of that suffers from design problems that make them risky to use, including narrow widths and potential conflicts with car doors. The amount of miles of unprotected bike lanes in Seattle did not change between 2013 and the end of 2016.

Women currently comprise only two out of ten bicycle riders in Seattle (Broache 2012). That number could and should be higher. Pucher noted that "fewer than 30 percent of Seattle bike trips are made by women. It's striking that more women bike to work in Portland (4.8 percent) than the share of men biking to work in Seattle (4.6 percent)." He also pointed out that several cities, including Portland; Vancouver; Montreal, Quebec; Ottawa, Ontario; Minneapolis; and Washington, D.C., have all surpassed Seattle in the rate of bicycling by women as well as in overall bicycling (Pucher 2013).

Although Seattle's bicycle infrastructure network has grown substantially over time, it is still fragmented. It has network gaps (route gaps of less than one quarter of a mile), corridor gaps (greater than one quarter of a mile) as well as intersection gaps (intersections that require fundamental bicycle-related improvements). The relative lack of cycle tracks is sorely felt. It is interesting to note that a motor vehicle network that looked like this would be considered "broken." Figure 0.2 depicts the 171-mile bicycle network in

Table 0.1 Type, length, and percentage share of bike lanes in the Seattle network, 2016

Type of bike lane	Length in miles	Percentage of system
Cycle track (protected lane)	14.2	5
Trail	52.6	20
Bike lane	76.7	30
Sharrow	88.2	34
Neighborhood greenway	28.0	11
Total	259.7	100

Source: 2010–2015 American Community Survey 5-year estimate and Seattle Department of Transportation, bike network data current as of December 2016.
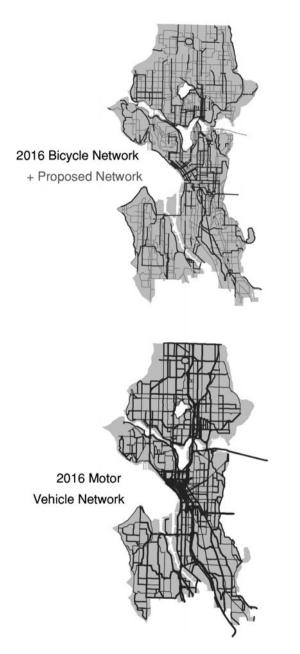
Figure 0.2 This comparison of bicycle and vehicle networks in existence in Seattle in December 2016 shows that bicycle riders have about one-third the amount of linear roadway of car drivers. The dedicated bicycle infrastructure shown here is 171 miles long (planned infrastructure is shown in gray), and the motor vehicle roadway is 505 miles long.

Source: Image created by Alta Planning + Design.

Seattle, including cycle tracks, separated trails, and bike lanes, and the three-times-larger motor vehicle network, including all city arterials, implemented as of December 31, 2016.

Connectivity is strongly related to equity. Some people have great access to bicycle infrastructure in Seattle; others do not (Table 0.2). Table 0.2 shows that only 14.3 percent of Seattleites live within a 1/4 mile of a protected bicycle lane. This is mirrored by an inequitable distribution of collective bicycle resources that occurs in many communities in the U.S. (Zavestoski and Agyeman 2015). Making Seattle a more bikeable city means creating equitable opportunities for all neighborhoods to become bicycle friendly within their borders as well as in connection with longer, citywide routes that can be used for commuting. By increasing equity, the city can also increase opportunities for achieving public health benefits through bicycling. The health benefits of bicycling are well documented (Sallis, Millstein, and Carlson 2011; Garrard, Rissel, and Bauman 2012).

Another key concern for bicycling is "stress" (see Figure 0.3). Several things contribute to real or perceived difficulties when bicycling, including weather, topography, geography, and real or perceived distance and safety. Safety can be affected by factors such as road conditions, traffic volume and speed, and the level of bicycle infrastructure, as well as other built environment elements, including the number of intersections, sight lines, and place quality. The perceived distance a cyclist travels may differ from the actual difference based on the comfort of the facility. A trail or cycle track is low stress and will make a trip feel shorter than the actual distance traveled, while a shared roadway with high traffic volumes increases the perceived distance traveled. Given that 41 percent of bicycle trips in U.S. cities are less than two or three miles long (Seattle DOT 2014, 3), there is a significant room for improvement in the number of people biking if facilities were to be improved to reduce stress, but for now, for many people, even these short trips are considered "too long."

Seattle's vision is to provide the conditions that make cycling "a comfortable and integral part of daily life . . . for people of all ages and abilities" (Seattle DOT 2014, 1). The city is wisely focused on the biggest demographic of

Table 0.2 Distance of Seattle residents from protected bicycle lanes, 2016

Distance in miles from protected bicycle lanes	Number of residents	Percentage of total population
0.25	93,997	14.3
0.5	212,201	32.3
1	379,893	57.8
2	571,429	86.9
3	646,605	98.4

Source: 2010–2015 American Community Survey 5-year estimate and Seattle Department of Transportation, bike network data current as of December 2016.