

Economic Impacts of
Walking & Bicycling in Sonoma County

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Table of Contents

Introduction

Background

The Sonoma County Transportation Authority (SCTA) Board of Directors directed staff to investigate the economic impacts of bicyclist and pedestrian activity in Sonoma County. Elected decision makers are constantly charged with evaluating which policies and investments will best serve the public interest. In an era of constrained resources at all levels of government it is especially important that public money be used where positive benefit to cost ratios will be achieved. Economic analysis helps in assessing the relative benefits of actions. The aim of this paper is to provide information about the economic benefits of investing in bicycling and pedestrian events, non-motorized infrastructure, and supporting amenities and activities.

A useful resource just published states that conventional project evaluation methods tend to overlook and undervalue non-motorized transportation. Author Todd Litman makes the case that "Conventional travel statistics imply that only a small portion of total travel is by non-motorized modes (typically about 5%), but this results, in part, from travel survey practices which overlook many short and non-motorized trips" (*Evaluating Non-Motorized Transport Benefits and Costs*, Victoria Transport Policy Institute, September 2012). Likewise U. S. Census data tends to distort the importance of non-motorized trips. Frequently cited mode share Census statistics are based on the longest leg of adults' commute trips. The shorter walking and bicycling legs of transit trips are not captured; nor are the majority (+80%) of trips, because commute trips account for less than 20% of all trips. Non-peak, non-work, children's school trips and those for pleasure, sport, shopping, and errands are not included. For the 2010 Census 1.2% were recorded as commuting by bicycle in the County; and 3.1% by walking.

The evaluation methodologies, and most pointedly the conventional thinking placing priority on mobility and congestion relief from which they arose, must yield to new thinking about transportation. Much focus has been placed on commute trips, comprising approximately 20% of all trips. Twenty plus years ago Congestion Management

Agency (CMA) legislation revealed the priority placed on mobility. This emphasis assumes faster throughput and longer trips are superior to slower, shorter trips. Non-motorized trips were categorized as: 1. "Transportation" (or utilitarian) trips (focused on commute travel), and 2. "Recreational" trips --- this despite the fact that all trips that provide mobility involve transport of people to desired destinations.

During the last decade the ideas about transportation have gradually evolved and become more complex, because transportation is recognized as being an integral component of decisions that must consider not only vehicular throughput, but system accessibility for diverse users (including multi-modal connectivity), and the environmental, social equity, economic stimulus, and health impacts. Furthermore, the need to take action to protect the climate is now a major driver of transportation policy decisions. The Sustainable Communities Strategy is a statement of policy direction that demands a much more sophisticated and complicated thinking about transportation relative to land use; resource use; quality of life factors including health; and planetary impacts. Each such aspect adds new layers of economic impact. The new considerations change the equation of which trips are to be considered important --- now *all* trips matter, not just those for taking people to jobs by car in peak hour traffic.

Report Purpose and Impact Categories

This report will attempt to add information to balance the undervaluing of the pedestrian and bicycling modes. It will also attempt to integrate the consideration of bicycling and walking into the context of the broadened conversation regarding what transportation is. The economic impacts of walking and walkability, and bicycling and bikeability, will be examined. These economic impacts are diverse, significant, overlapping, and multi-faceted. In considering these impacts it will be useful to examine them by category, even though there is crossover between categories. The categories are:

1.) Pedestrians & Bicyclists

2.) Businesses

3.) Government

4.) Residents (Society at Large)

Pedestrians & Bicyclists

Pedestrians and bicyclists are direct beneficiaries of investments in non-motorized infrastructure, amenities, events, and programs. Such investment makes it possible for these users to reap the physical and mental health benefits associated with active lifestyle choices; and makes alternative mobility options more attractive. The categories of benefit are: 1. Health, and 2. Mobility Options.

Health Benefit

The benefits of exercise for virtually all age groups are well documented by the medical profession. Exercise is in fact a keystone of preventative medicine --- and considering the monetary, social and human costs of illness and chronic disease, an overwhelmingly cost effective one. Exercise not only strengthens muscles but can cut rates of obesity, heart disease, cancer, hypertension, osteoporosis, stroke, dementia and depression, among other conditions (Peter Tuckel and William Milczarski, *Population Shifts and Implications for Walking in the United States,* Hunter College, July 2012, plus multiple other sources). "Adults who bike to work have better weight, blood pressure, and insulin levels" (Bikes Belong: Gordon-Larsen, P., et al., 2009). "Women who bike 30 minutes a day have a lower risk of breast cancer" (Bikes Belong: Luoto, R., et al., 2000).

"Adolescents who bicycle are 48% less likely to be overweight as adults" (Bikes Belong: Menschik, D, et al., 2008). The Rails-to-Trails Conservancy determined the cost/benefit of Portland Oregon's $57 million investment in a 300-mile bicycle network. As infrastructure was built "From 1991 through 2008, bicycling increased exponentially at an annual rate of 10%, and at annual rates of 15 to 20% more recently." "… by 2008, Portlanders had saved … $10 million in health care costs from the increase in biking."

Positive health outcomes are likewise a major goal of safe routes to school programs --- particularly aimed a reducing rates of childhood obesity with the associated risks of increased diabetes, heart and other diseases. These programs encourage bicycling and walking to and from school, as was much more customary for past generations. Among students living within 1 mile of school, the percentage of walkers fell from 90% to 31% between 1969 and 2001 (Environmental Protection Agency, 2003, *Travel and environmental implications of school siting,* EPA 231-R-03-004). According to the Centers for Disease Control and Prevention, only 13% of children walk to school today compared with 66% in 1970. The health impacts of obesity are of such seriousness that, if not curbed, the predictions that the current generation of children will die at a younger age than their parents may come true. The associated human and economic costs are staggering.

Walking and bicycle riding are among the most affordable and available means of exercise. User monetary costs are minimal for walkers, i.e., perhaps shoes can be regarded as equipment. For bicyclists, costs involve purchasing and maintaining bicycles, helmets, and perhaps specialized riding attire; which is far less than automobile ownership. Per the League of American Bicyclists the cost of operating a bicycle for a year is only $120 (bicyclinginfo.org).

As with all transportation users there are injury risk costs. Any actions, projects, programs or enforcements that contribute to greater safety for non-motorized users will enhance the overall cost-benefit of walking and bicycling. Users themselves can significantly reduce their personal risk by adopting safety practices (proper equipment, following rules of road, being visible and unimpaired). Research has reported that "... the health benefits of cycling outweigh the risks by a factor of 20 to one" (Bikes Belong: Hillman, M., 1992). Additionally, as the number of bicyclists and walkers grows, safety increases --- the more there are, the safer it is (Injury Prevention: Jacobsen, P., 2003).

Mobility Options Benefit

As direct users, pedestrians and bicyclists are also provided transportation options for commute, business and recreational trips – options that are in general more affordable and more supportive of environmental quality. While many people will be unable to forgo all car driving, if even some trips are made by bicycling or walking versus by gasoline-fueled vehicles, financial saving will be realized --- the more non-motorized trips the higher the incremental savings.

According to the 2011 American Community Survey, 37% of Sonoma County households have three or more available vehicles; 41.8% two; and less that 2% none. If a two-car family reduces car ownership to one car by implementing thoughtful trip planning, the savings can be substantial, for the costs of car use include not just buying the car and gas (at this writing approximately $4.00 a gallon), but insurance, maintenance, taxes, fees, financing, depreciation, capital replacement and at times parking and tolls. For example, at an average of 15,000 miles per year, car operation is estimated to cost $8,250 each year (Using the 2012 government reimbursement rate of 55 cents a mile for employee use of private cars). The Bureau of Transportation gave a national estimate in 2010, stating that the average American household spends $7,179 per year on owning and driving their cars (Bureau of Transportation Statistics, 2010). Per AAA's *Your Driving Cost*, the figure was $7,800 for one year of operating a sedan.

Access to less costly transportation also includes access to transit by walking or bicycling. Recent ridership surveys of Sonoma County's three transit operators revealed that the majority of bus riders start and complete their bus trips by walking (Most trips are under 15 minutes in duration). Far fewer used bicycles. See percentages below:

Operator	Walking		Bicycling	
	To bus	From bus	to bus	from bus
Sonoma County Transit	85%	89%	7%	6%
Santa Rosa CityBus	97%	97%	2%	2%
Petaluma Transit	97%	95%	3%	3%

Having adequate infrastructure to safely begin and complete trips on foot is, therefore, essential to an integrated transit system. The majority of people who do not choose to drive for any of a number of reasons (too young, non-driving elderly; transit dependent for financial reasons; and those who wish to use modes with fewer environmental impacts, lower costs, etc.) depend on sidewalks, pathways and road shoulders to access the affordability of transit trips.

"Everybody Walks" is a cliché, but never-the-less a useful one in raising awareness of the importance of the pedestrian mode of transportation. If barriers exist in the walking environment that entail unacceptable safety hazards and/or obstacles for people, including people using wheelchairs or other mobility aids, the benefits of non-motorized and bus transportation may be denied to them. Social equity is served by having a range of viable transportation options. Significant socio-economic benefits are realized when people can reach employment and educational opportunities and needed services. People also need to be able to participate fully in civic, recreational, social, and religious activities of their choice. For some low-income or transit dependent individuals, walking and bicycling may be essential primary modes and/or components of other trips.

It is crucial to understand that the definition of "pedestrian" includes people who use wheelchairs, electric personal assistive devices and other mobility aids. The proportion of these types of pedestrians is anticipated to rise as the boomer generation ages --- the "grey tsunami" is coming. By 2020, (i.e., in less than 8 years) California's senior population (residents 65 years and older) is projected to grow by over 70% from 2000, with the population of those 85

years and older growing by 55% over this period (*Keeping Communities Connected; New Challenges for California's Rural Transportation*, California Association for Coordinated Transportation). Adequate pedestrian infrastructure is needed to provide such users easy and safe access to destinations, including transit services. When people can access fixed route transit, paratransit use can be reduced. Fixed route bus service offers more independence and flexibility.

It is not just people who can't drive or afford cars that want prioritization of pedestrian infrastructure and supporting amenities and actions. "Major population shifts in the United States point to changes in American attitudes and behaviors regarding walking. These shifts are likely to result in a substantial increase in both recreational and utilitarian walking. Three demographic changes, in particular, are likely to promote this "walking revolution": (1) the aging of the baby boomers, (2) the different transportation priorities of young people, and (3) the decline of the suburbs" (*Population Shifts and Implications for Walking in the United States* by Peter Tuckel and William Milczarski, July 2012). Americans in 2011 drove 6% fewer miles than in 2004. Regarding the age cohort of younger drivers (18-30), they are driving even less --- even among those who can afford car ownership (Tuckel & Milczarski).

A recent survey showed that boomers prefer to live in more "walkable" communities – whether these communities are situated in cities, older suburbs, or small towns (Belden, Russonello & Stewart, LLC., *The 2011 Community Preference Survey: What Americans are looking for when deciding where to live*, commissioned by the National Association of Realtors, March, 2011). People want non-motorized options and complete streets. 47% of Americans say they would like more bike facilities in their communities. (National Highway Traffic Safety Administration, 2008).

"Complete Streets" facilitates realization of the mobility benefits of non-motorized options by requiring rethinking streets as "public places." Striving to realize the fullest potential of Complete Streets should be a countywide priority. As policy, it aims to consider the needs of all users of all modes, of all ages and all abilities. As infrastructure is built and retrofitted, implementation will facilitate walking, bicycling and transit use, because those users, in addition to motorists, are to be explicitly accommodated. Motorists of all ages, driving vehicles of all types (e.g., including buses and emergency vehicles) are also to be considered. At times needs compete, so addressing them requires balancing. Complete Streets maximizes the utility of the economic investment in streets, and serves to

democratize them because one type of user is not given preference over another.

In his thirty years of studies of how people use space and time, Swedish geographer Torsten Hagerstrand concluded that it is the ability to make contact with people that determines the success of a transport system or location. He made the case that *access* is what we really value, but that the transportation system has been giving us mobility, but not mobility for all; rather mobility in proportion to wealth, and reduced access for almost all. Complete Streets reverses this trend.

Businesses

The positive economic impacts of event-based and year-round bicycling and walking are increasingly recognized in Sonoma County. Economic benefits for the business sector are realized as profits. Business profits are gained through sales generated by tourism events; directly from sales related to bicycle use and walking; and more pervasively through the walkability and bikeability of business place environments --- the profitability of ambiance. Less direct impacts take the form of increased property values; and the ability to recruit and retain a desirable work force.

Tourism Profits Benefit

Some of the draws for bicycle tourism, including major bicycle events, bicycling tour groups, and independent riding, are the County's scenic environments, varied topographies, moderate climate and bicycle related businesses. Annual bicycle and pedestrian events impact the local economy through spending by riders, support staff, riders' families, spectators, staff, and media personnel on food and drink, shopping, recreation and lodging. Events also generate business for local media and advertisement suppliers, which in turn generate profits from advertising. Some tourists come to Sonoma County for scheduled events; many others are avid or more casual independent bicyclists looking for vacation destinations with attractive bicycle facilities. Organized or not, tourist dollars are spent.

Sonoma County hosts many special bicycle and pedestrian events. Some of the major annual bicycle and pedestrian races and events include the Amgen Tour of California, Levi Leipheimer's King Ridge GranFondo, Vineman Triathlon, and the Santa Rosa Marathon. A list of scheduled

2012 bicycle and pedestrian events is provided in Appendix A of this report.

The Amgen Tour of California is one of the largest, most successful, and recognized bicycling events in the United States. Since the Amgen Tour of California's start in 2006, the city of Santa Rosa has held stage starts and finishes, which provide Santa Rosa with significant economic benefits. In 2012, the Amgen Tour of California was projected to generate $6.8 million for the local economy as spectators, racing teams, sponsors, and organizers patronized local hotels, restaurants, and shops. (Bob Norberg, *Amgen Tour of California Expected to be Economic Boon for Santa Rosa.* The Press Democrat, 2012). During this year's tour there were over 2,000 hotel rooms filled in Santa Rosa and 4,500 throughout Sonoma County. According to the Sonoma County Tourism Bureau, this amounts to about $750,000 a night in room revenue and an additional $1.8 million in spending per day by visitors and tourists.

Levi Leipheimer's King Ridge GranFondo is another bicycle event that is held annually in Sonoma County. Santa Rosa's *GranFondo Economic Impact Report for 2009* states that nearly 3,500 bicyclists (some local and some visitors) registered and participated in the event. It created 13.8 jobs; recruited 600 volunteers and 48 vendors with staff to work the event. Results from a rider survey indicated 65% of the participants stayed in Santa Rosa for one or more nights (43% for 1 night, 22% for 2 + nights) and 51% stated that they traveled with friends and family who did not ride in the event. This produced an economic benefit of tourist spending over the weekend of the GranFondo of $811,807, and transient occupancy tax of $17,325.

The assumed average daily spending of the visitors the weekend of the race includes:

- Food and Beverage $50.00
- Lodging $100.00
- Retail $50.00

Many local bike shops, bars, and restaurants experienced record or near record sales on the weekend of the GranFondo. Sonoma County hotels and lodging facilities either had high occupancy rates or were completely sold out within the city limits of Santa Rosa for the weekend of the event.

Extrapolations can be made for the more recent GranFondos, the latest of which was on September 2012. The estimated number of riders has at least doubled since 2009. As a rough measure, the economic benefits could be estimated as likewise doubling. An additional economic benefit is the money the event raises. It is plowed back into the local economy. $200,000 was expected to benefit Santa Rosa (for hosting), and local charities, schools and activities. The event itself covers expenses that would otherwise be public costs. For example "Fifty CHP officers were hired to handle and direct traffic." (Bob Norberg, *GranFondo*, The Press Democrat, 9/26/2012.)

For the *2011 Sonoma County Annual Tourism Report* (Sonoma County Economic Development Board, and Sonoma County Tourism Bureau) local tourism-related businesses were asked to identify what tourism assets were most attractive to potential visitors to Sonoma County and in which markets there was room for growth. The highest ranking of potential niche markets was judged to be bicycling at 53.8%.

It is safe to assume that the Vineman, Santa Rosa Marathon and the many other bicycle and active recreation events produce similar economic impacts on the local economy proportionate to the size of these events. Across the U.S.A. $46.9 billion is spent on meals, transportation, lodging, gifts and entertainment during bicycling trips and tours (Darren Flusche, Policy Analyst, *The Economic Benefits of Bicycle Infrastructure Investments*, League of American Bicyclists, June 2009).

Sales Profits Benefit

Sonoma County is home to bicycle and pedestrian related businesses including manufacturers and retailers of bicycles and parts; bicycle repair and maintenance services; running and cycling apparel; and bicycle tour operators. These types of businesses provide economic benefits through annual sales, rentals and services. Only part of such sales are to tourists. A list of bicycle oriented businesses is provided in Appendix B of this document. Businesses range from small and medium businesses to large big box retail stores. Local business owners were interviewed in order to gather information, and to get a sense of the magnitude and type of economic impacts bicycle and pedestrian related businesses have

on the County. From the information gathered, annual revenue from sales, rentals, repairs, and services from these small and medium sized bicycle and pedestrian related business is estimated at $900,000 to $1.5 million. Additionally, big box businesses provided various comparable products.

Nationwide, "More than three times as many new bicycles (14.9 million) are sold in the U.S. each year than cars (4.6 million)" (National Bicycle Dealers Association, 2010; Bureau of Transportation Statistics, 2010). The U.S. bicycle industry sold $5.6 billion in bicycles and equipment in 2009. (National Bicycle Dealers Association, 2010)

Profitability of Ambiance Benefit

More subtle, but more pervasive and sustainable are the positive economic impacts that result from an increased emphasis on creating and maintaining walkable and bikeable communities. By creating a culture that promotes and supports non-motorized travel, both visitors and residents are encouraged to bicycle and walk. For retail shops and eating/drinking establishments, fostering non-motorized traffic by making environments safe, pleasant and convenient is good for business. Sonoma County has a wealth of environments that thrive as being pleasurable places to walk and bike. Many Sonoma County downtowns are vibrant meccas for business friendly non-motorized traffic. Complementary to Sonoma County's spectacular Wine County vistas is the charm of bicycling on scenic rural roadways and walking in picturesque built environments. Many of the old downtowns existed before the advent of motor vehicles, so they are walkable by design. There are also new areas that have

been built with walkability/bikeability in mind. People spend money where it is pleasurable to linger and stroll --- places where foot traffic is safe, trees give shade, and the environments are interesting and human scale.

Walkability for seniors merits special attention in so much as "Statistics show that Americans 50 years of age and over account for one-half of the total amount of discretionary spending" (Peter Tuckel and William Milczarski, *Population Shifts and Implications for Walking in the United States*, July 2012). Walkability for seniors means smooth sidewalks and also adequacy of crossing times, places to sit to rest, and good lighting.

A discussion paper referenced below explored the economic benefits of making streets more walking and cycling friendly. This topic was taken on in part because "A potential barrier identified in 2010 was around retailer perceptions that creating pedestrian and cycle friendly streets would negatively impact the retail sales of the traders located on those streets. Retailer and trading associations had opposed reducing traffic speeds in high pedestrian areas and had called for more car parking near local shops" (Dr. Rodney Tolley, *Good for Business: The benefits of making streets more walking and cycling friendly*, Heart Foundation of Australia, 2011). The report has applicability locally. The research demonstrated strongly that greater pedestrian ease, safety, and comfort; bicycle parking; and a welcoming of customers arriving on foot or by bicycle (many from surrounding neighborhoods) was an excellent means of boosting sales --- not in the least an inhibitor.

Property Value Benefit

Another positive economic impact on businesses from the establishment of a bicycling culture and a pleasant, safe and convenient walking and bicycling environment is the resulting increase in property values. The desirableness of places to eat, drink, shop and conduct business is positively impacted economically when people can access them by non-motorized modes. As such, those properties are more valuable.

Business Workforce Benefit

Less measurable, but no less valuable, is the attractiveness of Sonoma County as a place to work, live and raise families. Businesses have the advantage of recruiting and retaining employees in a place many find attractive. Part of that attraction is the walkability of many Sonoma County environments and the year-round opportunities for great bicycling of all types.

Sonoma County residents are fortunate in having many state, county, and city parks, and open spaces, for hiking (both organized groups and independent) and bicycling.

Furthermore, when employees engage in active transportation, statistically they will tend to have reduced rates of absenteeism related to health problems; and greater productivity (e.g., due to more alertness).

Government

Government is primarily responsible for planning, designing, constructing and maintaining non-motorized infrastructure. Government also provides law enforcement both year-round and for special events to foster bicycling and walking safety; and delivers services like barrier placement and clean-up after events. Government also incurs costs aimed at increasing the health of communities. Bicycle Encyclopedia (www.bicyclinginfo.org/bikecost) and Guidelines for Analysis of Investments in Bicycle Facilities (Krizek, et al. 2006) are recommended as sources of infrastructure costs. The former has a web-based tool that enables cost/benefit analysis. Locally, cost estimates are provided in the *Countywide Bicycle & Pedestrian Master Plan* (find at www.sctainfo.org: Planning/Transportation/Bikes & Pedestrians).

Conversely, government reaps economic benefits by having a non-motorized system, and supporting bicycling and walking. Benefits include revenue sources and revenue savings. Unlike businesses that operate for profit, however, government operates to serve the public good --- and as such the benefits are not all easily monetized.

Revenue Generation Benefit

Public funds may pay for bicycle facilities, pathways, and sidewalks; walking or bicycling maps; education programs; bicycle and pedestrian amenities like racks, benches, street trees; bike parking; center medians; curb bulbs; speed humps; traffic circles; crosswalks, signs and signals; and maintenance --- and in ideal circularity, the volume of some of those public funds are positively impacted by bicycling and

walking --- directly and indirectly. Examples include sales taxes, transient occupancy taxes, property taxes, capital gains and estate taxes

Pertaining to the 2012 Amgen race, Raissa de la Rosa, Santa Rosa's economic development specialist, stated that for the city of Santa Rosa alone, the event was expected to generate $82,000 in hotel occupancy taxes (Bob Norberg, *Amgen Tour of California Expected to be Economic Boon for Santa Rosa.* The Press Democrat, 2012).

When sales are up, sales-tax based revenue sources, such as local Measure M and state Transportation Development Act (TDA), are also up. Both of these programs have dedicated funding streams for non-motorized. infrastructure. Other taxes flow into capital projects and non-capital programs that can benefit bicyclists and walkers. The League of American Bicyclists reports that nationally bicycling generates $17.7 billion in federal, state and local taxes (Darren Flusche, *The Economic Benefits of Bicycle Infrastructure Investments*, League of American Bicyclists, June 2009).

Cost Savings Benefit

Much of the economic benefit for government is based much less on economic generation than significant cost savings. These cost savings would be greatly accelerated if levels of bicycling and walking were to reach those achieved in many other countries (e.g., Denmark, Netherlands, China, Germany). The greater the mode shift to modes with lesser roadway impacts the lower the need for costly vehicle-oriented infrastructure investment, as well as for vehicle parking. Other externalities of motor vehicle use --- that become public costs --- include traffic congestion; air, water and noise pollution; and greenhouse gas (GHG) production. Each one of these is costly to mitigate and have been persistent over time. All have significant negative public health consequences. Climate change, effected directly by the rise in GHGs, is changing eco-systems. Governments will be challenged to deal with the resulting social and economic fallout of

resource issues related to land use, water and food supply; health, safety and emergency preparedness and response needs; and massive infrastructure adaptation impacts. Hurricane Sandy is only the latest example of a climate change influenced disaster. Climate scientists have been predicting an increase of just such extreme weather events. The governmental costs of just Sandy will be monumental, and even greater are the costs in lives and human losses.

Dependence on oil supply creates enormous costs related to extraction and protecting foreign supply and supply routes; as well as huge environmental impacts both domestic and international.

The overarching message is that increasing the use of non-motorized modes can mitigate the costs of each of these externalities.

In Chapter One it was stated that adequate pedestrian infrastructure is needed to provide users easy and safe access to destinations, including transit services. When people can access fixed route transit, paratransit use can be reduced. Because of the cost differential between what a fixed route bus trip costs a transit provider and what an on-demand paratransit trip costs, government realizes savings each time fixed route can be utilized by a rider who would otherwise ride paratransit.

CityBus Transit Planner, Michael Ivory, reports that for every trip taken by fixed route bus versus paratransit a savings of $24.00-$25.00 is realized. The full cost for Santa Rosa of a paratransit trip is approximately $27.00 to $30.00; for a fixed route bus trip approximately $2.70. Adding to the overall cost is increasing demand for paratransit services. The full cost of a county paratransit trip is approximately twice that of Santa Rosa.

Over the last decade, there has been greater recognition of the health impacts of transportation choices. Many of these impacts are directly related to public costs of health care delivery; and lost productivity due to sickness and absenteeism. If a population's health can be improved through the increased choice of non-motorized modes, personal,

private (e.g., employers) and governmental costs can be reduced. As an example: by 2040, the city of Portland, Oregon will have saved $3.40 in health care expenses alone for every dollar it invested on bicycling (*Why Invest in Bicycling*? Bikes Belong). The *2012 Benchmarking Study* states "If just one out of every 10 adults started a regular walking program, the U.S. could save $5.6 billion in health care costs — enough to pay the college tuition of more than 1 million students" (Alliance for Biking & Walking). Additive are the improved health outcomes resulting from a reduction of pollution from motor vehicles, for example reduced particulate exposure for people with pulmonary diseases.

An online tool was developed by the World Health Organization (WHO) to enable economic quantification of mortality rate improvements resulting from regular bicycling and/or walking. (see: positive health effects of cycling and walking). The Health Economic Assessment Tool (HEAT) can be applied in many situations. It can be utilized in planning new bicycling or walking infrastructure, allowing modeling of the impact of different levels of cycling or walking, and attaching a value to the estimated level when the new infrastructure is in place. This can then be used to make more informed decisions. HEAT can also be used in health impact assessments of policy targets pertaining to walking and bicycling.

Residents/ Society at Large

Residents of Sonoma County realize larger societal benefits, in multiple ways, related to bicycling and walking, in additional to those related to being bicyclists and/or walkers. Several of the ways are explored herein: Employment, property values, and myriad positive environmental influences.

Jobs Benefit

A direct benefit of bicycling and walking in Sonoma County is through the job opportunities resulting from bicycle-related manufacturing, retail sales and maintenance of bicycles; planning, design and construction of non-motorized infrastructure; bicycle and pedestrian advocacy; safe routes and safety programs; plus those generated by non-motorized events (including associated media use and reporting); rentals; and tours. As described above, jobs may be directly related, or indirectly by way of visitor and resident spending ancillary to events and tourism. According to the League of American Bicyclists, bicycling supports nearly 1.1 million jobs nationally (Darren Flusche, *The Economic Benefits of Bicycle Infrastructure Investments*, League of American Bicyclists, June 2009).

Sonoma County has many small and medium sized bicycle and pedestrian related businesses providing products and services, such as sales of bicycles, parts, and accessories, running shoes, bicycling apparel, bicycle repairs, and bicycle rentals. Small bicycle and pedestrian related businesses employ between two and four full time employees with an average annual staff salary from $40,000 to $80,000. On average, medium sized bicycle and pedestrian related businesses employ a mix of full time and part time employees, ranging from six to twelve employees. These medium sized businesses have annual staff salary expenditures of $250,000 to $300,000+ for their full time and part time employees (data derived via employer surveys).

Property Value Benefit

Residents also benefit by the rise in property values when their neighborhoods/communities are perceived as being walkable and bikeable. Desirableness as places to live and work are positively impacted economically when people can move about on safe and attractive ample sidewalks and bicycle paths or lanes. In a report the case was made that "… houses with the above-average levels of walkability command a

premium of about $4,000 to $34,000 over houses with just average levels of walkability…" The study analyzed 94,000 real estate transactions in 15 major U.S. markets. A 100 point "Walk Score" methodology was developed to rate neighborhood walkability. The research revealed that house values increased by $700 to $3,000 for each point of walkability (Joseph Cortright*, Walking the Walk: How Walkability Raises Housing Values in U.S. Cities*, Impress, Inc., 2009). Similarly, "Studies have shown that homes closer to bike paths are more valuable" (Bikes Belong: Various sources).

In the Heart Foundation discussion paper *Good for Busine$$,* Carl Coletta, President and CEO of CEOs for Cities in the US, is quoted as stating that research findings "… are significant for policy makers. They tell us that if urban leaders are intentional about developing and redeveloping their cities to make them more walkable, it will not only enhance the local tax base but will also contribute to individual wealth by increasing the value of what is, for most people, their biggest asset" (i.e., one's house). The paper went on to state that "… a 5 to 10 mph reduction in traffic speeds increases property values for adjacent residences by 18% to 20%."

Environmental Benefit

All residents also benefit from the environmental benefits achieved through bicycling and walking. These include reduction of polluting emissions to air and water, greenhouse gases, noise, and traffic congestion, with its associated cost of travel delay. "For every 1 mile pedaled rather than driven, nearly 1 pound of CO_2 (0.88 lbs) is saved." (US Environmental Protection Agency, 2009) "Traffic congestion wastes nearly 3.9 billion gallons of gas per year in the U.S." (Texas Transportation Institute, 2010)

The Rails-to-Trails Conservancy determined the cost/benefit of Portland Oregon's $57 million investment in a 300-mile bicycle network. As infrastructure was built "From 1991 through 2008, bicycling increased exponentially at an annual rate of 10%, and at annual rates of 15% to 20% more recently." "By 2008, Portlanders had saved $12 million in fuel … costs from the increase in biking." By 2040, amortizing the initial $57 million, and considering another $100 million investment, and $7.2 million for promotion, Portland "… is on track to generate net benefits of $1.2 billion" … "more than $8 for each dollar invested" just considering two of the many potential factors of savings (a benefit to cost ratio of 8.3 to 1) (Thomas Gotschi, PhD, *The Success of Active Transportation in Portland*, Rails-to-Trails Conservancy).

The conservancy conducted additional research on the benefits of bicycling and walking. In the report *Active Transportation for America: The Case for Increased Federal Investment in Bicycling and Walking*, quantitative assessments and an overall estimation of the monetary value of the benefits of current and future bicycling and walking is provided. "The main premise of the analysis is that short trips of three miles or less, which currently make for about half of all trips taken in the United States can, to some extent, be shifted from driving to bicycling and walking." Currently 78% of these short trips are made by car. "One-quarter of all trips … are within a mile, or about a 20-minute walk." US Department of Transportation confirms that "most trips Americans make are short: 50% are less than 3 miles, 40% are less than 2 miles, and 28% are less than 1 mile." (US Department of Transportation, 2009). The status quo for bicycling and walking was deemed to be a 9.6% mode share; a modest increase would be 13%; and a substantial shift 25%. For comparison, Portland is aiming for 20% by 2040. The report stated that the federal investment in bicycling and walking is only about $1.50 a year per resident. Being the United States has the lowest rate of active transportation of all western countries and investments have a direct relationship to rates, the under investment is a barrier to achieving the transportation, oil independence, climate protection and public health benefits estimated with cost/benefit ratios of $1 to $5 or more.

Short car trips are a significant source of emissions. The rate of emissions during the first few miles of driving is higher, and fuel efficiency is lower, because the catalytic converter does not function well when a car is first started. Shifting to non-motorized trip making for short trips (e.g., under 5 miles) helps to reduce these "cold start" vehicle emissions.

The benefits of non-motorized mobility choice extend to the global in terms of climate protection. The Victoria Transport Policy Institute states “Walking and cycling improvements can support strategic land use development objectives by helping to create more compact, mixed, multi-modal, “smart growth” communities, where residents drive less and rely more on alternative modes” (Todd Litman, *Evaluating Non-Motorized Transport Benefits and Costs*, 2012). The Bay Area Air Quality Management District states “Walkability of environments and increased transit use are key strategies of creating sustainable communities, thus walking is deserving of greater focus for the benefits of greenhouse gas and pollution reduction. Alternatives to gas-powered single-occupancy vehicles, whether for commuting or recreation, serve environmental goals.” Likewise this holds for bikeability.

Summary

At first glance it is easy to think that the benefits of investment in non-motorized modes accrue principally to users of non-motorized modes. While it is true that bicyclists and pedestrians derive the direct benefits of active transportation for their health and pleasure, as well as the socio-economic advantages of a range of mobility options, this paper has also explored an array of other benefits. Economic benefits appear as significant contributions to Sonoma County's business vitality, employment base, and property valuation. Greater mode shifts to non-motorized modes—spurred by investments in facilities and programs --- have the potential to save governments billions of dollars, while realizing for society at large an array of positive quality of life, health, and environmental benefits. These benefits all have positive economic consequences.

With prudent examination of cost/benefit calculations of investments that take account the breadth of impacts, decision makers will be wise to consider ways to make bicycling and walking more ubiquitous, safe and connected in networks. Today, transportation must no longer be regarded as simply mobility --- rather transportation choices are part of an interwoven tapestry of societal needs for health, prosperity, and quality of life for all members --- and as any good tapestry it needs to wear well through time by being sustainable for the long-term.

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Committee members are thanked for their contributions:

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Lynn Walton, Sonoma County Health Department

Photography by Lynne March

APPENDIX A: 2012 Events

January

1 Resolution Run 5 K

February

18 Heart to Heart 5 K

19 Valley Ford Relay

March

11 Ilsanjo Classic 10-miler & Neo-Classic 4-miler

17 St. Patrick's Day Run

31 Tech High 5K Race for Success

April

8 Loop de Loop 14-Mile Trail Race/ 2 x 7 Mi Relay

14 Annadel Half Marathon & Kathy's Race 5K

15 Biker Chicks with Shirlee Zane

21 Double Dare Duathlon

22 8th Annual Petaluma Footrace

28 Kelseyville Donut Run

May

5 Wine Country Century

5 Human Race

5 Boggs Mountain Bike Race

6 Biker Chicks with Shirlee Zane

10 Bike to Work Day!

12 Echelon Gran Fondo

12 Girls on the Run 5K

12 Sonoma Valley Footrace and Festival

13 Amgen

19 Mombo's to Mombo's

19 Sonoma County Backroad Challenge – Petaluma

19 Lake Sonoma MTB Series

20 Windsor Green Half Marathon

20 Jackrabbit Derby

20 Heart and Sole Festival of Miles

29 Tuesday Night Twilight Series Starts

June

2 SoNoMas MTB Enduro

3 Fitch Mountain Footrace

10 Windsor Just Ride! Bike Ride

10 Biker Chicks with Shirlee Zane

10 The Dipsea Race

16 Terrible Two

16 Lake Sonoma MTB Series

23 Steven Cozza's Giro Bella Classic

24 Bruce Gordon's Bike Swap

July

4 Kenwood Footrace 10K and 3K

14 Healdsburg Harvest Century Tour

15 Vineman Ironman Race

15 Napa-to-Sonoma Wine Country Half Marathon

18 Howarth Park Dirt Crits

21 Rivertown Revival

21 Lake Sonoma MTB Series

28 Other Vineman Events

August

5 Salmon Creek Beach Run

11 Tour d'Organics

12 Water to Wine Half Marathon

18 Annadel Mtn. Bike Race

18 Holstein 100

19 Sonoma County Bicycle Expo

25 Phil Widener Empire Open

26 Santa Rosa Marathon

26 Run/ Walk for Daniel

APPENDIX A: 2012 Events

September

2 Annadel Loop 7-mile Trail Race

8 Tour De Fuzz

9-13 Climate Ride

15-16 MS Waves to Wine Ride

16 Petaluma Clo-Cow Half Marathon & 5K

29 Levi's GranFondo

October

3 Walk and Roll to School Day

14 Wine Country Marathon

14 Healdsburg Half Marathon

November

25 McGuire's Breakfast Run

December

1 Girls on the Run 5K

15 The Last 10K & Final 2-Mile

APPENDIX B:

Sonoma County Bicycle Related Businesses

BUSINESS	CITY
Aria Velo	Santa Rosa
BiciSport	Petaluma
Bicycle Czar	Santa Rosa
Breakaway Bikes	Rohnert Park
Cambria Bicycle Outfitter	Santa Rosa
Cloverdale Cyclery	Cloverdale
Costco	Rohnert Park
Costco	Santa Rosa
Echelon Cycle & Multisport	Santa Rosa
eMotors	Sebastopol
Kmart	Santa Rosa
Mike's Bikes	Petaluma
NorCal Bike Sport	Santa Rosa
Performance Bicycle Shop	Santa Rosa
Play It Again Sports	Santa Rosa
REI	Santa Rosa
Rincon Valley Cyclery	Santa Rosa
Sonoma Valley Cyclery	Sonoma
Spoke Folk Cyclery	Healdsburg
Sports Authority Sporting Goods	Santa Rosa
Target	Rohnert Park
Target	Santa Rosa
The Bike Peddler	Santa Rosa
The Hub Cyclery	Cotati
Trek Store	Santa Rosa
Uber Bike, LLC	Santa Rosa
Uncle Crusty's Bike Shop	Santa Rosa
Walmart	Rohnert Park
Walmart	Windsor
West County Cycle Service	Sebastopol
West County Revolution	Sebastopol
Windsor Bicycle Center	Windsor
Wine Country Cyclery	Sonoma