

Urban Open Space: Essential to Physical and Mental Health

Sonoma County’s public parks, preserves, and regional trails are some of the many open spaces essential to our community’s health and social well-being. From Petaluma to Gualala and Sonoma to Bodega Bay, residents and visitors can explore some of the most beautiful natural, undeveloped landscapes, gather at sports fields and playgrounds, and head to our beaches and boat launches.¹ Hikers, bikers and horseback riders can follow more than 140 miles of regional trails and campers can choose from one of 268 campsites to pitch their tent. School children venture to nearby parks for Physical Education classes or afterschool programs. Together, these urban and rural spaces offer residents nearly 300 areas open to the public to relax and unwind, or engage in physical activity.

The Benefits of Open Space

Researchers for years have documented the link between physical activity and our health. Recent studies now show the influence that parks, trails and other open space have on residents’ motivation to get outdoors and exercise. In particular, the open spaces within and near our towns and cities have encouraged higher levels of physical activity among our residents, contributing to their lasting physical and mental health with lower rates of obesity and diabetes, reduced stress, and increased productivity at the workplace (see details below). When communities make an investment in accessible, outdoor recreational space, children and adults are more active – a major goal of health advocates.

Open Space Encourages Physical Activity

- A review of 50 studies found that 40 of the studies showed at least some positive association between the presence of recreation settings (such as parks, trails and open space) and levels of physical activity in a community.²
- Urban parks, trails and other outdoor public open spaces are more often used for physical activity than a gym or other indoor exercise facility.³
- The location of our parks and trails plays a key role in how residents use them. The closer the park to a resident’s home, the higher the odds a resident will engage in physical activity.^{4,5,6,7}
- Along with school grounds, public open space such as parks are an important setting for physical activity among children. In fact, the National Physical Activity Plan (2014), in its *2014 United States Report Card on Physical Activity for Children & Youth*, stated that “Evidence suggests parks are second only to schools as the setting where children and youth are most active.”⁸

The Health Benefits of Physical Activity

- In adults, documented health benefits of physical activity include weight loss, prevention of weight gain, increased lifespan, as well as a lower risk of coronary heart disease, stroke, type 2 diabetes, breast cancer, and colon cancer.^{9,10,11,12}
- In children, physical benefits include improvements in bone health, muscular fitness, and body composition.¹³

The Mental Health Benefits of Open Space

- Exposure to neighborhood green spaces has been linked to recovery from mental fatigue, stress reduction, and lower levels of symptoms for depression and anxiety.¹⁴
- The presence of a nearby urban park can result in the same mental health benefits to a community as a decrease in unemployment by 2 percent, as measured by the 5-item mental health inventory (MHI-5), an international method used by researchers to measure mental health in communities.¹⁵
- Leisurely forest walks can lead to a significant decrease in the stress hormone cortisol and lower depression and perceived stress.^{16,17} A 2015 study in the Bay Area found that nature walks resulted in decreased anxiety and had a greater positive affective benefits (e.g. decreased anxiety, preservation of a positive mood) compared with urban walks.¹⁸
- Exercise in outdoor natural environments may have added benefits compared with indoor exercise. One study found that “...exercising in natural environments was associated with greater feelings of revitalization and positive engagement, decreases in tension, confusion, anger, and depression, and increased energy.”¹⁹
- In children, research shows that opportunities for children to play, such as those provided by playgrounds and parks, are linked to positive development of neural pathways for motor-skills, social skills, cognitive learning, imagination, language, and expression.^{20,21}
- Children who have little access to nature often have higher rates of ADHD and other mental disorders.²² For those children with ADHD, a 20-minute walk can be just as effective as the common prescription medication to improve concentration.²³

Promoting Use of Open Space with Parks Prescriptions

Healthcare providers across the U.S. are writing “parks prescriptions” to encourage patients to engage in some form of physical activity and develop outdoor exercise habits. San Diego County’s *Rec Rx* initiative for example offers subsidized fitness classes and free recreation programs to overweight youth through clinical prescriptions, providing opportunities to exercise while reducing associated costs and other real and perceived barriers.²⁴

The Sonoma County Regional Parks Foundation is piloting a parks prescription program using a \$7,500 grant between 2012 and 2013.²⁵

Estimating the Economic Benefits of Urban Open Space in Sonoma County

The *Sonoma County Community Health Needs Assessment (2013-2016)* identifies physical fitness, along with a healthy diet, as one of the top opportunities for reducing obesity, chronic disease, disability, and premature mortality in Sonoma County.²⁶ *A Portrait of Sonoma County*, commissioned by the County of Sonoma Department of Health Services, recommended increased access to parks as one key place-based intervention that would benefit the health of Sonoma County residents overall.²⁷ By providing residents with a place to exercise, Sonoma County's urban parks and open spaces may be among the county's most cost-effective assets to reduce medical spending associated with obesity and inactivity.

Valuation Approach: Economic Benefits for Adults and Seniors

The economic benefits of improved health from engaging in regular physical activity can be valued as the prevented or avoided costs due to that activity. The costs associated with physical inactivity among adults in Sonoma County have been estimated at \$274 million annually (in 2013 dollars),^{28,1} representing both healthcare costs and lost productivity costs due to illness or other factors. That calculates to approximately \$699 for each adult in Sonoma County, and \$534 for each senior.²

To determine the current value of the healthcare and productivity benefits of Sonoma County's urban parks and open spaces, Earth Economics estimated the number of adults and seniors who met all three of the following conditions:

1. They live in urban areas; AND
2. They meet the U.S. Centers for Disease Control and Prevention's physical activity recommendations (based on the amount of time and types of physical activity they engage in weekly);²⁹ AND

¹ Note that this estimate is specific to the costs associated with *physical inactivity*. The source of this estimate (Chenoweth and Associates, 2009) provides an independent estimate for costs associated with *obesity* in Sonoma County.

² For the purposes of this calculation, it is assumed that the majority of seniors do not work, and therefore the healthcare costs are applied, while the costs associated with "lost productivity" are not included.

- They use the county’s urban parks, trails or open spaces to meet those activity recommendations.

For our calculation, we assumed the population of adults and seniors in Sonoma County who meet all three of the above requirements avoid healthcare and/or lost productivity costs solely through physical activity in Sonoma County’s parks and open spaces.³ By multiplying the population numbers with the cost savings per individual for each age group, we were able to calculate the total annual value for avoided costs across the county.⁴ Table 1 summarizes the results of this analysis.

Table 1. Value Supported by Sonoma County Parks and Open Spaces for Adults (18-64 years old) and Seniors (65 years old +)

Calculation Step	Adults (18-64 years old)		Seniors (65 years old +)	
	Proportion	Population / Value	Proportion	Population / Value
Population in Sonoma County		312,361 ³⁰		79,204 ³¹
Population who live in urban areas	69.7% ³²	217,600	69.7% ³³	55,176
Number who meet CDC daily activity recommendations	58.2% ³⁴	126,643	58.2% ³⁵	32,112
Number who exercise in parks or trails	16.5% ³⁶	20,892	16.5% ³⁷	5,297
Annual cost savings in Sonoma County related to healthcare & productivity (per individual)		\$699 ³⁸		\$534 ³⁹
Annual cost savings in Sonoma County related to healthcare & productivity (total)		\$14,602,313		\$2,829,491

Valuation Approach: Economic Benefits for Children

Like adults and seniors, children receive a variety of benefits from physical activity in parks and open spaces; however, limited information is available on the costs associated with physical inactivity for children. It is likely that most of the medical costs associated with child inactivity are incurred later in adulthood.⁴⁰ Earth Economics therefore developed a conservative estimate for the costs of inactivity by using only the avoided costs associated with obesity, which is just one of the many medical conditions associated with physical inactivity in children.

³ It is important to note that if the parks and open spaces were to suddenly disappear, these avoided costs would not necessarily be incurred due to substitution effects (e.g. some people would use an indoor gym for exercise instead). However, the goal of this study is to estimate the value of the parks and open spaces as they are currently used.

⁴ All values are in 2013 dollars.

Earth Economics estimated the additional medical costs associated with childhood obesity based on the average of estimates in two commonly cited studies in the literature.^{41,42} Costs can include higher prescription drug expenditures, outpatient procedures and other medical costs. We concluded that the cost of obesity for each child was \$318 per year, but that amount covers all causes of obesity, such as genetics, diet, and socioeconomic factors. The contribution of physical activity to reduction in obesity, in proportion to these other factors, is difficult to put precise a number on, and it may be more important in some children than others. To estimate the relative importance of physical activity, we relied on several papers, as well as a comprehensive literature review of 31 studies, investigating the relationship between physical activity and obesity in children.^{43,44,45,46} The literature review found that the four studies that most objectively measured physical activity levels in children (e.g. using accelerometer) demonstrated the strongest relationship. Therefore, we believe it is safe to say that physical activity accounts for at least for 25 percent of the prevention and reduction of obesity in an average child. This translates to ($\$318 \times 0.25 =$) \$79 a year.

As we did with adults, we estimated of the number of children in Sonoma County who live in urban areas, meet the CDC’s physical activity recommendations,⁵ and use the county’s urban parks, trails or open spaces. For our calculation, we assumed the children in Sonoma County who meet all three of those requirements avoid obesity-related healthcare costs through physical activity in Sonoma County’s parks and open spaces.⁶ By multiplying that population of children in Sonoma County with the obesity-related cost savings per child, we were able to approximately estimate the total annual value supported by parks and open spaces.

Table 2. Value Supported by Sonoma County Parks and Open Spaces for Children (5-17 years old)

Calculation Step	Multiplier	Value
Population in Sonoma County		76,729 ⁴⁷
Population who live in urban areas	69.7% ⁴⁸	53,452
Number who meet CDC daily activity recommendations	27.1% ⁴⁹	14,485
Number who exercise in parks or trails	8.2% ⁵⁰	1,195
Annual cost savings in Sonoma County related to obesity (per individual)		\$79 ⁵¹
Annual cost savings in Sonoma County related to obesity (total)		\$94,975

⁵ U.S. Department of Health and Human Services, 2008. Fact Sheet for Health Professionals on Physical Activity Guidelines for Children and Adolescents. Available at: http://www.cdc.gov/physicalactivity/downloads/pa_fact_sheet_children.pdf

⁶ It is important to note that if the parks and open spaces were to suddenly disappear, these avoided costs would not necessarily be incurred due to substitution effects (e.g. some people would use an indoor gym for exercise instead). However, the goal of this study is to estimate the value of the parks and open spaces as they are currently used.

Investments in Open Space Trigger Health Care Savings

The annual health and productivity benefits and associated cost savings provided by urban open space and parks in Sonoma County are estimated to be \$95,000 for children, \$14.5 million for adults, and \$2.8 million for seniors, for a total of approximately \$17.5 million annually. By comparison, the combined budgets of the various county and city parks departments and open space agencies in Sonoma County – the Sonoma County Regional Parks, Sonoma County Agricultural Preservation and Open Space District, the nine incorporated cities, the Monte Rio Recreation District, and the Russian River Recreation District - is approximately \$72 million.⁷

The \$17.5 million in value that our urban open spaces provide is a preliminary estimate. In fact, the savings could be substantially more (or less) if we gathered more detailed, local information for Sonoma County. To more accurately the health and productivity benefits of open space, surveys could be conducted to determine the percentage of residents in Sonoma County who use parks and open spaces for exercise, and what proportion of their exercise is done in parks and open space. In addition, those results could be expanded to include the number of people who use rural parks and open spaces to meet their daily physical activity requirements, which would likely increase the value significantly.

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⁷ Because a large portion of the Sonoma County Regional Parks and Sonoma County Agricultural Preservation and Open Space District budgets are dedicated to rural parks and open space, this means the budgets dedicated to urban parks and open spaces is likely significantly lower.

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³⁸ Healthcare and lost productivity costs for adults are based on a study by Chenoweth and Associates (2009) estimates that healthcare and lost productivity costs in Sonoma County total \$274 million annually. This cost was then divided by the total population of adults and seniors in Sonoma County (391,565) to arrive at a per person annual cost of \$699.

³⁹ Healthcare and lost productivity costs for adults are based on a study by Chenoweth and Associates (2009) estimates that healthcare and lost productivity costs in Sonoma County total \$274 million annually. This cost was then divided by the total population of adults and seniors in Sonoma County (391,565) to arrive at a per person annual cost of \$699. However, it is assumed that most seniors would be retired and not working by this time, so the lost productivity portion of the costs were removed to arrive at a cost of \$267 per senior per year. The healthcare costs for seniors were then multiplied by 2 to arrive at a value of \$534 annually, based on evidence of higher healthcare costs for seniors presented in Chenoweth and Associates (2004): "Since adults older than 65 tend to incur higher medical costs than younger adults, a multiplier of 2.0 has been inserted in the formula to account for this discrepancy. A baseline multiplier of 2.0 was chosen and is based on research showing adults >65 years of age typically incur two or more times more medical care services and costs than younger adults."

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