Haywood County

11.7.2011

Comprehensive Bicycle Plan

Health Impact Assessment

A plan to connect Haywood County to the places and people we love....

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Acknowledgments

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Health Impact Assessment

The Haywood County Comprehensive Bicycle Plan was adopted in November 2011 by the Haywood County Board of Commissioners. As part of the planning effort, BicycleHaywoodNC and the Haywood County Recreation and Parks Department undertook a Health Impact Assessment (HIA) to define health-based concerns and outcomes of the Plan.

What is a Comprehensive Bicycle Plan?

A community that aspires to grow awareness of bicycling and create a bicycling culture must first take steps to identify what makes that community special and what attributes can be improved to facilitate more people taking to their bicycles. Being comprehensive entails a full-scale examination to incorporate the needs of citizens, government agencies and key stakeholders within an integrated examination of various projects, programs and policies that should be pursued to foster a bicycle friendly community.

Community health and wellness is a critical component to understanding and evaluating how a community can become more bicycle friendly.

To this goal, BicycleHaywoodNC created a mission statement upon its formation in 2009 to reflect the perspective of its members and what it wants to accomplish for Haywood County and its residents in becoming a BFC. That mission statement is (emphasis added):

"Dedicated to enhancing cycling through advocacy and ***addressing improved health and wellness****, community growth, and reduction in dependence upon foreign oil."*

Being a Bicycle-Friendly Community

A recognition of the variety of bicycle users and the facilities they desire has led the bicycle and pedestrian planning profession, along with the League of American Bicyclists, to endorse an approach to developing a bicycling culture that is inclusive of the "5 E's"—Engineering, Education, Encouragement, Enforcement, and Evaluation. A bicycle plan incorporating all five of these E's is a required step in becoming a Bicycle-Friendly Community (BFC) through the League of American Bicyclists. A health-based component of such a plan is directly related to Evaluation and considers recommendations from the other E's.

What is a Health Impact Assessment?

An HIA is an evaluative model used to determine the potential physical and mental impacts of a proposed plan, policy or program through the lens of community health. Effective HIAs diversify the level and types of both qualitative and quantitative input to help inform the outcomes of efforts such as the Bicycle Plan. HIAs also bring together various interests in the community to help identify goals and objectives from a variety of stakeholders, then assess how those very aims are impacted – both positively and negatively – by the Plan's rec-

The 5 E's of a Comprehensive Bicycle Plan

Exhibit 1: Haywood County Ranking among North Carolina Counties for Various Health Evaluation Measures

Evaluation Measures	Haywood County Rank (out of 100)
Health Outcomes	56
Mortality	58
Morbidity	55
Health Factors	19
Health Behaviors	35
Clinical Care	11
Social & Economic Factors	16

Source: University of Wisconsin Nationwide Evaluation of United States County Health Statistics

ommendations.

Due to the limitations associated with scope, budget and time, the Haywood County Comprehensive Bicycle Plan employed a method known as a Rapid HIA. The basis of a Rapid HIA is fundamental research, a stakeholder workshop and synthesis of assessment findings. The benefit of a Rapid assessment is that the findings can be determined in a relatively short period of time and with minimal resources and therefore was used in conjunction with the Haywood County Comprehensive Bicycle Plan. This HIA is the first conducted and adopted in North Carolina associated with a comprehensive bicycle or pedestrian plan. It was employed to bring an added value and new perspective to the planning process and to help position Haywood County and BicycleHaywoodNC for a more broad-based approach to pursuing funding and gathering support to implement the Plan.

Methodology

The HIA included four steps:

- Extensive reviews of various documents, including existing plans, as well as health and demographic data;
- In-the-field evaluation of various existing and planned bicycle facilities;
- Half-day workshop with area health professionals and associated groups; and
- Evaluation of health-related outcomes of Plan recommendations.

In following these steps, the Plan's consultant team generated a primer document for area health professionals to review prior to the half-day workshop. The document included baseline health conditions, demographic information and a collection of relevant goals from public agencies tasked with improving community health. Plans and documents reviewed ranged from municipal pedestrian plans, countywide parks and recreation plans, corridor studies and education-related plans.

The data gauged historic and current county health conditions, identified likely poor-health hot spots and determined how the Plan can influence the goals and objectives of various organizations within Haywood County and Western North Carolina.

By correlating countywide health statistics with demographic information, trends and likely conclusions were extrapolated. For example, areas or population cohorts with less discretionary income often have less access to health care than areas with more discretionary income. Higher rates of heart disease and lower rates of morbidity are also likely among low-income groups.

In addition to health statistics measured by death rates, hospital admittance and other factors, the HIA considered quality-of-life factors in Haywood County. The area has a higher than average retirement population, meaning a more susceptible population as it relates to ailments such as arthritis, hypertension and osteoporosis. People with these conditions

can improve their conditions through bicycle riding, and the higher-than-state-average for older adults indicates that bike facilities and educational efforts should include all age groups to achieve the greatest health impacts. Much of the information contained in the initial documentation and cited in this report was contained in the *Haywood County, State of Health Report*, published by the Haywood County Health Department in December 2010 (1).

Area Health Indicators

Four key health indicators were identified for Haywood County for their potential to have strong correlation to bicycle-related activity.

Leading Causes of Death from 2005 to 2009 were diseases of the heart, cancer and ischemic heart issues. With a strong relationship between cardiovascular conditions and these leading causes of death, there is an opportunity to limit or even prevent such conditions through improved diet and exercise that can be associated with riding a bicycle.

Heart Disease is the leading cause of death in Haywood County, and heart disease rates have improved since 1994. With regular exercise and activity, heart disease can be limited if not prevented. One suggestion given as a preventative measure is to get 30 continuous minutes of cardiovascular exercise per day. (2)

Obesity increases risk for health conditions such as cancer, hypertension, Type 2 diabetes, various heart issues, stroke and others. In Haywood County, 29 percent of the adult population (over 20 years of age) is classified as obese. With nearly 60,000 in total population, this equates to roughly 20,000 citizens with a body mass index (BMI) measure of 30 or greater. According to the recent University of Wisconsin Population Health Institute, this is similar to the collective average score across the state and slightly above the national average. (3)

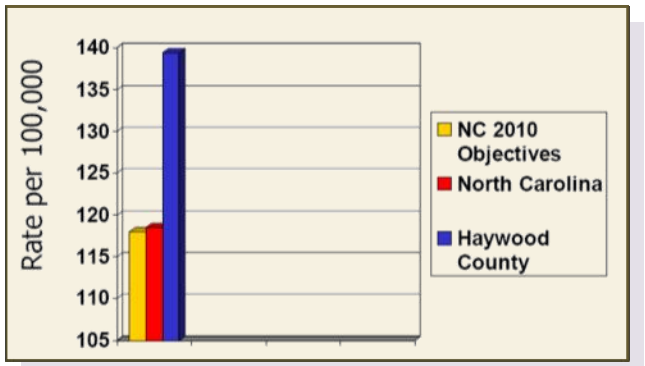
Asthma and air quality are considered by most health professionals to be directly related (4). Deterioration of air quality is attributed to agriculture, manufacturing, industry and the transportation sector. Haywood County's hospital discharge rates for asthma (Exhibit 2) are 15 percent higher than statewide statistics, and the area has a regional haze issue, according to a report developed by the Division of Air Quality at the NC Department of Environment and Natural Resources. (5)

Bicycle Plan & Local Agency Goals

Early in the Bicycle Plan process, BicycleHaywoodNC representatives identified several goals and objectives to guide the Plan and align its findings with their mission statement. Exhibit 3 illustrates these goals and objectives and contains identifiers based on the likelihood each has for increasing physical activity.

Once these goals were established, numerous agencies were invited to be a part of the HIA process based on a screening of government, non-profit and educational organizations in Haywood

Exhibit 2: Haywood County Hospital Discharges for Asthma (2006)



Source: Haywood County Health Department

Exhibit 3: Potential for Increased Physical Activity for Goals & Objectives Established for the Haywood County Comprehensive Bicycle Plan

NOTE: Parenthetical references indicate research identified in Bibliography used to make determination.

● Strong Evidence of Increased Physical Activity
◉ Moderate Evidence of Increased Physical Activity
○ Little Evidence of Increased Physical Activity

Build Bicycle Infrastructure & Other Improvements: ***Engineering-based infrastructure for bicycle routes and parking***	**Evidence of Increasing Physical Activity**	**Potential Negative Impacts**
Prioritize bikeways that connect destinations such as downtowns, schools, neighbor-hoods, lodging & parks. (6)	●	Improper design, driver conflict
Create a county —backbone loop (Haywood Hub) as a priority route to connect the population center of the county between Waynesville and Canton. (6)	●	Improper design, driver conflict, limited riding skills of recrea-tional riders
Designate and improve —pocket areas in existing communities that can serve as learn to ride areas. (7)	●	None
Construct bicycle lanes along major arterial roadways and greenways along major rivers and streams. (8)	●	Improper design, driver conflict
Provide safe space via shoulders or other treatments when bicycle lanes are not feasible or practical. (6)	●	Improper design, driver conflict
Install signage and other bicycle-friendly markings to delineate bicycle routes. (9)	◉	None
Erect bicycle parking in downtown areas and at other major attractors and destinations. (9)	◉	None
Develop Support Facilities & Programs: ***Help attract bicyclists to the community & connect bicyclists to facilities.***		
Identify a location for a cycling sports complex that could include a velodrome, BMX track and mountain bike trails. (10)	○	Improper design of connections
Develop and enhance mountain bike trails in natural settings such as the Rough Creek watershed area. (10)	●	Improper design of connec-tions, litter
Organize a multi-stage road race in Haywood County and surrounding counties. (11)	◉	None
Develop natural trails above Lake Logan and near other water features. (10)	○	Improper design of connec-tions, litter
Encourage a bicycle rental program through a public facility or bicycle shop. (12)	●	Limited riding skills of recrea-tional riders
Conduct non-race competitions such as —Biggest Loser: Cyclist. (11)	○	None

Increase Educational Opportunities: ***BicycleHaywoodNC and its partners can provide hands-on outreach to users of all age groups and abilities. (7)***	**Evidence of Increased Physical Activity**	**Potential Negative Impacts**
Conduct how-to sessions for beginner or returning bicyclists.	●	None
Identify potential for bicycle rodeos and other teaching of school-age children.	●	None
Organize parents / kids rides.	◎	Limited riding skills of recreational riders
Integrate bicycle-based education into drivers' education curricula.	●	None
Reach out to employers to promote policies and facilities for bicycle commuters.	●	None
Build on —Bike to Work Month / Day to establish monthly Bike to Work rides.	●	Limited riding skills of recreational riders
Focus on older or senior bicyclists through a —Silver Wheels program.	●	Driver conflict
Provide Information to Residents & Visitors: Promote bicycling through a variety of media & educational and outreach programs. (11)		
Design an interactive map (online) of bicycle-friendly locations.	◎	None
Print road and mountain bike maps of routes and trails.	◎	None
Organize a —Share the Road public service campaign to raise awareness of bicyclists.	◎	Driver conflict
Develop specialized guided routes of the communities, such as a Cycling Café, coffee shops tour, Haywood County history, or artists gallery route.	●	Limited riding skills of recreational riders
Promote fitness through coordinated education and guided rides.	●	Driver conflict, limited skills of recreational riders
Support Policy Change & Economic Development: Identifies methods for stakeholders, advocates, businesses and municipalities to promote bicycling.		
Foster inter-governmental collaboration to standardized bicycle-related policies at the municipal, county and state level.	○	None
Seek a ban on texting while driving municipal or state level. (13)	◎	Such a ban is in place, none.
Develop animal control ordinances to help protect bicyclists. (13)	◎	None

The Haywood County Health Department is responsible for :

- Assessing the health needs of the community;
- Identifying threats to health;
- Providing health services;
- Establishing health policies; and
- Identifying community resources to meet health needs. (14)

Health Issues in Haywood County (in order of concern based on survey)

1. Overweight/Poor nutrition
2. Cardiovascular Disease
4. Mental Health
5. Diabetes
6. Lack of Access to Care
7. Asthma and Lung Problems (15)

County. Though several have missions to indicate an indirect impact on public health, two – Haywood Health Department and Healthy Haywood – are specifically tasked with implementing measures to monitor and improve the health of Haywood County residents.

The purpose of identifying and reviewing agency goals and guiding documents was to determine how the Haywood County Bicycle Plan recommendations and outcomes can help advance the mission of each respective agency. Several of the findings and specific plan elements are included below and were a part of the original primer document sent to participants.

Haywood County Health Department oversees the general health issues of the County. The Department is charged with generating impactful policy and meaningful programs and strategies to both prevent and reduce the ills of poor health. The Department tries to achieve these goals through numerous vehicles with specific responsibilities, including Healthy Haywood. The County Health Department was a key participant in the workshop and is an asset to the future evaluation steps needed to determine the impacts of the Plan.

Healthy Haywood is an extension of the Haywood County Health Department established in 1992 as a result of the Healthy Carolinians effort, a statewide partnership housed in the State's Department of Health and Human Services. The organization has several "action teams" charged with improving physical and mental health within the community, many of which have overlapping objectives with the vision and goals established for the Bicycle Plan. In addition to the action teams, the organization runs a popular Annual Fitness Challenge, which is an opportunity to incorporate bicycling into the fabric of the community to combat the ills of poor public health. Health Haywood also gave BicycleHaywoodNC a $2,000 grant in 2011 to purchase new bicycles for Haywood County Schools.

Haywood County Recreation and Parks is a department of the Haywood County government and adopted a Countywide Parks and Recreation Plan in 2007. The Plan was used in the HIA as a reference to the types of strategies and approaches popular in the County as they pertained to streets. The goals and objectives of such pedestrian plans have similar goals bicycle plans due to similarities in pedestrian and bicycle functions within society and a transportation system. Exhibit 4 outlines elements of the Parks and Recreation Plan pertaining to the HIA and Bicycle Plan. (16)

Waynesville Pedestrian Plan (2010) has numerous goals and objectives (Exhibit 4) related to cycling and were included for use in this effort. Participants were asked to substitute the words pedestrian, walking, and walkability, with words such as biking, bicycling or bicyclists to think about how each goal would impact public health in Haywood County. (17)

Exhibit 4: Recommendations Adopted as part of the Haywood County System-wide Comprehensive Parks & Recreation Plan

Haywood County System-wide Comprehensive Parks & Recreation Plan

Recommendation #3: Greenways

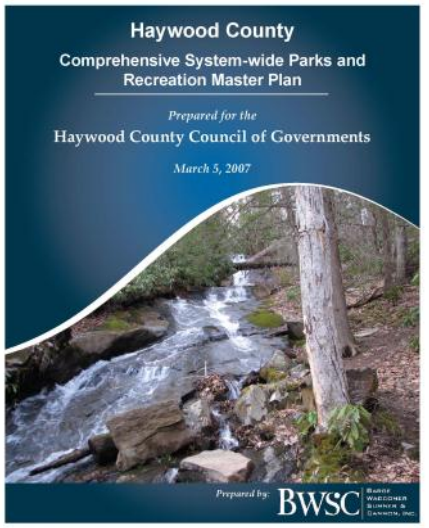
Walking and biking are two highly sought after activities based on national and State studies. The community survey also demonstrated the local demand for these facilities with 80% of the respondents favoring development of greenways. Although this study includes specific recommendations with regard to parts of a greenway system, a comprehensive greenways master plan should be developed for Haywood County that identifies a phased approach for the development of a connected greenway system across the County. As was done with this effort, the County and the municipalities jointly fund the study. For the purposes of this study, costs are proposed to be shared based upon the percentage of each entity's population of the total County 2021 population. Some work has been done on suggested routes for greenways in the County and further suggestions were gathered during the public meeting with the greenways group.

Recommendation #4: Bike Lanes

Given the cost of fuel, air quality concerns and the need to increase the health and fitness of the population, a planned network of bike trails, bike lanes and shared roadways should be developed to support alternative transportation to recreation facilities and travel within the County. Any future roadway construction project in the County should include provisions to accommodate pedestrian and bicycle travel. This network should connect existing and future park and recreation facilities and greenways. Bike racks (sheltered ones at schools and other high potential use areas) should be installed at all publicly owned facilities across the County.

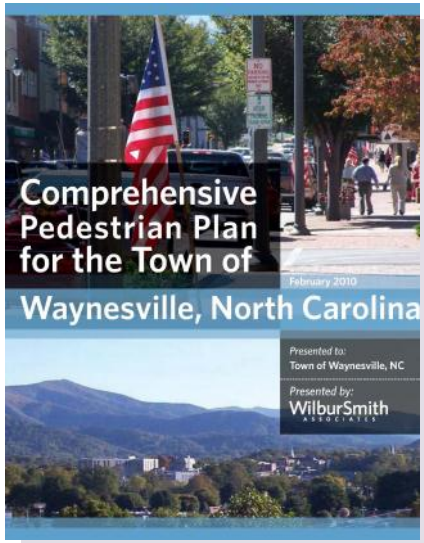
Recommendations #5: Develop a Greenway between Clyde and Canton

An excellent opportunity exists for the development of a four- mile greenway in this location due to the flood properties. It is recommended that the County work with Canton and Clyde to jointly fund and develop this greenway. Given the length of the trail, it will likely have to be developed in two or three phases. As stated in the General Recommendations, the municipalities and the County should jointly fund a countywide greenways master plan to guide and prioritize developments of an interconnected greenways system across the County. The cost shown below is Haywood County's 1/3 share of the total estimated cost of development of the trail. The following table shows the preliminary budget figures to support the recommendations made herein.



"Any future roadway construction project in the County should include provisions to accommodate pedestrian and bicycle travel. This network should connect existing and future park and recreation facilities and greenways. Bike racks … should be installed at all publicly owned facilities across the County."

- Haywood County Comprehensive Recreation Plan (2007)



"The benefits of walking are numerous and many fold. The obvious benefit is improved health and well being for the individual. Walking is a means of not only achieving physical fitness but also provides a means of releasing stress. "

- Comprehensive Pedestrian Plan for the Town of Waynesville

Exhibit 5: Vision, Goals and Objectives Adopted as part of the Comprehensive Pedestrian Plan for the Town of Waynesville

Comprehensive Pedestrian Plan for the Town of Waynesville

Vision

The town of Waynesville is a safe and healthy place to live, work, learn, and play. Out town is a community where walking is a major travel mode and where the town's development patterns and interconnected pedestrian circulation network:

- Provide pedestrians convenient, safe and enjoyable access and mobility throughout the developed portions of town,
- Link the town's neighborhoods by providing a "seamless system", which helps to maintain a vibrant and sustainable lifestyle.

Goals and Objectives

Goal #1: Increase and enhance the safety of pedestrians

Goal #2: Enhance public awareness and education of pedestrians

Goal #3: Adopt policies that promote connectivity, coordination and continuity of pedestrian facilities

Goal #4: Enhance personal and environmental health

Objectives

- Promote walking to children in the town
- Encourage residents of the town to "be active"
- Coordinate with the hospital and county health department's programs to promote walking.

Haywood Community College (HCC) has an enrollment of more than 2,700 students and has been a fixture in the community for more than 45 years. HCC curriculum has grown from that of a single-purpose institution to offering more than 50 academic tracks. Additionally, HCC has launched numerous sustainability efforts and practices and is a member of the American College & University Presidents' Climate Commitment of ACUPCC, with a goal of being carbon neutral by 2050. Staff members from the college participated in the HIA and helped generate thoughts on ways the college can implement its sustainability goals. Listed below are the schools sustainability policy and the terms of ACUPCC membership:
ACUPCC institutions have agreed to:

- Complete an emissions inventory.
- Within two years, set a target date and interim milestones for becoming climate neutral.
- Take immediate steps to reduce greenhouse gas emissions by choosing from a list of short-tem actions.
- Integrate sustainability into the curriculum and make it part of the educational experience.
- Make the action plan, inventory and progress reports publicly available.

Haywood County Conditions

An analysis of demographic data, primarily from the U.S. Census Bureau, can help indicate factors related to public health. Population, income levels, employment and housing occupancy data typically correlates to access to healthcare, safety and mental stresses. Census tract data from the 2000 and 2010 Census were used for the HIA.

Additionally, as part of the survey conducted for the Haywood County Comprehensive Bicycle Plan. Respondents were asked to identify reasons they choose to ride a bicycle in Haywood County (Exhibit 6). The top three reasons were all related to health activities (exercise, recreation and mountain biking). Exhibit 7 indicates the preference for various types of bicycle facilities.

Demographic Summary By evaluating population (Exhibit 9), income, housing occupancy and employment, we can identify how certain geographic sectors of the community compare to others based on changes from the 2000 to 2010 Census.

The data appear to indicate that the high-risk places facing more difficult conditions than other areas of Haywood County are:

- **Clyde** (8 percent decrease in household income, 6 percent decrease in housing occupancy rates and 5.8 percent decrease in employment rates);
- **South Waynesville** (lowest household income – $28,668 – and 8 percent decrease in housing occupancy rates);

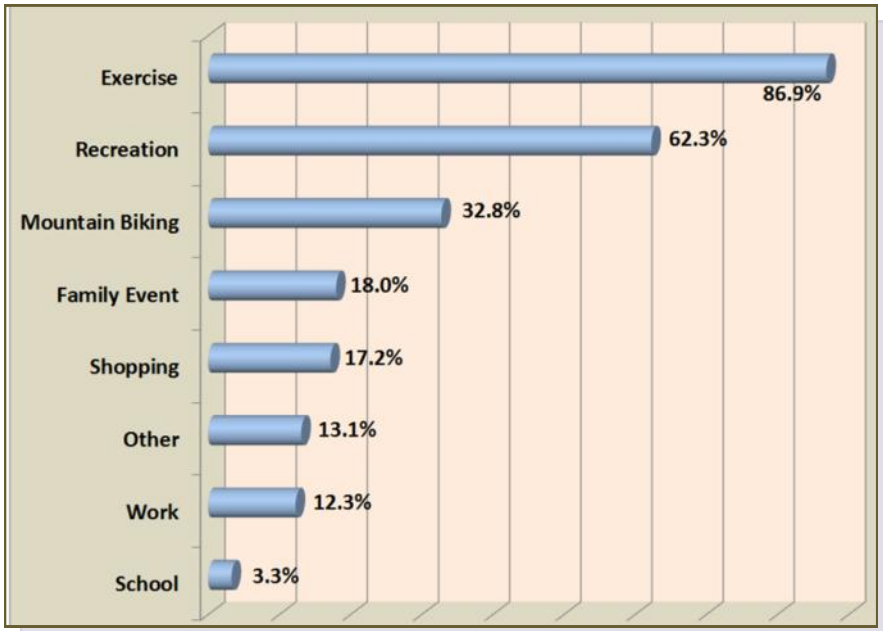


Exhibit 6: Reasons people choose to ride their bicycles in Haywood County

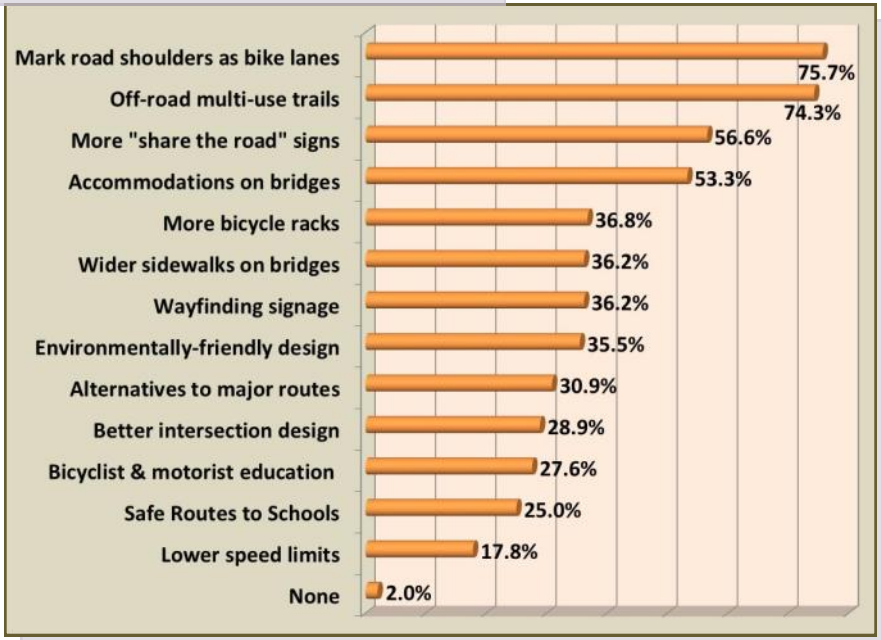


Exhibit 7: Preferred Improvements, by percentage of respondents, to Roadways and Other Facilities to Accommodate Bicyclists

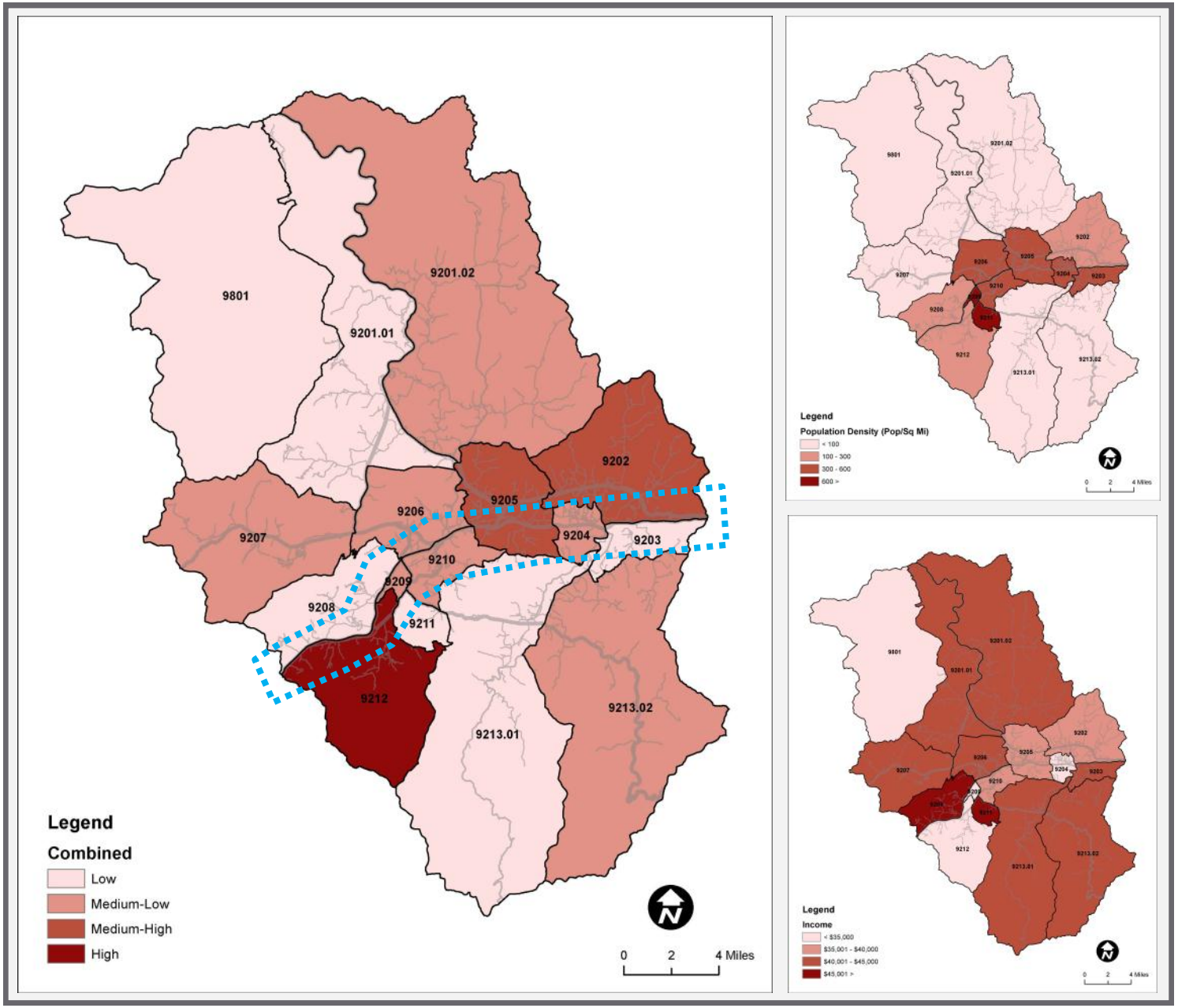


Exhibit 8: Combined Census demographics (left) for both population density (top) and income (bottom)

Analysis revealed the area surrounding the US 19 Corridor (buffered in blue) that connect Waynesville, Clyde and Canton had a strong correlation in these demographics to the schools containing the highest Body Mass Index (BMI) rates.

The Haywood Hub route (located within the blue buffer) is intended, in part, to address these demographics and health concerns.

- **Maggie Valley** (lowest housing occupancy rates – 37 percent – and 3.5 percent decrease in the rate of employment).

Those parts of the community with the highest economic and health indicators are:

- **West Waynesville** (highest household income – $53,750 – and a 98.2 percent rate of employment);
- **Lake Junuluska** (household income $44,007, highest employment rate 98.4 percent);
- **Southeast Waynesville** (household income $49,485, employment rate +5.3 percent).

By first assessing general countywide information followed by more detailed information found in the Census, we began to determine pockets of need. Exhibits 8 illustrates population density and household income, as well as a combination of these two factors to identify where the most people with the lowest levels of income reside.

Additional date was provided by Healthy Haywood in the form of BMI measurements from Haywood County elementary schools (Exhibit 10). Due to the sensitive nature of this data, this HIA does not contain school-specific data, however it was used to help generate recommendations. When each school was aligned with the Census Tract in which it is located and combined with Census data summarized in the previous section, the links between higher BMI rates and areas experiencing the more difficult demographic conditions were affirmed. The three high-risk areas also indicated higher-than-average BMI calculations

Exhibit 9: Haywood County Population by Age Groups

Source: Haywood County Health Department

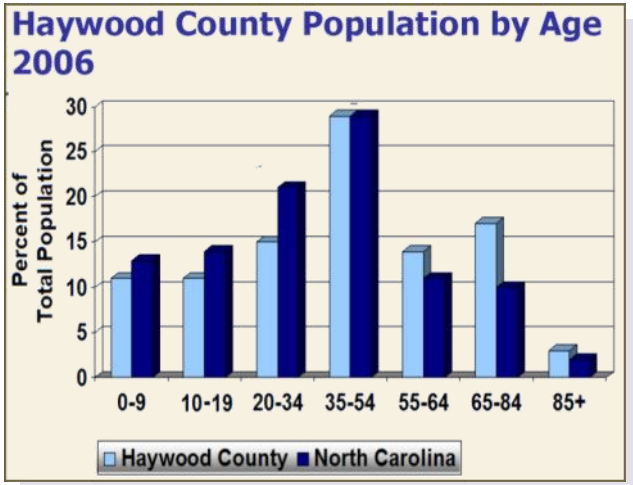


Exhibit 10: Body Mass Index Measurements for Haywood County Elementary Schools

Source: Healthy Haywood

Body Mass Index Measurements for Haywood County Elementary Schools 2001-2010

School Year	% Overweight and Obese	% Overweight	% Obese	# of Morbidly Obese
2010-2011	39%	18%	22%	63
2009-2010	40%	18%	22%	65
2008-2009	40%	19%	21%	72
2007-2008	39%	18%	21%	65
2006-2007	37%	18%	18%	72
2005-2006	37%	19%	19%	50
2004-2005	38%	19%	19%	54
2003-2004	35%	17%	18%	62
2002-2003	35%	17%	18%	8
2001-2002	32%	16%	16%	Not Available

Exhibit 11: Bicycle Crash Statistics for Western North Carolina Counties (1997 to 2008)

Source: North Carolina Department of Transportation

WNC County	Crashes	Crashes per 10,000 Pop.	Crash/Pop. Rank	Roadway Miles	Crashes per 100 roadway	Crash/ Road Rank
Alleghany	9	8.1	3	448	2.0	13
Ashe	7	2.6	17	795	0.9	19
Avery	2	1.1	21	337	0.6	20
Buncombe	222	9.3	2	1250	17.8	1
Burke	66	7.3	4	851	7.8	5
Caldwell	57	6.9	6	688	8.3	4
Cherokee	10	3.6	15	584	1.7	15
Clay	7	6.6	7	247	2.8	10
Graham	4	4.5	12	273	1.5	16
Haywood	**19**	**3.2**	**16**	**591**	**3.2**	**9**
Henderson	77	7.2	5	869	8.9	3
Jackson	7	1.7	19	578	1.2	17
Macon	7	2.1	18	673	1.0	18
Madison	3	1.4	20	657	0.5	21
McDowell	23	5.1	9	588	3.9	7
Mitchell	1	0.6	22	320	0.3	22
Polk	8	3.9	14	429	1.9	14
Rutherford	38	5.6	8	1062	3.6	8
Swain	6	4.3	13	275	2.2	12
Transylvania	16	4.8	10	405	4.0	6
Watauga	51	10.0	1	567	9.0	2
Wilkes	32	4.6	11	1315	2.4	11
Yancey	1	0.6	23	396	0.3	23

when compared to other schools and Census data.

South Waynesville, Northeast Canton and Clyde had combined overweight and obese BMI ratings of more than 42 percent of total students. Assuming children represent typical outcomes of overall conditions, these statistics are generally be transferable to the adult population and therefore reinforces where pockets of cardiovascular disease (CVD), obesity and other risks may reside.

Bicycle Safety Statistics for Haywood County were summarized to help inform the HIA and identify geographic areas that seem to pose greater risk for bicyclists. The data was generated by the North Carolina DOT (18) and included county ranks, types of accidents and prevalence amongst age groups.

Exhibit 11 illustrates where Haywood County ranks among other counties in Western North Carolina in terms of bicycle crash rates, the rate per 10,000 in population, and the rate per 100 roadway miles. Haywood County is ranked in the bottom third in the crash / population ratio and in the top 10 in the crash / road miles ratio. Exhibit 12 shows bicyclist and pedestrian crash records listed by age group for years 1997 through 2008, indicating youth as the most vulnerable age group.

Participants were asked to consider how the bicycle plan would address the conditions and the impacts on public health.

HIA Workshop Summary

To best gather the thoughts and opinions of the many physical and social health experts throughout the County, a half-day workshop was facilitated. The workshop centered on the baseline-conditions report described earlier. Throughout the discussion, numerous ideas and future coordination opportunities were advanced in addition to making recommendations for the final bike plan iteration. The following section describes information gathered at the workshop that helped shape final plan development.

Potential impacts to physical and mental well-being. Many area health experts were either interviewed independently or included in a half-day workshop for the HIA, which generated numerous ideas and future coordination opportunities. Those attending represented municipal government interests, the French Broad River MPO, Healthy Haywood, Haywood County Social Services, North Carolina Division of Air Quality and the MedWest hospital system. Many health afflictions and leading causes of death were discussed as well as mental health issues, economic health due to the direct relationship between access to health care, healthy food and family health.

Attendees shared their thoughts on the following health conditions and potential impacts stemming from implementation of the Plan.

Heart Disease. Bicycling is a mode of transportation and a recreational activity that increases an individual's heart rate and improves heart strength, thereby reducing the risk of cardiovascular disease. Numerous studies indicate a direct

Participants from a variety of health-related and governmental organizations participated in a June 2011 workshop as part of the Health Impact Assessment.

Photo Credit: Don Kostelec

Age Group	1997-2008 Bike Crashes	Bike Lane - Shoulder	Driveway – Alley	Non-Roadway	Sidewalk/ Crosswalk	Travel Lane	Other	*1997-2008 Pedestrian Crashes*
17 & Younger	**8**	3			1	3	1	***16***
18 – 25	**3**				2	1		***12***
25 – 35	**6**	1		2		3		***14***
35 – 50	**0**							***21***
51 & Older	**3**					3		***23***
Unknown	**1**					1		***0***
Total	**21**	**4**	**0**	**2**	**3**	**11**	**1**	***86***

Exhibit 12: Haywood County Bicycle & Pedestrian Crashes by Age Group (1997 to 2008)

Source: North Carolina Department of Transportation

Implementation of the Haywood County Comprehensive Bicycle Plan has the potential to promote activities and programs such as the Thursday night novice rides led by BicycleHaywoodNC to help fight obesity, heart disease and other ailments

Photo Credit: Don Kostelec

relationship between increased physical exertion and reductions in heart disease risk. Group members also identified a relationship between particulate matter and heart disease. If a significant and comprehensive effort was implemented including infrastructure investments, rider/driver education, promotional outreach and improved public/private coordination for plans and policy, cardiovascular disease rates should decline over time, correlating with increases in bicyclists, cardiovascular exercise and a reduction of vehicle trips.

Obesity. Increased riding amongst all demographics will increase calorie expenditures and therefore lower obesity measures among bicyclists. Similar to heart disease, if a robust and comprehensive approach is utilized, over time obesity statistics countywide should improve or at least maintain assuming increases in the remaining sedentary portions of the population. If all elements are successful of the final plan, obesity rates amongst children should gradually improve, especially when combined with changes to diet and increase general activity, which is the focus of health and school officials in the area.

Asthma. Several connections were identified regarding air quality, asthma and the Plan, notably that among youth hospital admittance records, 30 percent of cases were due to asthma. The group noted there should be careful consideration of placement of facilities as they relate to major vehicle routes. This concern was raised due to studies indicating higher asthma causing particulate exposure rates when up to 1,000 feet of major vehicular routes (19). A positive side effect for households of better asthma rates was thought to be the economic impacts from fewer missed school days. Lastly, concern was voiced on alerting people to poor air quality days, especially for those with respiratory problems.

Mental Health. Implementation of the Plan should include reinforcing the interaction with nature and the social interaction possible for bicyclists of all cohorts. This can be possible with signage, social outreach and education messaging. Positive outcomes may be possible by improving self esteem from improved health measures, lowering of stress through physical/natural connections, improving family relationships by sharing common experiences and fostering a sense of community and environmental stewardship.

One warning from the group was made cautioning the potential for increased "road rage" due to the potential for more cyclist/motorist confrontation. It was thought that due to lack of experience when driving near cyclists, there exists potential for frustration leading to aggressive driving behavior.

General Habits. Attendees concluded increased ridership amongst Haywood youth would be likely through education and encouragement campaigns and the gradual placement of bicycle facilities. This would ultimately make in-roads on the adult population and impact lifestyles trends.

Perception Change. Perception of being active without the presence or participation of formalized "exercise" was another positive side effect of the long term investment in both bicycle programs and projects. If citizens participate in trip making by bicycle, they will be physically active thus gaining all the known health benefits associated. The perception that people are not actually "exercising" but rather traveling for either recreation or utility is the desirable end goal for workshop participants. With an eventual shift in attitudes, activity will become more common through an alternative mode choice to personally occupied vehicles.

Economic Health. The group concluded that increased access to bike facilities leading to increased riding could appeal to those either considering a health club membership or provide an option for free exercise if they are not able to afford membership. Also, by cycling and improving general health a possibility of reducing reliance on medication is possible, thus saving individuals and households money. This impact was thought to have the greatest potential for older and overweight segments of the population. Additional impacts on potential reduced vehicle costs were identified, such as gasoline, maintenance and insurance costs.

Physical & Perceived Barriers

Numerous barriers were identified during the preliminary discussion, including some of both a physical and social nature, and will help mold the final bike plan, list of recommended projects and both the educational and encouragement campaigns.

Safety: The concerns with safety have to do with traffic and roadway safety such as vehicle conflicts, narrow roadways and a lack of driver awareness for cyclists as well as safe riding skills.

> ***Plan Impacts:*** Bike facility design and placement, lighting recommendations, signage, education reinforcement for cyclists and drivers.

Convenience: Another barrier identified was that of facility convenience. The noted convenience included proximity of facilities to residential, park and school areas as well as convenience of riding on those roads viewed as being most ripe for increased riding.

> ***Plan Impacts:*** Bike facility placement for maximum population impact, bike rack placement near high use areas and bike education.

Dog Control: Participants identified loose or intimidating dogs as a barrier to increased and safe riding as well as an overall deterrent, especially to the youth of the community.

> ***Plan Impacts:*** Education and awareness campaigns, enforcement of city code.

Perceptions: Unrelated safety influences such as sex offenders registration lists were viewed as an obstacle for parents influencing where and when their children are allowed to ride their bicycle.

The presence of loose dogs along a route can become a barrier that dissuades people from riding a bicycle, particularly in rural areas.

Photo Credit: Don Kostelec

BicycleHaywoodNC organize the county's first-ever Bike to Work day in May 2011, which had 15 participants along with Waynesville Police Department bike patrols. HIA participants expressed concern about recent unemployment rates and how that can impact a person's ability to commute by bicycle due to residents seeking work in other counties, creating a commute distances beyond one's normal bicycling abilities.

Photo Credit: Don Kostelec

Plan Impacts: Bike route placement, add-on to youth bike education, distribution of County bike route maps.

Communication: Due to occasional sever air quality degradation events, communication with the public ensuring that riding is done in a safer manner was viewed as a possible barrier and could even detract from the health goals of local agencies. Specifically, difficulties getting word out to more isolated portions of the community were brought out in the meeting.

Plan Impacts: Signage, add-on to general bike education, additional social media and website communication.

Economic: A concern was raised specifically related to the current economic climate. The loss of jobs in Haywood County and other areas of Western North Carolina forces workers to seek employment across a broader geographic area, reducing the likelihood that their job will be located within a reasonable distance to consider commuting by bicycle.

Plan Impacts: Bike facility placement, promotion of "park-n-pedal" facilities.

Population Segments Most Impacted

Cycling in Haywood County is infrequent and challenging due to topography, narrow roads and driver behavior. When asked which residents would be most impacted by the proposed bicycle plan facilities, participants felt seniors, vacationers, kids and families would benefit most. Commuters were thought to be minimally impacted due to their general knowledge of roadway riding and experience. Therefore, the recommendation of the committee was to ensure that bicycle facilities were designed to accommodate more novice riders similar to the proposed county loop. Safety features such as additional pavement, signage and stripping are critical to provide a more comfortable feel for identified users.

The potential health impacts from increased riding within these segments of the population range. Riding amongst seniors will strengthen lung capacity, lower risk of cardiovascular disease, stimulate brain activity and maintain balance. Youth will benefit from building lifelong habits, improving classroom focus, reduced asthma rates and prevention of both obesity and Type II diabetes. Families as a whole may not only see similar health benefits but also could realize improved family bonds, lower household transportation costs, reduced overall health care costs and in some cases reduced risk of domestic violence and/or child abuse.

Community Impacts

The next phase of the HIA discussion focused on identifying who and where potential impacts could be most realized and where the plan should focus to make the most significant difference from a health perspective. Using the various demographics and area concerns as well as talking through general recommendations typically found in bicycle plans, the

group was led through a series of questions aimed at identifying segments of the population or geographic hot spots within the county

Geographic Focus of Plan. Despite demographic information, the group largely felt that the most significant impact on public health would be realized if the plan focused on integration early along the US 19/23 corridor (identified as the Haywood Hub route in the Engineering Recommendations). Improvements for bicyclists along this corridor could impact nearly two-thirds of the County's population. The stretch between the west and east portions of the corridor span approximately 13 miles and include approximately 39,000 people of the 59,000 countywide total.

Additional support for the Haywood Hub includes the establishment of numerous economic urban centers, maximizing convenience to more concentrated pockets of residents, the possibility of gaining a greater mode share of utilitarian trips for access to the local jobs, educational and retail possibilities and the highest number of K-12 school sites, which could foster an environment of generational cyclist increases.

Route Recommendations

Haywood County topography is a major influence on the ability to construct new facilities and connect those communities and populations whose health and well-being would stand to benefit from routes that were viewed as safe for a variety of users.

Safety considerations should be maximized when designing facilities in areas of limited sight lines for both drivers and riders in areas of substantial vertical grades. County topography was cited as a barrier to increase riding due to riding difficulty and safety hazards. Exhibit 13 on the following page contains the top health-based recommendations identified in the Plan.

A Central Route—The Haywood Hub: Due to the rural nature of the County outside the central business district, it was believed by the panelists that recreational opportunities would be the most promising if a centralized county bicycle route was established to connect the population core of Haywood County.

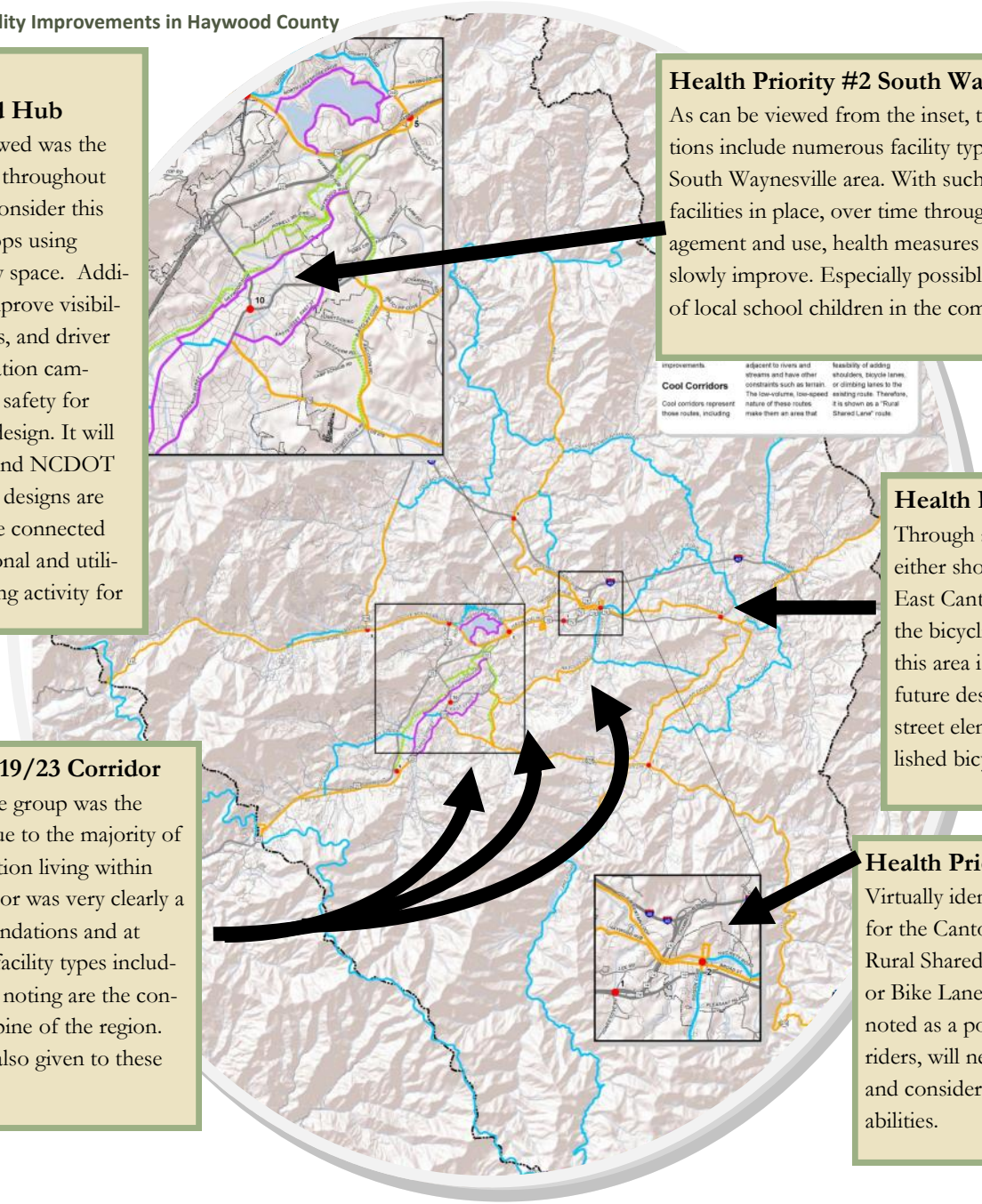
The route would include a series of rural roadways in need of particular safety consideration due to the higher probability of younger, less experienced and overall novice riders. The establishment of a loop was viewed as helpful for promoting family rides, recreational rides by out-of-area tourists, seniors and some commuters.

The Haywood Hub (Exhibit 14) traverses many of the other priority areas. It was developed to serve as the mainline of this loop through a combination of on-street improvements, intersection enhancements and construction of greenways.

Maximizing the health benefits of bicycle facilities requires understanding of the needs of users of all ages and abilities. While some bicyclists might be comfortable riding on the street, others will prefer greenways like those being established in some areas of Haywood County.

Photo Credit: Don Kostelec

Exhibit 13: Health Priorities for Bicycle Facility Improvements in Haywood County



Health Priority #1 Haywood Hub

A priority amongst those interviewed was the establishment of a series of loops throughout the County. The final Plan does consider this and has recommended several loops using shoulders and designated roadway space. Additional recommendations are to improve visibility through signage, paint schemes, and driver awareness through multiple education campaigns. One note, key to roadway safety for both riders and drivers is facility design. It will be imperative for both the cities and NCDOT to ensure appropriate and proven designs are utilized. The loops should provide connected and safer places for both recreational and utilitarian riders to cycle thus increasing activity for

Health Priority #2 South Waynesville

As can be viewed from the inset, the Plan recommendations include numerous facility types in and around the South Waynesville area. With such a concentration of facilities in place, over time through education, encouragement and use, health measures in this pocket should slowly improve. Especially possible are the BMI measures of local school children in the coming years.

Health Priority #4 NE Canton

Through a series of rural shared lanes and either shoulders or bike lanes, the North East Canton area will see improvements to the bicycling environment. Essential to this area is the Hot Spot identification and future design for city streets. The future street elements need to be based in established bicycle facility design practice.

Health Priority #5 US 19/23 Corridor

A priority mentioned by the group was the Highway 19/23 corridor due to the majority of Haywood County's population living within close proximity. The corridor was very clearly a focus of the final recommendations and at various points includes all facility types included in the Plan. Also worth noting are the connections to and from the spine of the region. Careful consideration was also given to these valuable links.

Health Priority #3 Clyde

Virtually identical to the recommendations for the Canton area, Clyde will also include Rural Shared Lanes and either Shoulders or Bike Lanes. Again, the downtown area noted as a potential challenge for most riders, will need to be designed with care and considerations of all user types and abilities.

Exhibit 14: Haywood Hub Profile

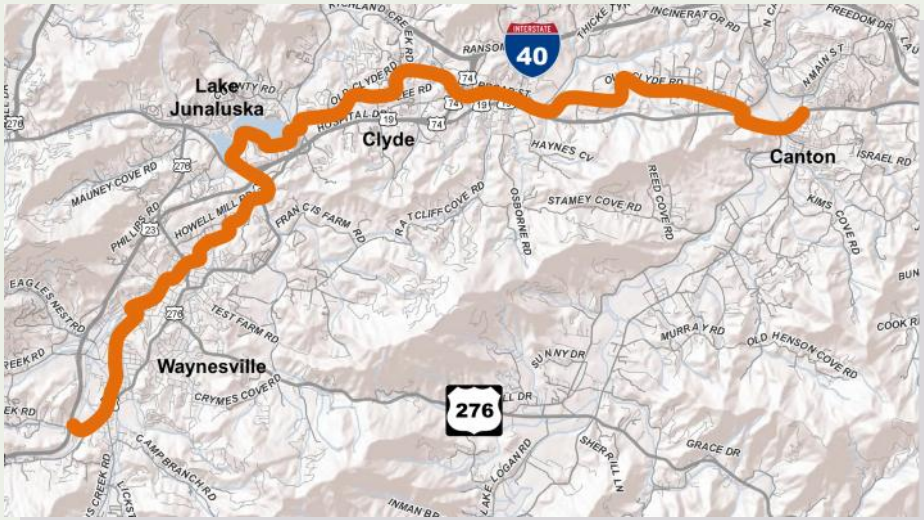
Haywood Hub: A Route to Connect Haywood County Communities

Short-term & Long-term investment
Estimated Cost: $3 - 7 million

Context: The Haywood Hub traverses the Towns of Waynesville, Clyde and Canton, as well as the Lake Junaluska community, to create a central route that serves the majority of the population of Haywood County.

Influences:

- Hazelwood Elementary School
- Hazelwood Community
- Waynesville Middle School
- Central Elementary School
- Downtown Waynesville
- Richland Creek
- Railroad tracks
- Frog Level Historic District
- Waynesville Recreation Center & Greenway
- Dutch Fisher Park & Vance St Park
- Lake Junaluska Walking Trail
- Tuscola High School
- Haywood Community College
- Haywood Regional Medical Center
- Clyde Elementary School
- Downtown Clyde & Parks
- Downtown Canton
- Canton Middle School & Recreation Park



Recommendations:

Brown Avenue: Road diet to three lanes plus bike lanes from South Main Street to Belle Meade Drive. Install Share the Road signs and / or shared lane markings from Belle Meade Drive to Richland Street.

Richland Street, Commerce Street & Boundary Street: From Brown Avenue to Shackleford Street install Share the Road signs and / or shared lane markings through Frog Level Historic District (alternate route: US 276 to Walnut Street).

Vance Street Park / Waynesville Recreation Center: Upgrade unpaved sections of greenway to paved sections. Connect greenway along Richland Creek or via Howell Mill Road to Industrial Park via Old Asheville Hwy.

Greenway to Lake Junaluska: Upgrade, where feasible, to paved greenway, and construct improvements at US 19—Dellwood to facilitate crossing to Lake Junaluska and South Lakeshore Drive.

South Lakeshore Drive to NC 209—Crabtree Road: Work with Lake Junaluska to gain approval for pavement markings, including shared lane markings or specialized signage.

NC 209—Crabtree Road: Complete shoulders to Old Clyde Road.

Old Clyde Road/Broad St.: Install shoulders for 7 miles from NC 209 to NC 215 in Canton. Re-stripe through downtown Clyde for travel lanes and bike lanes. Until then, sharrows or Share the Road signage should be installed.

Complete Streets: Several NCDOT Complete Streets Cross Sections could apply to this corridor due to diversity of land uses along it. The most applicable are the Rural Road and Rural Village Main Street cross sections (see Plan Appendix).

Assessment Conclusions

The impacts of the Haywood County Bicycle Master Plan are generally positive in their impacts on community health. Due in part to the holistic approach of the Plan, virtually all members of the community will be made aware of bicycling either as a mode of transportation or as another element of roadway users. Between the increased level of awareness and education, the specific roadway facilities and the numerous segments of the population who will soon be able to access both, the Plan should give citizens a level of bicycle understanding new to Western North Carolina which has a strong chance of improving numerous elements of community health measures.

Evaluation Recommendations

Implementation of the Bicycle Plan will take several years, with a combination of projects, programs and policies aimed at creating a bicycle-friendly community. To further understand how the Bicycle Plan can impact community health, future evaluation measures should be taken by those stakeholders who contributed to the HIA.

Evaluation steps can be conducted by annual surveys, health monitoring reports, bicycle activity measures and numerous other means. The following section describes each participating agency or organization, describes the appropriate evaluation measures to be undertaken and the proposed timing and frequency the measures should be conducted.

Exhibit 15: Evaluation Recommendations

Evaluation Recommendations

Haywood County Health Department

Countywide Obesity, CVD, Asthma Data is already collected and should result in a running comparative database for historic comparisons. The data should continue to be included in the annual Haywood Health report representative of the lowest geographic measure possible for comparison with planned facilities. (**Annual)**

Asthma Hospital Discharge Rates need continual monitoring as the data is especially valuable for Plan impact measuring due to the outreach amongst Haywood County youth. Improvements to rates may not be directly attributed to increased bicycling, but if a collaborative survey shows increases in riders and drops in asthma rates, a correlation will likely exist. (**Annual)**

Communities of Haywood County

New Bicycle Facility Inventory. BicycleHaywoodNC and other community partners should conduct a yearly inventory and report which facilities were added to the system or improved. The facilities can include on-street improvements or greenways as well as off-street improvements such as bicycle parking and signage. Non-infrastructure related tools like supportive policies and programs should also be tracked as they bolster the proliferation and awareness of bicycling. (**Annual)**

Bicycle Accident Report. Collected by the state, this information should be gathered at the local level for the generating of an annual safety report to be shared with police, fire departments, school, parks and recreation, larger employers and any other targeted groups that can increase awareness or address any trends. This information should also be kept for Plan updating purposes in future iterations to identify problem areas or common accident types. (**Annual)**

Bicycle Counts. A very important measure of success is bicycle counts. Cities should collect the data twice a year and chronicle changes as infrastructure and non-infrastructure elements are put in place. This data can also be used by the MPO / RPO and health agencies to evaluate impacts. **(Semi-Annual)**

Healthy Haywood

BMI Measuring at Haywood County Schools. Continue this effort and correlate the information with any new bicycle facilities to determine changes. If possible, this program should also include middle or junior high school students. (**Annual)**

Haywood County, State of Health Report. The annual report is an asset to the community and one that could possibly be expanded to include bicycle-related health measures such as estimated annual miles traveled, location counts, accident data and mode share amongst cohorts. **(Annual)**

Haywood County Schools

Conduct Show of Hands Bicycle Travel Survey. During the Fall and Spring, a show of hands survey should be conducted for one weeks' time twice per school year. The format should follow SRTS guidelines and will indicate intensity of riding for elementary but also middle, junior and high school levels. This data may show increases over time and demonstrate correlation between education and infrastructure projects and increased riding. **(Semi-Annual)**

All Agencies

Data Correlation Meeting. Each year the participating organizations should reconvene to compare data, discuss activities implemented during the past year and upcoming plans, programs or policies that the other organizations should be made aware of. Future collaboration will help bolster community health both in terms of data collections and awareness in Haywood County. **(Annual)**

Haywood Community College

Campus Bicycle Use Survey. Similar to counts, counting bicycles for a given period of time on campus each year clearly shows level or riding and percentage of trips taken via bicycle. The count data should be compared with route infrastructure improvements and campus improvements. A formalized survey in conjunction with counts should also be conducted to better gauge both barriers to and perceptions of riding. **(Annual)**

Student BMI Measures. As part of student orientation or health and physical education classes, HCC should measure students' BMI. This data will eventually mesh with Haywood Elementary data to show regional BMI levels. **(Annual)**

French Broad River MPO & Land of Sky RPO

Mode Share Survey. Conducting a mode share survey will show how people in Haywood County typically travel, specifically which mode they chose. Keeping the data over time could begin to show an increase in bicycle use for both utilitarian and recreational trips, again demonstrating a relationship between county, city and school efforts with citizens' behavior and health. This could be combined with Household Travel Surveys conducted as part of Long Range Transportation Plan updates. **(Every 3 to 5 years)**

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