

Adapting To The New Economy: The Impacts of Mountain Bike Tourism in Oakridge, Oregon



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Abstract

The city of Oakridge, Oregon has seen a measurable increase in the number of mountain bike visitors over the last five years. These visitors are providing a needed boost in their economy, which was historically based in natural resource extraction. While some literature exists on the economic impact of mountain bikers at larger geographic scales (county, state, or national levels), very little exists at a community level. This research uses existing data to determine the economic impact of mountain bikers in Oakridge. Furthermore, as economic development is inexplicably linked with community development, the study also examines the social impacts of mountain bike tourism in Oakridge. Through key informant interviews, the attitudes and perceptions of local residents and business owners were obtained. By identifying barriers and opportunities to future development, this research presents strategies to increase local spending while maintaining community values.

Organization of This Report

This report serves a variety of audiences. As such, it's organized in a manner to provide the findings and recommendations in the beginning of the document, prefaced by a short context section. Within this section, major points and takeaways are highlighted via text boxes and callouts. After Further Research, the document transitions into a more conventional format, with detailed results, methods and analysis presented. For those interested in a summary of the economic, environmental and social impacts, along with specific recommendations for Oakridge, refer to Section I. For those interested in the detailed methods and individual findings of each impact refer to Section II.

Contents

Section I

CONTEXT	1
FINDINGS AND RECOMMENDATIONS	5
DETAILED FINDINGS	12
ADDITIONAL RESEARCH NEEDS.....	15

Section II

THEORETICAL CONTEXT	17
ECONOMIC IMPACTS	20
TOTAL TRIPS ESTIMATION	21
<i>Summary</i>	27
TRIP SPENDING PROFILE ESTIMATION	28
<i>Travel Oregon</i>	29
<i>National Forest Data</i>	29
<i>Local Studies</i>	30
IMPLICATIONS & SUMMARY.....	32
OAKRIDGE ESTIMATES.....	33
ENVIRONMENTAL IMPACTS.....	34
<i>Quantitative Analysis</i>	35
<i>Qualitative Studies</i>	37
COMMUNITY PERCEPTIONS.....	38
CONCLUSION	43
REFERENCES	44

SECTION I: Context

Rural Communities in Transition

The sport of mountain biking has seen a measurable increase in the last five years. As it becomes more popular, people are traveling farther distances to ride at destination locations. While Colorado and Utah have been synonymous with mountain biking for years, the Pacific Northwest is seeing more riders, and more tourists, traveling to those locations and spending money in the local economy.

As an economic stimulator, the outdoor recreation sector as a whole, including all manufacturing, retail and service sector jobs related to hiking, bicycling, hunting, fishing, and other sports, provides more jobs than any other sector in the country, and grew at an annual growth rate of 5% over the last five years (OIA, 2012). As many of the rural communities surrounding mountain biking destinations have historically had natural resource based economies, they are starting to see the effect that recreation, and mountain bikers specifically, can have on their revenue streams. As communities develop economic strategies, facets of recreation are often left out due to their unknown impact. Struggling cities and towns must be made aware of the positive impact mountain biking has on their economy.

Growth is not without challenges, however, and sometimes more important than the economic benefits are the environmental and social externalities that can present themselves during rapid development. In this sense, not only must the economic impacts be addressed, but the environmental and social impacts as well.

Mountain Bike Capital of the Northwest

The city of Oakridge, Oregon is one rural community that has experienced an economy in transition. Located 35 miles Southeast of Eugene on the crest of the Cascade Range, it is a remote community with just over 3,200 residents. Originally founded due to the bountiful old growth timber surrounding the city, which later become the Willamette National Forest, Oakridge was a prosperous timber town for nearly 80 years until the Pope & Talbot mill closed in 1989. Struggling for the better part of the last 25 years, Oakridge is beginning to come to life again, this time as a premiere destination for mountain biking.

Oakridge Quick Facts

- City of 3,200 residents, completely surrounded by Willamette National Forest
- Historically had natural resource extraction based economy
- Timber mill closing in 1989 plunged the city into economic and social decline
- Currently experiencing needed, but controversial, growth in mountain bike tourism

With 350 miles of trails in the Oakridge vicinity, the mountain biking experience is unrivaled. The combination of long descents with a bountiful number of trails that are sparsely populated at one time, means a rider can spend hours riding winding singletrack through old growth forests, without seeing another person.

While the increase in mountain bike tourism is a boost to the local economy, it has not been without conflicts. With anything new comes apprehension, especially in rural communities, and Oakridge is no different. The roots of the timber industry run deep, and many residents were at one point or another hesitant to embrace anything other than logging as an industry. Additionally, as more mountain bikers have occupied the trails, more encounters between bikers and other trail users such as hikers and equestrians have led to territorial claiming of user's rights. In turn, this has led to more apprehension of support for developing mountain bike tourism as an economic sector. To rally both the community and the city government behind the industry, the economic, social, and environmental impacts of the sector were evaluated.

Measuring The Impacts

Three Tiered Approach

- ✓ Economic analysis using secondary data
- ✓ Social analysis through in person interviews
- ✓ Environmental analysis via literature review

The purpose of this research is to provide a first attempt at measuring the economic impacts of mountain bike tourism in Oakridge, Oregon. However, as economic development is paired closely with community development, the economy is not the only item of concern. For a community to stand behind its economic development strategies, it must believe in the strategies, and this means addressing any concerns the citizens might have. Therefore, not only are the economic impacts presented, but also the social and environmental impacts.

In summary, the following research questions guided the project.

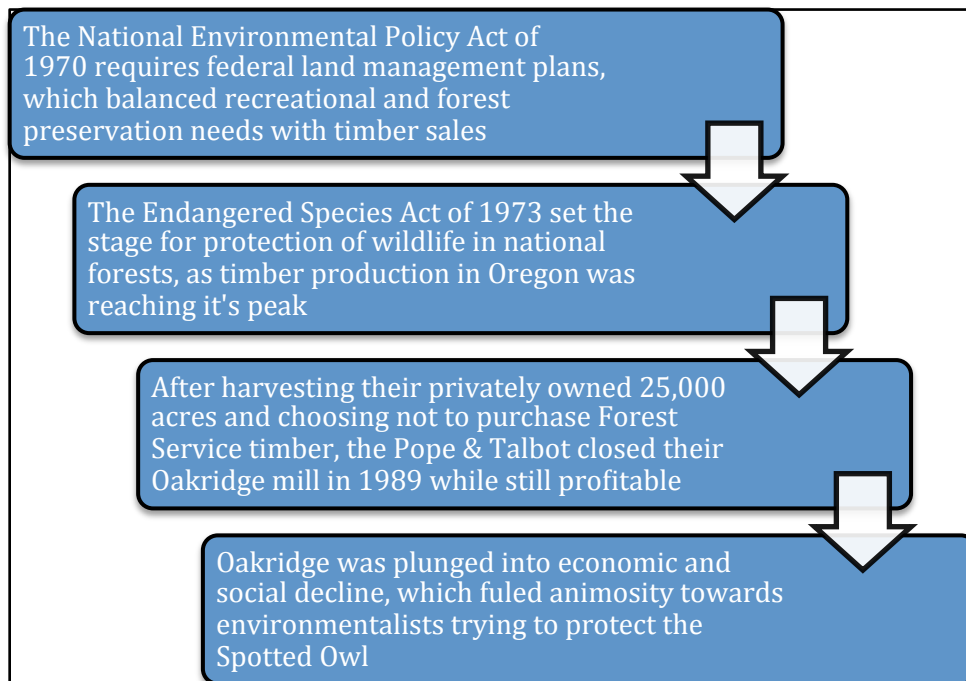
1. *What are the economic impacts of mountain bike tourism in Oakridge, Oregon?*
2. *As an economic strategy, what are the community's opinions on mountain bike tourism and does this present barriers or opportunities to development?*
3. *If the sector is expanded, can the current trail system handle the increased use?*

The three themes of economic, social and environmental impacts also reinforce a theoretical framework previously established known as the New Natural Resource Economy (NNRE). While the goal of the research is to identify the impacts of mountain

biking in Oakridge, it is helpful to locate it within NNRE. Significant time is given to discussing the impacts of the sector in the beginning of the paper, while an effort to build mountain bike tourism into the framework of NNRE is presented later.

Contextual Framework for Mountain Bike Tourism

In parallel with the Pacific Northwest, Oakridge experienced significant growth due to the timber industry throughout the 1900's. A dynamic industry to invest in, the demand for timber is cyclical; it's based on the housing market at the time, i.e. how many new homes are being built across the country. This naturally results in the industry experiencing boom and bust cycles over time. After Oregon timber companies survived an initial decline in demand during the Great Depression, the Pope and Talbot mill opened in Oakridge to expectations of active operation for the next 100 years. A century of operation turned out to be too optimistic however, and Pope and Talbot closed their mill in 1989, 40 years after opening and still profitable. Whether the company could foresee the evolving industry is questionable, but one thing for certain is the consideration of profits was placed well above the consideration of the community.



Many blame the Endangered Species Act (ESA) of 1973 and the existence of the Spotted Owl on the eventual downfall of the timber industry, however the decrease in timber harvesting didn't occur until the adoption of the Northwest Forest Plan in 1994. This was five years after Pope and Talbot had already shut down their mill in Oakridge, and Oregon was still the top timber producing state. "Three years into a drastic curtailment of logging in Federal forests, Oregon, the top timber-producing state, has posted its lowest

unemployment rate in a generation, just over 5 percent,” (NY Times, 1994). While there was a drop in production during the 80’s, by 1994, Oregon was still supplying the majority of the nation’s lumber, and the federal government, nor the spotted owl, nor environmentalists, were to blame. Oakridge quickly learned the impacts of an economy based on a single large employer that cared more about profits than the community it was based in.

As Oakridge strives to transition away from a timber-based economy, it must consider the externalities of the new sectors it attracts. No longer a timber town, and unlikely to entice large employers, Oakridge should focus on the assets and amenities the town has to build a new economy. Furthermore, if the industry continues to utilize natural resources, it should strive to use in a more sustainable way. Mountain bike tourism does just that, and thereby provides a way forward. Utilizing the vast network of trails that already exist, the city can begin to rebuild its economic base without the same risks of large single employers involved in commodity production.

No existing research captures the community level economic impacts of eco-tourism such as this, in addition to examining the social impacts. The following paper uses a three-fold approach to discuss the impacts mountain bike tourism have on the Oakridge community, and how the city can move forward on developing the sector without alienating the residents or harming the environment.

The remainder of this document is organized in the following manner (and outlined in graphical form below): a list of the findings is found on the next page, followed by recommendations for Oakridge. Detailed findings are then presented which tie the economic, social and environmental analysis to the conclusions. As this project is grounded in theory, the theoretical context is described, followed by a detailed description of the social, economic and environmental methods.

Goals of This Report

- Provide quantifiable recommendations for Oakridge
- Provide key points in an easily digestible format
- Include detailed analysis and methods for interested parties



Economic Estimates

\$2.3—\$4.9

million

The amount of direct spending by mountain bikers in Oakridge

**10,700-
15,900**

Annual mountain bike trips in Oakridge

3

The average number of group members on a mountain bike trip

5%

The percentage of the Oakridge economy mountain bikers account for

0.25%

The percentage of the Oregon economy mountain bikers account for

3

The average number of nights mountain bikers stay on destination trips

\$491

The average amount spent on a 3 night trip by 3 mountain bikers

Impacts

Economic

Mountain biking helps sustain the Oakridge economy

Accurate information regarding spending habits is needed

Mountain bike tourism increases destination visits to Oakridge which has exponentially positive impacts

Social

A culture of volunteerism exists that is an ingrained part of the community

A new community is forming as Oakridge is in transition

The timber industry is an important part of the city's identity and should be respected

Environmental

Mountain biking has similar if not equivalent impacts to trails as hiking,

Mountain bike tourism is a proven aspect of the New Natural Resource Economy

Economic Recommendations

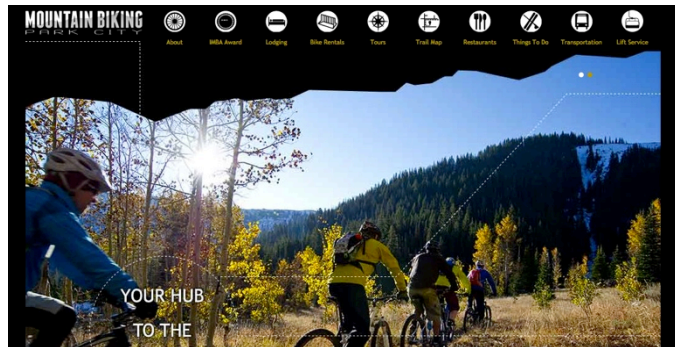
Economic recommendations speak specifically to growing the mountain bike economy for all businesses in Oakridge. It should be noted that while many of these recommendations were generated with mountain biking in mind, they are applicable to all forms of tourism.

Create a central point of information

While the Oakridge-Westfir Chamber of Commerce has published a visitor guide for the Oakridge area, no central point of information exists for online visitors. If searching for “Oakridge mountain biking,”

the city’s website does not appear on the first two pages of results. To help visitors appropriately plan for their visit, a website with the available lodging options, places to eat, and location of services should be created.

*Visitor website for
Park City, Utah*

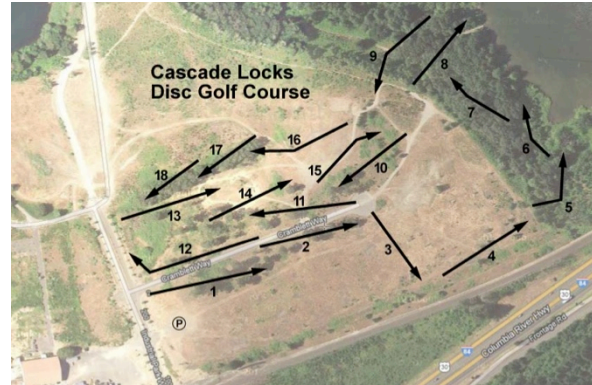


Develop additional non-mountain bike amenities

With the knowledge mountain bikers are bringing their families for the weekend, additional activities focused towards families should be developed. Furthermore, since mountain bikers don’t typically bike for the entire day, additional amenities would

encourage day visitors to spend the night, or destination visitors to spend more time, and more money, in Oakridge.

Cascade Locks developed a disc golf course to increase non-bike amenities



The city of Cascade Locks recently created a disc golf course to augment their mountain bike trails. This has dual benefits of creating additional activities for visitors as well as residents, especially teenagers, to participate in. While the city of Oakridge has a Wednesday night concert series in Greenwaters Park, it is unlikely many mountain bikers are spending Wednesday nights in local lodging. Moving the concerts to Friday or Saturday nights could convince riders to bring their families out the night before for a mini-vacation. Furthermore, events catered specific to mountain bikers would be bike-in movie nights that could be hosted at Greenwaters Park as well.

Market to mountain bikers

Mountain bikers that stay overnight in lodging spend significantly more than those that visit for the day. To attract day visitors to spend the night, local businesses could work together to offer discounts on

combination packages. For example a night at a motel could come with a 20% off coupon for a local pizza restaurant.

Additionally, to get riders to stay in town instead of camping, lodging establishments could offer free trailhead shuttles, allowing bikers to leave their vehicles in town (and creating a need for them to come back), and/or offer shuttles to the top of trailheads. These types of packages welcome mountain bikers, and go above and beyond the bike friendly business program established by Travel Oregon. This effort would demonstrate a friendly and welcoming attitude to mountain bikers, who have been proven to patron bike focused businesses.

Social Recommendations

The social recommendations speak to maintaining the historic culture in Oakridge, while also allowing for the expansion of not just the mountain bike tourism sector, but also the tourism sector in general.

Maintain the heritage of the timber industry

Through the establishment of timber themed bicycle events, races or prizes, Oakridge can pay respect to their past while working for their future. In addition to respecting long time residents, this could educate visitors about the history of Oakridge. For example, a weekend could be dedicated to combining logging competitions (typically held at county fairs), with a mountain bike race, and prizes could include decorated cross cut saws and peaveys.

*Potential
lumberjack/biking
competition*



To further respect the impacts of tourists on local residents, Oakridge in combination with GOATs and the forest service could sponsor a resident appreciation day. Designed as a way to thank locals for promoting their town and local businesses, it could also help build community and break down animosity between folks.

Break down barriers between businesses

In addition to bringing people together over food, barriers that currently exist could be addressed through transparency of tourist spending habits. While many residents and business owners say mountain biking has not had the impact many thought, an infographic with the spending habits

distributed to the entire community would build knowledge of the economic impacts, while acknowledging mountain bike tourism cannot be the only sector. The city has recently made steps to improve transparency in the distribution of grant funds, which is an excellent step forward.

Attract future small business owners

After visiting for mountain biking, or other recreational opportunities, people are moving to Oakridge. Since mountain biking alone will not sustain the Oakridge economy, efforts should be made to attracting

additional employers. As mentioned, Oakridge will unlikely attract large employers since they lack the comparative advantages of Eugene and Portland, and the existing amenities of Bend. Oakridge's biggest asset is the quality of life, and it should focus on attracting *future business owners that want to live in Oakridge*, not businesses that should locate in Oakridge.

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services*

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For more information go to Oakridgebusinessincubator.webs.com
Or Call Glenia Baines at 541-782-4485



St. Vincent de Paul's Business Incubator & Service Center
St. Vincent de Paul
Society of Lane County, Inc.

Oakridge is ripe for the development of small businesses, and amenities could be increased to help business. This could include shareable workspace and one day a week rotating services such as legal services, accounting aid, etc.

Environmental Recommendations

The environmental recommendations provide for the growth of mountain biking while protecting the natural resources that make Oakridge unique.

Expand the volunteer base in the community

While the Greater Oakridge Area Trail Stewards (GOATS) is responsible for the majority of trail maintenance, their volunteer capacity is limited. A small number of people do a lion's share of the work, and this can lead to volunteer burn out. Efforts should be made to expand community involvement of both trail work groups and business revitalization efforts. One example could include monthly "clean up days" incorporating high school students working to improve their community while volunteering.

The Greater Oakridge Area Trail Stewards serve a vital role in the community



Expand New Natural Resource Economy sectors

With mountain bike tourism proven as a viable example of the New Natural Resource Economy, other examples can be expanded upon including biomass harvesting and forest restoration. A targeted industry study previously developed for Oakridge speaks directly to increasing these opportunities in the city.

Detailed Findings

The recommendations previously discussed build off the list of findings already identified. The goal of this section is to discuss those same findings in more detail, which incorporate the economic, social and environmental analyses. The combination of economic modeling, key informant interviews, and a literature review were utilized to develop the following conclusions. While listed in no particular order of importance, they are generally organized by the following themes: economic, social, and environmental.

MOUNTAIN BIKING HELPS SUSTAIN THE OAKRIDGE ECONOMY

Mountain bike tourism plays a role in the Oakridge economy with the estimate for direct spending between \$2.5 and \$5 million dollars. Not all of this money stays in Oakridge however, and this “leakage” has not been accounted for. For example, spending \$20 for gas in Oakridge does not equate to \$20 benefitting Oakridge. In order to provide a comparison, a “community level” gross domestic product (GDP) was calculated for Oakridge. With a value of all goods and services totaling \$98.6 million, mountain bike tourism accounts for up to 5% of the Oakridge economy, which is 20 times more when compared with Oregon as a whole.

With three businesses estimating 75% of their business is from mountain bikers, it has led to the creation, and helped sustain, new businesses in the community. One interview respondent used the following example as one type of indicator as well, *“even the beer selection has changed at Ray’s. There’s beer being sold there that wasn’t even on the shelves five years ago.”*

ACCURATE INFORMATION REGARDING SPENDING HABITS IS NEEDED

A general feeling of unfairness exists among some businesses and residents due to the historic efforts placed on attracting more mountain bikers. Multiple interview respondents mentioned, *“more than just mountain bike focused businesses exist in Oakridge.”* However, some debate remains about how much money has been spent and whom exactly it benefitted. According to advocates, until last year, the city has never used any of it’s own dollars for attracting tourism. With this research providing a first cut at annual economic impacts, the details of where the money is going can now be communicated. Oakridge was host to the International Mountain Bike Association’s Pacific Northwest Summit last fall, and the city made a donation of \$2,000 towards sponsorship. In return, it’s estimated visitors spent \$40,000 over the course of four days lodging, dining and recreating in Oakridge.

At a city level, steps have been taken to equalize processes that were once deemed biased. The program, which historically funded the Chamber of Commerce, has been

changed to an application process more accessible to all businesses and residents, with more money available.

MOUNTAIN BIKE TOURISM INCREASES DESTINATION VISITS TO OAKRIDGE WHICH HAS EXPONENTIALLY POSITIVE IMPACTS

The demographics of mountain bikers were a surprise among some residents and business owners. The stereotype of “young dirtbags sleeping in their cars,” was proven false, as the majority of mountain bikers are working professionals, many with families. This demographic stays in hotels as much as they camp, and after visiting for mountain biking, later brought back their families for the weekend. The Travel Oregon study found that for mountain bikers, 43% choose to stay in commercial lodging over camping or in other accommodations.

Additionally, anecdotal remarks were made about people that visited Oakridge for mountain biking, or another recreational opportunity, and enjoyed the area so much; they bought a house in the city. Perhaps more important than the money mountain bike tourism brings to Oakridge, is that people come and stay in the city, and these people subsequently buy homes, become residents, and pay taxes.

A CULTURE OF VOLUNTEERISM EXISTS THAT IS AN INGRAINED PART OF THE COMMUNITY

After the completion of the Oakridge Wesfir Community Trails Plan, the group that helped write the plan continued to meet and formed the Greater Oakridge Area Trail Stewards (GOATS). This group’s role has grown exponentially, and includes mountain bikers, hikers, equestrians, and local residents that are non-trail users. With their primary role of maintaining trails, in 2013 they dedicated over 3,000 hours of volunteer time (that’s more than the equivalent of one full time employee).

This has generated an enormous amount of respect for the group. Every interviewee made direct mention that the only reason the trails remained in good shape was because of GOATS work. GOATS has spurred more volunteer activity, working with the High Cascades Forest Volunteers, and Disciples of Dirt, among others. This results in people traveling from all over Lane County, and sometimes the state, to volunteer in Oakridge. Not only does this protect the trails, but as mentioned above, it brings more people into the city that could be future residents or business owners. When it comes to community events, GOATS are often looked at to have a role, and often have one in some capacity or another.

A NEW COMMUNITY IS FORMING AS OAKRIDGE IS IN TRANSITION

The increase in mountain bikers visiting Oakridge over the last five years has led to an increased role for local advocates. With this increased role has come a growing community of like-minded people, and this community has created an unofficial hub of activity at the Brewer's Union 180. The Brewer's Union has become a meeting place, a link between locals and visitors, and one of the primary funding sources for GOATS.

The forest service hosts meetings here regarding upcoming work, the first Monday of every month is a fundraiser for GOATS, and in the summer, every afternoon finds the parking spaces outside lined with mountain bikes attached to vehicles. One example of how much of a "hub" the Brewer's Union is appeared while the author was conducting key informant interviews. While interviewing one of the founders of GOATS, who provided the original contact list for interviewees, at least half a dozen people on the list came into the pub on a Wednesday night.

THE TIMBER INDUSTRY IS AN IMPORTANT PART OF THE CITY'S IDENTITY AND SHOULD BE RESPECTED

A level of animosity still exists in Oakridge, due in part to what locals consider the loss of their identity. While the increase in mountain bike tourism has brought a much-needed boost to their economy, some locals find it slowly deconstructing the identity of the town, which was founded on and existed solely for the purposes of timber production. Moving forward, the culture of Oakridge is changing. To preserve the heritage of the town, and respect the history that created the town, efforts should be made to incorporate the logging industry into the new culture of mountain biking.

MOUNTAIN BIKING HAS SIMILAR IF NOT EQUIVALENT IMPACTS TO TRAILS AS HIKING

The extent of the literature provides sufficient evidence that mountain biking has no more significant impact on trails than hiking. This conclusion maintains trails are built, or reinforced, for mountain biking as well as properly maintained. Those against the use of mountain bikes on multi-use trails have often had one or two bad experiences from a minute group of bikers. When mountain bikers are not building rogue trails, respecting the variety of users, and maintaining the trails with proper compaction and drainage, there should be no adverse environmental impacts.

MOUNTAIN BIKE TOURISM IS A PROVEN ASPECT OF THE NEW NATURAL RESOURCE ECONOMY

Now that the economic, social and environmental impacts have been identified for mountain bike tourism, it can authoritatively be listed as a viable aspect of a New Natural Resource Economy. With minimal environmental impacts, social impacts that

can be mitigated, and representing a non-trivial portion of the economy, mountain bike tourism is an economic development strategy that can move Oakridge, and other rural communities forward into the future.

Additional Research Needs

After a comprehensive analysis of the economic, social and environmental impacts of mountain bike tourism in Oakridge, need for further research remains. While this paper provides a base estimate for the impacts, efforts should be made to further quantify the economic aspects of mountain bike tourism, in addition to developing more detailed travel estimates.

The economic values presented within this report are for direct spending and therefore the greater economic impacts have not been calculated. Often in economic modeling, a tool known as IMPLAN is utilized to calculate the leakage rates of various commodities, and in turn, the benefits to the local economy. In effect, IMPLAN would calculate how much of \$20 spent at a gas station the local owner sees. It is also used to determine the number of jobs that overall direct spending generates. Moving forward, the values estimated for direct spending should be input into an IMPLAN model to determine the leakage rate and local economic impacts.

Another facet that is typical of recreational spending estimates is intercept surveys conducted at trail locations. This provides direct measurement of the amount spent by mountain bikers, as well as more refined numbers on visitation. This methodology presents a challenge to Oakridge due to the high number of dispersed trailheads in the area. However, at the least, establishing a baseline of riders by using trail counters, would allow for Oakridge to track the increase in riders, and economic spending, over time. Information gained from these surveys could be invaluable for attracting more mountain bikers. By asking questions related to where the rider is traveling from, how long they are staying, and other activities they're participating in, Oakridge can cater their marketing efforts and build on amenities their target audience desires.

As discussed, mountain bike tourism is a proven aspect of the New Natural Resource Economy. As Oakridge rebuilds the economic base, efforts should be made to explore additional facets of NNRE. This can include forest restoration, biomass harvesting, and other economic generators that utilize the natural assets of Oakridge, without using them up. Small investments in these sectors can pay large returns, not just economically, but environmentally and socially.

SECTION II: Theoretical Context

Originally known as Hazeldell, the current name of Oakridge was established in conjunction with a station on the Southern Pacific Railroad in 1912 (McArthur, 2003). Oakridge, much like Oregon and the greater Pacific Northwest, experienced significant growth during the 1900's due to the timber industry. "In the period from 1890 to 1914, the harvest in the Pacific Northwest rose from less than 10 percent to more than 20 percent of the U.S. total, and by 1936, the region accounted for more than 60 percent of the American timber harvest (Hibbard, 1999). However, with an industry based solely on the demand for a single commodity, the timber industry would more intensely experience the same boom and bust cycles an economy does.

Bust cycles in the timber industry posed a particular challenge to the communities they were located in. Often a rural location, a mill opening would require a surge in labor force, and this would result in the rapid development of rural cities. While some mill workers would be family men looking to settle down, the high wages of the timber industry also attracted men who traveled to find work. This particularly migrant work force would come into a relatively self-sustaining community, extract all of the old growth timber, and then move on to another location, taking the timber company and its jobs with it.

At the time in the early 1900's, Oakridge provided enough old growth timber estimated to keep mills busy for a century. However, as the Great Depression led to a significant reduction in homebuilding, the timber industry in Oregon experienced its first bust cycle. "In Oregon for example, about 90 percent of the timber firms were near bankruptcy by 1933, and even the larger ones were on the brink." (Hibbard, 1999) Recognizing the unsustainable rate at which timber was being extracted, in addition the effects the industry was having on communities, the Forest Service pushed for active collaboration and management.

The Sustained Yield Forest Management Act of 1944 (The Management Act) was a joint project between the timber companies buying, processing and selling the timber, and the federal entities that owned it in the first place. The goal of The Management Act was to develop a plan for *sustainable yield* of the forest. This meant, instead of moving from location to location and extracting all the natural resources at once, timber companies could cut down a *certain number of trees* per year that would give sufficient time for additional infilling of the forest. However, just as The Management Act was being passed, World War II was ending, and the United States was about to enter a period of unprecedented growth.

As suburban sprawl led to unprecedented new home construction, the initial intentions of The Management Act were forgotten as timber companies strived to meet the growing demand. More concerned about making money than their effect on a community, the timber companies subsequently convinced the public that their social and environmental concerns would be fixed through growing the economic base. “Industry representatives contended that community stability would follow from a stable timber industry” (Hibbard, 1999). The population of Oakridge responded to the need for timber, doubling twice between 1940 and 1970, and remaining stable through the 80’s.

While Oregon was the largest supplier of timber, southern states as well as Canada expanded their market, offering lower prices due to cheaper labor. To maintain competitive, in combination with evolution of technology, Oregon companies slowly began to mechanize equipment and no longer required as large of a workforce. Perhaps recognizing the future fate of the industry, Pope and Talbot closed the Oakridge mill in 1989, 40 years after original construction, and after the promise of 100 years of operation.

The Sustained Yield Forest Management Act of 1944 had tried to account for the boom and bust cycles the timber industry was likely going to encounter, but 45 years later, the residents of Oakridge were not on the minds of Pope and Talbot’s shareholders. “The continuing stability of the industry had been achieved at the cost of community instability” (Hibbard, 1999). The timber industry responsible for the economic prosperity in Oakridge was also responsible for its economic demise; an economy that could be argued was doomed from the start.

Oakridge is but one example of a city facing rural decline. The 2010 Decennial Census placed 82% of American citizens living in urbanized areas, compared with 64% in 1950. As Americans become more and more distant from where their food is grown, their energy produced and their products manufactured (non-withstanding of globalization), so have the communities where those key commodities come from been forgotten. State and regional level economic development programs are focused on urban centers close to interstates and airports, to meet the need for exportable products. However, the residents of rural cities have made a choice to live where they do, whether for the better connection with neighbors, hometown mentality, or rugged individualism. In this sense, they cannot be forgotten, and programs and policies must be developed to serve their needs. Recently, a theory has emerged that specifically addresses rural economic development.

In 2012, Michael Hibbard and Susan Lurie published an article titled “The New Natural Resource Economy: Environment and Economy in Transitional Rural Communities,” in *Society and Natural Resources: An International Journal*. While the components of the New

Natural Resource Economy (NNRE) were not new, the broad conceptualizing of them as an economic sector was. The authors say the following:

The activities and businesses that comprise NNRE may not be new; what is new is accounting for them collectively as an emerging economic sector in its own right, one that can help diversify rural economies and increase local resilience as a complement to the traditional natural resource economy

Conventional economic theory tells us that governments collect tax revenue by attracting businesses. Simply, with a bigger tax base from businesses comes more tax revenue, which can then be distributed to social welfare programs, environmental assets, and other amenities residents value. Traditionalists tell us to grow the economic base by attracting business first, and the expansion of social programs and increased environmental remediation/protection will follow.

The risk of have an economic base dominated by one major employer focused on a singular commodity has greater risks in a rural environment than an urban one. The volatility of the sector, and will of the employer can lead to sudden layoffs and relocations. With a loss of jobs come high unemployment, high poverty, out migration, and a downward spiral that can be hard to stop. In an urban or more populated area, enough industries exist that offer a broad range of goods and services, that to some degree, the community can more adeptly respond to fluctuations in loss of employers.

The New Natural Resource Economy provides a different approach to frame the situation. The theory posits that as the economy is built, environmental, social and cultural assets can *simultaneously* benefit. Accomplished through three categories of activities, **Table 1**, each community requires a different package of options to meet their specific needs and build on their specific assets.

Table 1. Examples of NNRE

Activity	Description
Production <i>Value based goods</i>	Grass fed beef, alternative energy, plant nurseries
Consumption <i>Utilization without depletion</i>	Ecotourism (i.e. recreation), agritourism (i.e. farm visits)
Restoration/Protection <i>Natural environment</i>	Environmental education, watershed restoration (stream bank plantings), forest restoration (previously logged locations)

The benefits have been proven to outweigh the risks. For example, restoring a previously damaged watershed or forest further enhances Oregon’s valued natural resources, the addition of jobs provides employment and thereby reduces the risk of high unemployment and poverty rates, and finally, the money is spent locally, which provides even more benefits such as an increase in local business sales, and subsequently, and increase in tax revenue. The economic benefits of these activities are not insignificant. For example, an investment of \$1 million in Oregon watershed restoration generates over \$2.1 million for the local economy. For that same \$1 million investment, between 15.7 and 23.8 jobs are created (Hibbard and Lurie, 2012).

While this research was grounded in a case study of Oakridge, the implications extend to the academic world through developing and measuring the facets of a New Natural Resource economy. The merits of the theory have already been proven, but this research builds the case for developing recreation as a viable means of promoting rural economies, while benefiting the community and the environment.

Economic Impacts

As described earlier, the author believes mountain bike tourism can serve an economic development role in Oakridge, if not as a major sector of the economy, then as a bridge, or catalyst to future development opportunities. To support this position, an attempt to measure the economic impacts of mountain bike tourism must be made. Proving the social and environmental benefits can be icing on the cake, however the economic benefits are the cake ingredients, and the reason city officials will invest effort in growing the sector.

In terms of recreation, a basic economic model that measures direct spending is comprised of two parts; the number of total trips, and the amount spent per trip. While the sub-components of these two variables can become very complicated, in the end, a direct spending calculation becomes a simple multiplication exercise, as seen below in Equation 1.

$$\text{direct spending (in dollars)} = \text{total trips (dim.)} \times \text{amount spent per trip (in dollars)} \quad (\text{Eq. 1})$$

The two pieces of data needed then, are the total number of trips, often calculated on an annual basis, and the amount spent per trip. These are discussed at length in the following sections. As Oakridge is surrounded by National Forest, a great benefit exists in being able to utilize already existing data. The federal government has been measuring the economic impacts of national forests since 2000 for multiple reasons, including the impact on local economies. “Estimates of the spending of national forest recreation visitors provide the basis for estimating the economic contributions of forest recreation to local economies.”

(White & Stynes, 2008) The forest service data, in combination with a statewide study completed in 2013, serve as the basis for economic estimates.

Total Trips Estimation

Four different models were created to estimate the total number of mountain bike trips to Oakridge, using a combination of sources. These sources were developed for larger geographic areas than the mountain bike trails surrounding Oakridge, and as such, required some assumptions that are examined further. The major sources of information include:

- *Economic Significance of Bicycle Related Travel in Oregon*, developed for Travel Oregon
- *Updated Spending Profiles for National Forest Recreation Visitors, By Activity*, White & Stynes
- *Willamette National Forest Visitor Use Report 2012*, USDA Forest Service
- *The Economic Contributions of Outdoor Recreation: Technical Report on Methods and Findings*, developed for the Outdoor Industry Association
- *Oregon Department of Transportation Traffic Volumes on State Highways, 2012*

The first two models, which utilize the first three sources listed above, provide the most reliable estimates for spending in Oakridge. While the sources for the second two models are less precise, their estimates fall in the same range as the first two, thereby building support for those estimates. In this sense, the Models I and II are taken as the primary models for estimation, with Models III and IV supporting evidence. The four models are numbered I-IV, and are discussed in detail below. Combined with the description of the methodology is a graphical representation of the logic process utilized for that particular model, including the steps where assumptions were made.

MODEL I

The first model utilized data sources from the Travel Oregon study conducted by Dean Runyan & Associates in 2013. Runyan calculated the statewide economic impacts of bicycle related travel by conducting over 3,000 surveys and extrapolating results on a regional and trip type basis. For this model, mountain bike trips within the Oakridge trail area were the focus. Oakridge is contained within the Willamette Valley region, **Figure 1**, and the primary trip type used from the study was “Day mountain bike rides,” **Figure 2**. This model was more straightforward than others as it involved simple interpretation of existing data, with only one broad assumption.

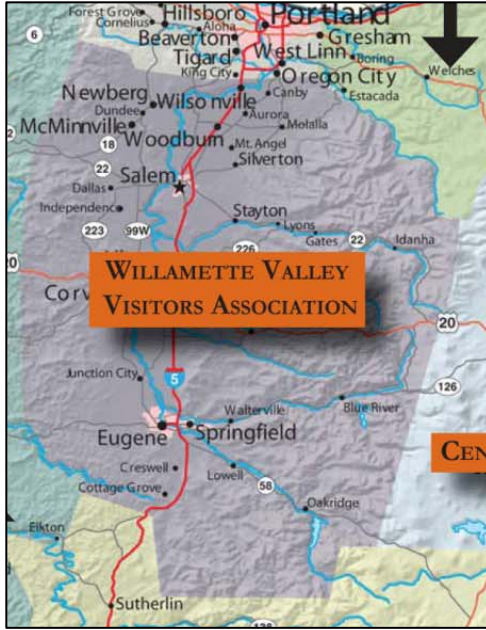


Figure 1. Willamette Valley Region associated with Travel Oregon study

Type of Bicycle Activity
Organized group tour
As a recreational activity
Sanctioned bicycle race
Independent bicycle touring
Day mountain bike ride
Organized non-competitive group ride
Day road ride
Other cycling event
Overall Bicycle Trip Average
All Oregon Travel*

Figure 2. Types of bicycle trips sorted in Travel Oregon Report

Figure 3 contains the logic flow for Model I. A base population of bike trips in Willamette Valley was the starting point. From here, a ratio of mountain bike trips compared to overall bicycle trips, at a state level was found, using the Travel Oregon data. This ratio was then inferred to be the same in the Willamette Valley, which narrowed down the number of trips. Finally, a percentage of the mountain bike trips in the Willamette Valley needed to be associated with Oakridge. Economic modeling often involves some assumptions, and for the first attempt at a community level spending such as this, assumptions are inherent.

For this case, an assumption that 2/3 of trips in the Willamette Valley are attributed to Oakridge was made. Not completely unfounded, the author is an avid mountain biker in the Willamette Valley. Judgment was based on other trail systems in the area, and made under the notion that it was a preliminary estimate. After estimates from other models were made, the assumption was re-examined. While taken out of context it may seem arbitrary, a case can be made in support of the estimate.

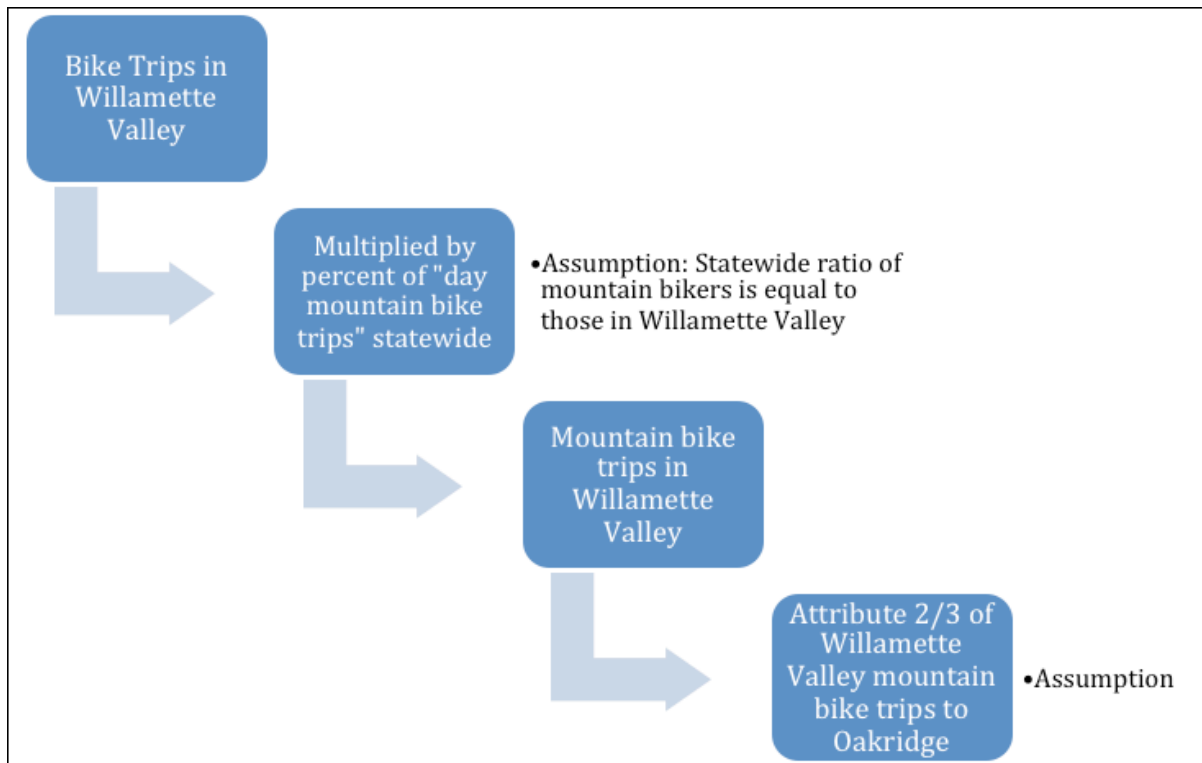


Figure 3. Model I Logic Flow. Based on Travel Oregon data

Examining the Willamette Valley Region in detail, one can sort through the possibilities of other mountain bike destinations. Corvallis contains a group of trails in McDonald Forest, but they are not a popular destination for traveling. No major trail systems exist between Corvallis and the Portland Metro area; with the exception of the Black Rock Mountain Bike Association trail system located in Falls City. While it’s a popular destination for downhill riders, it does not attract a wide spectrum of riders. Furthermore, the lack of developed camping facilities and general amenities does not draw overnight visitors. The McKenzie River Trail is another popular destination in the area, but that trail is not included in the Willamette Valley study area (located in Central Oregon study area).

MODEL II

The second model utilized Willamette National Forest visitor data. The USDA Forest Service conducts a National Visitor Use Monitoring (NVUM) survey, to build accountability at a federal level, as well as help local land managers make decisions at a forest level basis. “To achieve this objective a selection of individual forests in each region are sampled yearly with each administrative forest in the National Forest System being sampled once every five years.” (White & Stynes, 2005) An additional survey is distributed to 25% of survey respondents, which in turn builds a national database on demographic information and spending profiles. The survey then extrapolates this data to develop values for the total

number of visitors to each national forest in the United States, as well as demographic data, trip purpose, and spending profiles. The Willamette National Forest (WNF) visitor data represents visitor and trip type estimates for fiscal year 2012.

Visits are estimated by surveys conducted at a variety of national forest “access points,” including Day Use Developed Sites (DUDS), General Forest Area (GFA), Overnight Use Developed Sites (OUDS) and Wilderness (WILDERNESS). A General Forest Area would be any undeveloped area (i.e. a trail on a dirt road), while a Day Use Developed Site could range from a boat launch, to a parking area with vault toilets. Since mountain bikes are not allowed in designated wilderness areas, as well as there are few of designated wilderness sections of the WNF, these trips were excluded. Overnight Use Developed Site visits were not included.

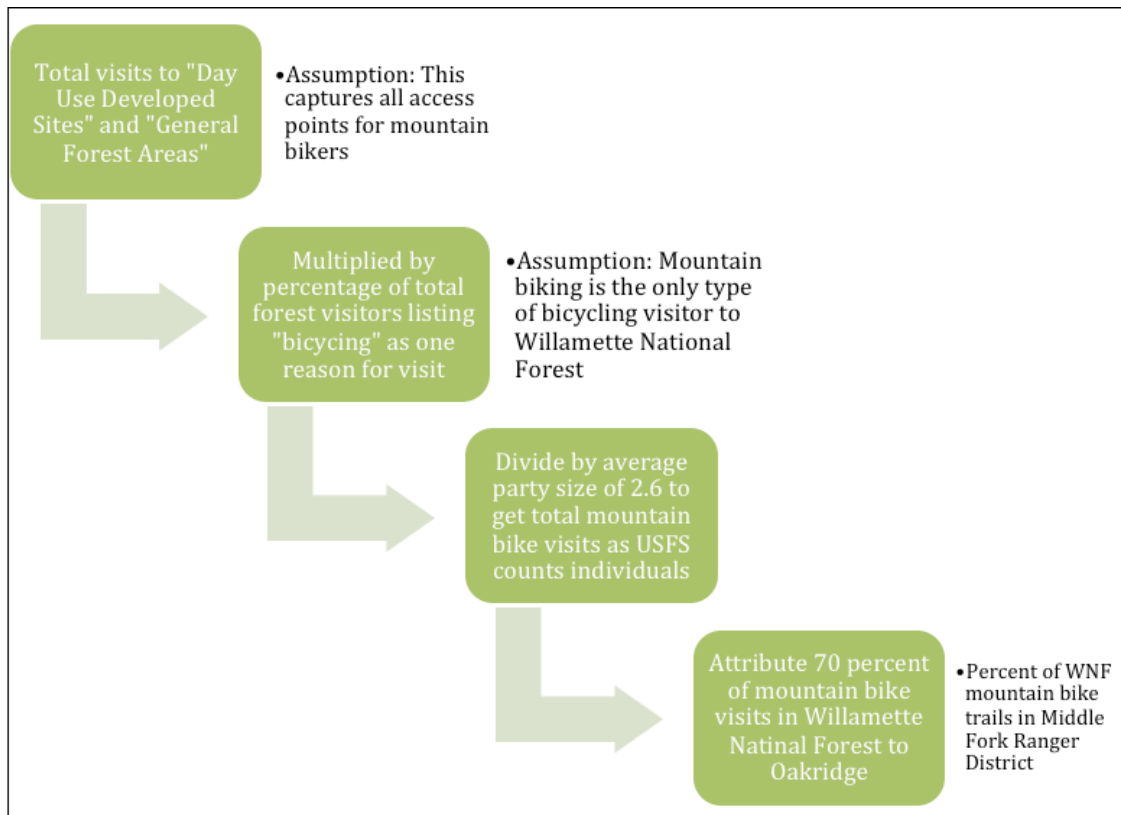


Figure 4. Model II Logic Flow. Based on USFS Visitation Data

The model, **Figure 4**, inherently begins with the assumption that DUDS and GFA capture all access points for mountain bikers. Next, this value was multiplied by the number of visitors listing “bicycling” as a reason for visiting the National Forest that day. This further assumes that mountain bikers are the only visitors using bicycles in the WNF. Since the Forest Service tabulates visitors by individual person, the data needed to be normalized into trips.

The NVUM survey data found that a mountain bike specific trip to a national forest has an average group size between 2.4 and 2.8 people. As such, the total number of bicycle visitors to Willamette National Forest was divided by an average group size of 2.6 to get total number of bicycle trips.

At this point, another assumption had to be made to associate a percentage of total bicycle trips in WNF to the Oakridge area. This was done through analyzing the total mileage of mountain bike trails in the Willamette National Forest. Conveniently sorted into ranger districts by travel corridors, OR-58 is the primary access route for the Middle Fork Ranger District, the district for the trails in the Oakridge area. Utilizing trail mileage provided by the Forest Service, it was found 70 percent of mountain bike trails in the Willamette National Forest are in the Middle Fork Ranger District. Without more specific data available, 70% of visits were associated to the Middle Fork Ranger District, and in turn, Oakridge.

MODEL III

The third model utilizes traffic volumes from the Oregon Department of Transportation, statewide statistics on recreation from the Outdoor Industry Association, and bicycle user statistics from the Travel Oregon study, **Figure 5**. Oregon State Highway 58 (OR-58), also known as the Willamette Highway, is the primary, and only access route from the city of Oakridge, as well as the trails surrounding the area. If a rider is mountain biking on any of the trails surrounding Oakridge, they are traveling on OR-58. The Oregon Department of Transportation maintains traffic volumes on all Interstate, US and State routes, as part of their traffic-monitoring program. With OR-58 a state route, and all mountain bikers traveling on the route at one point or another, it provides a valuable way to measure number of trips.

Due to Oregon's statewide land use system, community development is concentrated within their specified urban growth boundary (UGB). With the majority of residents and businesses within this "area" more straightforward assumptions can be made regarding trip purposes. For Model III, this technique was used to estimate the number of vehicles traveling on OR-58, and the subsequent percentage of them mountain biking. To determine this volume, the number of vehicles traveling east past Oakridge were subtracted from those entering from the west. This captured those "traveling to the area" as opposed to those "traveling through the area." The percent of heavy trucks were removed, as well as the motorcycles and buses. The remaining traffic volume, comprised of light trucks and automobiles was considered to be the base population of potential mountain bikers.

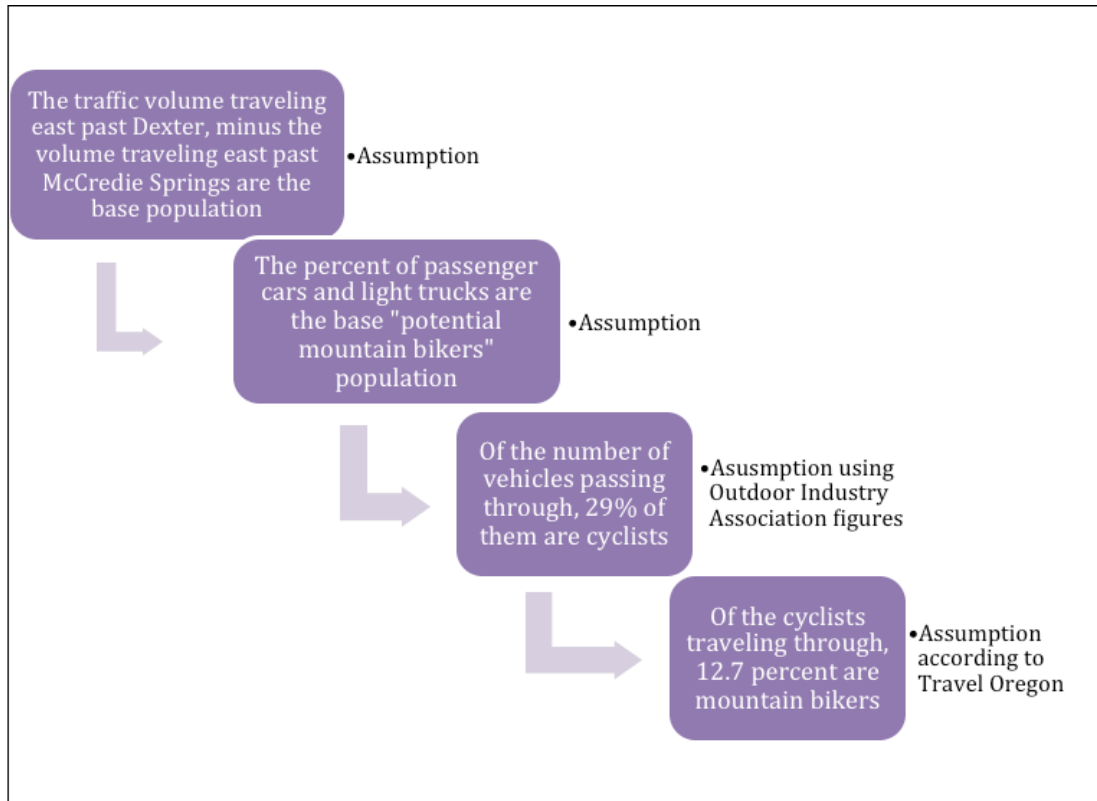


Figure 5. Model III Logic Flow. Based on ODOT and OIA Reports

This base volume was then multiplied by 29%, or the percent of Oregonians that participate in bicycle recreation, according to the Outdoor Industry Association (OIA). The OIA uses a national survey combined with state statistics to determine the percentage of adults recreating in various sports. Since there is no distinction between mountain bikers, road cyclists and recreational rides, further refinement was needed. The Travel Oregon study, whose base population were those taking a bicycle related trip in Oregon was used to cross tabulate the amount of mountain bikers. Since 12.7% of bike trips in Oregon are taken for mountain biking, the refined value from above was finally multiplied by the percentage of mountain bike trips to calculate the number of trips along OR-58 that were for mountain biking.

While the trips for the entire year were used for calculation, it is recognized that the majority of mountain biking takes place during the summer months. In this sense, two values for the total traffic volume were used; one that accounted for the total annual volume, and one that only accounted for volumes between the beginning of May and the end of October. These are designated in the summary table with a lowercase "s" after the model number.

MODEL IV

The fourth model started with the same base assumptions described above, including the traffic volumes and percent of light trucks and cars, **Figure 6**. However, this model then assumed that every traveler to the region was visiting Willamette National Forest. From this base population, the WNF visitor data was used to imply that 2.7% of all visitors were traveling to the forest to mountain bike. Similar to Model III, a summer estimate of traffic volume was used and is provided in the summary.

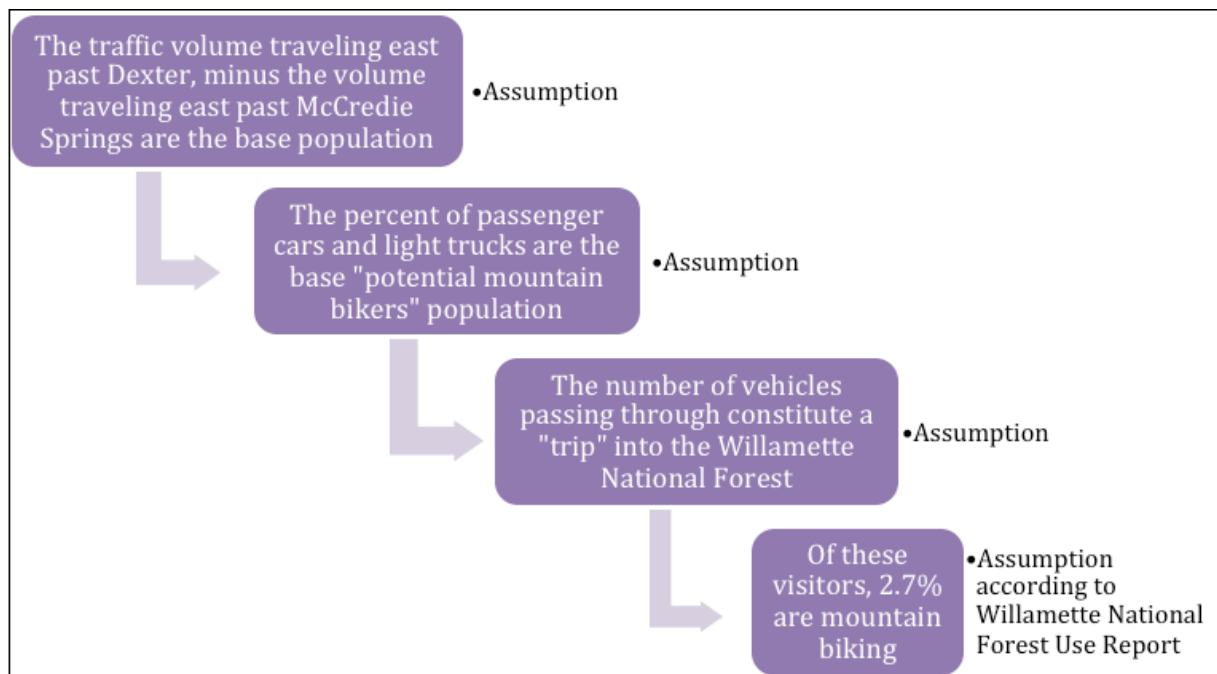


Figure 6. Model IV. Based on ODOT and WNF Visitor Reports

Summary

The four models described above result in the total number of estimated mountain bike trips to the Oakridge area. **Table 2** contains the estimates for each model, including the summer only estimates using Models III and IV. As these are estimates, the end values will be presented as a range, to not confuse the reader with level of precision. Furthermore, values were rounded to the nearest 100. Between 10,700 and 15,900 trips are estimated to the Oakridge trail system via mountain bikers. Note, this is *total trips* and not total visitors.

Table 2. Summary of total trip estimates

Primary Source	Model	Estimated Trips
Travel Oregon	I	13,000
USFS NVUM	II	11,200
ODOT & OIA	III	15,900
<i>(May-Oct)</i>	III _s	10,700
ODOT & WNF	IV	15,900
<i>(May-Oct)</i>	IV _s	10,700

The next step after determining total number of trips is estimating the amount spent on a per trip basis. The following section goes into the methods used to estimate average trip expenditures using a number of previous studies.

Trip Spending Profile Estimation

The second half of estimating direct spending involves calculating the amount spent, in dollars, on a per trip basis. Most often this is done utilizing intercept surveys of visitors, asking them how much they spent on various amenities, how far they traveled, how many nights they stayed, and how many people are in their party. These values are then extrapolated to a larger population to calculate the spending in a geographic area. For research conducted thus far, the geographic area used for analysis has been quite large: county, state, or national forest. However, after analyzing the trends in studies across North America, one can begin to draw conclusions on spending patterns of mountain bikers, and recognize mountain bikers spend a similar amount of money, stay for similar amounts of time, and travel in similar sized parties, regardless of where their trip is.

Six studies from across the United States and Canada were used to determine spending habits of mountain bikers in the Oakridge area. The following sources were used, have been sorted into three categories for further discussion:

- *Economic Significance of Bicycle Related Travel in Oregon*; developed for Travel Oregon
- *Updated Spending Profiles for National Forest Recreation Visitors, By Activity*; White & Stynes
- *Willamette National Forest Visitor Use Report 2012*, USDA Forest Service
- *The Economic Contributions of Outdoor Recreation: Technical Report on Methods and Findings*; developed for the Outdoor Industry Association
- *Sea to Sky Mountain Biking Economic Impact Study, Overall Results*; Western Canada Mountain Bike Tourism Association (WC-MBTA)
- *Jackson Hole Trails Project Economic Impact Study*; Kaliszewski

Travel Oregon

The State of Oregon's tourism organization, Travel Oregon, hired Dean Runyan and Associates to determine the economic impacts of bicycle tourism in the state of Oregon during the 2012 calendar year. Two separate surveys were conducted. A targeted survey was distributed to contact lists of various bicycle organizations, shops, tour companies, bicycle specific events, and Oregon State Park campgrounds at bicycling sites. Additionally, a national household panel was conducted of Oregon visitors, and was used to establish weighting factors for the data collected via the targeted survey.

The targeted survey sorted respondents into the type of bicycle trip they were participating in, based on the list shown in **Figure 2**. In all, 3,270 surveys were collected, 415 of which listed "day mountain bike ride" as their trip type. For this study, a trip included travel of more than 50 miles, one way. This is contrary to many economic impact studies, which define trip as "an activity for which your primarily traveling," and then define local and non-local trips, with the cut-off at 50 miles.

The survey went on to sort respondents into day versus overnight visitor and then asked a series of questions regarding expenditures, party size, number of nights and type of lodging used. The study was further broken down into regions, as discussed earlier. The Travel Oregon study provides a robust set of data on not only expenditures per trip, but number of nights spent, type of accommodation, and average distance traveled. The study found for mountain bike trips, the average party size was 3.1 adults, the length of stay was 3.4 nights, and between \$409 and \$1073 was spent in total, depending on their lodging choice. The party size stayed true for day trips, with the cost averaging out to \$125 for day mountain bike trips.

National Forest Data

As discussed in the section above, the USDA National Forest conducts National Visitor Use Monitoring (NUVM) surveys, which aggregate a portion of national surveys to obtain trip spending for a variety of forest recreation activities, as well as duration of overnight stays. The NVUMs data is broken into local and non-local trips, with 60 miles as the qualifier. For both local and non-local trips, low, average, and high values are presented for day and overnight trips. For the purpose of this study, average values were used.

White and Stynes, authors of the NVUM reports since their inception, have shown the type of trip and duration of stay matters more than the location of that trip. Using this logic, spending profiles are determined at a national level and sorted into statistically significant categories. For example, they have found there is no statistical difference between the amounts a group of hikers spend and a group of bikers spends. Although NVUMs collects nearly 30,000 surveys, the sample sizes minimize as they're broken into spending profiles

and activity types. Non-local values were used for comparison in this study. For non-local visitors, the average spent on a day trip was \$50, while the average spent on an overnight trip was \$473. The average party size was found to be 2.4 and 2.5 for day and overnight trips, respectively, which were also measured as a national level.

In addition to spending profiles developing at a national scale, the USDA conducts an analysis for each forest within its jurisdiction, i.e. all national forests in the United States. These studies provide more in-depth information, which compliments the NVUM data, collected at a national level. The data for the Willamette National Forest (WNF) provides specifics on visitors that spend nights within the forest versus outside of it, as well as more refined estimates of activity participation. Due to a majority of sampling done at overnight campgrounds and day use sites (i.e. parking lots), the survey oversamples for those staying in the forest. The Willamette National Forest study finds that 66.7% of visitors stay in the forest, camping at either developed or undeveloped sites, while the Travel Oregon study found nearly 42% of mountain bikers stay in commercial lodging, while 35% camp. The study does report that the average nights spent is 3.0, which is comparable with the Travel Oregon study, for mountain bikers.

Local Studies

To supplement the Travel Oregon and National Forest data, a search was done for mountain bike tourism economic impact studies throughout the United States and Canada. Within the last 10 years there have been two major location specific studies completed, one in Jackson, Wyoming, and one covering regions of British Columbia, Canada. Prior to this, the only major research done on the subject was in Utah, in the late 90's. Both the Jackson and British Columbia study used intercept surveys to ask mountain bikers spending and trip information as they were coming from or going to the trails.

The Jackson study, completed by Nadia Kaliszewski at the University of Wyoming, examined the countywide economic impacts of a trail system centered in Jackson. The Jackson Hole Trails Project builds on an existing network of trails located within the surrounding Bridger-Teton National Forest (BTNF). The purpose of the study was to determine the economic impact of local and non-local visitors that utilized the trail system during the summer months. A number of unique features of the area allowed for a direct interpretation of impacts. Jackson is the only incorporated town in Teton County, with seven unincorporated, significantly smaller towns making up the rest of the county population. In addition, 97% of Teton County is owned by the federal government or managed by the State of Wyoming (Kaliszewski, 2011).

Kaliszewski analyzed the impacts of all trail users on all trails within the BTNF, so did not have the need to parse out trips from other parts of the National Forest, or county. An additional benefit looking at countywide impacts was utilizing employment data to analyze spending patterns of retail trade, as well as employment numbers. With Oakridge located within Lane County, any data at a county level would be disproportionately skewed towards the Eugene Springfield Metropolitan area. In total, 303 intercept surveys were conducted to ask visitors a number of questions related to their satisfaction using the trails, spending habits, and trip characteristics. Of the trail users surveyed, over 50% were mountain biking. Of the non-local visitors surveyed (132), the average spent per night, per person, was between \$83 and \$126, depending on lodging choice. The majority of visitors, 34%, stayed with friends and family, with 32% staying in hotels or other commercial lodging.

Prior to the Jackson study, the Sea to Sky Mountain Biking Economic Impact Study was one of the first reports to specifically analyze the impacts mountain bike tourism has on local economies. The study evaluated three areas with developed trail systems, as well as the Whistler Bike Park (not used for analysis in this study). Completed by the Western Canada Mountain Bike Tourism Association (WC-MBTA), intercept surveys were used to develop spending profiles and trip characteristics. However, since the trails are not captured in a National Forest visitor use monitoring program, WC-MTBA calculated the total trips in two different ways. In addition to using trail counters, the staff administering the survey kept track of the number of bikers that passed them in a given time period. Due to the variety in sample times, there was enough level of comfort to develop estimates for weekday versus weekend riders to calculate overall use.

The three study locations were the North Shore, Squamish, and Whistler Valley. The North Shore, known as the birthplace of freeriding, is a part of the metropolitan area of Vancouver, British Columbia, and is abutted by provincial parks. Squamish, approximately 45 miles north of Vancouver, is a major destination for outdoor recreation. Part of the “Sea to Sky” Highway, the rugged forests and cliffs used for recreation appear to rise directly out of the ocean. Whistler, British Columbia is approximately 80 miles north of Vancouver and home of Whistler Bike Park in the summer, and Whistler Blackcomb Ski Resort in the winter. In addition to the bike park trails, there are a number of trails in an area known as Whistler Valley.

The results from the WC-MBTA study are best discussed per location. One of the few similarities among all three destinations (again, not including Whistler Bike Park) is that the average group size was three people. Length of stay, however was much more variable. The average trip duration for Whistler Valley was 4.5 nights, Squamish 3.6 nights, and the North Shore 6.3 nights. The North Shore overnight visitors were only 9% of respondents, so these were likely visitors spending an entire week in the Vancouver area. Squamish had

20% of respondents spending the night, so these were likely long weekend trips from Vancouver and beyond. Finally, Whistler Valley had 90% of their visitors spending the night, so the longer duration likely means they were traveling from further away and spending more than a weekend, but less than a week. The statistics for Whistler Valley and Whistler Bike Park are similar in both percent staying overnight and trip duration, so those staying at the Park could have been the visitors riding in the valley as well. These presumptions match the origin of non-residents visiting, which was another question on the intercept survey.

Whistler Valley had the highest lodging costs, and subsequently the highest per person per night costs, at \$96.05. The North Shore and Squamish overnight trips were much more similar at \$47.79 and \$52.20, respectively, per person per night. For day trips, Squamish values were found to be much higher than North Shore, which when examined was due to bike shop purchases. When this extraneous value was removed, the per person per day expenditures for day trips in Squamish and the North Shore were within 20 percent of each other.

Implications & Summary

Based on the studies analyzed for both trip spending and characteristics, a number of implications can be made surrounding their habits. Although these studies were conducted at a variety of geographic scales in a variety of geographic areas, mountain bikers appear to follow similar trends while recreating. The following conclusions were drawn based on the analysis of the literature:

- In the United States, mountain bikers spend on average, 3.2 nights on a mountain bike related trip
- Mountain bikers travel in groups of 3 on overnight biking related trips
- Lodging type has the biggest influence on total trip costs
- Regardless of lodging, visitors are spending between \$47 and \$63 per person, per night, on mountain bike trips, which equates to a total trip expenditure between \$451 and \$605
- Visitors spend more time at more well known destinations that have more activities
- On overnight trips, mountain bikers don't spend as much as winter recreation visitors, but are some of the highest summer recreation spenders

These implications can guide decisions to develop mountain bike tourism as much as estimates of economic impacts. **Table 3** contains a summary of the spending profiles and trip characteristics for the studies discussed above. The table supports implications

discussed above, and beings to develop trends on the amounts mountain bikers spend for both overnight and day trips, regardless of location.

Table 3. Summary of Spending Profiles

Author	Location	Trip Characteristics		Day Trips		Overnight Trips		
		Avg. Persons	Avg. Nights	Day Trip	Per Person/Per Day Trip	Overnight	Per Night	Per Person/Per Night
Kaliszewski	Jackson Hole	n/a	6.7	n/a		\$ 845.44	n/a	\$ 126.19
Sea to Sky	Whistler Valley	3	4.5	\$ 234.00	\$ 78.00	\$ 1,296.70	\$ 288.16	\$ 96.05
	North Shore	3.2	6.3	\$ 97.41	\$ 30.44	\$ 963.41	\$ 152.92	\$ 47.79
	Squamish*	3.1	3.2	\$ 120.77	\$ 38.96	\$ 517.85	\$ 161.83	\$ 52.20
OIA	Oregon	n/a	n/a	\$ 43.81	\$ 43.81	\$ 150.93	\$ 150.93	\$ 50.31
Travel Oregon	Oregon	3	3.4	\$ 125.00	\$ 41.67	\$ 488.00	\$ 143.53	\$ 47.84
USFS	National Forests	2.5	3	\$ 50	\$20.00	\$ 473	\$157.67	\$63.07

*Squamish Day Trip value decreased by \$144.44 to account for difference in bike shop spending

Oakridge Estimates

After determining the total trips that can be attributed to mountain bikers in the Oakridge area, as well as their spending habits, estimates of direct spending can be formed. **Table 4** contains the low, average and high values for total trips, estimated day and overnight trip expenditures per person, and estimates of overall direct spending. The Oakridge area experiences between \$2.35 and \$4.91 million dollars in direct spending, directly related to mountain bike tourism.

Table 4. Oakridge Direct Spending Estimates

Value	Low	Average	High
Total Trips	10,700	12,900	15,900
Day Trip Expenditure Per Person (Dollars)	\$20.00	\$38.72	\$43.81
Overnight Trip Expenditure Per Person (Dollars)	\$47.84	\$52.24	\$63.07
Total Dollars, Annually	\$2,351,000	\$3,227,000	\$4,914,000

Environmental Impacts

If mountain bike tourism is to be suggested as a viable form of the New Natural Resource Economy, then the environmental and social effects of the sector must be discussed. As with literature on the economic impacts of mountain bike tourism, little exists on the environmental effects of mountain bikes. Through an extensive search, five articles were found, which utilized a mix of quantitative and qualitative methods to determine the environmental effects of mountain bikes. While not extensive in geographic focus or detailed in scientific methods, the literature is comprehensive enough to draw conclusions on the topic. **Table 5** contains the sources, listed by author and year, in combination with the title of their article and methods used for their study.

Table 5. Environmental Effects Literature

Author, Year	Title	Methods
Thurston & Reader, 2001	Impacts of Experimentally Applied Mountain Biking and Hiking on Vegetation and Soil of a Deciduous Forest	Single-site experiment that compared soil and vegetation impacts of hiking and mountain biking (Quantitative)
White et al, 2006	A Comparative Study of Impacts to Mountain Bike Trails in Five Common Ecological Regions of the Southwestern U.S.	Breaking out study sites by ecological regions, analyzed erosion for varying slope angles at single site locations (Quantitative)
Wilson & Seney, 1994	Erosional Impact of Hikers, Horses, Motorcycles, and Off-Road Bicycles on Mountain Trails in Montana	Single-site study that analyzed erosion due to rainfall from various trail users (Quantitative)
Marion & Wimpey, 2007	Environmental Impacts of Mountain Biking: Science Review and Best Practices	Half literature review, half management implications, geared towards land managers (qualitative)
Pickering et al, 2009	Comparing hiking, mountain biking and horse riding impacts on vegetation and soils in Australia and the United States of America	In depth literature review of all articles that analyze comparative effects (qualitative)

Quantitative Analysis

Wilson and Seney completed their study in 1994 on a section of existing trails, on National Forest land, in southwest Montana. One of the first experiments to analyze comparative effects, their article is quoted in both subsequent studies. Wilson & Seney measured water runoff and sediment yield (i.e. erosion), on 100 plots (i.e. specific areas of trail), after 100 passes of activity. Comparing horseback riding, hiking, and mountain biking, the rainfall events were simulated both prior and after the activity to measure specific situations. Rainfall was simulated prior to the activity, to measure the effect of moist versus dry conditions on results. Additionally, rainfall was simulated post activity, to determine if increase in density led to an increase in runoff. Wilson & Seney found there was no statistical difference between hiking and biking impacts and horseback riding disturbed the soil the most. Furthermore, they found when the trails were pre-wetted; hikers disturbed the soil *more* than mountain bikers.

Thurston and Reader's study was completed in 2001, in Ontario, Canada. They used a deciduous forest as their test site, as they purposed it was the most sensitive to impacts. Their study varied slightly, in that the *initial* impact of trail development was measured. In this sense, they used areas where no trails existed for test sites, and then impacted them with five different severities of hiking and biking. Severities varied from 0 to 500 passes of each activity. They measured a "lane," **Figure 7**, and then analyzed plant density, species richness, and soil exposure at three different time periods: before impact, two weeks after, and one year after. Two weeks after impact, density of plants and species richness had decreased up to 100% and soil exposure was up 50%, i.e. a trail was created. However, one year later, none of the impacts were detectable.

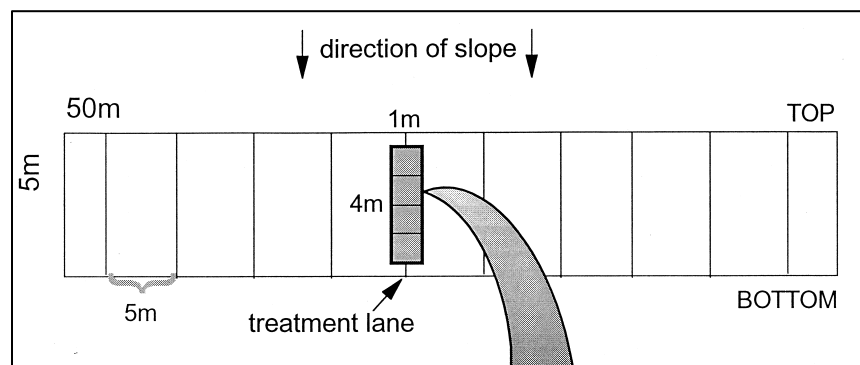


Figure 7. Plan view of study area used in Thurston & Reader's analysis

White, et al., completed their study in 2006 throughout the Southwest. Their goal was to compare different ecological regions and how mountain biking and hiking affected existing trails in those regions. Using 319 sample points over 163 miles of trail, their study was mostly inconclusive due to statistical variation. Two conclusions they were able to draw were with an increasing slope, there was an increasing impact, and bikers had more or less similar impacts to hikers. Additionally, they surmised areas with sparse vegetation and looser soil, i.e. the higher desert trails in Arizona, had the most severe effects of all ecological regions. It should be noted there aren't a lot of effects measured in the Southwest, as many of the trails are on sandstone, such as the famous Slickrock trail in Moab, and as such are nearly completely resistant to erosion and degradation.



Figure 8. Slickrock trail, Moab. Trail exists entirely on sandstone. Source: Utah Mountain Biking

In summary, all three studies found there was no statistical difference between the environmental effects associated with mountain bikers and those with hikers. This is only for existing trails. Where no trails currently exist, effects are severe, but short lived, and the natural area revitalizes itself after a year. This brings about the opinion that where trails already exist, mountain bikers have no more significant impact than hikers, and should be valued as such by land management agencies. New trail development and the widening of trails increase the severity of impacts by all users, and efforts should be made to minimize them. Finally, deciduous forests, where many of the trails in the Pacific Northwest lie, have a “regenerative” ability to them, in that each season effects are diminished over the course of a winter.

Qualitative Studies

Pickering, et al. compared literature between the United States and Australia, in regards to studies analyzing impacts of hikers, mountain bikers, and horseback riders. Reviewing over 100 sources, the authors felt Australia and the US shared a number of characteristics including size, recreational and social traditions, and an attitude of conservation. A number of conclusions were made, most notably that effects of mountain biking are vastly understudied. Out of all research collected, the authors found 6 articles in the US, and 4 in Australia that directly measured effects of mountain bikes (including the three discussed above). They suggested that further research should better capture the reality of mountain bikers such as traveling quickly down the trail, turning corners, etc. The empirical studies were site specific and did not take into account the overall trail.

Pickering, et al. went on to discuss the nuances associated with mountain biking. None of the studies addressed the various styles of mountain biking and the varying effects they could have. For example, cross-country riding is often on mellower terrain and at a slower pace. Downhill, or Freeride, is much faster, involves bermed corners, jumps, and wooden features. Different user groups can have different effects on the environment. Finally, the authors mention no study of indirect effects of any of the users, which can play a large role in effecting the overall environment. As an example, bikers travel the length of a trail fairly quickly, and are generally out for only a day at a time. Hikers can be out for multiple days, create rouge campsites, and need to deal with their waste in some manner. It could be surmised hikers can have *more* of an indirect effect than mountain bikers.

Marion and Wimpey's article, geared towards land managers, provides a comprehensive yet succinct overview of environmental effects. Analyzing outcomes on vegetation, soil, water, and wildlife, the authors first outline all research pertaining to the subject. The authors then discuss the mountain bike specific research, if any exists, and lastly conclude each section with implications for land managers. There is much discussion on unavoidable impacts versus avoidable impacts. Unavoidable impacts are those that happen as a trail is built—there will be loss of vegetation, soil will be compacted, and some additional runoff will occur. Avoidable impacts are those that result from poor trail design and off trail travel by users. In each section, recommendations are also provided to minimize the disturbances those trails create.

In the end, Marion and Wimpey draw three conclusions about their research. First, environmental degradation can be avoided when existing trails are used and trampling is avoided. Second, trail design and management become the largest factors in environmental impacts. Trails that are well designed, have adequate drainage, make appropriate use of the terrain, and are properly compacted to begin with, result in the least overall impact to the

surrounding natural area. Finally, the authors conclude that of the empirical research, mountain bikers have less than, or equal environmental impacts, compared with hikers.

The two qualitative articles, or those that summarized existing literature, demonstrate that mountain biking can have significant impacts to the environment, in certain circumstances. However, these circumstances are the subject of a minute group of users whose attitudes and perceptions of the sport are not reflective of the greater user group. When managed properly, mountain bike and multi-use trails can have limited impacts.

Community Perceptions

Properly planning for economic development strategies should require input from local residents. The features and assets that make a community unique should be harnessed, to provide the community with the best opportunities for success. As the people that live in a community vary from location to location, their opinions and perceptions inherently become important while planning for that communities' development. If a proposed sector is controversial, such as mountain bike tourism in Oakridge, the implications become even more important. "The atmosphere in which the change is to be made is as important as the change itself.... failure to come to grips with the real "locational" issues can doom even the most dedicated economic development practitioner" (Blakely and Leigh, 2010).

To determine the social impacts of developing the mountain bike tourism sector in Oakridge, key informant interviews were conducted and used as the primary data collection technique. A key informant refers to those embedded in the community: business owners, various city commission members, involved citizens and lifelong residents. Forty-four community members were contacted, fourteen agreed to in-person or phone interviews, and 10 completed the interview via email. A long time resident of Oakridge that has been invaluable in developing the mountain bike tourism sector thus far provided the original contact list. While he is obviously biased towards his perceptions, the list contained community members that support, oppose and are neutral in developing the sector.

The same questions were asked to all informants, and were broad in nature so not to be persuasive. The interview started by asking respondents about their connection to Oakridge and whether they were a trail user. Next, respondents discussed their perceptions on the effect mountain bike tourism has on them, their business (if applicable) and the Oakridge community as a whole. The third part of the interview inquired about the economic, social, and environment impacts the informants saw from mountain bike tourism, if any. Finally, they were given an opportunity to provide recommendations on how the sector could grow, or conversely, what else the city should be focusing on instead.

The author determined the following themes after interviews with a small, but diverse percentage of Oakridge residents and business owners. While the themes are likely representative of the larger community, it cannot be said everyone's views have been considered. The interviews ran between 35 and 90 minutes in length, and the author took typed notes. The following themes were identified during the key informant interviews and are discussed in detail below.

The quality of life is deeply valued.

A few respondents had grown up in Oakridge and moved back when they could, however the majority of respondents moved to Oakridge explicitly for the high quality of life. This was prevalent across all respondents, not just mountain bike tourism supporters. The sense of community, and rugged individualism of a rural town were mentioned at multiple times. One respondent said, *"When I moved in, I had people come and say don't call 911, just stand in the street and yell. The gifting that goes on here, it's just that kind of place, and I love it for that."*

While some people are moving to Oakridge for the access to great recreation, including mountain biking, most are moving there because they want to live in a small town where everyone not only knows their neighbors, but care about and support them as well. *"You can walk into a Winco and recognize 7 people and stop and chat with them. That just doesn't happen in Eugene. People are going to stop you and ask you how you are, what you're doing."*

Oakridge is in transition, yet logging remains a part of the town's identity.

As a town that was built on the back of one industry, it's been challenging for many residents to embrace any transition towards a mountain bike based economy. There isn't a general dislike of mountain bikers, but a motion of support towards the sector, to some degree, means forgetting about their past. As one respondent said, some residents believe *"any contribution towards the mountain bike economy represents a displacement of the logging economy."* This is a deeply held belief—the town has always and should always revolve around logging. Further reinforcing this sentiment was the following statement by one respondent, *"I still hear a lot of talk about resenting the idea that mountain bikers are here doing something the town was never founded on or built for."*

However, there has been a slow growth of mountain bike tourism in the last five years that has created a change in the community culture. This transition has proven to be positive for the community as a whole, and quieted some skeptics, according to the following quote, *"there used to be quite a big divide in town, with the two sides, and I think that's kind of gone away....there's not so much arguing anymore."* As the sector is likely to grow, there will be more of a shift towards the positive, however some residents will remain resistant as

mentioned by an interviewee, *“there’s some people that don’t want any change regardless of what it is. There’s a little resistance to that, but it’s not against mountain biking in particular, just change in general”*

There’s a concern for tourism growing too quickly, and the effect increased riders will have on the trails.

When asked about the future development of the sector, respondents expressed a hesitation towards Oakridge growing too quickly. The same quality of life they value is in direct competition with establishing Oakridge as a premiere mountain biking destination. One respondent framed the issue well as a business owner, *“how do we promote this without ruining it?”* While many advocates want to see an increase in mountain bikers, no one desires to see Oakridge become the next Bend with millions of tourists a year. As mentioned earlier and discussed more below, relations between mountain bikers and locals are overall very positive.

With an increase in riders comes an increase in trail use, which transitions into another sentiment interviewees expressed. All respondents either used the forest for some form of recreation and subsequently valued environmental protection, or valued it regardless. As it was often one of the reasons they moved to Oakridge, they have a desire to protect it. It was mentioned on several occasions that the only potential environmental detriment from mountain bike tourism would be the effect on the trails from increased use. However, the same respondents also mentioned the excellent work local volunteer groups do to maintain and revitalize the trails, and were subsequently much less concerned. As a member of one of the volunteer groups stated *“We’re constantly making the trails more sustainable, as they’re not made here for what we do. We’re constantly creating better solutions and some trails are over 100 years, and we’re making them more sustainable for their current use. Most of these trails haven’t seen this much traffic in the last 80 years”*

Multiple volunteer groups have been created that serve a vital role in the community.

The original catalyst for expanding trails and attracting more mountain bikers was the Oakridge-Wesfir Trails Plan, completed in 2008. After the plan was finished the same group of people that worked on the plan wanted to see it implemented and continued to meet. This group became the Greater Oakridge Area Trail Stewards (GOATS), and five years later the GOATS have become an anchor in the community. Through their volunteer efforts, they spend thousands of hours maintaining trails, organizing mountain bike events for kids, and giving both Oakridge and the greater trail user community something to rally around. The effect has certainly been felt, according to one respondent, *“One way to put it, GOATS and DOD, brought more people to the table who are not mountain bikers, so now there is this huge volunteer force. And half of the trail work is done by volunteers, whereas in 2005, it was much*

more like 20%.” Others notice their work as well. When asked about environmental impacts, one respondent said, “Well, I think mountain biking is hard on the trails, but I think the amount of effort that goes into rebuilding and maintaining them is excellent. So I doubt that it’s causing a problem. If there wasn’t as much work being done I think it would cause a problem.”

Shortly after the founding of GOATS the Uptown Business Revitalization Association (UBRA) was created. Started by members of the new businesses on East 1st Street, the goal was to combine volunteer time and resources to clean up the “Uptown” area, which is the commercial part of Oakridge other than Highway 58. Previously lined with vacant buildings and overgrown green space, the association of businesses was tired of waiting for the city to take action, and took it upon themselves to clean up the neighborhood. Slowly, they have painted buildings, trimmed shrubs, and created a more welcoming environment. Now a part of the Oregon Main Street Program, one respondent mentioned how much nicer E 1st Street has become, *“I’ve heard many people say that, as a business, uptown is the place to be because of what UBRA has done.”*

A level of animosity remains between mountain bike “supporting” businesses, the city government, and the remaining businesses in Oakridge.

Throughout the stakeholder interviews, repeated mention was made of the effort the Chamber of Commerce has put towards mountain bike tourism. There was varying levels of frustration expressed, with some respondents expecting there to be more of an established industry surrounding mountain bike tourism by this point, and others expressing the unfairness that focusing strictly on mountain bike tourism creates. As said by one respondent, *“the majority of their funding is spent on mountain biking. That creates animosity towards the city council and the chamber.”*

This hasn’t helped to foster an inclusive culture among the supporters of mountain biking, or the community, according to one respondent. *“Those who love mountain biking love it. A lot of people are unaffected and don’t care either way. And some people don’t like it because of the unfairness. That’s why they don’t like it, because of the unfairness.”* While it has been the Chamber that is spending the funds, the City Council directs and approves the distribution of money from the Transient Room Tax (TRT). Applications are available to everyone so to some degree the city council should not be held accountable for the inactions of other applicants, but the fact remains people notice the division.

This further polarizes the businesses that have benefitted from mountain biking and those that claim there’s been no impact. The newer businesses that have opened recently claim the majority of their business is from mountain bikers, with anecdotal estimates of 75 percent of their business is from bikers. While the non-bike focused businesses blame the

city council and chamber for unfair distribution of funds, the bike focused businesses claim those same businesses haven't made efforts to attract mountain bikers.

Most mountain bikers are working professionals with families.

Many business respondents expressed surprise at the demographics of mountain bikers. The stereotype of “young dirtbags” was not found to be true. In reality, many riders are professionals with full time jobs and families. As stated by one interviewee *“And I see so much more of that, because [everyone] thinks it’s a bunch of dudes, and it’s not, they have families, and we have a lot of people coming back bringing their families.”* The professional rider spends more money than many interviewees anticipated and after one visit, multiple respondents said they came back at a later date and brought their families. The multiple recreation options gave the family an opportunity to enjoy Oakridge while one or two family members went on a mountain bike ride.

An element of apathy exists in some residents, and mountain biking will not fix that.

While many respondents commented on the effects mountain bike tourism is having in Oakridge, they were just as quick to mention it is not the end all be all. Everyone recognizes Oakridge is facing an uphill battle and mountain bike tourism alone will not fix that. When asked about challenges to the expansion of the sector, lack of a quality workforce was a hurdle mentioned. Some respondents brought up the unwillingness of the residents to work full time and on a regular basis. As one interviewee said, *“You’re dealing with a crowd of people that doesn’t understand for a job you have to show up and you can’t wear your pajamas. We have a long ways to go, and trails aren’t going to fix that, mountain biking isn’t going to fix that. These are poverty related issues. The issues are not with former mill workers, they’re what happens when property values collapse.”*

This collapse affects everyone: residents, business owners, and visitors, citywide. It results in a lack of general upkeep because while some folks are working hard to make a difference and increase their business, others are waiting for the next best thing to come along. The waiting and wanting is an easy escape for some residents, thinking that they have to just wait for the next best thing to come along. This lack of realization is a hurdle to turning Oakridge around, as it will take hard work from everyone. As one respondent said *“You don’t see the attention to detail across the board. If they could instill a sense of pride or ownership—people just taking care of their own piece of the pie, there would be discussions of beautification.”*

Conclusion

Oakridge provides but one example of a rural community experiencing economic and social decline. A case has been made for a way forward, utilizing the natural assets of the community to benefit the economy without detriment to either the people or the environment. It has been proven recreation can be both a catalyst and an anchor for transitioning rural communities. When it is nested within the New Natural Resource Economy framework, it builds the economic, social and environmental base simultaneously, and changes a conversation based on economic development to one based on community development. Through building the New Natural Resource Economy, rural communities can become economically self sufficient, which in turn this lets rural Oregon remain rural Oregon.

References

- Dean Runyan Associates. 2013. The Economic Significance of Bicycle Related Travel In Oregon: Detailed State and Region Estimates, 2012. *Prepared for Travel Oregon*
- ECONorthwest. 2007. Outdoor Recreation Destination Economic Opportunities Analysis for the City of Oakridge. *Prepared for City of Oakridge*
- Hibbard, M., Lurie, S. 2012. The New Natural Resource Economy: Environment and Economy in Transitional Rural Communities. *Society and Natural Resources: An International Journal*
- Hibbard, Michael. 1999. Organic Regionalism, Corporate Liberalism, and Federal Land Management: Creating Pacific Northwest Timber Towns. *Journal of Planning Education and Research* 19: 144
- Kaliszewski, Nadia. 2011. Jackson Hole Trails Project Economic Impact Study. *The Haub School of Environment & Natural Resources, University of Wyoming*
- Marion, J., Wimpey, J. 2007. Environmental Impacts of mountain biking: Science review and best practices. *Managing Mountain Biking: IMBA's Guide to Providing Great Riding*.
- McArthur, Lewis A., Lewis, McArthur L. 2003. Oregon Geographic Names, 7th Edition. *Oregon Historical Society*.
- McNamee, et al. 2013. Project Brief: The Economic Impacts of Bicycle Events in Oregon. *Linfield College, McMinnville, Oregon*.
- New York Times. 1994. Oregon, Foiling Forecasters, Thrives as It Protects Owls. *New York Times October 11, 1994*. Retrieved electronically
- New York Times. 2006. Rural Oregon Town Feels Pinch of Poverty. *New York Times August 20, 2006*. Retrieved electronically
- Oakridge-Westfir Community Trails Committee. 2008. Oakridge-Westfir Community Trails Plan.
- Pickering, C., et al. 2010. Comparing hiking, mountain biking and horse riding impacts on vegetation and soils in Australia and the United States of America. *Journal of Environmental Management*, Volume 91.

Sen, Amarta. 2000. *Development As Freedom*. New York: Knopf

Thurston, E., Reader, R. 2001. Impacts of Experimentally Applied Mountain Biking and Hiking on Vegetation and Soil of a Deciduous Forest. *Environmental Management*, Volume 27, No. 3. 2001.

USDA Forest Service. 2014. National Visitor Use Monitoring Data Collected FY 2012. *Visitor Use Report: Willamette National Forest*

USDA Forest Service. 2012. National Visitor Use Monitoring Data Collected FY 2007. *Visitor Use Report: Willamette National Forest*

Western Canada Mountain Bike Tourism Association. 2006. Sea to Sky Mountain Biking Economic Impact Study.

White, et al. 2006. A Comparative Study of Impacts to Mountain Bike Trails in Five Common Ecological Regions of the Southwestern U.S. *Journal of Park and Recreation Administration*, Volume 24, No. 2.

White, E., Stynes, D. 2010. Updated Spending Profiles for National Forest Recreation Visitors by Activity. *USDA Forest Service and Oregon State University*

White, E., Stynes, D. 2005. Spending Profiles for National Forest Recreation, NVUM Four Year Report. *USDA Forest Service and Michigan State University*

Wilson J., Seney, J. 1994. Erosional Impact of Hikers, Horses, Motorcycles, and Off-Road Bicycles on Mountain Trails in Montana. *Mountain Research and Development*, Volume 14, No. 1.