MONTANA
BUSINESS QUARTERLY

HOW MONTANANS GET THEIR NEWS

THE TREASURE STATE CROSSES
THE MOBILE MEDIA DIVIDE

FALL 2019

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BUREAU OF BUSINESS AND ECONOMIC RESEARCH
UNIVERSITY OF MONTANA

The Bureau of Business and Economic Research has been providing information about Montana's state and local economies for more than 70 years. Housed on the Missoula campus of the University of Montana, the bureau is the research and public service branch of the College of Business. On an ongoing basis the bureau analyzes local, state and national economies; provides annual income, employment and population forecasts; conducts extensive research on forest products, manufacturing, health care and child well-being; designs and conducts comprehensive survey research at its on-site call center; presents annual economic outlook seminars in cities throughout Montana; and publishes the award-winning Montana Business Quarterly.

COVER
Mobile news application on a smartphone. (Tero Vesalainen)

INSIDE COVER
Sen. Jon Tester, D-Mont., responds to reporters' questions on Supreme Court nominee Brett Kavanaugh on Capitol Hill in Washington, D.C., in 2018. (AP Photo, Rachel Leathe)

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MESSAGE FROM THE DIRECTOR OF THE BUREAU OF BUSINESS AND ECONOMIC RESEARCH

Someone once said that the telephone and the jet plane made the world a smaller place. But those amazing inventions are arguably nothing compared to the internet – a technology that lets us watch the sun set in Siberia or watch our grandkids play soccer across town. It's a technology that has changed everything around us.

Plenty has changed in Montana as well – and it continues to change. This issue of the Montana Business Quarterly reports on the astounding speed at which the news and information business is evolving. The days of watching the evening news on one of two or three channels are over and what's taken its place may surprise you.

Even though this is just one of many pivotal studies the Bureau of Business and Economic Research has conducted in recent years, I think it showcases two important aspects of what we do. The first is information gathering. Without accurate, unbiased, rigorous data gathering, decision-making is helpless. Our survey research team has built its reputation on doing just that, and the findings we report have power.

Second, this particular study showcases the secret ingredient for our success – our partnership with other experts across the state. BBER executive-in-residence Bill Whitsitt has been an amazing partner, colleague and collaborator on a number of high visibility projects over the years. His insights on the news business are especially valuable, as a former broadcast journalist who now serves on the Greater Montana Foundation, devoted to advancing the art.

I hope your enjoy this issue and have a great holiday season.

Patrick Barkey
Director
Bureau of Business and Economic Research

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RENEWED MEDICAID EXPANSION GROWS MONTANA'S ECONOMY

Could New Requirements Hurt Low-Income Residents?

BY ROBERT SONORA

In 2015, the Montana Legislature passed the HELP Act, which expanded Medicaid for a number of low-income residents in the state. Opponents denounced the plan saying it would be a drain on the state's economy by expanding enrollment, spending, coverage and employment. But a report by the Bureau of Business and Economic Research at the University of Montana in 2018 found it had the opposite effect. Medicaid expansion has had a substantial positive impact on Montana's economy providing nearly $1.4 billion of health care to beneficiaries during its first two and half years.

As the Legislature was set to resume in 2019, those who continued to oppose the entitlement were asked, "How would failing to renew Medicaid expansion impact Montana's economy?" The answer was substantial.

Prior to the debate on HB 658, a bill to extend the Medicaid expansion program, the Bureau of Business and Economic Research updated their study of its economic impact. Sponsored by the Montana Health Care Foundation and Headwaters Foundation, the study found that from 2016 to 2020, the overarching economic impact would be about $1.6 billion in additional personal income and just over $2 billion in gross state product. In 2018, Montana's personal income was about $50 billion and gross state product was $48 billion, so the expansion would contribute about 4 percent and 3.2 percent to the state economy, respectively.

In addition, federal funding would support an additional 6,000 jobs, as well as help increase the overall population. It's important to note that while the expansion is in the health care sector, the ripple effects are felt throughout the economy. For example, while 2,400 of the jobs are specific

Democratic Rep. Mary Caferro, left, and Republican Rep. Ed Buttrey, right, look on as Gov. Steve Bullock signs House Bill 658, reauthorizing Montana's Medicaid expansion program. (AP Photo, Amy Beth Hanson)

to the health care industry, an additional 1,000 jobs will be added to the retail sector and 600 to construction. Jobs in a variety of sectors, including food services and high-tech will be added as well.

The impacts will be felt across all regions of the state. A majority of the benefits will accrue in areas with larger population centers, such as Billings, Bozeman, Butte, Great Falls, Helena and Missoula, but rural areas will also see some economic benefits. This is particularly important given the decline in rural health care centers nationwide.

According to the National Rural Health Association, since 2010 almost 100 rural hospitals have closed their doors across the nation. More troubling is the statistic that nationally nearly 700 rural care centers are considered financially vulnerable and at a high risk of closure. The addition of over 1,000 jobs in rural regions of Montana, as well as the additional income generated, will help alleviate some of the issues facing rural hospitals.

Both studies were commissioned to analyze the economic impact of the Medicaid expansion, not necessarily the health and financial impacts of Medicaid expansion. Clearly, greater access to health care has a positive influence on physical and mental health outcomes. But there are additional benefits to improved access to health care, such as improved financial health via reduced debt, bankruptcies and better credit terms; a reduction of crime; and improvements in the health care sector overall, particularly in rural areas.

THE NEW LAW ADDED SOME REQUIREMENTS, INCLUDING A WORK REQUIREMENT, AN INCREASE IN PREMIUMS AND MORE RED TAPE, SUCH AS PROVIDING DOCUMENTATION OF RESIDENCY.

To date, no study has been conducted on the health impacts of expanding Medicaid in Montana. One of the challenges

would be statistical issues that arise when conducting research on the effects of access to health care. For example, in 2008 Oregon initiated a limited expansion of its Medicaid program for low-income adults. Research found that the expansion had no significant impact on the health outcomes, using cholesterol and hypertension. However, this could also be due to the increased use of medical services, which found more incidences of medical issues.

Other research has shown that because health insurance reduces the costs of seeking care, low-income households are more likely to use clinical services, which increases the likelihood of finding potentially harmful health conditions.

Another way to look at the potential impacts of Medicaid expansion, which increases the universality of health care, is to observe health outcomes in countries which have adopted some form of universal health coverage. In developed countries, two models of health insurance have risen: the Beveridge model (found in the United Kingdom, Spain and Sweden) and the Bismarck model (found in Germany, France and Japan). In the Beveridge model, insurance is centralized in

Figure 1. Life expectancy at birth in countries worldwide. OECD is the average. Source: Organisation for Economic Co-Operation and Development.

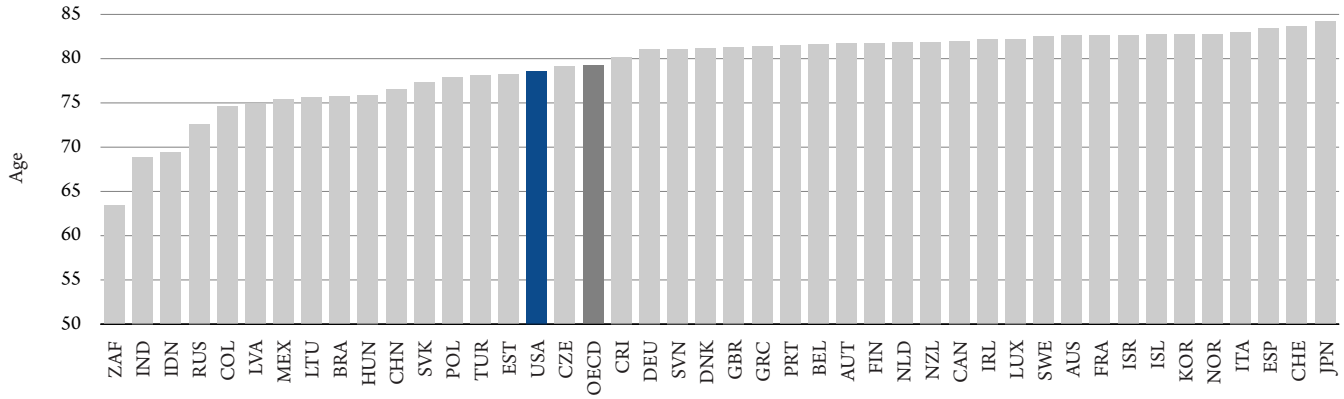


Figure 2. Per person health care expenditures in 2018 in countries worldwide. OECD is the average. Source: Organisation for Economic Co-Operation and Development.

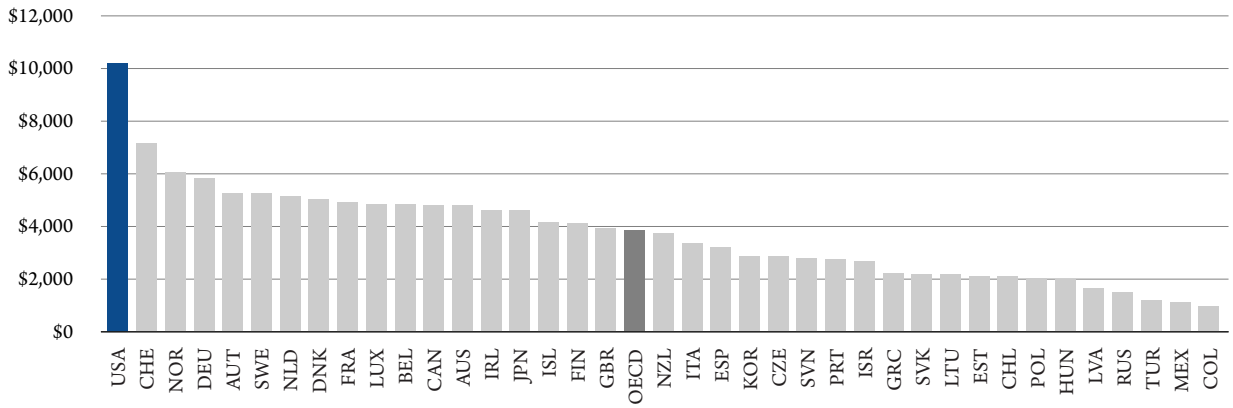
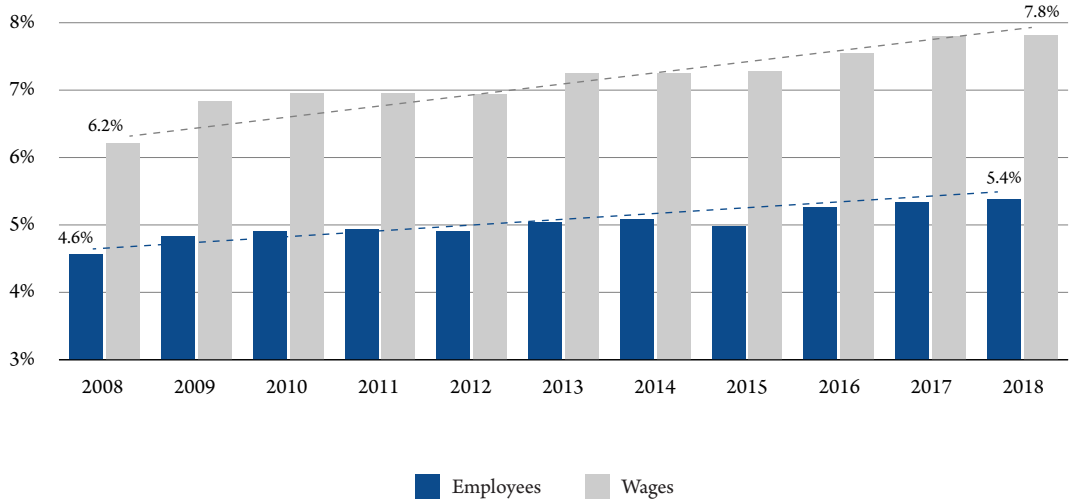


Figure 3. Hospitals share of Montana state employment and wages. Source: Bureau of Labor Statistics.



the National Health Service, i.e. Medicaid for all. While in the Bismarck model, private companies provide insurance, but prices are fixed by the government. Most countries with high incomes have adopted a version of these two models.

In most categories of health outcomes, countries with some form of universal care perform better than the United States and do so at a lower cost. These countries exceed in almost every category – from doctor consultations, infant mortality to life expectancy (Figure 1). The U.S. spends over twice the average of other high income countries per person (Figure 2).

This past May, Gov. Steve Bullock signed HB 658 reauthorizing Montana's Medicaid expansion. The new law added some requirements, including a work requirement, an increase in premiums and more red tape, such as providing documentation of residency. This last requirement is especially difficult for vulnerable groups, including the homeless who may have difficulty verifying residency.

The number of Montanans that will lose coverage is expected to be about 4,100 individuals – out of approximately 100,000. Independent analysis has hinted that it will likely be higher, citing evidence from other states' experience with work requirements. The law allows for future 1 percent enrollment growth and an enrollment audit if suspensions for noncompliance exceed 5 percent of program participants. The reduction of Medicaid enrollees will pare down some of the economic impacts presented in the study.

Overall, the health care industry in the state is growing. Figure 3 shows the share of total wages and employees in Montana's hospital sector. There is a clear upward trajectory that will only increase with changes in demographics and structure.

While the new law has just taken effect, further reevaluation of the law's economic and health impacts will be needed. If the past is any indication, health care in the state will leave an ever growing footprint on the Montana economy and we should see improving overall health over a wider swath of households.

Robert Sonora is director of health care research and associate director at the Bureau of Business and Economic Research at the University of Montana.


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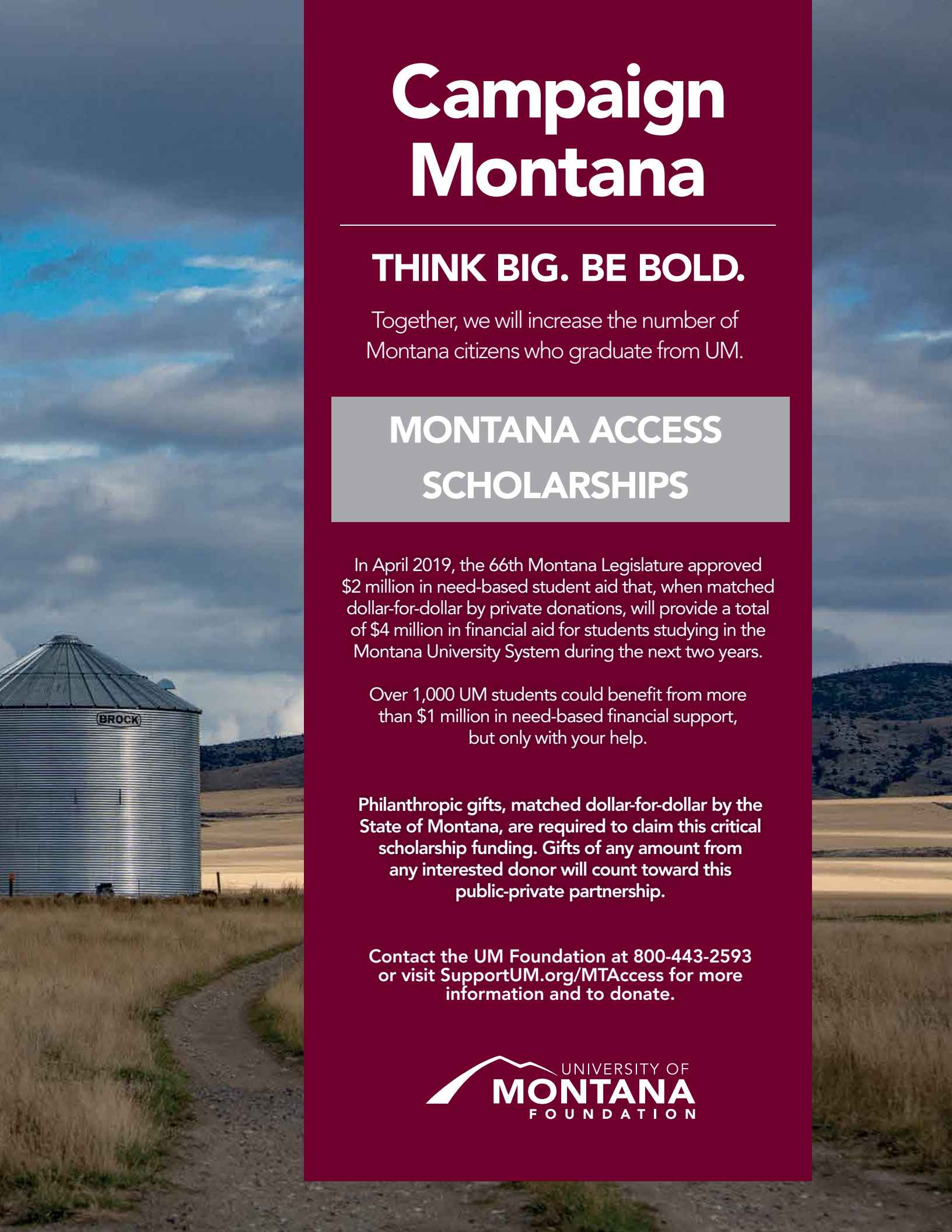
Photo by Donnie Sexton



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HOW MONTANANS GET THEIR NEWS

The Treasure State Crosses the Mobile Media Divide

BY BILL WHITSITT

The increasingly common news alerts on smartphones and tablets signal more than just another story that's waiting to be read – they also signal that Montanans have moved into the mobile device phase of the digital media age. That's one of the important findings from the latest Greater Montana Foundation survey on news media preferences.

This shift in how we get information has a number of important implications for us as citizens, voters and consumers of news and information. For those in Montana's media industry it's certainly worth a moment of reflection – how is news content consumed and what will be their future business model?

This was the third such study by the Greater Montana Foundation on how Montanans use media to stay informed and what issues they see as most important. It was crafted and analyzed with the assistance of the nationwide polling firm of Public Opinion Strategies, who conduct the well-known NBC News/Wall Street Journal public opinion polls, and administered by the Bureau of Business and Economic Research at the University of Montana.

It confirmed several trends, but also revealed some new and somewhat surprising specific findings. Among the results:

- More Montanans are paying attention to the news.
- Ninety percent of Montanans now say they have internet access, and internet provided news and social media are driving a proliferation of news sources that complement more traditional sources, such as broadcast television, radio and print newspapers (Figure 1).
- Nearly 70 percent of Montanans say they get at least a portion of their news from the internet or social media, although other traditional sources remain very important.
- Almost 60 percent of Montanans say they use a mobile device more than a computer to access online sources (Figure 2).
- This combination of more available sources and mobile access has caused declines in the regular consumption of traditional news sources, such as nightly national television news programs, Montana newspapers and local broadcast news (Figure 3).

Figure 1. Do you have internet access at your home? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.

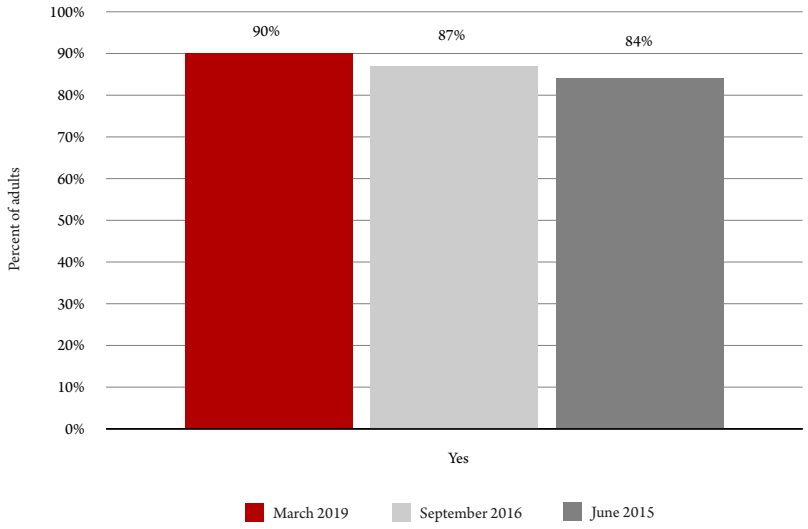


Figure 2. Do you get more of your online news using a computer or mobile device? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.

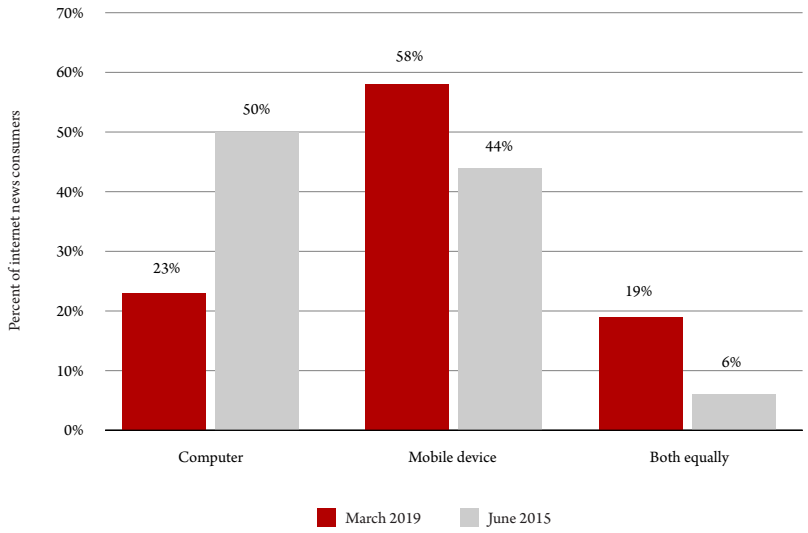


Figure 3. How often do you watch broadcast network TV news? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.

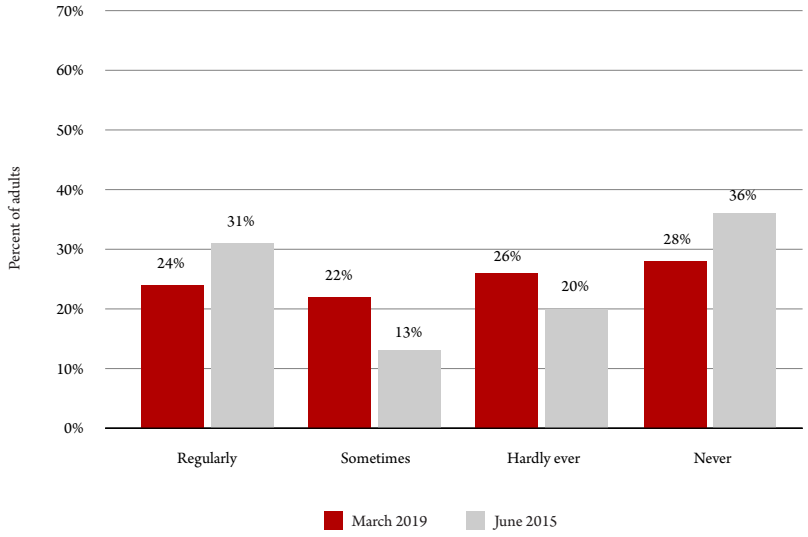


Figure 4. Which sources did you use to get most of your news in the past week? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.

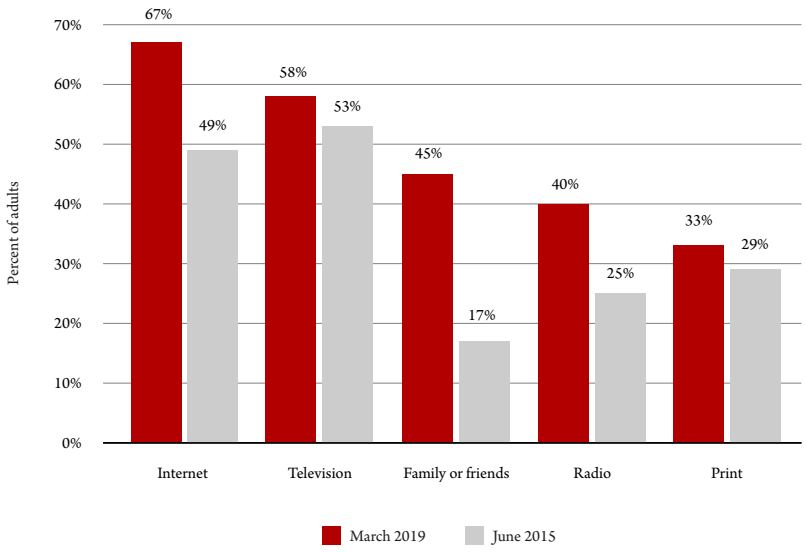


Figure 5. How credible are the following types of news sources? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.

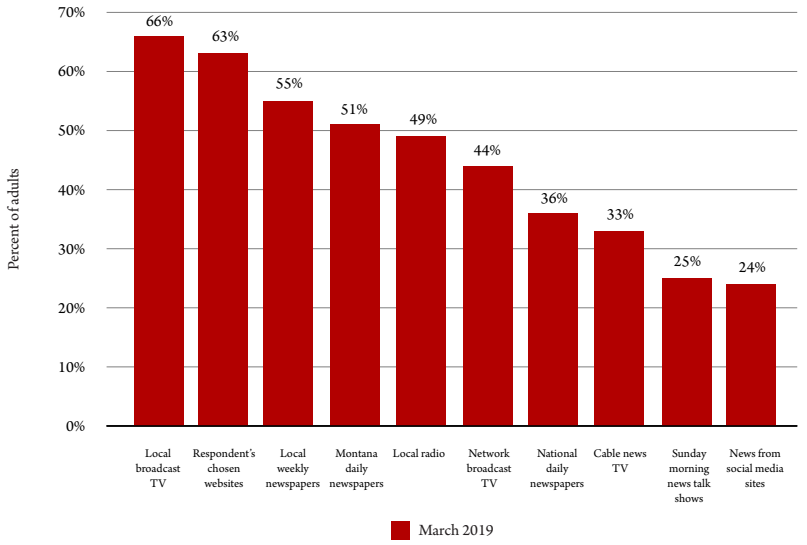
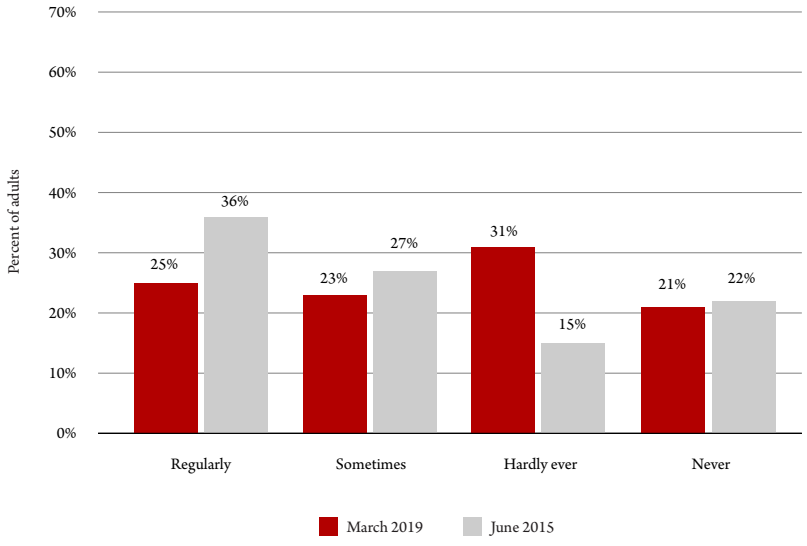


Figure 6. How often do you read a Montana daily newspaper? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.



However, also significantly:

- Montanans are paying more attention to news source credibility – and they rate local news sources as more credible than national news sources (Figure 5).
- Among the top-ranked internet website news sources cited by respondents, seven of the top 15 were local or Montana news outlet sites (Figure 8).
- Among news sources rated as most trustworthy, Fox News comes out on top. NPR ranked second with half as many respondents. Roughly the same number stated voluntarily in their belief that all news is biased or should not be trusted (Figure 9).
- Views of national news source credibility were highly correlated with political party affiliation (Figure 10).
- There has been a sharp increase in respondents saying they sometimes share internet news stories or social media items to influence others (Figure 12).

Figure 7. How often do you watch local TV news? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.

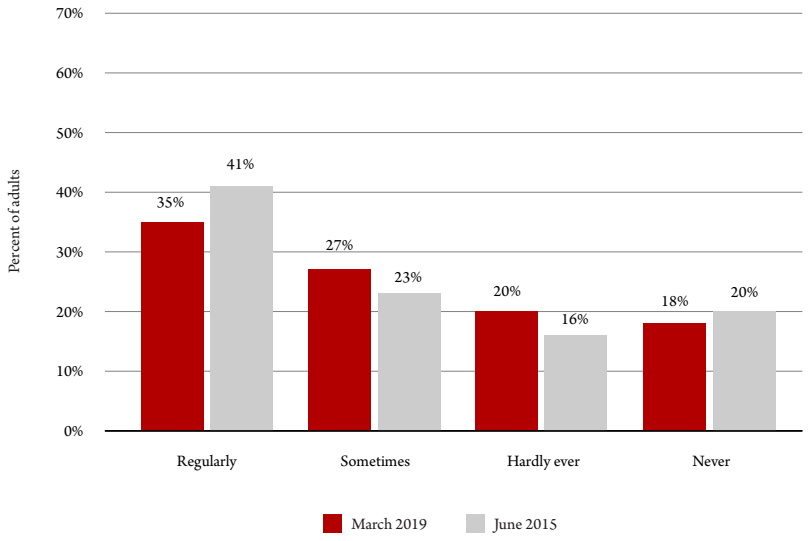
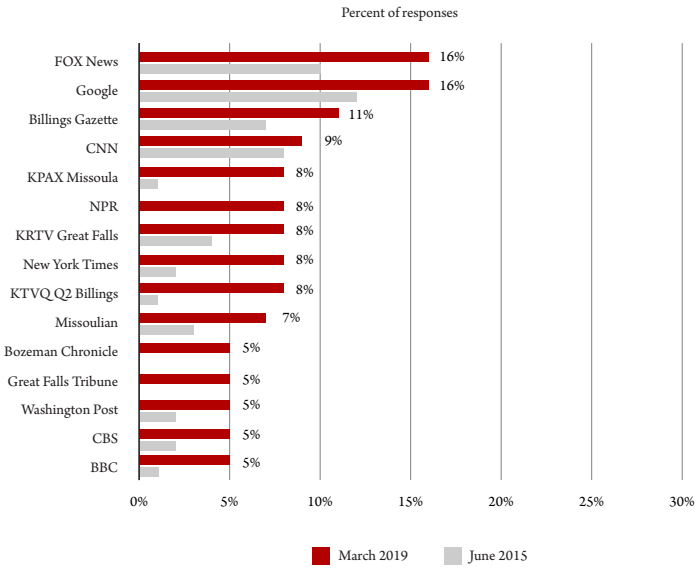


Figure 8. What are the one or two websites you use most frequently for news and information? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.



THIS COMBINATION OF MORE AVAILABLE SOURCES AND MOBILE ACCESS HAS CAUSED DECLINES IN THE REGULAR CONSUMPTION OF TRADITIONAL NEWS SOURCES, SUCH AS NIGHTLY NATIONAL TELEVISION NEWS PROGRAMS, MONTANA NEWSPAPERS AND LOCAL BROADCAST NEWS.

Figure 9. What specific news source do you consider the most trusted source of information? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.

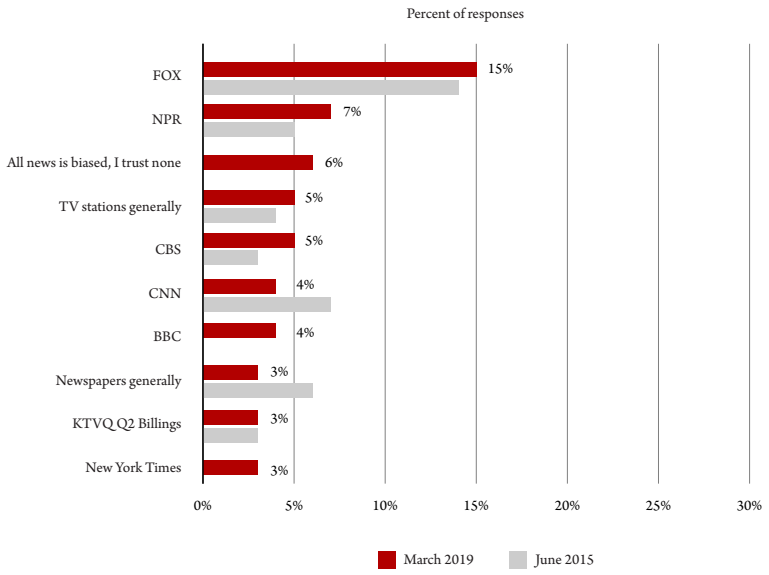
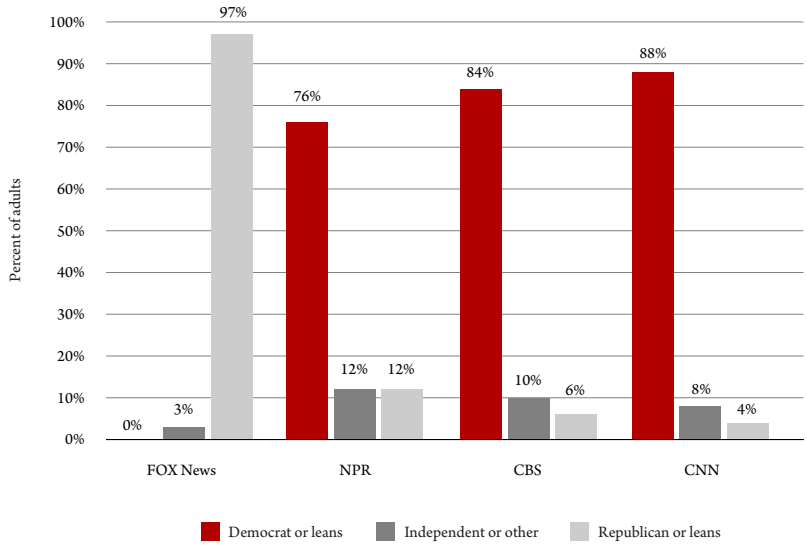


Figure 10. Trust in news sources is sharply divided by political party. Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.



THERE HAS BEEN A SHARP INCREASE IN RESPONDENTS SAYING THEY SOMETIMES SHARE INTERNET NEWS STORIES OR SOCIAL MEDIA ITEMS TO INFLUENCE OTHERS.

Figure 11. How often do you access a social networking site? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.

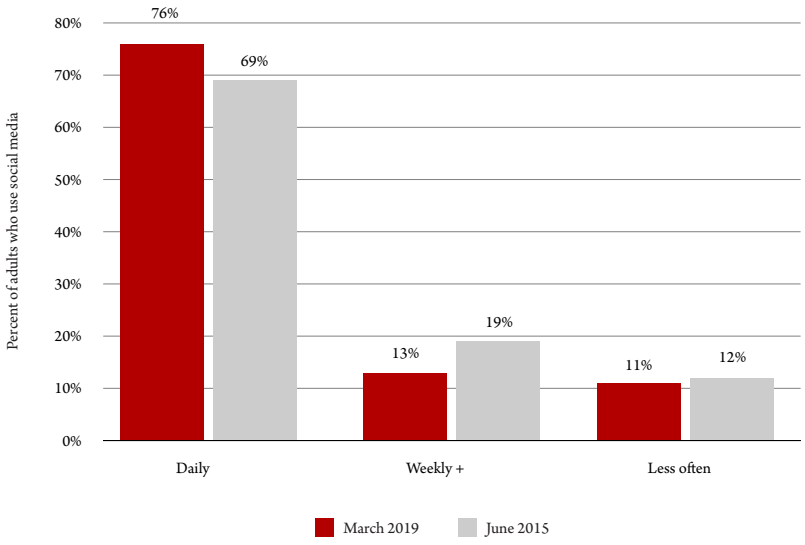
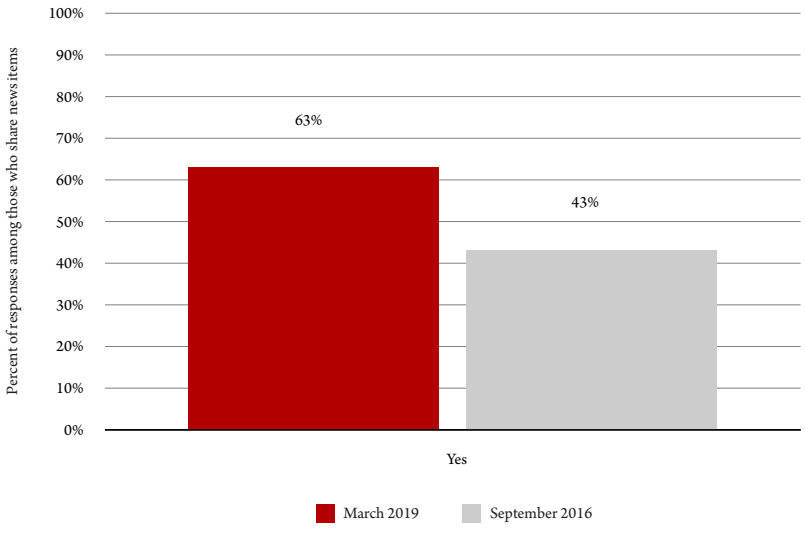


Figure 12. Would you say you sometimes share a news item on the internet to influence others? Source: Greater Montana Foundation, BBER, 2019 News Media Preferences and Issues Survey.



President Donald Trump talks to reporters while in flight from Billings, Montana, to Fargo, N.D. (AP Photo, Susan Walsh)

There is much to consider from these findings. Do we have confidence in the news media and our institutions of government? Is the political polarization we see in the United States due to a lack of trusted news providers or is it caused by partisan news sources – or is it a bit of both?

A hopeful sign is the continuing trust and reliance by Montanans on local news sources. There are a number of media owners, managers and reporters in our communities who are committed to providing solid information about a range of topics important to our daily lives. In doing so, they earn our trust and keep their audience, which is a good model for all media.

On the business front, the growing use of the internet and mobile devices has already disrupted the industry. We continue to see newspapers with popular websites and reporters who post to their own channels or social media feeds. Television and radio stations are sharpening their content too, which is now streamed or archived online.

The longer-term questions yet to be answered include a number about journalism education and the business economics of all this.

What implications does a changing media landscape and declining trust in the media have on the education of future journalists? A number of journalism schools, including the School of Journalism at the University of Montana, have merged their print and broadcast programs and begun to emphasize new media as part of their curriculum – these include courses in podcasting, web editing and design, online journalism and social media. Beyond these trends, are there other ways journalism schools could help students build credibility for the organizations they go to work for after graduation?

Finally, can the media industry sustain itself with its current advertising model? Some have turned to subscription models, while others have pursued more controversial forms of advertising, such as native advertising where paid ads and content match the look and feel of stories found in their social media feeds and websites.

Whatever the future holds, let's encourage more exploration of these trends, questions and potential implications.

Bill Whitsitt is executive-in-residence at the Bureau of Business and Economic Research at the University of Montana and past chairman of the Greater Montana Foundation.

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SCIENTIFIC RESEARCH'S MULTIMILLION-DOLLAR ECONOMIC PUNCH

The Economic Impact of University Research

BY BRANDON BRIDGE

Across Montana, scientific research is having a significant impact on the state's economy. Researchers are studying how traumatic injuries change human brains, the origins of mitochondria and chloroplasts and how they integrate with cells, how to predict trends in the evolution of bird shapes, how to overcome herbicide-resistant weeds, how to breed more profitable wheat varieties, and the list goes on.

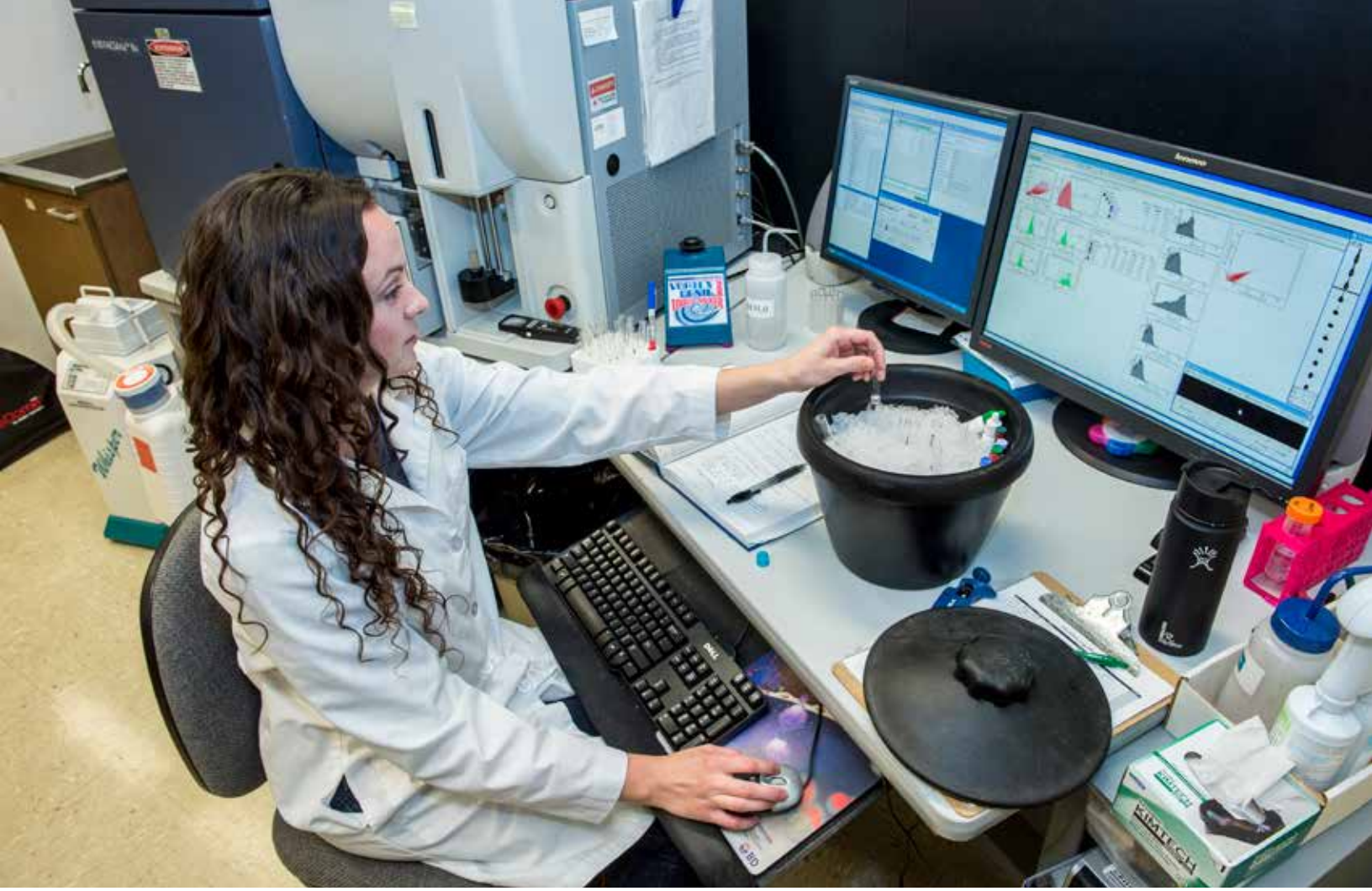
The Montana University System (MUS) provides a home for this research. These activities are primarily undertaken at six university locations: Montana State University – Bozeman, the University of Montana – Missoula, Montana Technological University, Montana State University – Billings, Montana State University – Northern and the University of Montana – Western. University research in general provides both direct and indirect economic impacts to the Treasure State.

To find out the economic impact of this research, the Bureau of Business and Economic Research studied what the state economy would look like without these activities. While it may be difficult to objectively or accurately quantify all of the impacts of university research, it was found that MUS research contributes a substantial amount to the state economy.

University Research in Montana

Just how does research impact an economy? Scientific research generally impacts a society in a number of measurable and immeasurable ways. Particularly, research performed in the Montana University System affects the state economy in the following ways:

- MUS research is a focal point for spending in the state by the federal government and other out-of-state sources in



support of projects. Without MUS research these monies would not come into the state.

- MUS research attracts talented faculty and students to Montana. Without MUS research many of these individuals would go elsewhere, taking their careers and earning power to other places.
- Research produces knowledge, which translates into economic value. Research supports the development of new products and services that make consumers better off and businesses viable and more productive.
- Research within MUS attracts visitors who attend conferences and other research focused activities. Without research, the spending of these visitors would be lost.
- MUS research has been an incubator for spin-off companies either founded by MUS research personnel or in close connection with research activities. Without this opportunity, these companies would not have been formed and their jobs would not exist.
- The fact that MUS is an important university research system makes Montana a more attractive place for technology-related companies to start or relocate to (even if there are no formal connections). This helps attract skilled workers and makes use of our research facilities and resources.

WITHOUT RESEARCH, THE ENTIRE MUS SYSTEM WOULD BE A DIFFERENT KIND OF INSTITUTION. WITHOUT THE KNOWLEDGE AND ABILITIES OF RESEARCH TRAINED PERSONNEL IN THE CLASSROOM, THE CALIBER AND PAY OF ITS FACULTY WOULD BE MUCH LOWER THAN IT IS TODAY.

Table 1. Spin-off companies from Montana University System research. Source: Bureau of Business and Economic Research and the Montana University System.

Advanced Microcavity Sensors, LLC	Montana Bioagricultural, Inc
AdvR, Inc.	Montana Gluten Free Processors, LLC
Agile Legal Technology, LLC	Montana Molecular, LLC
Applied Coastal and River Science, Inc.	MPA Technologies, Inc.
Applied Ecological Services, Inc.	NWB Sensors, Inc.
ATERIS Technologies, LLC	PhysioZing, LLC
Beartooth Biotech, Inc.	Project WET
Bee Alert Technology, Inc.	Resonon, Inc.
Big Sky Biotechnology, LLC	Revibro Optics, LLC
Bio Robotics, LLC	S2 Corporation
BioSurface Technologies Corporation	Safflower Technology Intl.
Bridger Photonics	Sensopath Technologies, Inc.
DermaXon, LLC	Sunburst Sensors, LLC
Good Nutrition Ideas, LLC	Sustainable Bioproducts, LLC
Grey Matter Research	Takeda Pharmaceuticals
GT Neuropharma, Inc.	Terradynamics, Inc.
Immersive Learning for Children, LLC	The Legal Atlas, LLC
Inimmune, Inc.	Transynaptic Technologies, LLC
Integrated Engineering Software, Inc.	Western Feedstock Technology
Managen, Inc.	Zdye
Meadowlark Science and Education, LLC	

- Without research, the entire MUS system would be a different kind of institution. Without the knowledge and abilities of research trained personnel in the classroom, the caliber and pay of its faculty would be much lower than it is today.

Research Approach

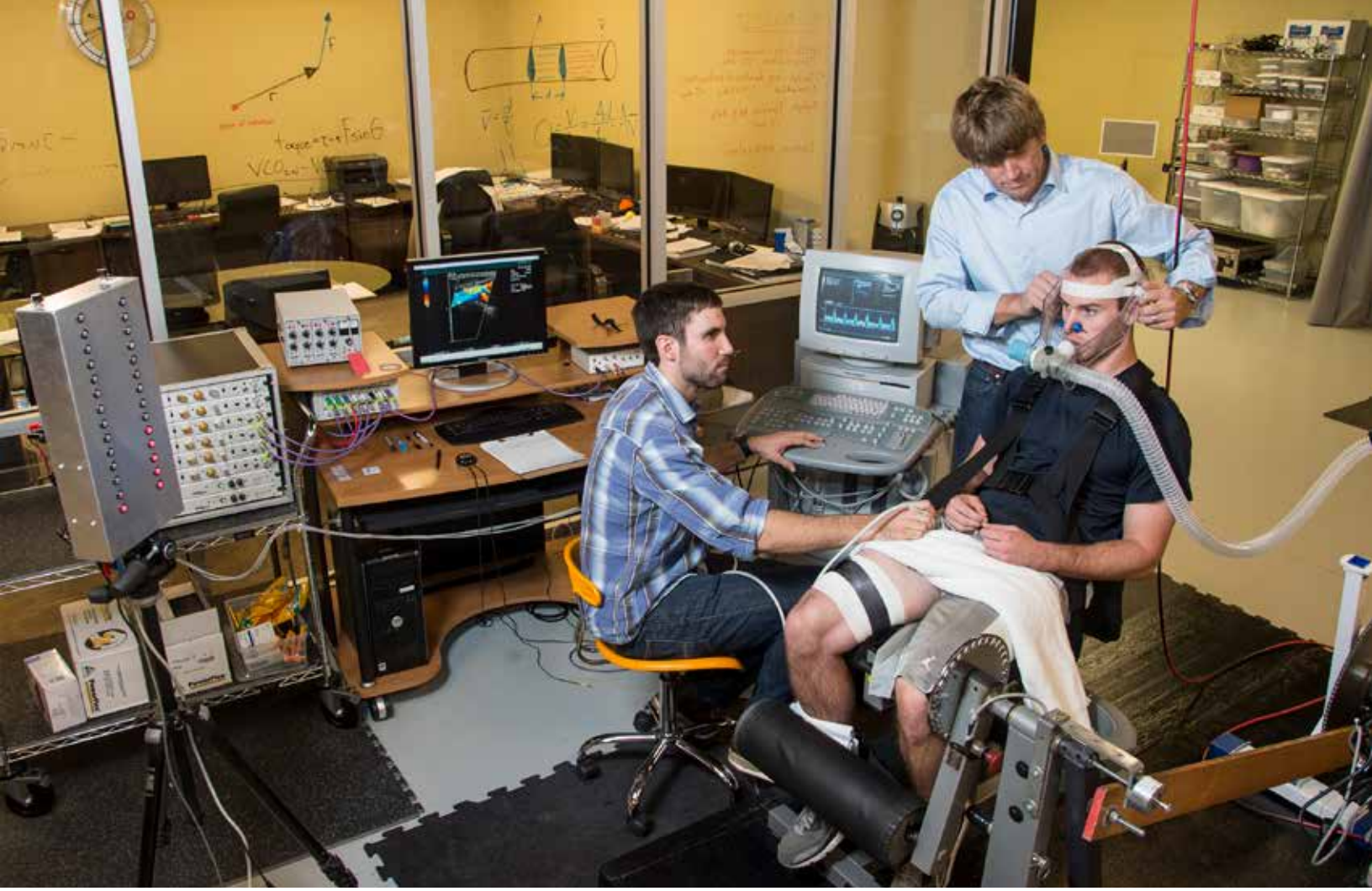
We built a model that incorporates detailed information on research taking place in six universities across the state. Using this model, we can see what the state economy would look like if these research activities were not undertaken.

To get a full picture of all of the economic interactions between university research and the rest of the economy, we used a model (REMI) that is specifically calibrated for application to the Montana economy. This model allows us to disentangle the direct, indirect and induced impacts of research activity in the state. This is done by comparing two states of the Montana economy: the current state where MUS research is being performed, and an artificial economy without MUS research and its accompanying spending, employment, spin-off companies and intellectual property revenue. The difference between these two scenarios is the calculated economic impact of MUS research in Montana.

MUS Model Inputs

This study used the most recent data of economic activity resulting from research at six universities in Montana. Together these universities spent $233.5 million on research and development activities, along with $1.2 million on research related construction projects. The MUS institutions directly received $712,330 in revenue from intellectual property payments. Visitor spending due to research related activities, such as conferences, was $274,689.

Lastly, employment in spin-off companies due to research transpiring at the MUS research institutions was included in the model. In total, we found that 233 jobs were a direct outcome of MUS research, attributed to 41 spin-off companies.



Research Results

After combining all of these inputs into the model, we can calculate an estimated economic impact. What we find is that research undertaken across the six primary locations of the Montana University System result in a state economy that:

- Has 3,532 more permanent, year-round jobs with average earnings of $66,506 per job.
- Provides households in Montana with $234.9 million more in annual income, including $201.5 million more in after-tax income.
- Produces an additional $565.8 million each year in economic output.
- Contributes $19.4 million more to the state government through tax revenue.
- Maintains a statewide population that is larger by 4,524 people, including 1,027 school-age children.

MUS research has been and continues to be an important driver to the Montana economy. It employs talented, high wage people and engages in activities that bring money and jobs into the state that otherwise would not exist. But as noted, its economic footprint is larger than the operations on the MUS system campuses themselves. The synergies and spin-off businesses that have occurred because of the discoveries and advances of MUS research represent another boost to economic activity that would not have occurred in its absence. Even without capturing the all of the dimensions of its relationship with the economy in this analysis, we find that the economic impact of research performed throughout the Montana University System is quite significant.

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HOW THE FOREST INDUSTRY CHANGED THE BITTERROOT VALLEY

The Impact of Timber Harvest Declines on the Ravalli County Economy

BY PATRICK BARKEY AND TODD MORGAN

What would the economy of Ravalli County, Montana, look like today if harvests of timber from its federally owned lands had remained at levels experienced 30 years ago? In one sense, it is a moot question. Timber harvests declined, mills in the region closed and the economy grew in a different direction – changing the past is not a feasible policy option.

Yet history can teach us how past events and policy decisions have affected current economic performance, which can help inform decisions that will affect the future. It is in this spirit that researchers at the Bureau of Business and Economic Research at the University of Montana examined the question of "what if." They prepared a picture of economic activity in the local economy as it might have looked if past land management decisions would have been different.

The project took into account the profound changes in sawmill and other wood processing technologies that have changed the scale and labor needed at facilities today. It also employed the judgment of BBER forest products researchers to make reasonable projections as to what mill capacity could have been sustained in the county if timber harvest volumes from adjacent federal lands been maintained.

The results of the analysis suggest that in the absence of the timber harvest declines, which began in the early 1990s, the Ravalli County economy would have significantly more jobs, income and population than exist today.

A convoy of log trucks head south on U.S. Highway 93. (AP Photo, Kurt Wilson)

Timber Harvests and the Wood Products Industry in Ravalli County

As in many western communities with a timber heritage, the forest industry in southwestern Montana has undergone dramatic changes. Just 17 primary wood products facilities remained operating in Ravalli County in 2014 (Hayes and Morgan 2017), with a majority of that capacity in the log home sector. By contrast, in 1988 the county's 29 active facilities had a capacity of 91 million board feet (MMBF) – seven times larger than today.

The dramatic decline in timber capacity was driven by declines of similar magnitude in timber harvests (Figure 1). In the late 1980s, the total timber harvest in Ravalli County averaged just over 34 MMBF per year. In the five most recent years with available data (2012-16), average annual harvests were under 10 MMBF.

With approximately 88 percent of the total forestland in Ravalli County under National Forest System (NFS) management, the policies and decisions affecting the Bitterroot National Forest (BNF) timber harvests have been a significant contributor to these industry trends. Between the late 1980s and today, harvests of BNF timber have declined 71 percent. Federal timber harvest reductions and continued low levels of harvests throughout the western U.S. are a direct result of the complex mix of evolving federal land management policies, agency budgets, environmental laws and case law developed from repeated litigation of federal forest management activities – particularly timber related activities (Keele et al. 2006; Miner et al. 2014; Morgan and Baldridge 2015; Keele and Malmsheimer 2018).

Research Approach

This study considered the impact of BNF timber harvest reductions on a) the local forest products industry, and b) the county economy as a whole. We considered what kind of local production capacity could have been sustained if management policies and timber harvest levels for the BNF had remained consistent with harvest levels of the late 1980s. Using an economic model, we estimated the level of economic activity – in terms of jobs, income, production and sales – that could have occurred in the county if policy decisions to reduce those harvests had not been made.

A comparison of this level of economic activity to the one that exists today provided an estimate of the economic impacts of land management policy, which led to reduced timber harvest levels on the BNF.

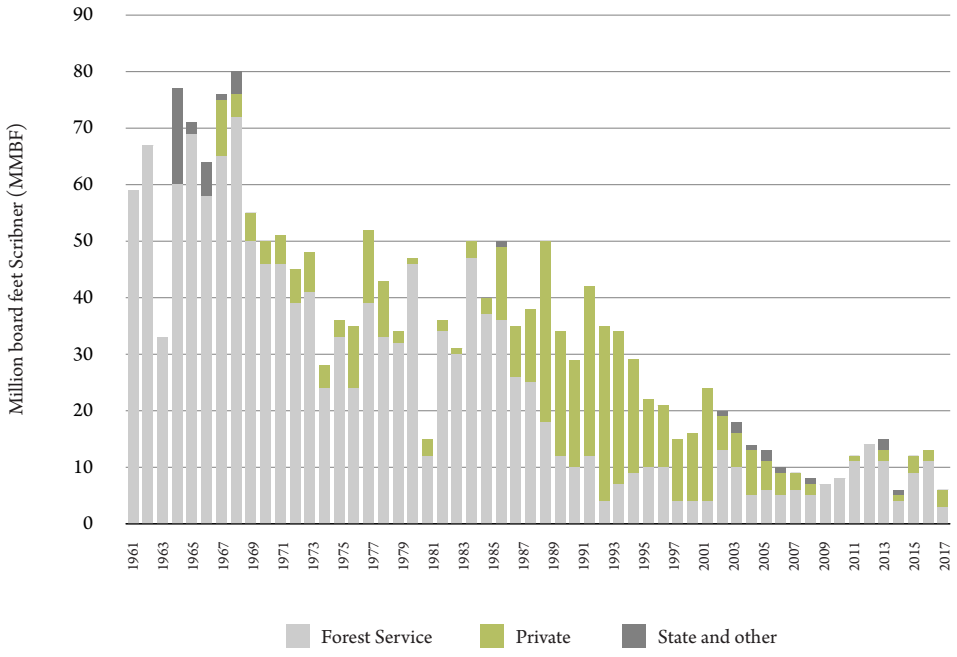
To better understand the economic impact on Ravalli County of the decline in timber harvests from the BNF, BBER researchers quantified the change in the average annual harvest from the BNF; estimated the direct employment, wages, and product sales value in the forest industry associated with that volume of timber; and used an economic model (REMI) to calculate the broader impact on the county's overall economy. Rather than speculate what the change would be if timber harvests were to increase, or which mills could have remained in business, this analysis sought to quantify the impact that the decline in harvests had on the county's economy. While retrospective in nature, this research helps inform decisions regarding future federal land management decisions (e.g., timber harvest levels in BNF plans) that have local economic implications.

This analysis envisioned two economic trajectories for Ravalli County. The baseline (status quo) scenario held current economic activity constant with timber harvests at

Table 1. Ravalli County forest industry employment and labor income. Source: Bureau of Business and Economic Research.

Year	Forest industry employment	Forest industry labor income (million 2016 $)
1976	455	$17.2 million
1981	525	$19.7 million
1988	695	$24.7 million
1993	725	$27.6 million
1998	671	$36.7 million
2004	616	$39.7 million
2009	358	$18.7 million
2014	262	$14 million

Figure 1. Ravalli County timber harvest by ownership, 1961-2017. Sources: U.S. Forest Service, Montana DNRC, Bureau of Business and Economic Research.



the 9.8 MMBF level that had been the average for the years 2012-16. The second alternative scenario, considered how the economy could have evolved with annual timber harvests 24.7 MMBF higher, thus holding total harvest volumes at the average level experienced in the 1985-89 period. In the alternative scenario, some of the timber processing capacity lost after that period remained in the county economy, supporting production and jobs. The difference between the alternative and the baseline was the total impact of decreased harvests.

The change in harvests between the late 1980s and the current period (2012-16) represents an average annual harvest volume reduction of 24,378 MBF Scribner. Direct response coefficients (Sorenson et al. 2016) and an assumed product mix of 95 percent sawlogs, 5 percent house logs and other wood products were used to estimate the direct jobs and wages of forest industry workers associated with the harvesting and processing of the timber. The direct response coefficients indicate that eight to 10 jobs in the forest industry are associated with each 1 MMBF Scribner of timber harvested.

The number of jobs varied somewhat depending on what types of facilities received timber and what mix of wood products were manufactured. Product recovery ratios (e.g., how much lumber was produced from each unit of timber) and product prices from BBER mill studies (McIver et al. 2013; Hayes and Morgan 2017b, c) were used to estimate primary product sales values.

The direct forest industry impact of 24.3 MMBF Scribner of timber harvest from the BNF was estimated to be more than 214 jobs, $8.9 million in wages and primary wood product sales of more than $23 million. On an annual basis, an additional 78 forestry and logging jobs, 117 sawmill jobs and 19 jobs in other primary wood products facilities could have been supported by the harvest of 24.3 MMBF Scribner.

Results Summary

The question of how the overall economy would have responded to the jobs, wages and production that might have taken place with higher timber harvest volumes was addressed with BBER's economic model, leased from Regional Economic Models, Inc. (REMI). The REMI model is a well-known and thoroughly document tool for understanding economic events (Treyz, 1980). Because local wages and purchases supported by wood products create spending and income for local businesses and households, the ultimate effect of higher timber harvests would propagate across the full spectrum of business activity in the county.

Our basic finding was had timber harvests continued at late 1980s levels, more of the wood products industry in Ravalli County would have survived and as a result, the overall economy would have more jobs, income and population today. A comparison of actual economic activity with what we estimated could have occurred had harvests not decreased revealed that:

- 514 additional permanent, year-round jobs could exist in the county economy today if timber harvests from BNF land had not been reduced.
- Ravalli County households in total could be receiving $32.6 million more in income annually, with $28.3 million of that increase representing disposable, after-tax, income. This includes both forest-related and other jobs in industries such as retail trade (51 jobs), health care (27 jobs) and government (58 jobs).
- Ravalli County businesses could have realized $113 million more in value-added economic production annually.

Table 2. Economic impacts of increased timber harvests in Ravalli County. Source: Bureau of Business and Economic Research.

Category	Units	Impact
Total employment	Jobs	514
Personal income	$ Millions	$32.6
Disposable pers. income	$ Millions	$28.3
Output	$ Millions	$113
Population	People	825

OUR BASIC FINDING WAS THAT HAD TIMBER HARVESTS CONTINUED AT LATE 1980S LEVELS, MORE OF THE WOOD PRODUCTS INDUSTRY IN RAVALLI COUNTY WOULD HAVE SURVIVED AND AS A RESULT, THE OVERALL ECONOMY WOULD HAVE MORE JOBS, INCOME AND POPULATION TODAY.

- The population in the county would likely be higher by 825 people, including 170 school-aged children, if higher levels of timber harvests had been maintained.

All of these impacts represent the difference between two scenarios for the county economy – the actual level of activity and what could have occurred if timber harvests had not decreased. Going forward, we would expect growth in the local economy in both scenarios due to events in other local industries. These impact findings do not change that fact, rather they indicate that the economy with decreased timber harvests is smaller by the magnitudes shown in Table 2.

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