

The State and Local Economic Benefits of Reintroducing the Gray Wolf to the Mt. Hood National Forest

Research Aim

This paper aims to prove that economic development that is based on and in support of conservation values, namely the recovery of endangered gray wolves – which includes the restoration of their habitat and watersheds – is the best option for city planners who are currently addressing the economic downturn facing many Mt. Hood communities. Job creation and employment are presented as the key economic arguments in favor of reintroduction. This report argues that reintroduction of the gray wolf will create many high skilled/high paying jobs via three phases of reintroduction: 1) initial construction and habitat preparation, 2) wolf-population monitoring and increased tourism, 3) secondary increases in local economies. This paper seeks to prove that the current greatest obstacle to reintroduction, the logging/timber industry, is not economically viable for local communities in the long term due to fundamental changes in the industry, primarily the shift toward exporting logs to Asia and increased automation. By contrast, the jobs created from reintroduction would both increase local employment and local prosperity of most communities in the Mt. Hood National Forest area.

Research Methodology

The conclusions of this paper were reached by analyzing statistical databases whenever possible. The first line of research included: the U.S. Bureau of Labor Statistics, U.S. Census Bureau, U.S. Department of the Interior, U.S. Forest Service, and the U.S. Fish and Wildlife Service. The second line of research included: various state and local government databases. The third line of research included: peer-reviewed academic research papers and studies. The fourth line of research included: scientific studies, journal articles, and reports conducted by private NGOs, think tanks, lobbying groups, and businesses. The fifth line of research included: news and magazine articles. Multiple sources were cited whenever possible.

Research Conclusions

The logging industry is at a pivotal moment in the United States. The recent logging industry slump due to the economic recession and the subsequent plummeting of housing starts in America has forced timber harvesters to increasingly export their timber to Asia, particularly China. The industry is simultaneously becoming increasingly automated. Both of these transitions have resulted in a reduction of jobs. These shifts in the industry, combined with the potential job creation and economic benefits to local economies in the Mt. Hood National Forest (MHNF) region from wolf reintroduction, provide a compelling argument for towns dependent

on logging jobs to pivot their economy away from this industry and embrace the diversified economic model that reintroduction would create.

There were an estimated 2,730 employed loggers in the USA as of May 2014, assuming a Relative Standard Error of 10.5%. The mean hourly wage is \$17.58 and the mean annual wage is \$36,560, with an RSE of 2.5%. The annual wage percentiles are: 10% = \$25,160, 25% = \$31,490, 50% = \$35,460, 75% = \$40,590, and 90% = \$49,390.ⁱ Comparatively, there were an estimated 1,720 employed loggers in the Pacific NW as of May 2014 – whom made up .00047% of the regional employment. Their mean hourly wage was \$19.65 and their mean annual wage was \$40,875.ⁱⁱ In Oregon, there were an estimated 1,420 employed loggers in Oregon as of May 2014 – they made up .00084% of the state employment. Their mean hourly wage was \$17.99 and their mean annual wage was \$37,430.ⁱⁱⁱ While there are no statistics covering the MHNF region, there were an estimated 180 employed loggers in the Portland-Vancouver-Hillsboro, OR-WA metro area as of May 2014 – they made up .00017% of the metro area employment. Their mean hourly wage was \$17.38 and their mean annual wage was \$36,140.^{iv} The MHNF area is encompassed within four counties: Clackamas, Hood River, Wasco, and Marion. Only Clackamas and Multnomah are part of this statistical area, however the vast majority of the land falls into Clackamas and Multnomah.

So far in 2015 there have been several timber sales and stewardships in the MHNF area.^v These include the: Basalt SBA Sale^{vi}, Ashes-Caldera Stewardship^{vii}, Shell Thin Timber Sale^{viii}, and the MAG Stewardship^{ix}. Each of these will result in significant road construction. For example, the estimated road construction for Basalt SBA Sale is 12.89 miles, the Ashes-Caldera Stewardship will result in 8.89 miles, and the Shell Thin Timber Sale will result in 2.17 miles. There are currently an estimated 3,000+ miles of roads in the MHNF.^x There are several timber sales that occurred in prior years that are still active.^{xi}

The logging industry faced an extreme slump due to the Great Recession. Due to the long-lasting downswing, the logging industry fundamentally changed its nature, pivoting towards an export-oriented business model. Logs are increasingly being sold to sawmills in Asia, particularly China, which is able to pay much higher prices due to demand stemming from their construction boom.^{xii} Domestic sawmills cannot compete with the high prices paid by the Asian firms and therefore many have been forced to close their operations and layoff employee.

Exporting logs creates less than 1 job for every million feet of board, while exporting lumber (via using local mills in the USA) creates 3 jobs for every million feet of board. The result has been increased pressure on congress from logging mega-firms in the USA to expand logging rights on federal public lands and to allow timber logged from these lands to be exported in order to compensate for the increased competition from Asia.^{xiii} The result is that large logging firms have shifted towards exporting their logs to Asia, and are seeking to jump into the federal lands and use the same strategy to push out smaller firms that employ local residents. This transition signifies that any benefits to local economies that could result from increased allowance of

timber logging in the MHNF would most likely be very minimal due to large firms selling the logs overseas instead of to local mills.

The upswing in the domestic timber market that has occurred recently is due to the increased domestic demand for timber. This is due to the rising number of housing starts. This seems to be the inevitable upswing in demand after the implosion of the housing market during the Great Recession.^{xiv} Housing starts are at 8 year highs; however, there is slight reason to believe that this upswing indicates a long-lasting future trend. Instead, it seems to be due to a reactionary short-term boom, and that the market will once again level out in time.^{xv} According to the US Census Bureau, “Privately-owned housing starts in August were at a seasonally adjusted annual rate of 1,126,000. This is 3.0 percent ($\pm 11.3\%$)* below the revised July estimate of 1,161,000, but is 16.6 percent ($\pm 10.4\%$) above the August 2014 rate of 966,000. Single-family housing starts in August were at a rate of 739,000; this is 3.0 percent ($\pm 9.5\%$)* below the revised July figure of 762,000. The August rate for units in buildings with five units or more was 381,000.”

^{xvi} The US Department of Housing and Urban Development states: “U.S. homeownership rate in the second quarter fell to its lowest level in more than 48 years.”^{xvii} When considered in tandem, these facts suggest that while construction is on the rise, it may be due to ambitious, speculating, developers. Therefore, there is scant reason to suspect that there is any solid indication that the non-export timber industry, which is the only section of the logging industry that would cause an increase in domestic logging employment, will be stable or continue to increase in the long run.

The increasing automation of the timber industry is also a cause for concern when estimating the stability of this industry. Automation is pushing logging company employees out the door of their companies; as Ola Ringdahl of Umea University in Sweden attests, “...as the machines becomes more and more efficient, the human operators risk becoming a bottleneck”^{xviii}

Automation is being seen in both factories as well as harvesting techniques in the field. Some examples of recent automation include: timber stacking and sorting, tree measuring, and self-directed harvesting machines.^{xix xx} Even if sawmills and timber companies had an increase in prosperity due to a relaxation of logging restrictions and increased domestic demand, there is no reason to suspect that manufacturers would keep workers employed as opposed to continuing their trend of automating their factories and harvesting techniques.

Andy Kerr summarizes the automation of the industry, saying: “Today it takes five acres (about five football fields) of clear-cuts per year to produce one timber job. As industry automation (pronounced “innovation”) continues, it will take even more clear-cutting to produce each of a smaller number of wood products jobs. There were 94 Oregon softwood lumber mills in 1995, and only 54 in 2012, a decline of 43 percent. There were 46,200 Oregon wood products jobs in 1995, and only 25,500 in 2012, a decline of 45 percent. There were a total of 1,428,200 Oregon jobs in 1995, and 1,638,300 in 2012, an increase of 15 percent. Oregon’s timber jobs composed 3.23 percent of all Oregon jobs in 1995 and only 1.56 percent of all Oregon jobs in 2012; a decrease of 52 percent. Logging and milling jobs per million board feet of logs cut were 2.04 logging and 7.91 milling jobs in 1995, and 1.52 logging and 3.52 milling jobs in 2012. These are

declines of 26 percent and 55 percent respectively. The milling capacity of Oregon softwood sawmills was 5.8 billion board feet of lumber in 1995, but dropped to 7.2 billion board feet of lumber in 2012, an increase of 24 percent (remember: with 43 percent fewer mills).”^{xxi}

Other than these alterations in the market and automation, the industry jobs are exceptionally dangerous. In fact, they are the most dangerous jobs in America. One can only imagine that workers would be excited to leave the industry and reduce the risk associated with their profession if other equivalent paying jobs opened up. To put this in perspective, from 2011-2014 there were 78, 65, 81, and 92 fatalities in this industry nationally.^{xxii} While this may not seem like many, when one considers the small number of timber industry employees nationally, this represents a significant death rate percentage.^{xxiii} The Oregon timber industry has an unfortunately significant portion of these injuries and deaths. There were about 300 non-fatal logging injuries in Oregon in 2013.^{xxiv} From 2011-2014 there were 4, 3, 6, and 3 logging deaths respectively in Oregon.^{xxv} This means that Oregon logging deaths average 5% of total USA logging deaths from 2011-2014.

Oregon’s logging industry was not always downtrodden. During the 1970s and 1980s it contributed a great deal of money to the state economy. However, the Oregon Employment Department recognizes that it is no longer a viable industry to count on for decreasing unemployment: “Technology advances, more automation, and less labor intensive manufacturing processes all conspired to reduce demand for employment, despite the ramp-up in lumber production.” Josh Lehner of the Oregon Office of Economic Analysis agrees, writing: “These increased efficiencies (standardization of logs, mills, equipment, etc.), in addition to the federal land restrictions, have contributed to the declining employment in the industry, even as value-added output has held steady”. In addition to the lack of employment opportunities, wages have declined over the past 30 years. When adjusted for inflation, wood products workers averaged about \$50,000 annually in the 1980s; however they average about \$40,000 annually today.^{xxvi}

When read closely, it is evident that the logging industry is no longer a viable employment sector in Oregon’s economy. However, the reintroduction of wolves to the MHNFA area presents a rare opportunity to help relieve unemployment in rural communities in the MHNFA area where timber jobs no longer offer the type of economic opportunities that families need, and increase environmental health.

Yellowstone National Park’s reintroduction of the gray wolf in 1995 was a contentious issue for local communities. However, an economic analysis of the success of this reintroduction proves that not only did this project increase tourism in the region but also helped buoy these small towns economically.

The presence of wolves can provide many economic benefits, ranging from tourism to improved ecological health in the reintroduction region. The latter benefits include healthier fauna and wildlife populations, cleaner air and water, and reduced soil erosion. At Yellowstone, from 2004-

2006 there were 150,000 park visitors from around the globe that came specifically to view the gray wolves. The local economies raked in about \$5,000,000 each year from wolf-watching tours alone.^{xxvii} In 2005, 44% of visitors to Yellowstone cited wolves as the species they wanted to see the most during their visit.^{xxviii} Wolf-related tourism is a \$35,500,000 boon to the Wyoming, Idaho, and Montana economies each year. In 2014, Yellowstone tallied 3,513,483 million visitors whom spent \$421,004 in local economies, which employed 6,662 people. Comparatively, Crater Lake National Park had 535,508 visitors whom brought in \$44,788 and kept 769 people employed.^{xxix}

These Crater Lake National Park numbers indicate that there is a healthy rate of visitors whom come to Oregon for sightseeing. However, there is room for improvement, and thus job creation, when the visitor statistics are compared to parks that have wolves. While MHNH is not a national park, these numbers give an idea of how much of an economic boon the very presence of wolves in a region are to local economies. The communities around Mt. Hood National Forest could grab a share of the ecotourism industry through reintroduction. If MHNH is thought of as a national park in terms of economic potential, it is a heady employment prospect for Oregon. National parks supported 252,000 jobs nationwide in 2011; many of them in gateway communities to these parks.^{xxx} In Montana, wolf ecotourism has been a significant economic driver for a long time. In 2002, the Wolf Management Advisory Council, commissioned by the Montana state government, acknowledged that “Wolf tourism is on par with agriculture in Montana in terms of state revenue and employment.”^{xxxi}

Some of the tourism-industry jobs would be from guided tours, arts and crafts for souvenirs, and hotels and dining. Tour guides, whom the Bureau of Labor Statistics classifies under ‘Fish and Game Warden’, average \$25.61 hourly nationally, which is \$53,260 annually.^{xxxii} Artists, painters, sculptors, and other craft workers average \$24.58 nationally, which is \$51,120 annually.^{xxxiii} Food and bar occupations came in around \$19,130 annually in Oregon in May of 2014.^{xxxiv} All of these positions are safer and more stable than logging jobs, and some of them pay roughly equivalent or higher than them.

In addition to tourism-related job creation, the process of creating a suitable habitat for wolf reintroduction will create many employment opportunities for residents of local communities. As noted previously, the MHNH encompasses over 3,000 miles of roads. Roads act as barriers to fish migration, increase the sedimentation of streambeds, increase poaching, and increase the prevalence of devastating wildfires.^{xxxv}

The high concentration of roads in the MHNH is unsuitable for wolf habitat, which requires a relatively large land area that has enough prey and remoteness to avoid humans. Habitat corridors and a low road density are also important.^{xxxvi} This presents a great opportunity for large-scale employment as many of these road would be removed to make way for reintroduction. “Full re-contouring” style road removal would be necessary to create the appropriate habitat. At minimum, a “road-to-trail” type conversion would be acceptable. The

former is more labor intensive and would employ more workers, while the latter would increase the accessibility of the MHN for pedestrian use.^{xxxvii} The Forest Service recognizes the importance of road removal, indicating that roads negatively influence wildlife via erosion, forcing alternative movement patterns, increasing poaching, and decreasing water quality. They argue that while road removal will increase soil erosion in the short term, it is incredibly important as a preventative measure against even worse erosion and other negative ecological impacts in the long run.^{xxxviii}

The National Legacy Roads and Trails program is an initiative of Wild Earth Guardians. The Wild Earth Guardians seek to reduce the presence of roads in wildlife areas. This program secured \$390,000,000 in funding from the federal government and used it to decommission 5,992 miles of roads, maintain and stormproof 15,463 miles of necessary roads, restore 965 fish passage sites, and upgrade 4,091 miles of trails. Most importantly, this project created 800-1,200 jobs annually and reduced annual road maintenance costs by about \$3,500,000 each year.^{xxxix} Since this program began in 2008, it is estimated that for every \$1,000,000 spent, 13-17 jobs are created nationally and 16-24 jobs are created in the 'Region 6' area, which encompasses CA, ID, MT, OR, and WA.^{xl} The jobs that would be created from road deconstruction are primarily construction laborers and their supervisors. The former received an average annual salary of \$36,264 in Oregon.^{xli} The latter has an average annual salary of \$61,028.^{xlii}

In addition to road removal, other necessary habitat restoration duties would create jobs in industries that include: heavy equipment providers and operators, plant nurseries, landscape architects, construction companies, and other firms. In 2011, the U.S. Fish and Wildlife Service reported that their habitat restoration programs created over 3,900 jobs and created an economic stimulus of \$327,600,000 for their coastal program alone.^{xliii} In their own words: "A new peer-reviewed analysis finds that the U.S. Fish and Wildlife habitat restoration programs are extraordinary engines for the U.S. economy."^{xliv} Every \$1 devoted toward this project returned \$12.78 on average.^{xlv}

Reintroduction would create a significant number of jobs related to environmental and wildlife population monitoring and evaluation. These jobs would be long-term and would increase in number each year as the wolf population grows. These jobs include: scientists, wildlife and range technicians, and wildlife rangers.

'Scientist' is a broad employment category that includes conservation scientists and wildlife biologists. While it may seem that loggers and foresters would not benefit from the creation of these jobs, this is an incorrect assumption. In fact, the State of Oregon Employment Department estimates that conservation scientists have a 67% skills overlap with foresters, and that wildlife biologists have a 33% overlap. Depending on the educational background of these foresters, many could potentially fill these new scientific positions. Conservation scientists in Oregon have an annual average salary of \$71,706 and there are numerous schools nearby for training them. Wildlife biologists average \$64,839 in Oregon annually and this job also has many training

schools and programs nearby MHNH.^{xlvi} Forest and conservation technicians average \$37,853 in Oregon and have a 37% overlap with foresters' skills. Game wardens, or wildlife rangers, average \$70,910 in Oregon.^{xlvii} Montana's wolf monitoring team is a good example of these jobs. The broad ranging specialists involved with this program totaled more than 40 employees.^{xlviii}

It's important to note that some of these jobs would benefit local Native American tribes. The large Warm Springs Indian Reservation borders a significant amount of MHNH. It is governed by the Confederated Tribes of Warm Springs. This reservation has been devastated by chronic unemployment for a great while.^{xliv} Unfortunately, the logging industry downturn hit Warm Springs hard, causing layoffs at the Warm Springs timber mill near Madras, Oregon. There is not a significant chance that there will be an increase in hiring at this mill as it has shifted its operations towards exporting its timber to Japan.¹ The inhabitants of this reservation need jobs, and they could benefit enormously from the employment creation that reintroduction would provide. Several ecological restoration programs in Washington have been successful due to the large role played by local tribes. Several project examples include: the restoration Nisqually River Delta by the Nisqually Indian Tribe, the restoration of the Qwuloolt Estuary by the Tulalip Tribe, and the reintroduction of the Pacific Lamprey to the Yakima River basin by the Yakama Nation, among many others.^{li}

Reintroduction would be also economically beneficial because it would move these local communities away from the single-industry economic model that is failing them. Towns in Oregon such as Roseburg, Oakridge, Prineville, and Burns-Hines were hit extremely hard during the recession; an impact that is due to their lack of economic diversity. In 2009, they had had 16.1%, 12.2%, 19.7%, and 19.1% unemployment, and a per capita income of \$20,324, \$14,525, \$21,313, and \$16,159 respectively. This is a far cry from their heyday as logging powerhouses. Many of them are hoping to diversify their incomes via tourism and other niche industries; most of which revolve around tree-abundant geography. For example, Oakridge is attempting to diversify into a mountain biking tourist destination.^{lii} All of these communities seek to diversify away from the timber industry and enjoy the same economic success that Bend, Hood River, Astoria, and Newport have had.

Bend averaged 1,990,000 – 2,430,000 visitors in 2014.^{liii} These tourists spent an average of \$106 per day per person, and an average of \$952 per trip in 2013.^{liiv} This tourism money has in turn attracted industry to Bend, which was the 10th fastest growing metro area in the nation in 2014 due to its re-branding as a tech-hub and a hotbed for small companies.^{liv} Some prominent sectors include: bioscience, aerospace, outdoor recreation equipment manufacturers, software, and brewing.^{livi} Hood River similarly has embraced tourism as a windsurfing destination. An estimated 43% of houses are second homes, which are occupied by seasonal visitors whom swell the town from 8,000 residents to 20,000 between June and October.^{liiii} This has created more economic diversity, taking the forms of healthcare, accommodation, professional firms, arts, and construction. Logging has dropped to only about 5% of the economy.^{liiii}

The importance of transitioning away from the timber-industry economy cannot be overstated. In 2007, The Rural and Small Town Programme at Mount Allison University indicated that forestry-oriented single-industry economies are a “perfect storm” of economic disaster, due to: new technologies, higher energy costs, shifts in demand, market changes, resource depletion, lower cost competitors, globalization, and corporate downsizing.^{lix} Professor David Leadbeater at Laurentian University indicates that these communities are shrinking in population, which is due to the decline in employment and standard of living.^{lx} The Environmental Protection Agency indicates that using the unique advantages of one’s small town to find a new economic engine is the best bet toward beating this inevitable economic slump in logging towns. They argue that these towns should focus on outdoor recreation, historic downtowns, and arts and culture institutions, while simultaneously protecting natural resources and creating jobs via cleaning up deforested and environmentally polluted areas.^{lxi} A second EPA study concurred, arguing that these communities should use “smart growth” strategies to repower their economies.^{lxii}

Let’s take a look at the environmental aspects of reintroduction. An example of an ecological and economic benefit is the natural repopulation of fish that would occur due to the wolves’ reduction of deer and elk grazing near streams. This grazing raises stream temperatures due to vegetation reduction which in turn kills the fish population.^{lxiii} Oregon’s fish populations have been hit hard recently due to global warming which has raised stream temperatures due to lack of glacial water from the MHNH entering streams.^{lxiv} Oregon’s fishing industry is a major employer and an economic powerhouse of the state economy, both from fishing tourism as well as industry jobs. In 2013, the onshore harvest hauled in and estimated \$154,800,000 which came out to \$353,000,000 in total personal income.^{lxv} These stats highlight how much is at stake economically in Oregon that can be solved from wolf reintroduction. Furthermore, wolves are very susceptible to these environmental problems.

The ecological benefits of reintroduction would be especially beneficial to the towns in the MHNH area when the tax burden from ecological disasters and their cleanup is taken into account. Forest fires, tainted water due to erosion and road run off, and mudslides are all issues that taxpayers will have to shoulder the burden of fixing.^{lxvi}

Finally, it is important to note that seniors and retirees are increasingly moving to small towns out west. They are especially attracted to towns that are gateway communities to federally protected lands. Oregon is projected to continue receiving retirees from California, according to the Oregon Office of Economic Analysis. Their 2015 report indicates that these retirees bring with them “a lifetime of experience and wealth” and that harnessing the retirees’ wealth should be the Timber Belt’s top priority.^{lxvii} This trend will continue to increase as baby boomers are retiring at a rate of 10,000 per day.^{lxviii}

Overall, the timber industry is a burden to the local economies in the Mt. Hood National Forest area. Instead of providing lucrative, stable jobs as it did in the 1970s and 1980s, it is instead remarkable only for its environmental destruction and the single-industry economic model

problems it has created for these small communities and their inhabitants. Despite the recent increase in the domestic timber market, the housing starts causing this bump are a temporary reaction to the end of the Great Recession. Indeed, the automation of the timber industry and its pivot toward exporting timber to Asia is cause for concern. Both of these factors indicate that future jobs in the logging industry will be few and far between. By contrast, introducing the gray wolf to the MHNF would create a massive amount of jobs due to both the initial creation a suitable habitat for the wolves, as well as the jobs necessary to effectively monitor and evaluate the wolf population once they are established. Once these local economies have diversified toward an ecotourism economy, they will begin to flourish again from an inpouring of money from visitors as well as the jobs created from catering to these visitors. Finally, the increasing amount of retirees that would be attracted to these towns would further boost their economies. The economic future looks bright for small towns in the MHNF area. The main obstacle is making the transition to the new “wolf economy”. Once this has been achieved, there could be stability and economic prosperity for the foreseeable future.

ⁱ <http://www.bls.gov/oes/current/oes454029.htm#nat>

ⁱⁱ <http://www.bls.gov/oes/current/oes454029.htm#nat>

ⁱⁱⁱ <http://www.bls.gov/oes/current/oes454029.htm#nat>

^{iv} <http://www.bls.gov/oes/current/oes454029.htm#nat>

^v <http://www.fs.usda.gov/detail/mthood/landmanagement/resourcemanagement/?cid=STELPRDB5306406>

^{vi} http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3852949.pdf

^{vii} http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3847501.pdf

^{viii} http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3838036.pdf

^{ix} https://fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3827011.pdf

^x <http://bark-out.org/project/removing-and-rewilding-old-roads>

^{xi} <http://www.fs.usda.gov/detail/mthood/landmanagement/resourcemanagement/?cid=STELPRDB5306406>

^{xii} <http://www.opb.org/news/article/lumber-mill-exports-to-china/>

^{xiii} <http://static1.1.sqspcdn.com/static/f/797309/18937053/1340642474740/LOP+10+Log+Exports.pdf?token=545nc0pivmvocOBcamxHa7dXhcU%3D>

^{xiv} http://www.oregonlive.com/front-porch/index.ssf/2015/09/housing_starts_in_us_fall_in_s.html

^{xv} <http://www.cnbc.com/2015/08/18/us-housing-starts-july-2015.html>

^{xvi} <https://www.census.gov/construction/nrc/pdf/newresconst.pdf>

^{xvii} http://www.huduser.gov/portal/sites/default/files/pdf/NationalSummary_2q15.pdf

^{xviii} <http://www.diva-portal.org/smash/get/diva2:412664/FULLTEXT02>

^{xix} <http://umu.diva-portal.org/smash/get/diva2:718380/FULLTEXT01.pdf>

^{xx} <http://www.machineryautomation.com.au/wp-content/uploads/2012/02/Fennings-Flyer.pdf>

^{xxi} <http://www.andykerr.net/mill-automation-op-ed>

^{xxii} http://www.bls.gov/iag/tgs/iag113.htm#fatalities_injuries_and_illnesses

^{xxiii} <http://www.bls.gov/news.release/pdf/cfoi.pdf>

^{xxiv} <http://www.bls.gov/iif/oshwc/osh/os/pr137or.pdf>

^{xxv} http://www.cbs.state.or.us/external/imd/rasums/ra_pdf/wc/fatal/annual_rpt_14.pdf

^{xxvi} <http://oregoneconomicanalysis.com/2012/01/23/historical-look-at-oregons-wood-product-industry/>

^{xxvii} <http://www.defenders.org/places-for-wolves/economic-benefits-wolves>

^{xxviii} <http://www.georgewright.org/251duffield.pdf>

^{xxix} <http://headwaterseconomics.org/dataviz/national-park-service-units>

^{xxx} <https://www.doi.gov/news/pressreleases/national-parks-serve-as-powerful-economic-engines-for-local-communities-supporting-252000-jobs>

^{lxiv} <http://www.reuters.com/article/2015/06/19/us-usa-oregon-salmon-idUSKBN0OZ2L420150619>

^{lxv} http://www.dfw.state.or.us/agency/docs/OR_Comm_Fish_Ec_Impacts_Brief_2013.pdf

^{lxvi} <http://www.nrdc.org/land/forests/roads/eotrix.asp>

^{lxvii} <https://oregoneconomicanalysis.files.wordpress.com/2015/08/rural-oregon-2015.pdf>

^{lxviii} <http://thehill.com/blogs/congress-blog/economy-budget/247546-retirees-a-growing-economic-force-in-the-west>