

# Bridge of the Gods 8 Ton Weight Restriction: An Economic Analysis

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## **Acknowledgments**

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## **Executive Summary**

Regional economies are especially dependent on infrastructure and the efficient movement of supplies and finished products that infrastructure like the Bridge of the Gods (BOG) supports. This analysis estimates the economic impacts of the BOG's weight limitation reduction from 80,000 pounds to 8 tons/16,000 pounds within the regional economy that includes Hood River County, Oregon and Skamania County, Washington (BOG region). It utilizes projections from businesses, nonprofit organizations and government agencies obtained through interviews as to the short and long term impacts.

Those impacts when projected throughout the BOG regional economy were estimated on an annual basis to negatively affect 390 full and part-time jobs, \$72.3 million in sales and most importantly the \$26.7 million of those sales dollars that are income to employees and business owners. This represents a negative shock to 2-3% of the regional economy in the first year and that amount may double if the actual limitations or concerns about future limitations remain in place for more than a year. More specifically, if ten jobs are not recruited to or retained within the region in a manufacturing business the negative effect can be a loss of 16 jobs, \$3.3 million in sales and \$1.1 million of the regional income portion of sales.

Uncertainty about future disruptions can be almost as serious as an actual closer of the Bridge. Getting the repair work done expeditiously requires all the attention until the weight restriction is lifted; however it is also important going forward to demonstrate that the necessary steps have been taken to avoid this type of problem in the future.

The types of economic effects caused by the reduced weight limitations are listed below. The effects are not evenly distributed across the region. Skamania County is experiencing the highest portion of negative impacts. It is likely that 5-10% of Skamania County's economy is currently being affected and if the limitations persist that percentage may double. Skamania County has a smaller economy than its regional partner Hood River County and may not have the resilience that would allow it to minimize the economic distress caused by this shock.

The fourth and fifth points below may be the areas of greatest concern. Rural economies struggle to develop industry clusters. Industry clusters can significantly increase the effects of sales as businesses locally purchase and sell an increasing percentage of their inputs or goods and services within the region. To the extent that these backward or supplier and forward or customer linkages can be developed locally, the dollars from the initial sales are respent in the local economy multiplying the effects of the initial production.

Rural economies can reach the scales of production necessary for clusters to develop by working together and that is happening in this region (e.g. wood products and tourism), yet the efficient movement of many of those goods and services rely on the Bridge.

The ability to recruit businesses that can further strengthen those clusters also relies on the Bridge and those businesses' ability to locate any place within the Bridge region knowing they can easily receive and deliver goods and services.

*Types of impacts include:*

- 1) Reduced toll revenue and spending by the Port of Cascade Locks and respending within the community
- 2) Increased transportation costs for incoming and outgoing shipments for businesses that often have smaller margins to absorb increased costs
- 3) Increased labor costs and production inefficiency as arrival time for suppliers' and customers' trucks becomes less predictable
- 4) Weakening linkages among regional businesses that are critical to the respending and retention of dollars in the local economy
- 5) Reduced certainty for current business expansion plans and business recruitment efforts

## **Introduction**

Economic effects of short term events are very difficult to quantify. This report analyzes the most certain effect – reduced Bridge toll revenue and also estimates the effects of business disruption in manufacturing and tourism both in terms of current activity and reduced growth of the manufacturing (e.g. greater difficulty recruiting leases for the Port of Skamania Industrial Park) and tourism (e.g. congestion effects on Washington State Route 14).

While the toll effects can be reliably predicted, the other effects are based on the limited time period that the weight limitation has been reduced and projections by

knowledgeable business and government managers of future consequences. The estimates in the report rely on the reader to make adjustments based on the reader's knowledge of the regional businesses and economy.

This analysis has five primary objectives:

- 1) Construct a regional input-output model
- 2) Project the trade flows of goods, services and tourism that rely on the Bridge of the Gods
- 3) Ground truth the projected trade flows with 15-20 personal interviews
- 4) Develop an economic shock scenario consulting with community leaders for lowering the weight limits on the Bridge of the Gods
- 5) Using the regional model estimate the economic effects of the shock scenario

The explanations for each objective are organized as subsections below. The terms that are repeatedly used throughout the report include:

- ***Bridge of the Gods Region (BOG region):*** Hood River and Skamania Counties
- ***Output:*** Amount spent on products or services or sales within the region. This metric can include significant double counting especially of intermediate goods and services purchased outside region. They are counted as a local sale when they become a part of a locally produced good or service
- ***Net Regional Product (Income):*** Output minus intermediate goods that are purchased outside the region
- ***Employment:*** Full and part-time jobs including both those covered by workers compensation and reported by the Oregon and Washington employment departments and uncovered jobs like sole proprietorships
- ***Economic Drivers:*** Sectors that bring money into the economy from consumers outside the region. Changes to the economic drivers can have structural impacts to the economy

## **Bridge Regional Economy**

The Hood River/Skamania regional economy has transitioned over the last 30 years from a natural resource based manufacturing economy to one that still has strong manufacturing sectors yet relies to an increasing extent on tourism. Tourism has only partially offset the losses experienced by the wood products and construction industries. As the wood products industry contracted, all levels of government and the private sector invested resources to develop the infrastructure (e.g. industrial parks on both sides of the Columbia) necessary to expand or recruit businesses and to create the marketing and administrative support (e.g. Mid-Columbia Economic Development District) necessary for a diverse economy. They were trying to fill the large gap caused

by reducing the timber harvests on public lands and the increasing mechanization of the wood products industry.

Based on the most currently available data (2011) from the Minnesota IMPLAN Group and the BOG regional Input-Output Model (I/O Model), which we constructed from that data, the net Bridge regional product and employment are estimated and shown in Table 1. The Real estate & rental sector includes rents, leases and an imputed rent value for owner occupied dwellings so those estimates need to be used with some reservation.

**Table 1. Regional Product and Employment by Sector – Sorted by Regional Product**

<i><b>Description</b></i>	<i><b>Regional Product (\$)</b></i>	<i><b>Employment Full &amp; Part- time Jobs</b></i>
<b>Total</b>	<b>1,108,806,208</b>	<b>18,561</b>
Manufacturing including Food, Wood Products and all Other	156,487,713	1,438
Government & non NAICs	138,087,249	2,071
Real estate & rental	124,876,668	376
Ag, Forestry, Fish & Hunting	92,367,244	1,729
Health & social services	92,195,448	2,360
Tourism (Visitor purchased Retail trade, Accommodation & food services, and Arts-entertainment & recreation)	84,359,420	2,649
Professional- scientific & tech svcs	76,820,796	1,510
Wholesale Trade	67,403,592	675
Retail trade (resident purchased)	58,620,396	1,391
Other services	37,447,130	813
Construction	34,275,720	807
Finance & insurance	32,624,162	336
Accommodation & food services (resident purchased)	29,020,833	837
Information	21,574,902	148
Utilities	20,624,726	48
Administrative & waste services	13,145,051	329
Transportation & Warehousing	9,093,922	343
Arts- entertainment & recreation (resident purchased)	8,044,899	362
Management of companies	7,807,125	90
Educational svcs	3,647,782	243
Mining	281,429	5

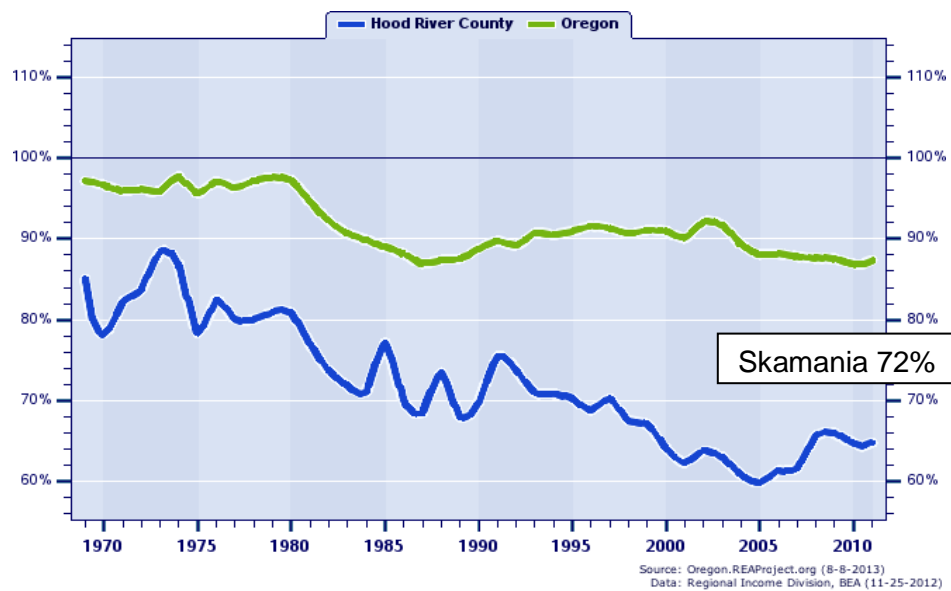
In Table 2 the percentages of the regional economy that are dependent on the economic drivers are listed. These percentages were estimated using the income for both products and services that are exported outside the region or receive income from investments or prior contributions (e.g. Social Security) from outside the region. Note that while tourism is not a designated sector, it includes the exported portions of Accommodation and food services, Arts – entertainment & recreation, and Retail trade. Tourism drives approximately 10.8% of the regional economy. Tourism is the second largest driver, after manufacturing, of the regional economy.

**Table 2. Economic Drivers – Portion of Economy Dependent on the Largest Sectors**

<b>Sector</b>	<b>Level (%)</b>
<b>Total</b>	100.0
Manufacturing	24.3
Tourism including visitor purchased:	13.7
Retail trade	3.8
Accommodation & food services	6.5
Arts- entertainment & recreation	3.4
Government	12.9
Ag, Forestry, Fish & Hunting	11.5
Professional- scientific & tech svcs	5.8
Health & social services	4.8
Other services (e.g. equip repair, dry cleaning, etc.)	3.5
Wholesale Trade	2.0
Real estate & rental	1.4
Subtotal	79.8
Remaining Sectors and Household Transfer Payments (e.g. Social Security)	20.2

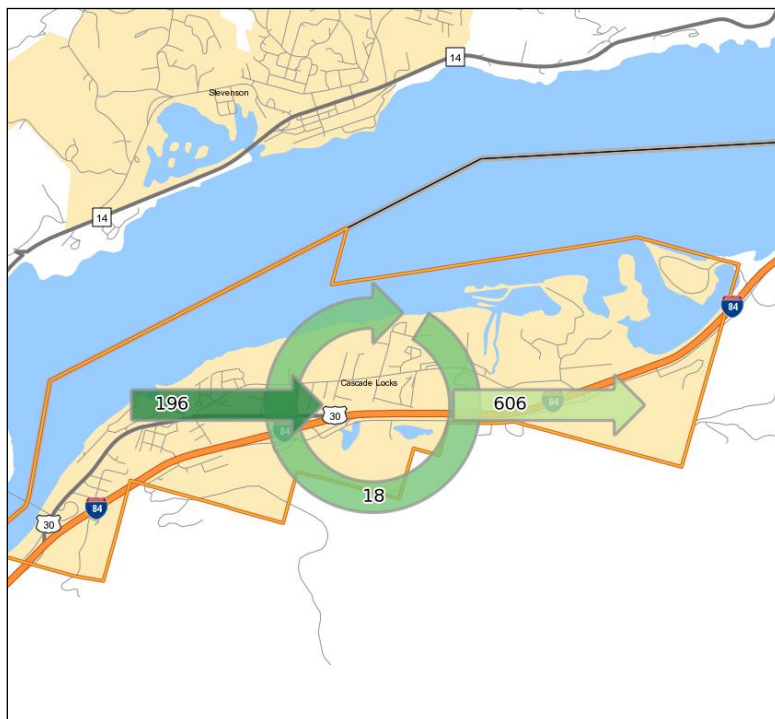
The importance of maintaining the stability of infrastructure and avoiding disruption to the regional economy can be further emphasized by the gap between the average earnings per job in the counties of the region and the U.S. average earnings per job, which is illustrated in Figure 1. Since the average earnings per job throughout the region are less to much less than the national level, it is very difficult for sectors that depend on the Bridge, primarily manufacturing and tourism, to offset the lost income from the weight reductions.

**Figure 1. Average Earnings Per Job as a Percentage of U.S. Average 1969-2012**



The regional economy is interdependent and a significant portion of the goods, services and workers that help region function effectively move across the bridge each day. As shown in Figure 2<sup>1</sup>, 196 workers who live outside Cascade Locks commute in each day, 606 workers who live in Cascade Locks commute out each day, and 18 workers live and work in Cascade Locks. Not all of those workers are crossing the Bridge or rely on the Bridge, yet many do.

**Figure 2. Worker Inflow/Outflow Analysis for Cascade Locks – 2011 data**



<sup>1</sup> U.S. Census 2011. *OnTheMap* <http://onthemap.ces.census.gov/>

Figure 3<sup>2</sup> shows the same type of worker flow analysis for Stevenson, Washington with 1,007 workers commuting in, 425 workers commuting out and 145 workers living and working in Stevenson.

**Figure 3. Worker Inflow/Outflow Analysis for Stevenson – 2011 data**



Just considering Cascade Locks and Stevenson, there are 2,234 commuters using SR14 and/or I-84 each day sharing the roads with the rerouted trucks. When the tourist traffic is included, depending on the season and time of the week, there is significant potential for accidents and delays.

### **Types of Economic Impacts**

Noted above, there are five major types of economic impacts from lowering the weight limitations to 8 tons. In the following sections, they are estimated individually and then summarized.

<sup>2</sup> Ibid.



***Reduced toll revenue and spending by the Port of Cascade Locks***

Toll revenue for vehicles that exceed 8 tons was estimated by the Port of Cascade Locks (Port) at \$225,332 per year. In Table 3 the economic impacts to the net regional product caused by that lost revenue are shown. The toll revenue loss was entered in the I/O Model as an output or sales value and with the multiplied effects of that loss, the sales effects were \$313,168. However, due to the double counting that was mentioned earlier and included in sales estimates, the net regional product or income effects are a more accurate measure. The lost multiplied effects of spending within the community of the \$225,332 create an estimated loss of \$239,120 of income within the region. Much of the spending by folks in the region is for goods and services outside the region, which in this case reduces the losses from multiplied spending.

**Table 3. Economic Effects of Reduced Toll Revenue**

<b>Sector</b>	<b><i>Employment Full &amp; Part- time Jobs</i></b>	<b><i>Regional Product (\$)</i></b>
<b>Total</b>	<b>4-5</b>	<b>239,120</b>
Ag, Forestry, Fish & Hunting	<1	303
Mining	<1	1
Utilities	<1	1,777
Construction	<1	1,653
Manufacturing	<1	362
Wholesale Trade	<1	2,998
Retail trade	<1	6,434
Transportation & Warehousing	<1	406
Information	<1	1,368
Finance & insurance	<1	2,884
Real estate & rental	<1	11,480
Professional- scientific & tech svcs	<1	2,772
Management of companies	<1	166
Administrative & waste services	<1	874
Educational svcs	<1	271
Health & social services	<1	6,782
Arts- entertainment & recreation	<1	718
Accommodation & food services	<1	2,967
Other services	<1	1,409
Government & non NAICs	3	193,493

***Increased transportation costs for incoming and outgoing shipments and increased labor costs and other production inefficiencies***

Business owners and elected and appointed people in government were interviewed to determine the level of disruption they and their customers or constituents are experiencing due to the reduced weight limits for the Bridge.

Most of the rerouting of deliveries that were carried on trucks that exceeded the current Bridge weight limitations has been to the I-205 or Hood River bridges. Both routes required that truckers travel Washington State Route 14 (SR14). This alternate routing forces shippers to change their sequence for and extend the time required to make deliveries. Not only have shipments become more time consuming and costly due to the extra miles travelled, they have become more dangerous and unpredictable. As an example, using one of the alternate routes along SR14, over the 24.09 miles<sup>3</sup> between Camas, Washington and North Bonneville, Washington there are 90 points of access to the highway<sup>4</sup> or 3.7 access points per mile. This many accesses points over such a short stretch of road raises safety and congestion concerns for residents and shippers. Many of the businesses that were interviewed have experienced delayed shipments due to this closure of the Bridge to trucks. They also provided examples from the past, even when the Bridge was fully operational, of landslides and traffic accidents that increase as the weather deteriorates over the winter.

Based on the interviews, it appears the reduced weight capacity of the Bridge is affecting ten percent of manufacturing production and five percent of the tourism industry. Again the tourism industry includes the Accommodation & food services sectors, Arts – entertainment & recreation, and Retail trade sectors. Table 4 shows the economic effects these ten and five percent shocks to manufacturing and tourism respectively are estimated to cause.

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<sup>3</sup> Mapquest: <http://www.mapquest.com/#d4753e7411331a248f37b2eb>

<sup>4</sup> Charles Pace/Bruce Sorte telecon September 13, 2013.

**Table 4. Ten Percent Shock to Manufacturing and Five Percent Shock to Tourism Portions of the Economic Drivers**

<i>Description</i>	<i>Employment Full &amp; Part-Time Jobs</i>	<i>Output or Sales (\$)</i>	<i>Net Regional Product (\$)</i>
<b>Total</b>	<b>390</b>	<b>72,329,652</b>	<b>26,736,200</b>
Ag, Forestry, Fish & Hunting	12	1,196,717	651,402
Mining	<1	3,720	1,508
Utilities	1	809,651	486,797
Construction	4	397,941	177,380
Manufacturing	140	51,524,421	14,913,844
Wholesale Trade	9	1,384,101	922,202
Retail trade	35	2,099,134	1,447,162
Transportation & Warehousing	5	432,416	134,232
Information	2	615,407	280,134
Finance & insurance	4	677,737	336,026
Real estate & rental	4	1,949,393	1,342,648
Professional- scientific & tech svcs	19	1,654,444	928,878
Management of companies	5	738,299	390,979
Administrative & waste services	5	409,084	212,862
Educational svcs	1	40,435	20,203
Health & social services	13	858,019	489,718
Arts- entertainment & recreation	51	2,273,468	1,118,685
Accommodation & food services	68	4,413,274	2,299,923
Other services	6	487,914	265,990
Government & non NAICs	5	364,076	315,624

Consumers, businesses and government agencies are very resilient. If the Bridge repairs are completed and the weight limitation is increased back to 80,000 pounds by January 2014, the impacts will have been concentrated primarily in logging and wood products and may not create lasting damage. If the repairs extend well past January 2014, the tourism sectors may experience progressively more severe negative impacts. Both manufacturing and tourism may face long term challenges to recover to current levels.

***Weakened linkages among regional businesses and increased uncertainty for existing and potential businesses that might want to expand or relocate to the region***

Business relationships among suppliers and customers are built over many years and are essential for a diverse and resilient economy. As economies have globalized, access to suppliers around the world has grown and local or regional economies have struggled to prevent dollars from “leaking out” of the region. Multipliers that are calculated from the percentage of a sale that is respent locally have declined from the 2-3 range (additional one or two dollars to 1.15-1.6).

Excellent infrastructure that provides all types of access among businesses within the region and when necessary outside the region is important to hold onto as many of those local and regional dollars for as long as possible. When it becomes more trouble/cost to reach a regional supplier, suppliers from outside the region become comparably less costly, tempting local businesses to spend outside the region. To demonstrate the importance of these relationships or linkages, the I/O Model created for this region has 173 sectors. Wood products manufacturing is linked in some way to 165 or 95% of the sectors in the regional economy.

Many of the regions’ businesses have alternate production or sales facilities amongst which they can assign production or marketing. During the interviews, the businesses expressed a strong loyalty to the Hood River/Skamania or BOG region and a willingness to work through this period. They intend to maintain their current business linkages within the region. However, if the Bridge limitations were to persist for years rather than months, it is tough to imagine that businesses would not be forced to consider their alternatives to retain as much of their often slim profit margins as possible.

***Reduced certainty for current business expansion plans and business recruitment efforts***

The Port of Skamania and the Port of Cascade Locks own and manage 162 acres and 226 acres respectively of developed (commercial to recreational), shovel-ready and developable land. There is also a significant amount of additional developable private land in the region. Access is a major variable in determining the value of that property

and the related rental or lease rates. While a few month hiatus for the Bridge is unlikely to seriously damage values of the industrial sites, if the weight reduction extends very far into 2014, recruitment efforts may at least be stalled if not abandoned by some companies and leases may be negotiated downward. Again, uncertainty about future disruptions can be almost as serious as an actual closer of the Bridge. While getting the work done expeditiously, it is also important to demonstrate that the necessary steps have been taken to avoid this type of problem in the future.

## **Conclusion**

Infrastructure that provides efficient and reliable access for businesses is essential for an economy to prosper. Infrastructure is built over time to achieve that access and the Bridge of the Gods is an important component of not only the regional economy, it is important to the statewide economies of Washington and Oregon. The far reaching importance of the Bridge was demonstrated by asking truck drivers at the toll both for the Bridge their destinations.

The economic effects of changes to infrastructure grow both in breadth (number of businesses affected) and depth (parts of the production processes for each business that are affected). The weight reduction for the Bridge of the Gods once again shows how resourceful people can be in working through a problem. It also shows that people remain optimistic for weeks and often months before they significantly alter their production processes or levels of production.

Businesses are being impacted and those impacts are estimated above, yet they are quite modest compared to how the businesses would respond to weight reductions or travel disruptions that persist or repeat. Unfortunately, many of these businesses needed to order supplies and make sales with delivery and shipping dates well into the future even to this point in the closure period. They may be negatively impacted for some time, though probably at a decreasing rate.

While the estimates in this report cannot be precise, they do point out the continuing importance of manufacturing \*see Table 2), to the economy and the how the regional businesses have built linkages amongst each other thereby keeping the dollars circulating in the regional economy. The linkages may weaken and businesses that might be recruited to the area further strengthening those linkages may be less likely to locate in the region if the Bridge of the Gods cannot return to full capacity in the near future.

## Appendix A

### **Bridge of the Gods Interviews 2013**

**Date** \_\_\_\_\_

**Type of Business** \_\_\_\_\_

**Introductions/thank you/responses confidential/feel free to pass/questions before we begin**

***Please explain your business and how long you have been doing business in this region.***

***What three or four of your costs and three or four types of sales are being affected by an 8 ton limit on the Bridge of the Gods?***

***How are you adapting or will you adapt to each one?***

***What percentage will your total sales change on an annual basis from the current reduction and if this weight reduction continues on the bridge beyond December 31<sup>st</sup>?***

***Would you consider moving your business if the weight limitation persists? If so how long would it need to last for you to seriously consider that alternative?***

***Have you considered expanding your business? Has this disruption affected that decision?***

***What one measure that has been implemented in response to the weight limitation for the bridge has been most helpful to your business?***

***Are there any additional measures that you think might be tried while the weight limits are reduced that could help limit the impacts to your business?***

***Do you feel well enough informed about the problems and how they will be addressed? If not, what other ways might information be provided?***

***Are there other points that you would like to include that I have not covered with these questions?***

**Thanks again and please let me know if you think of other issues.**