WESTERN MONTANA CORRIDOR

Regional Capacity
Volume II

Northwest Advanced Renewables Alliance

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NARA is led by Washington State University and supported by the Agriculture and Food Research Initiative Competitive Grant no. 2011-68005-30416 from the USDA National Institute of Food and Agriculture.

2.0 WESTERN MONTANA CORRIDOR CAPACITY INTRODUCTION

2.0.1 WMC Region

The Western Montana Corridor (WMC) encompasses the western half of Montana, parts of northeastern Washington and northern Idaho. Figure 2.0.1 shows a map of the WMC.

The geographic scope for the WMC was selected based on a biomass to biofuels supply chain. In establishing these boundaries, we considered feedstock (woody biomass) location, existing forest industries, petroleum refining and distribution capacity, and location to the markets where the biofuels will be consumed (e.g., Spokane International Airport and Fairchild Air Force Base).

The WMC has significant assets making it a compelling region for developing a pilot forest residuals to biofuels supply chain. This volume examines the region's assets and existing supply chain infrastructure.

2.0.2 Assets

Assets, according to the Webster's Second International Unabridged Dictionary, are "any item of value." Every region has its own unique set of tangible and intangible assets or resources that can be used in pursuit of economic development (Council on Competitiveness 2008). Examples of tangible assets for developing a biofuels supply chain include: infrastructure, wood processing facilities, brownfields and abundant natural resources. Intangible assets include workforce knowledge, skills and abilities and collaborative partnerships like the Blackfoot Challenge and the Montana Forest Products Retention Round-table. To realize a sustainable forest residual to biofuel industry in this region, all assets, both tangible and intangible, must work in concert. The the purpose of this volume is to articulate the relevant assets of the WMC region.

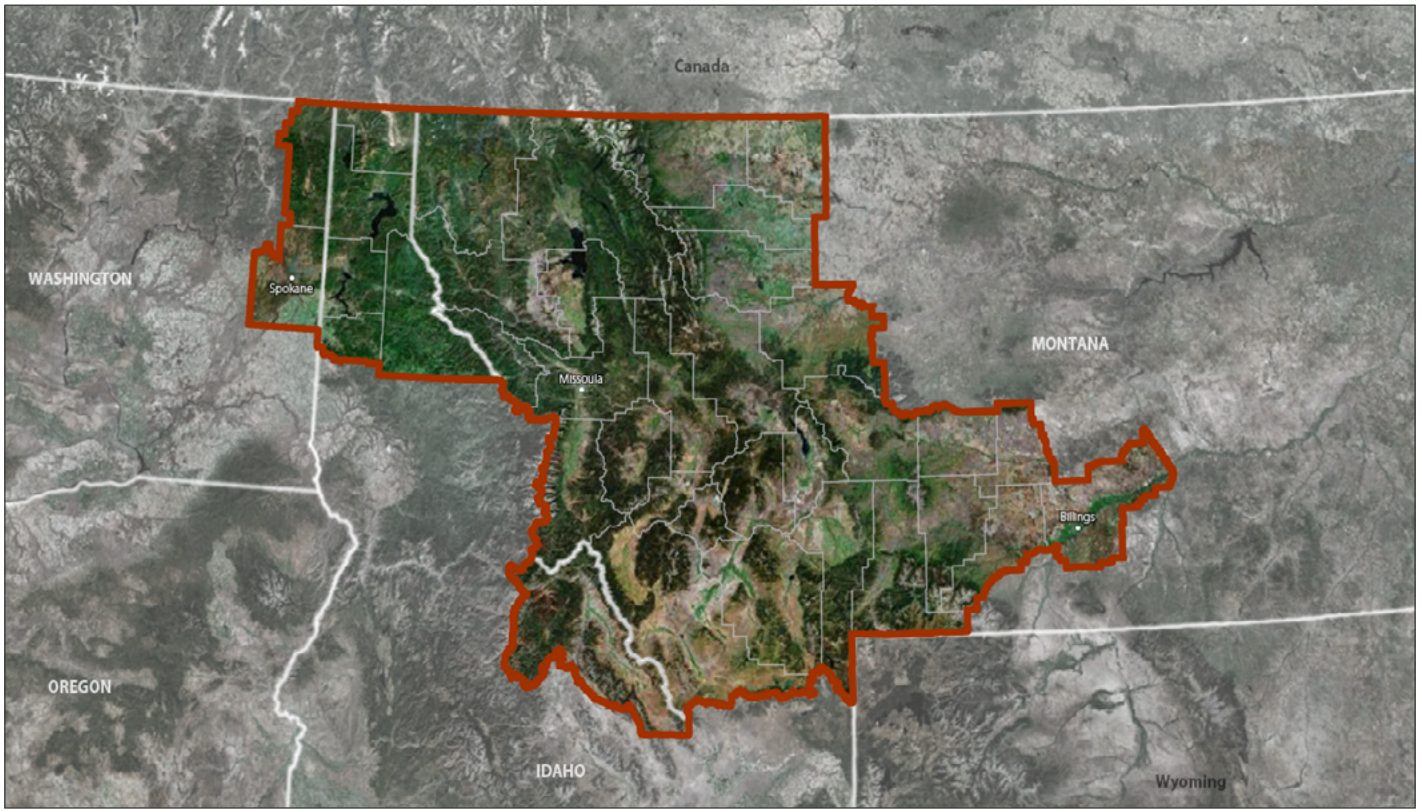

Figure 2.0.1. Western Montana Corridor (WMC) Region

2.0.3 Asset Mapping

To understand the geographical distribution of the region's biomass and other biofuels assets, we employ asset mapping which is an "inventory of key resources that can be utilized in a development effort" (Council on Competitiveness 2008, 5). Asset mapping is used extensively in the community economic development field to identify a community's existing and potential assets that enable the community to take advantage of economic development opportunities.

Asset mapping focuses on a region's capacity for problem solving and development. It is a positive approach that emphasizes a region's resources and aids in promoting connections and relationships with individuals and organizations. The approach identifies present assets in a region, concentrating on regional capacity, and stresses local investment, creativity, and control (Kretzmann and McKnight 1993).

NARA's aims are to identify existing resources to support economic development goals; lay the foundation for strategic planning; assist in demonstrating regional systems and linkages; catalyze partnership formation; while developing powerful tools for engaging stakeholders in regional development projects (Council on Competitiveness 2008).

2.0.4 Assets as Capital

An asset becomes a capital when it is invested (Emery, Fey and Flora 2006). For example, a region may possess a large volume of forest residuals generated from sawlog harvests. In its current form, this material may be a liability because it poses a risk for wildfires. When assessing potential development of a biofuels or bioenergy industry, this material may be viewed as an asset to the industry. But when invested in becoming feedstock for the new products and industries, this biomass now becomes a capital. This conceptual approach can be applied to a diverse set of assets such as education programs, investment opportunities, skilled workforce, and existing infrastructure.

Asset development in regions can be traced to the investment of existing assets in strategies and projects that build additional assets across the region. For example, with a forest residual to biofuels industry, the existing timber industry assets in the WMC can be employed to support the region's involvement in the emerging biofuels industry. Assets may be invested internally to build local or regional capacity, or externally to support asset development outside the region.

2.0.5 Community Capitals

To envision and assess the development of regional biofuels supply chains, NARA uses a community capitals framework, which originates from the community development literature (Flora, Flora and Fey 2004). It is helpful to categorize assets into capitals when identifying the importance and role of the assets within a region.

Cornelia and Jan Flora with Susan Fey (2004) developed the community capitals framework as a way to analyze how communities or regions function. Flora, Flora and Fey, (2004) define capital as, "...any type of resource capable of producing additional resources. When those resources or assets are invested to create new resources, they become capital." Based on their research to uncover characteristics of entrepreneurial communities, they found the communities that were most successful in supporting sustainable community and economic development paid attention to all seven types of capital: 1) natural, 2) physical, 3) human, 4) social, 5) cultural, 6) political, and 7) financial (Figure 2.0.2). In addition to identifying the capitals and the role each plays in community economic development, this approach also focuses on the interaction among these seven capitals as well as how investments in one capital can build assets in others.

Figure 2.0.2. Community Capitals

2.0.6 WMC Community Capitals Framework

In the WMC Atlas, we used a modified capitals framework (Emer, Fey, and Flora 2006) to asses the region's assets. The capitals used are defined below:

NATURAL CAPITAL

Ecological stocks and flows that provide valuable goods and services (e.g., forests, water quality, biodiversity).

PHYSICAL CAPITAL

Material resources that can be used to produce a flow of future income (e.g., transportation infrastructure, utilities, mothballed mills).

CIVIC CAPITAL

Assets of the community including human (leadership capabilities, knowledge, skills, abilities and information possessed by people in the region); social (interpersonal interactions, networks and customs that contribute to stronger community fabric including trust, cooperation, community cohesion, tolerance, compassion, patience); and cultural (shared experiences through traditions, norms, values, heritage, and history).

ECONOMIC CAPITAL

Money and access to funding (e.g., tax burden/savings, state and federal tax revenues, grants, contracts, etc).

POLICY CAPITAL

Federal, state and local laws and regulations that create an environment conducive to regional goals (e.g., supportive legislation, incentives for new or existing businesses, regulatory exemptions).

2.0.7 REFERENCES

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CAPITALS

Every region is endowed with capitals. Using a community capitals framework to organize assets helps regions to identify:

- Which capitals/resources it is rich or poor in
- Which capitals/resources it should invest in
- How investment in one capital can impact other capitals

We used the community capitals framework to identify regional assets in the WMC that could be used to develop a biomass to biofuels supply chain in the region.

2.1 NATURAL CAPITAL

2.1.0.1 Overview

Natural capital is comprised of the natural resources and processes required for an organization to produce a product or deliver a specific service (Forum for the Future, 2002). The most commonly utilized natural capitals include sinks, resources, and processes. A natural sink provides a noninvasive way to accumulate and store unwanted chemicals or nutrients for an indefinite period of time (i.e. carbon). Natural resources consist of any raw material found in nature that is valuable to a company or that can be made valuable by a company. Lastly, a natural process is an already-in-place environmental system that can be utilized by an organization as a service (i.e. air and water purification).

For the purpose of the WMC study, it is necessary to consider all potential natural assets and how they will be affected by the forest residuals to biofuels process. More importantly, researching these natural assets will set the groundwork to create a product life-cycle that is sustainable and operates within the limits of our natural environment.

The natural capital areas that most effect a developing forest residuals to biofuels industry are water, biomass (forests) and wildlife. Other natural capital categories to consider are air, mines and climate; however, these have minimal effects on the industry and are not evaluated in this analysis.

Figure 2.1.1. Clark Fork River, western Montana

2.1.1 BIOMASS

2.1.1.1 Biomass Introduction

Biomass is defined as the material from an organic plant or animal that is available on a renewable basis (Ashton et al, 2009). The type of biomass considered by the NARA project is woody biomass, particularly forest residuals. Forest residuals include branches, tree tops, stumps, and other woody debris left behind after commercial harvest or thinning.

In the WMC, the forest residuals remaining after timber harvest are typically combined in slash piles and burned. If used as a biomass feedstock, those slash piles will be removed and processed. In the NARA project, it is anticipated that a majority if not all of the sustainable supply of forest residuals will come from private, tribal and state lands. If policy regarding public lands warrants active management that includes thinning operations, then those residuals could also be used as biomass feedstock.

Mill residues and wood debris left from construction and demolition could also be considered as biomass feedstock for chemical production; however, these resources in the WMC either have current use or are available in minimal quantities.

In order to establish the most efficient supply chain for the production of biofuels and co-products, is of primary importance that the location and amount of available and sustainable woody biomass be determined for the WMC region.

Figure 2.1.2. Forest residuals as biomass

2.1.1.2 Biomass Field Research

To educate NARA researchers and the IDX team on biomass availability, site visits were conducted in 2013. Visited sites include the Lubrecht Experimental Forest, the previous Stimson mill site in Bonner, MT and the Pyramid Mountain Lumber mill. At the Lubrecht Experimental Forest, the team was introduced to the importance of tree spacing, the prevalence of mountain pine beetle infestations, and to opinions on how forest residual harvest from thinning operations could affect insect-tree interaction and wildfire intensity. Figures 2.1.3-2.1.5 show images taken at the Lubrecht Experimental Forest comparing thinned and untreated forest.

The site visits also introduced the IDX team to potential harvest and processing sites and to current management issues facing forest land managers.

Figure 2.1.3. Experimental Forest — The "no treatment" scenario

Figure 2.1.4. Experimental Forest — The "10 x10 spacing" scenario

Figure 2.1.5. Bark from a mountain pine beetle infested tree

2.1.1.3 Biomass Mapping

BIOMASS VOLUMES

To help understand the locations, amounts and availability of forest residual biomass, GIS maps were created. Figures 2.1.6 - 2.1.8 illustrate the total volume, bone dry tons (BDT), of biomass by county within the WMC region. One BDT represents the volume of woody biomass weighing 2,000 pounds without moisture.

The total volume data used to create these maps include forest residuals, mill residues and various land ownership classes. The land ownership classes included were national forests, other public, forest industry, and other private, which includes tribal land ownership (RPA TPO Database, 2013). A class for mill residues was added into the mapping data set in case at some point mill residues, as source of woody biomass, became available.

For orientation, the cities of Libby, Olney, and Frenchtown are listed. The grey counties represent areas with lower levels of biomass, while the green and blue counties represent medium to high volumes of biomass. The higher volume counties are representative of highly dense forested areas. These maps indicate that the most abundant biomass available is within the most northwestern corner of the WMC region. It must be noted that the maps assume an equal distribution of biomass throughout each county. In reality, the actual locations of the most dense biomass vary within each county.

For economic sustainability, projected NARA conversion and depot sites will need to be centrally located within areas of dense biomass. Based on forest residual availability, Lincoln, Flathead, and Missoula counties could serve as prime locations to place conversion and depot sites that would contribute to a viable supply chain.

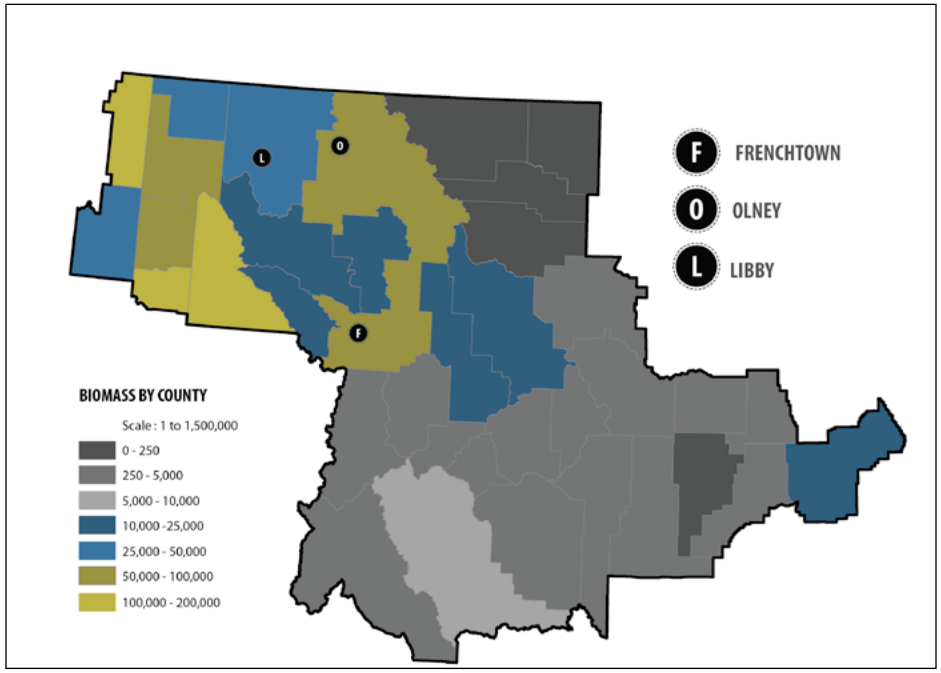

Figure 2.1.6. Total biomass volume per county (BDT) (http://www.bber.umt.edu/pubs/forest/fidacs/MT2004.pdf)

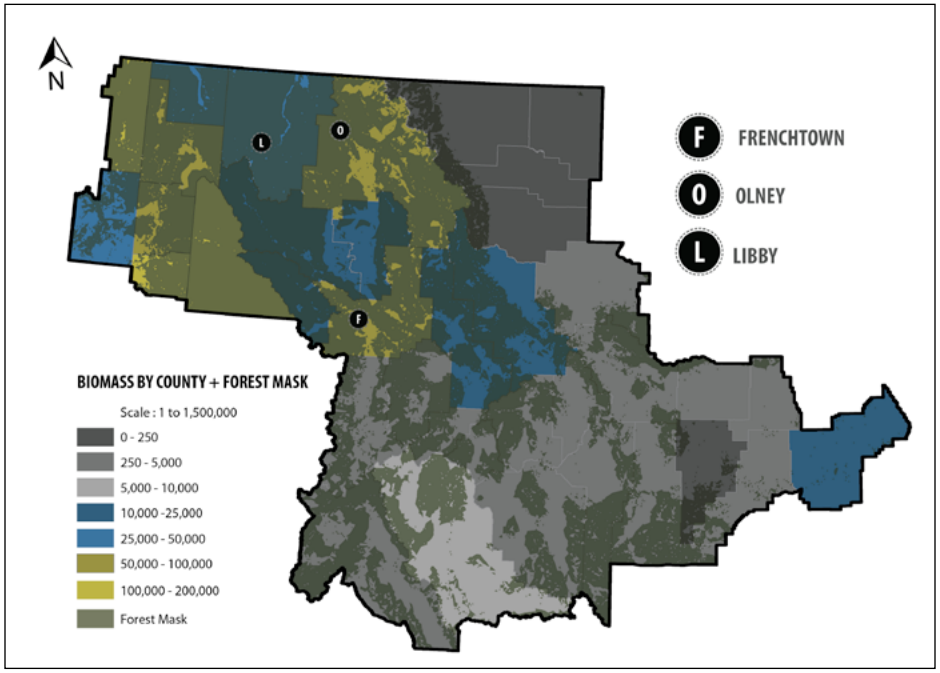

Figure 2.1.7. Total biomass volume per county (BDT) with forest mask overlay (http://fsgeodata.fs.fed.us/state_private/nationaldata.php)

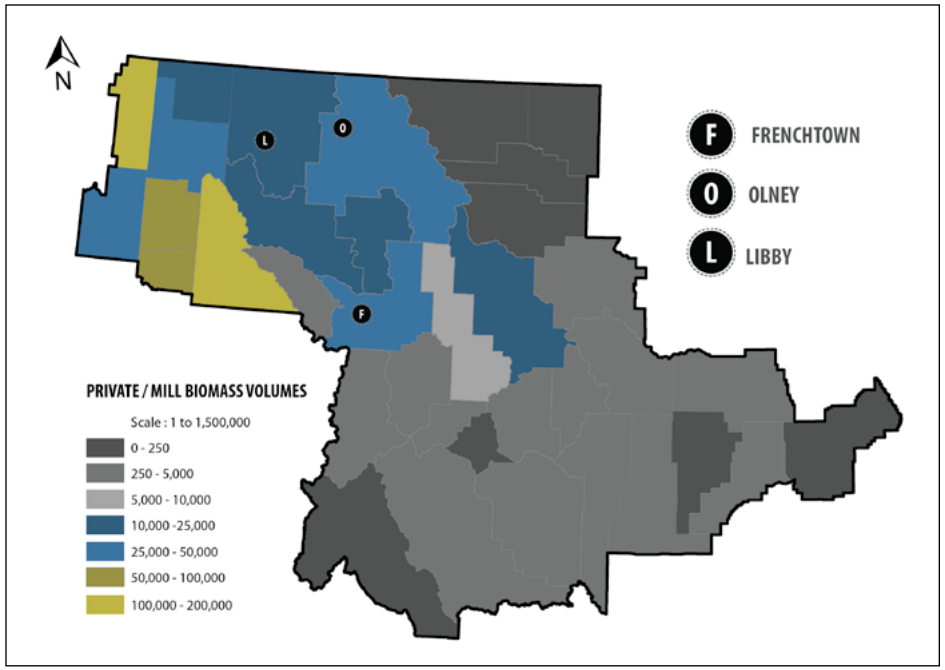

Figure 2.1.8. Biomass volume per county (BDT), only including private land and mill residues (http://www.bber.umt.edu/pubs/forest/fidacs/MT2004.pdf)

Though areas of northern Idaho and eastern Washington also possess high levels of biomass, they are located in the westernmost part of the WMC. Selecting centralized counties in the WMC allows the supply chain to reach out to all of the dense biomass areas to the west (WA and ID), while also allowing continued access to other dense biomass locations in the eastern part of the WMC.

Taking into account the three selected counties, bar graphs were created for each to show the volumes of biomass in each county. The first bar graph (Figure 2.1.9) was created to illustrate the differences in total volume of biomass to private and mill biomass volumes for each county. Differentiating between the total volume and the private/mill volume is important given forest residuals from private land (i.e. slash piles) and potential residues from mills will be collected as the main source of woody biomass for the purpose of the NARA project.

A bar graph was also created to show the distribution of biomass for each land or mill class within each county (Figure 2.1.10). This information is important given certain land ownership types will be more accessible than others when it comes to biomass extraction.

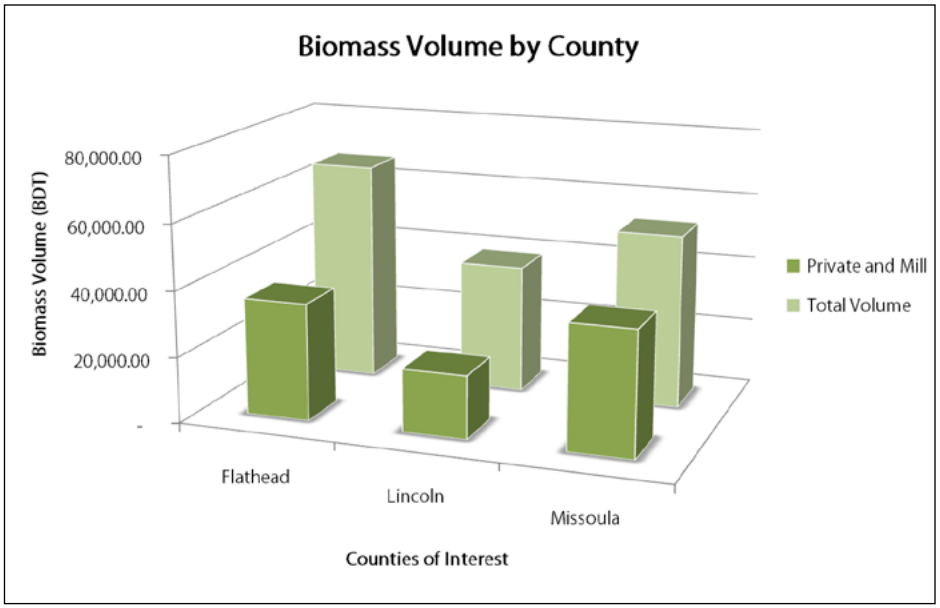

Figure 2.1.9. Bar graph comparing total biomass volumes to private and mill biomass volumes (http://www.bber.umt.edu/pubs/forest/fidacs/MT2004.pdf)

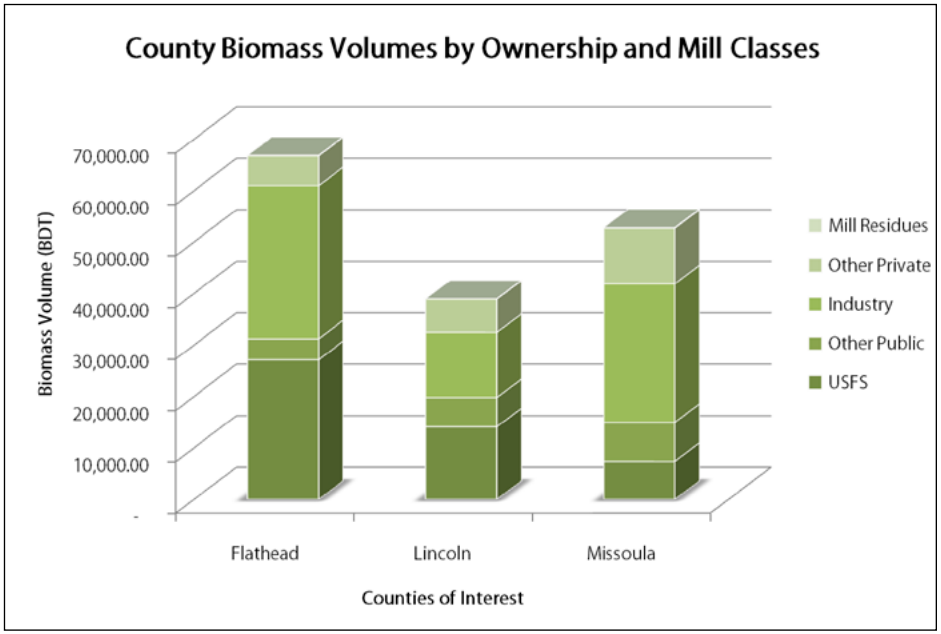

Figure 2.1.10. Bar graph showing county biomass volumes divided into land classifications and mill residues (http://www.bber.umt.edu/pubs/forest/fidacs/MT2004.pdf)

LAND OWNERSHIP

In order to develop a better understanding of accessible land in the WMC, a GIS map was created to illustrate land ownership within this region (Figure 2.1.11.) The land ownership classes considered were national parks, trust lands, Bureau of Land Management (BLM), tribal lands, national forests, land from the Department of Natural Resources and Conservation (DNRC) and private land. It must be noted that the private lands listed are assumed due to insufficient data available for the mapping scale used in Figure 2.1.11. Private land will be evaluated more closely later in the research process once particular project sites are identified.

Additionally, it must be noted that individual landowners have different forest management practices, rules, regulations and codes that must be considered with regards to the biomass harvesting. As Figure 2.1.11 illustrates, national forest and private land are the two most prevalent land ownership types in the WMC. Through further research and conversations with peer mentors, it was determined that private forest land will be the main source of forest residuals. Forest residual biomass is not available from National parks and limited from state parks.

National forests could potentially provide significant amounts of forest residual biomass; however, current policy and management activity does not allow for sustainable volumes.

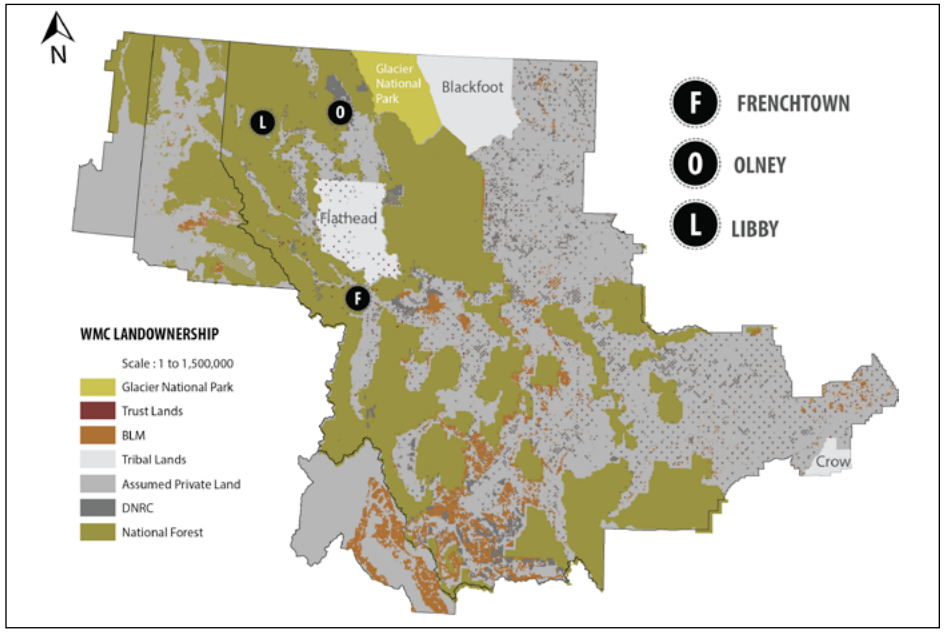

Figure 2.1.11. Land ownership in the Western Montana Corridor (http://gisportal.msl.mt.gov/geoportal/catalog/main/home.page)

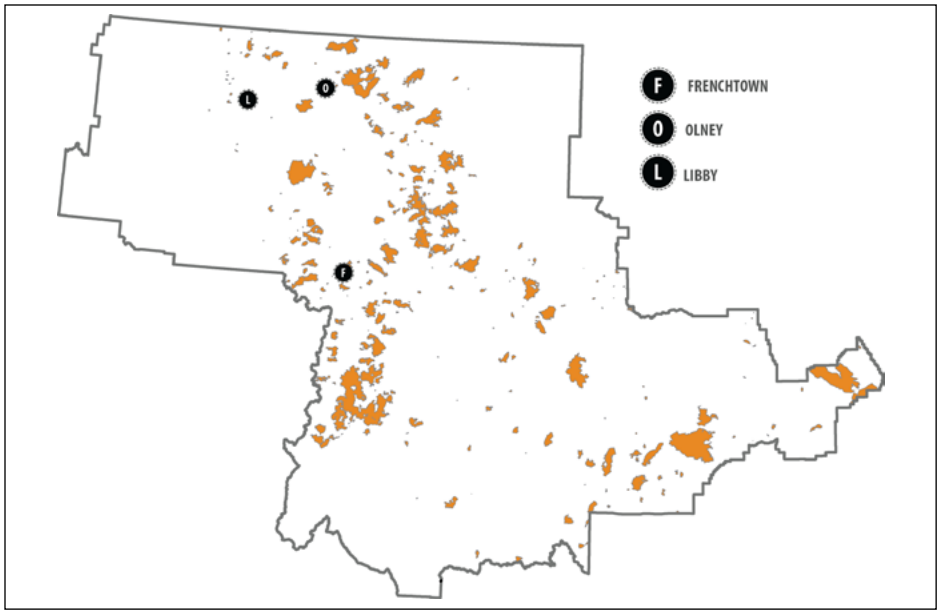

Figure 2.1.12. Wildfire history from 2000 to 2011
(Montana Department of Natural Resources and Conservation, received 2013)

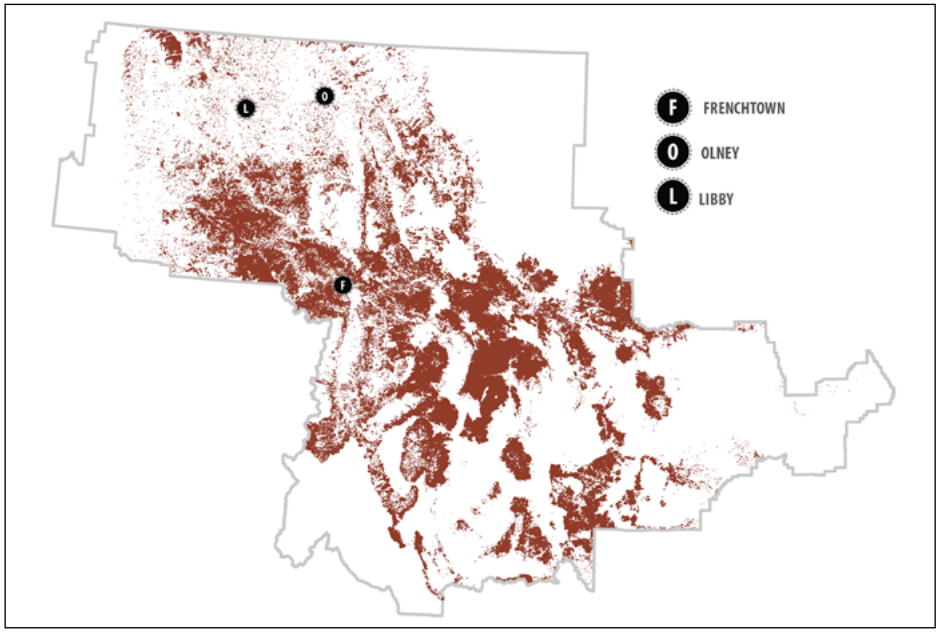

Figure 2.1.13. Mountain pine beetle disturbances from 2000 to 2011
(http://www.fs.usda.gov/detailfull/r1/landmanagement/gis/?cid=stelprdb5354608)

During site visits with stakeholders, it became evident that wildfire and insect disturbances were two significant concerns related to forest health. Two maps were compiled to show wildfire history and mountain pine beetle disturbances from 2000 to 2011.

The wildfire map (Figure 2.1.12) shows that wildfires (in orange) have historically been most prevalent in the central and southeastern sections of the WMC. Prevalent fire locations are important to note considering they could negatively impact the biomass availability. Conversely, prevalent fire locations could also be a source of forest residuals if thinning practices are adopted.

The mountain pine beetle information presented in Figure 2.1.13 was gathered using an aerial detection survey, where the red regions represent land that has been negatively affected by this insect from 2000 to 2011 (USDA, 2011).

The mountain pine beetle affects pine trees by laying eggs under the bark and introducing a blue fungus into the sapwood (DNRC, 2011). This weakens the tree and prevents proper water and nutrient transport. Within a year of infestation, the needles on the tree turn red, indicating the tree is dying or dead. Overgrown forests tend to be more susceptible to the mountain pine beetle considering they are already competing for nutrients due to inadequate basal spacing (City of Boulder, 2013). Alternatively, properly spaced trees are more resilient to potential infestations and can better defend themselves against the mountain pine beetle. Thinning overgrown forests has been proposed as an effective way to decrease the occurrence of insect infestations and restore natural forest conditions and habitats. It this treatment is administered, then forest residuals from these areas will become available.

2.1.1.4 References

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2.1.2 WATER RESOURCES

2.1.2.1 Introduction

Water is a significant resource for a forest residuals to biofuels industry located in the Western Montana Corridor region and throughout the world. It is needed to prepare and convert woody biomass into biofuels and co-products. For the conversion process evaluated by NARA, roughly three gallons of water are needed for every one gallon of isobutanol produced. This estimate is based on the conversion of wood biomass to ethanol which employs similar conversion processes.

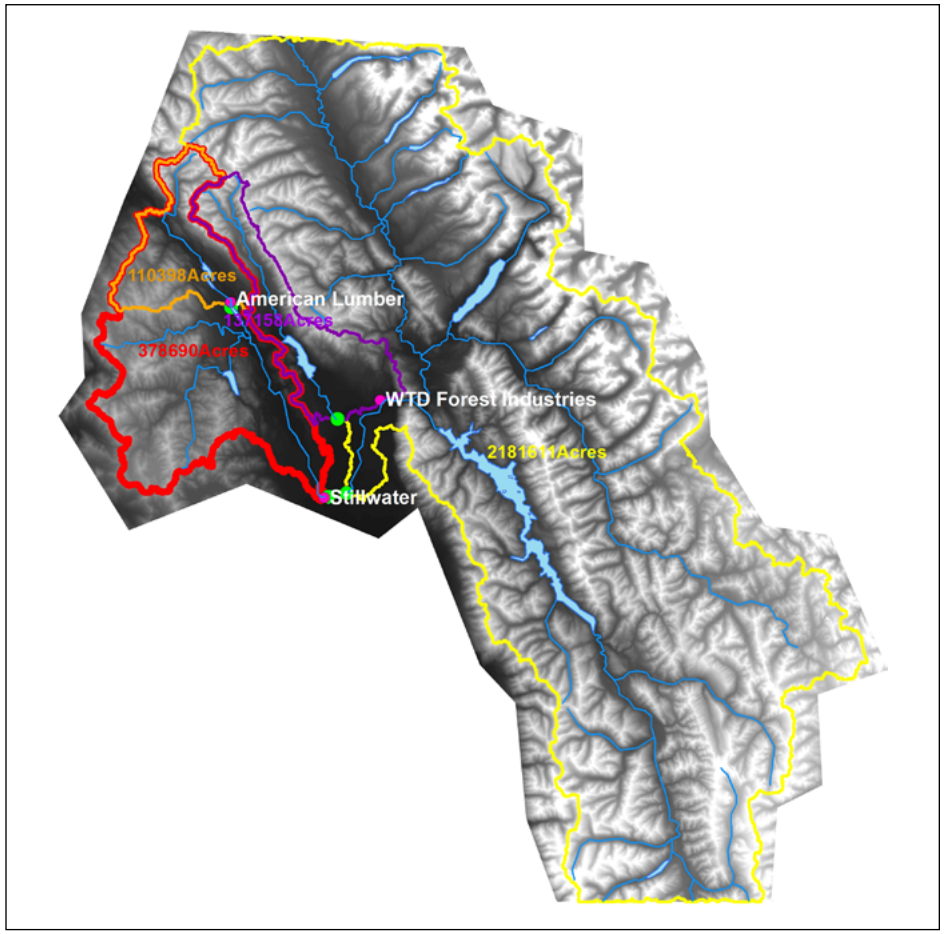

Figure 2.1.14. Analyzed watersheds for several potential conversion sites in Flathead County

2.1.2.2 Analysis

Any large scale conversion facility will need access to water. The vast majority of conversion sites considered in the WMC have aquifers beneath them. The Frenchtown MT location, for instance, has three deep wells available which can produce enough water to accommodate a conversion facility.

To illustrate watershed availability, Figure 2.1.14 shows the watersheds surrounding potential conversion site locations in Flathead county.

In addition to water quantity, water quality considerations are important. Figure 2.1.15 shows the watersheds with TMDL (total maximum daily load) limits. These limits establish maximum pollution levels for industrial wastewater discharge and require compliance from industry. The allowable discharge levels of contaminants from the conversion process will need to be checked with the EPA to determine the required level of treatment.

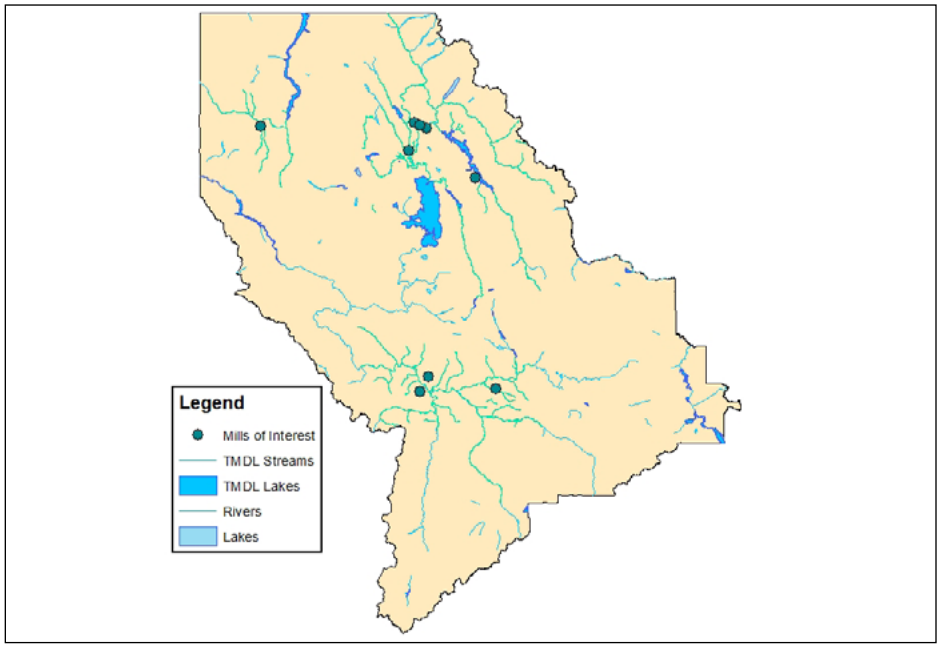

Figure 2.1.15. TMDL water sources and mill sites located in the Flathead Basin

2.1.3 WILDLIFE

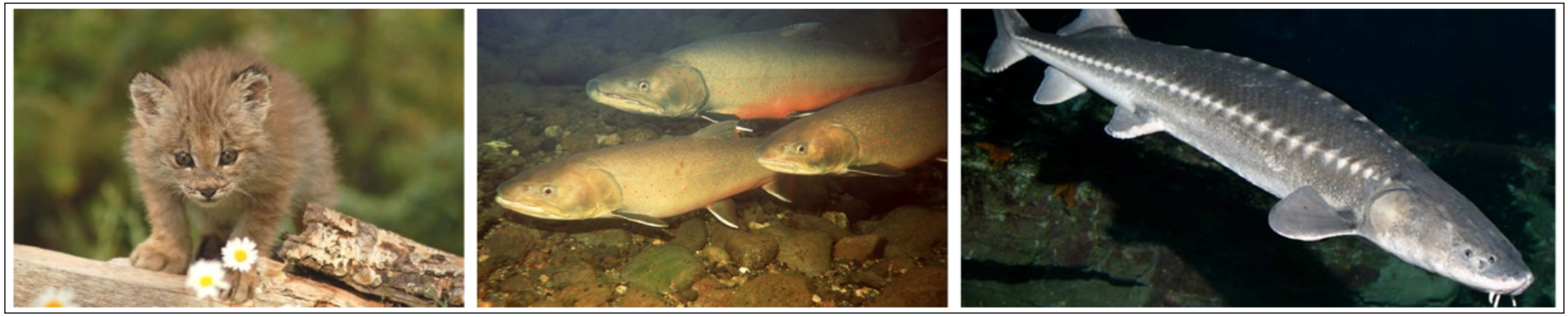

Figure 2.1.16. Three of the prevalent threatened species in the area; Canadian lynx (kitten), bull trout, and the white sturgeon)

For wildlife considerations, a primary concern is to preserve the natural environments of endangered and threatened species within the bounds of the Western Montana Corridor region. Canada lynx, bull trout and white sturgeon were identified as notable threatened species within the region and their locations are noted in Figure 2.1.17 along with a potential conversion site in Libby and seven potential depot sites.

Any conversion or depot site development will need to comply with local laws, rules, and regulations pertaining to logging and biomass extraction with regards to threatened species.

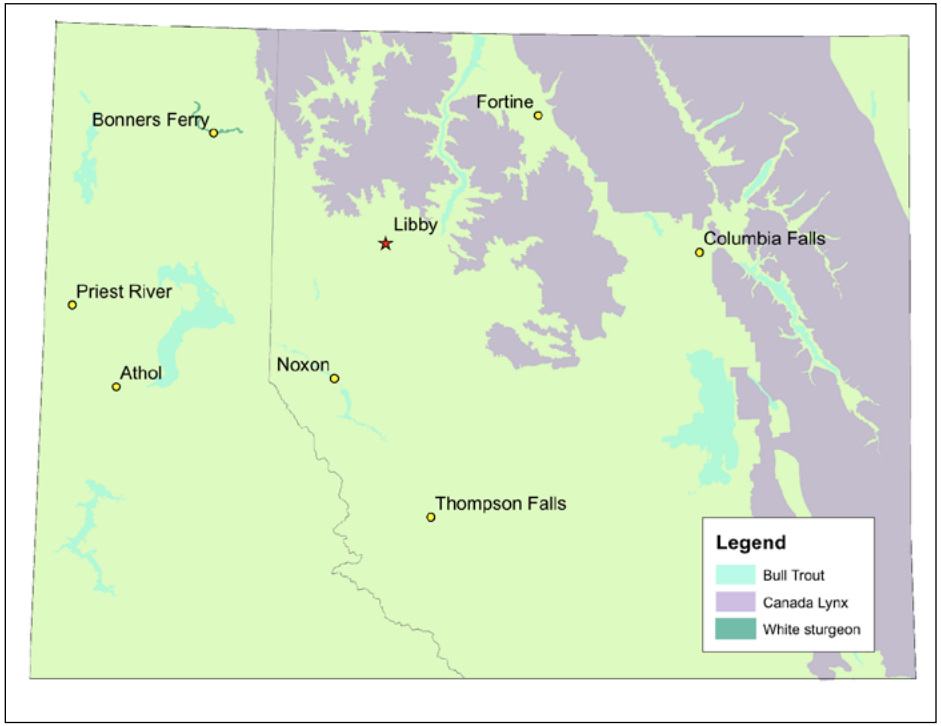

Figure 2.1.17. Threatened species habitat in the northern region of the WMC

2.2.0 PHYSICAL CAPITAL

2.2.0.1 Overview

Physical capital for this analysis refers to infrastructure such as buildings, roads, and railways. This definition is similar if not identical to the classic economist's use of "capital" to refer to all human-made inputs to production, not including labor, that do not end up in the product. Usually there is a distinction between infrastructure, which is often built or owned by the public (roads,electric power systems), versus capital such as a conversion plant or factory, that is built and owned by a private firm and used for a specific production process. We have divided the physical capital resources into two groups called Sites (nodes) and Transportation (linkages). The Sites category represents facilities that receive biomass or biofuel inputs, and include mills (saw and pulp), chipping facilities and petroleum refineries. The transportation category includes the roadway system, railways, barge transportation, airports, and pipelines. Physical capital is important in the biomass-to-biofuels conversion process, as the nodes represent places to store or modify the biomass, and the linkages represent methods of transport.

Figure 2.2.1. Wood chips being loaded near Missoula, Montana

2.2.1 SITES

2.2.1.1 Sites Introduction

In the biomass to biofuel supply chain being assessed by NARA, forest residuals are brought to a conversion facility and converted into carbohydrates (simple sugars) used to make isobutanol and biojet fuel. The conversion of forest residuals to carbohydrates is similar to a traditional sulfite pulping process; therefore, closed pulp mills would be ideal candidates for retrofit into an isobutanol conversion facility.

Since the conversion process relies on a steady stream of forest residuals, holding yards in the form of "depot sites" will be needed to ensure that material is available year-round. Active or closed sawmills may provide good holding capacity to store residuals or wood chips. The depots may be utilized to collect, chip, and store biomass from smaller regions that would otherwise be cost-prohibitive to transport to the conversion site directly. We assume that a conversion plant would also include its own chipping and storage capacity.

Sites can be classified as either "greenfields" which are undeveloped parcels of land; "greyfields" which are previously developed parcels of land; or "brownfields" which are parcels of land with potential contamination. Each site may have multiple classifications depending on prior land use. For example, a site may have an old building that contains asbestos and is considered a "brownfield" but the rest of the area is undeveloped and is therefore a "greenfield" Each classification has its own benefit and liabilities when considered a conversion facility or depot site.

Greenfields are undeveloped, and the site can be designed to meet the needs of a conversion facility. However, there will be additional costs to install water and sewer lines, electricity, parking, and storm-water drainage structures. The conversion facility will need air and water permits, water rights and may also need either a waste lagoon or access to a local wastewater treatment plant if the water requires treatment. Although it is most economical to redevelop and retrofit existing facilities, greenfield sites could be used if they are in the right location and there are no feasible alternatives.

Greyfields are sites that include buildings and infrastructure from prior industrial use that might be retrofitted to meet the needs of a conversion facility. The owners of a greyfield may have retained certain permits (such as air emission permits and water rights) from prior uses which are a valuable commodity, as permits will most likely be required for any new conversion or chipping facility. While the benefits of a greyfield allow for existing infrastructure and permits, the down side includes demolition costs and new construction costs, provided the existing buildings do not meet the needs of the project. There is also the potential of soil or groundwater contamination that would require remediation.

Brownfields may have existing buildings and infrastructure, but they also have existing or perceived soil or groundwater contamination that either has been remediated, is in the process of being remediated, or will be remediated. The U.S. government offers grants for the redevelopment of brownfields that can help reduce the costs of new construction and may help revitalize communities that were impacted by the closure of prior industries on the land.

2.2.1.2 Libby Region Physical Capital

LIBBY CONVERSION SITE: KOOTENAI BUSINESS PARK

The Kootenai Business Park is the 175 acre closed Stimson lumber and plywood facility located in Libby, MT. The property is currently owned by the Lincoln County Port Authority and it is a double super-fund site for asbestos contamination and groundwater contamination. The cleanup is underway. There is not much existing infrastructure left on the site due to a fire in 2010 that burned the buildings to the ground; however, multiple rail lines run through the property.

Figure 2.2.2. Kootenai Business Park

Bonners Ferry, ID:

A potential depot site location in Bonners Ferry, ID is the former Louisiana Pacific mill site. The site is a 60 acre greyfield adjacent to the Kootenai River. Historically the mill used the river to transport logs that were floated from upstream. The site is located on Highway 95/2, and two rail lines run through the property. Electricity, water, and sewer are available on site. The property contains one industrial building, a large concrete pad where another building was located, and an office building. The site is zoned for industrial commercial use. The strength of this site is that it is on the BNSF rail line and therefore transportation to the Libby, MT conversion site would be cost-effective. This site also has a large amount of available land to store excess biomass.

Figure 2.2.3. Bonners Ferry

Fodge Pulp, Inc:

Fodge Pulp, Inc. is currently a production chip mill located near Bonners Ferry, Idaho. The site has Burlington Northern rail access, which is currently used by its chip mill operation. Current site operations include small, electrical horizontal grinders that receive excess mill waste from the Louisiana Pacific (L-P) mill in Moyie Springs, Idaho. Fodge Pulp, Inc. takes this excess biomass, regrinds it, and screen-sorts the material into eight different beauty-bark or landscaping products. The Fodge site has substantial electric service that currently runs their electric grinders. The site is 43 acres in size, with additional undeveloped land to the east. This easterly adjoining land is not owned by Fodge Pulp, Inc. but does represent potential room for expansion if needed.

This proposed site would be ideal for a solids depot. It has industrial electric service and low utility rates. In addition, the site already receives biomass via railroad, an important transportation asset.

Figure 2.2.4. Fodge Pulp, Inc.

Priest River, ID:

The Priest River location is a 50 acre closed mill site located within 600 yards from a rail line, the Pend Oreille River and State Highway 2. The land between the site and transportation connections is undeveloped and could be purchased for use. The site offers electricity, water and sewer. The property contains an office building and concrete pads where another building previously existed. The site is zoned for industrial commercial use. Upon further investigation, this site is not the best for a depot site in Priest River because accessing rail would be difficult. Other potential sites in Priest River need to researched.

Figure 2.2.5. Priest River

Athol, ID:

The Athol location is a 60 acre closed mill site on US Highway 95. The site is adjacent to a rail line; has electricity, water, and sewer; and it is less than 6 miles from Lake Pend Oreille. The property contains one industrial-sized building and one office building. The site is zoned for industrial commercial use.

Figure 2.2.6. Athol

Fortine, MT:

The Fortine location is a 110 acre closed mill site located on US highway 93. The property value is estimated at $500,000. The site has utilities including electricity, sewer, and water. There is a main office, shop and warehouse on the site, all of which were built between 1975-1980. The land is zoned for industrial commercial use.

There is ample land available for biomass storage. A rail line exists approximately 600 yards from the site.

Figure 2.2.7. Fortine

Noxon, MT:

The Noxon location is a 12 acre specialty beam and custom timber operating mill site. The land is a greyfield and is zoned for industrial commercial us. it is located on US highway 200 near the Cabinet George Reservoir. While small, the property has room to expand outward. The land is valued at $300,000 by the county assessor. As a working mill, the property has utilities and existing infrastructure.

An expensive aspect of this site is that a rail hook up would have to be built, and the land around the small mill would have to be developed in order to accommodate a depot site.

Figure 2.2.8. Noxon

Thompson Falls, MT:

The Thompson Falls location is a 116 acre closed mill site located on Highway 200. The property contains no structures and has an estimated value of $1.5 million. It is situated on the Clark Fork River and across the highway from a rail line. The property has electricity, water, and sewer. The site is zoned for industrial commercial use.

Figure 2.2.9. Thompson Falls

2.2.1.3 Missoula Region Physical Capital

MISSOULA CONVERSION SITE: FRENCHTOWN, MT

The abandoned Frenchtown pulp mill is 3,200 acres. It has been closed since January 2010. In May 2011, the land was bought by Green Investments. The site has some contamination and could be a possible super-fund site. There are wastewater ponds on site with a maximum capacity of 5.7 million gallons. This site has the potential to be an excellent conversion site because of its central location near Missoula and transportation options. Frenchtown is at the junction of interstate 90, 93 and US Highway 200. There are also rail spur lines leading to the facility.

Figure 2.2.10. Frenchtown

Pablo Mill | Plum Creek, MT:

The Plum Creek depot site option is located in Pablo, MT. Before it closed in 2009, the site was owned by Plum Creek Timber Co. and operated as a saw mill. Much of the infrastructure exists on the site including 12 buildings and complete utilities. While no chipping facility is listed in the description, there is a planer building which could be retrofitted to include a chipper. The site can be accessed directly by rail and also by road via highway 93; it is approximately 65 miles north of the proposed conversion site in Frenchtown MT. The property is 92.03 acres and is valued at $750,000 which includes the buildings.

Figure 2.2.11. Pablo

Deer Lodge, MT:

The Anaconda Smelter is a Super-fund site encompassing 300 sq miles. The Deer Lodge location is near biomass resources and has close proximity to Missoula MT. Sun Mountain Lumber is an active mill and could function as a potential depot site.

Figure 2.2.12. Deer Lodge

Darby, MT:

There is an 8 acre undeveloped lot off the corner of Highway 93 and Bunkhouse Rd. that could potentially serve as a depot site.

Figure 2.2.13. Darby

Princeton, ID:

Bennett Lumber Products in Princeton, ID operates a mill on over 60,000 company owned acres. 212,590 BDT of forest residual biomass is available within an hour and a half travel distance. A second 22 acre mill site is adjacent and is no longer in use. Several large industrial buildings are located on site. The property is situated between Highway 6 and the BNSF railroad line. A small creek is on the property. The travel distance to a potential conversion site in Frenchtown, MT is 223 miles: a one-way cost at $29.43/BDT and a round trip cost at $55.92/BDT.

Figure 2.2.14. Princeton

Kamiah, ID:

Three Rivers timber mill is 114 acres and is currently operational in Kamiah, ID. The property is near US 2 and Highway 64 and is along the Clearwater River. Two rail spurs go through the property. There is space around the operating mill to establish a depot site. There is approximately 58,278 BDT of biomass available within an hour and a half travel distance. This site is 150 miles to the proposed conversion site in Frenchtown, MT with an estimated one-way cost at $21.58/ BDT and a round trip cost at $41.01/BDT. It is also 648 rail miles to Frenchtown, MT at an estimated cost of $59.09/BDT.

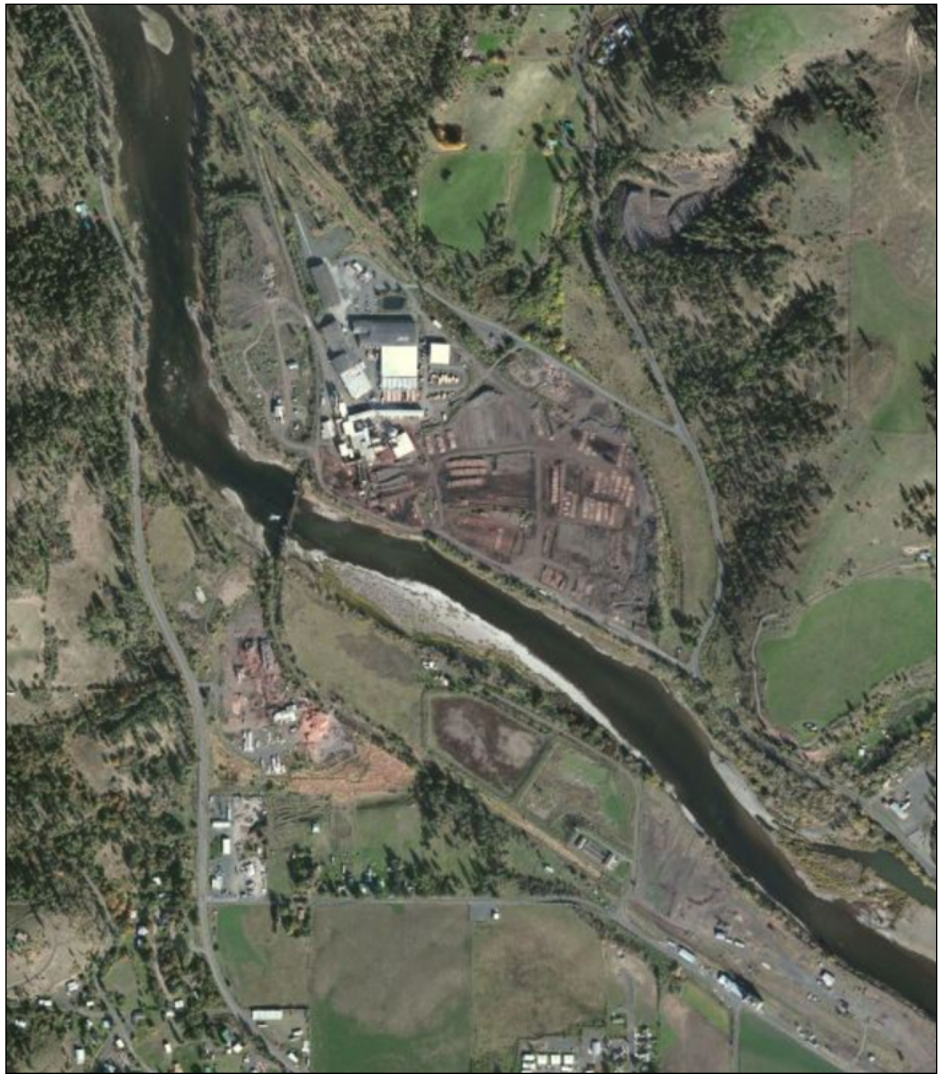

Figure 2.2.15. Kamiah

Bonner, MT:

The abandoned Bonner Mill covers 168 acres and is located six miles east of Missoula. The mill was formerly owned by Stimson Lumber and was the largest continuous running lumber mill in the United States. Since the closure of the mill, the town of Bonner has struggled with unemployment. The property contains five rail spurs plus air and water discharge permits. One of the greatest assets of this site is the 305,500 ft 2 planar building with three 10 ton double way cranes running the 800 foot length of the building. The property is a brownfield site with potential environmental concerns where hydraulic fluid has leaked into the ground adjacent to the Blackfoot River. A portion of the site is currently being rented to a chipping operation that supplies a pulp mill in Washington. The rental rate for the land is $3.50/ ft2/ yr. This property would be a good location for a potential chipping and production site.

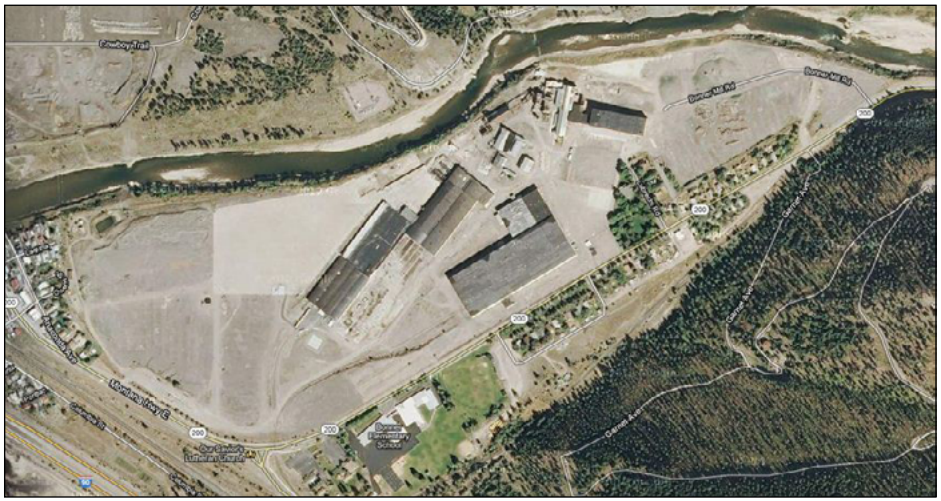

Figure 2.2.16. Bonner

2.2.1.4 Flathead Region Physical Capital

FLATHEAD CONVERSION SITE: OLNEY | AMERICAN TIMBER

This proposed conversion site in Olney housed the American Timber sawmill, which closed in 2000. Glacier Gold, LLC currently uses the site for a fertilizer operation. The fertilizer operation uses only a portion of the property. The site has working electricity, water, and sewer. The site is adjacent to Stillwater Lake. There are also two NPDES permits associated with it the site, but information on whether they are current or not was not found. There are several warehouse structures on site. The site is on US Highway 93, and there is a rail line going past the property.

Figure 2.2.17. Olney

F.H. Stoltze:

The F.H. Stoltze Land and Lumber site is an 80 acre sawmill located in Columbia Falls, MT. It produces dimensional lumber as well as specialty lumber such as log cabin siding. The property is adjacent to the BNSF Half Moon rail line and has a spur line that runs through the site. While the F.H. Stoltze mill may not have room on their current site for a conversion facility, there is land adjacent to the property that would be ideal for expansion.

Figure 2.2.18. F.H. Stoltze

Columbia Falls, MT:

The Columbia Falls location contains 140 acres and is located on State Highway 2. It currently is being used by Johnson Brothers as a chipping site. The county assessor places the estimated value at $3.3 million. There is rail access on the site. The property is located across from the Flathead River. Utilities include electricity, water, and sewer. Property infrastructure built between 1960 and 1980 includes storage tanks, office buildings, garages, and industrial buildings. The land is zoned for industrial commercial use.

Figure 2.2.19. Columbia Falls Johnson

Dupuis Lumber and Hunts Timber:

Two other potential mills in Montana are Dupuis Lumber in Polson and Hunts Timber in St. Ignatius. Both are roughly halfway between Missoula and Kalispell, and either could serve as a depot and chipping facility and draw biomass from the large area of land between Missoula and Kalispell. Dupuis Lumber is a small firm that produces 300,000 board feet of lumber and approximately 480 tons of wood waste per year. The mill does not have rail access and occupies only five acres, but it appears to border undeveloped property, so there could be potential for expansion. Hunt's Timber is a small firm with 15 employees.

Figure 2.2.20. Dupuis Lumber

Figure 2.2.21. Hunts Timber

Stillwater Mill:

The Stillwater Mill is located in Kalispell, MT. The site is currently used as a quarry. The site is 12 acres with an additional 16 acres of connected land leased from BNSF. The leased parcel is not currently in use. There are multiple buildings on the site including a small office building, a warehouse and a truck scale. Utilities are installed, access is available to a rail line, and the site is located directly on State Highway 2.

Figure 2.2.22. Stillwater

Specialty Beams and Custom Timber:

Specialty Beams and Custom Timber is an operational mill located 158 miles southwest of a potential conversion site in Olney. They specialize in custom structural timber as well as custom mill-work and siding. The mill is located on MT 200 highway and does not have any rail access. This site is 12 acres with potential green field sites surrounding the mill.

Figure 2.2.23. Specialty Beams and Custom Timber

Plum Creek Pablo Mill:

This site is described in Section 2.2.1.3 as part of the “Missoula Region” depot sites, but may also be included as a potential site for the Flathead region.

The site is located south of Flathead Lake, putting it in Lake County and a couple of hours driving time from the proposed conversion facility site in Olney, MT.

Figure 2.2.24. Pablo

Plum Creek Fortine Mill:

The Plum Creek Timber Co. site in Fortine, MT is no longer operational. The site has five buildings plus water and power access, and is located 22 miles from our proposed conversion site in Olney. The site can be accessed by highway 93, and there is a rail yard located approximately one mile away. The site is split into two parcels, one being 221 acres in a donut shape around the other 10 acre plot. The larger parcel is listed at a value of $465,420 and the smaller parcel is listed at $164,786.

Figure 2.2.25. Fortine

Wallace, ID:

The depot site in Wallace, ID is the only greenfield site listed in this report. The site is available for $325,000 and consists of 370 acres of forestland.

There are many disadvantages of choosing a greenfield site, most notably the cost of development. We included this site in our analysis because its use would allow access to biomass in Northern Idaho.

Figure 2.2.26. Wallace

2.2.1.5 Mines

The Troy Mine is a closed mine site of more than 600 acres, previously used to deliver silver ore. It opened in 1979 and closed in the 1990's. The site is 15 miles south of Troy, Montana, along Highway 56 near Bull Lake. The nearest rail access is in the city of Troy. The land is worth $1.7 million according to the county assessor and is a brownfield site. There are two mill-water supply wells and three domestic wells with potable water. Oil pipelines may still exist on site, but no buildings or cement pads remain.

Figure 2.2.27. Troy Mine

2.2.2 TRANSPORTATION

2.2.2.1 Transportation Introduction

Transportation infrastructure involves roads, railways, and airports/heliports. Traditional logging operations use trucks to transport harvested logs or woods chips from the mountain to a saw mill or a chip mill. To transport forest residuals, this approach is only cost effective within a short travel distance.

Montana has an extensive railroad network that may be utilized to transport materials over longer distances. Several old or abandoned railroad lines could potentially be used to transport woody biomass if they were reopened or rehabilitated.

2.2.2.2 Roads

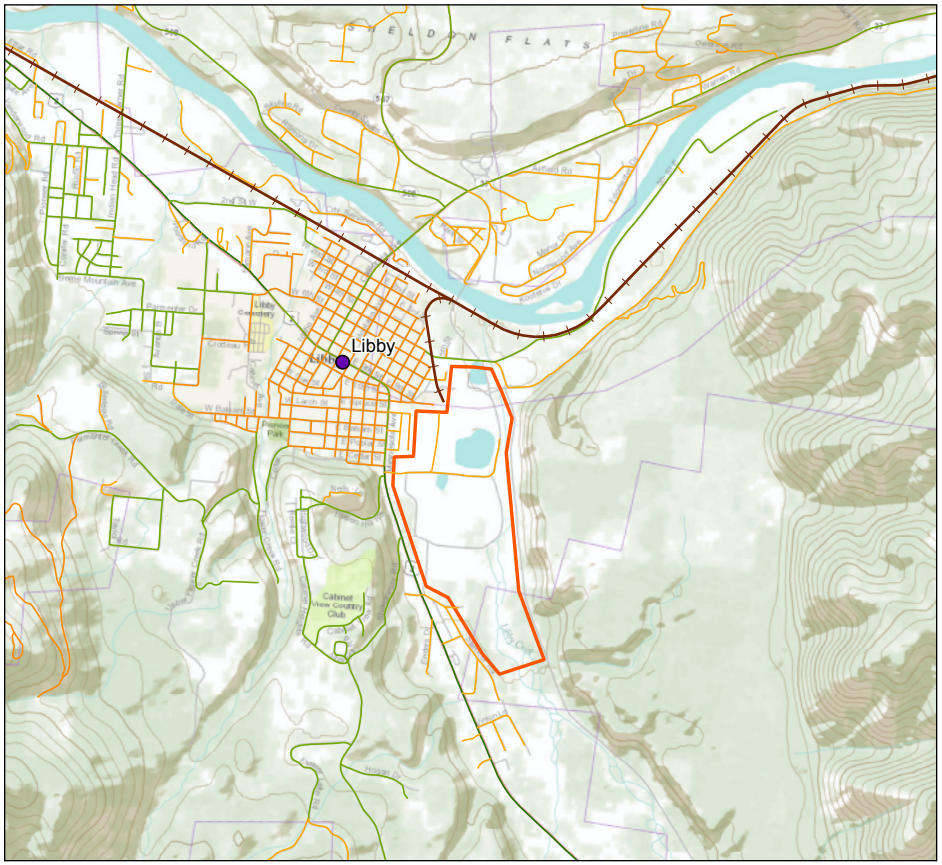

Figure 2.2.28. Roads - Lincoln County, MT - Conversion Sites

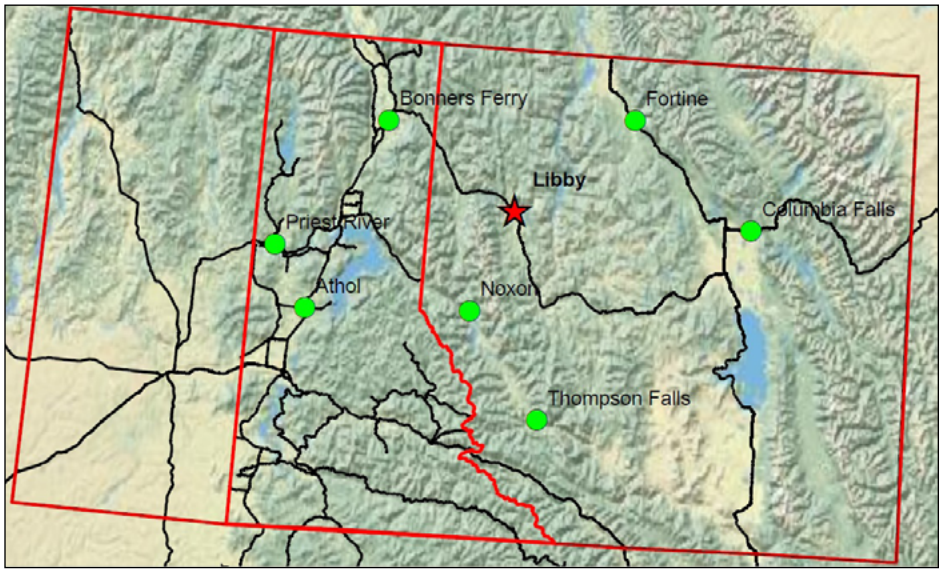

Figure 2.2.29. Roads - Lincoln County, MT

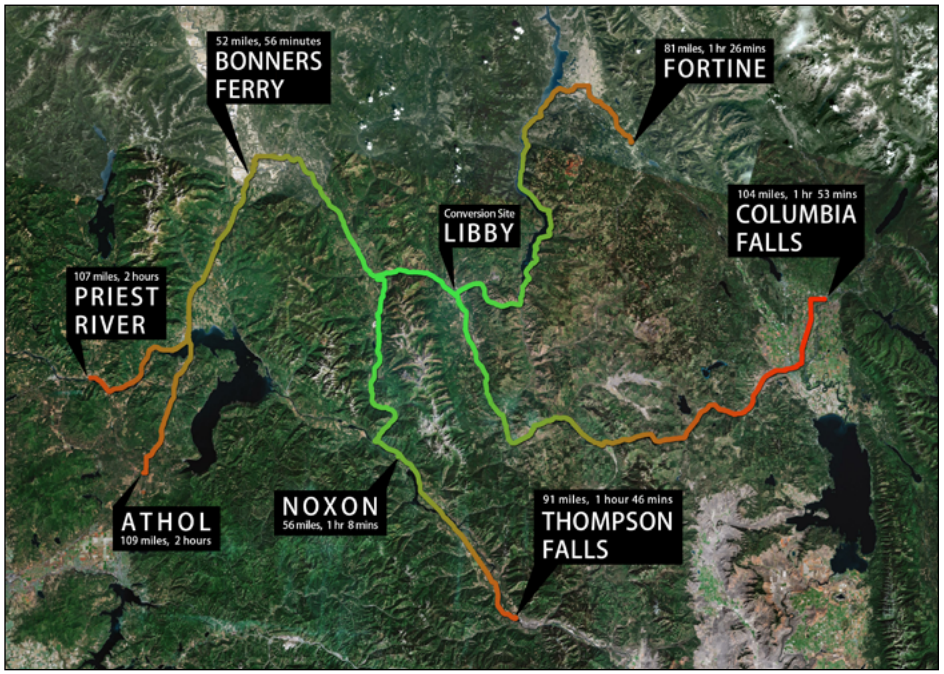

Figure 2.2.30. Roads - Lincoln County, MT - Drive Time

2.2.2.3 Rail

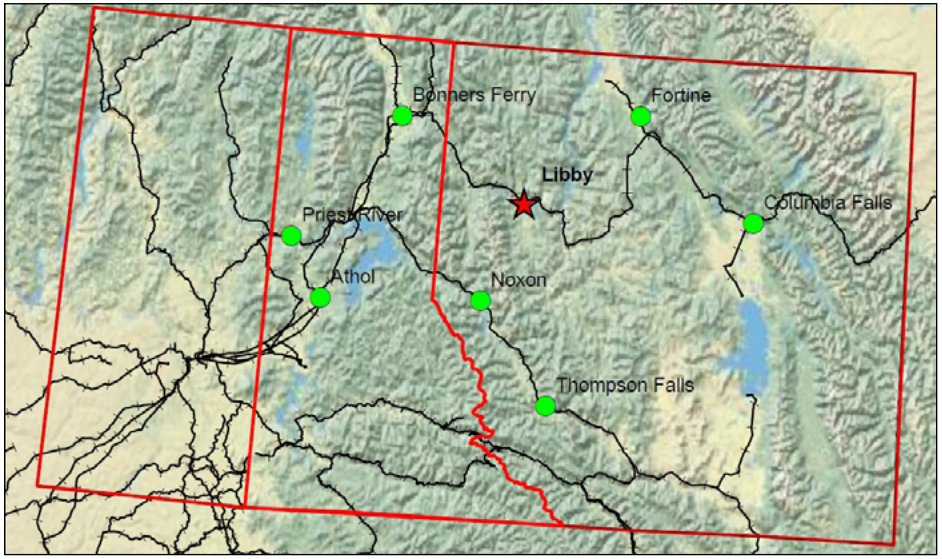

Figure 2.2.31. Rail - Lincoln County, MT

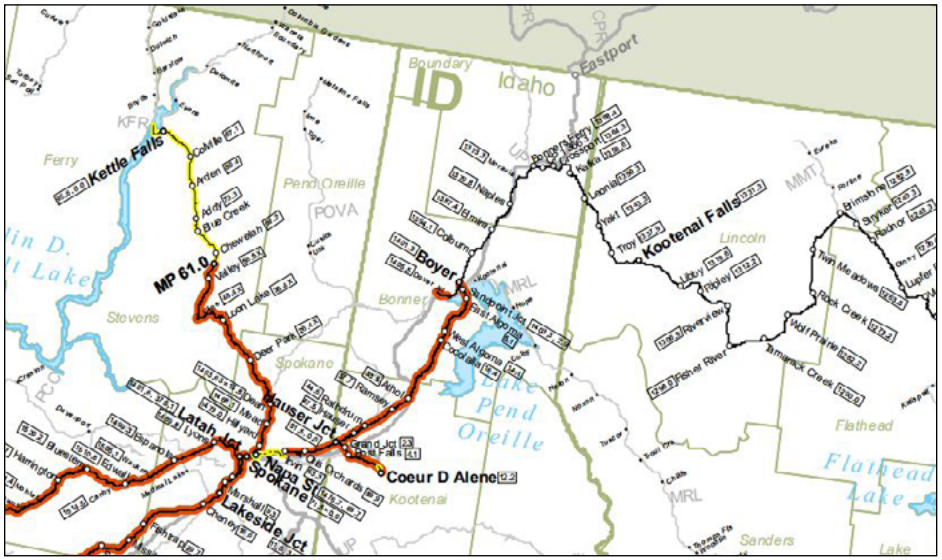

Figure 2.2.32 Rail. - Lincoln County, MT to Washington State

2.3.0 ECONOMIC CAPITAL

2.3.0.1 Overview

Economic indicators are important to evaluating the Western Montana Corridor regional potential for woody biomass extraction, conversion and use. These indicators include economic demographic data, current timber and woody biomass firms and processes, and private and public frameworks that affect or enable biofuel business development. By gathering this information, we can accurately assess the economic viability of biomass utilization.

Figure 2.3.1.

2.3.1 REGIONAL ECONOMY

2.3.1.1 Timber Employment and Productivity

INTRODUCTION

Montana's economy can be described by three main characteristics: it is physically isolated from most of the United States' major markets; it has a small and dispersed population; and the region has a greater dependence on natural resources than most other regions in the United States. About one quarter of the state of Montana is covered in forests (The Economy 2012).

The 2013 outlook for Idaho's forest products industry is that it will continue improving as it did in 2012. In the U.S., housing is up 25% from 2011 and about 40% from 2009. These increases in housing will increase the demand for lumber and other wood products. Surveys done by the University of Montana show that many of the major wood products manufacturers in Idaho were doing better financially in 2012 than in 2011. One survey shows that sales and production increased by 58% in 2012 and profits increased by about 56% (Morgan et al 2013).

Lumber production in Idaho is a major component of the wood products industry and provides raw materials for pulp and paper mills. It increased by 5% in 2012 to about 1.42 billion board feet. In 2012, employment increased by 4.2% from 2010. The jobs created were private foresters and loggers, primary and secondary wood and paper product manufacturers, and forestry supported activities. The 2012 harvest is estimated to be 1.1 billion board feet with an increase of 2% from 2011 and 29% from 2010 (Morgan et al 2013).

The economic downturn in the Idaho forest industry from 2007-2011 was the worst since World War II. The 2012 levels are still below the 2006 production, sales, and employment levels; however, production increases are projected to continue in the coming years. The survey aforementioned, shows that wood products executives predict modest increases in operating conditions, employment, sales, etc (Morgan et al 2013).

Montana's timber industry relies heavily on external economic factors. If the state, country, or world experiences an economic downturn, it is difficult for the forest products industry to thrive. (Widespread Economic Growth 2012).

The forest products industry in Montana began in the 1840s with the opening of the first sawmill in Stevensville. With the mining industry beginning to boom in the region, railroads were built throughout the state. This provided national access to lumber companies and the opportunity for them to expand. After World War II, Montana's timber harvest industry continued to expand and quadrupled from 1945 to 1969. The industry began to diversify between 1950 and 1970 with plywood, pulp and paper mills using wood residues from the existing sawmills and plywood plants (Spoelma 2004).

In 1969, the forest products industry employed 10,546 workers earning in total $381 million. In 1978, these numbers peaked with 13,494 workers earning well over $611 million (McIver 2012).

In 1980, things began to decline for Montana's timber industry with the onset of the recession. Even though there appeared to be a boom in wood products consumption in the United States, low prices were detrimental to the success of the industry in Montana (Spoelma 2004).

The 1990s were tough times for the timber industry in Montana as well. With litigation, threatened and endangered species, constrained federal budgets, and the expectation of a future recession, harvest fell by more than 70%. The 1990's saw a shift in the industry base in Montana from extractive industry to retail trade and service-sector jobs (The Economy 2012).

In 2000, Montana had a civilian labor force of about 480,000 people with an unemployment rate of 4.9%. From 2001 to 2006, the timber industry continued to experience decreases in employment. Forest industry employment went from 10,937 in 2001 to 10,340 in 2006, a decrease of 5% in five years. Labor income decreased from 2001 to 2004, but then increased in 2006. Between 2000 and 2006, several of Montana's large mills closed which caused a dramatic economic loss in the state. These decreases in both employment and labor income can be mainly attributed to the closure of various mills in Montana over that time period (Spoelma 2004).

In 2004, Montana harvested about 785 million board feet (mmbf). Of that harvest, 77% was from private lands; Douglas Fir was the leading species, making up 38% of the harvest. The timber harvest was heavily concentrated in the western part of the state, particularly in Flathead County (20% of the harvest), Lincoln County (15% of the harvest), and Missoula County (14% of the harvest). These three counties have the most biomass assets in the WMC. 2004 is an important

year because it was the first time since 1988 that Montana shipped more timber out of the state than it imported. Most forest products facilities are located in the western part of the state. Sawmills are the largest sector of the forest products industry in terms of sales, employment, and timber use. In 2004, the industry capacity in Montana for processing saw timber was at 70% utilization (Spoelma 2004).

There have been steady declines in employment in the timber industry since 2010, and recent research suggests that increased emplyment will not happen soon. Lumber production, however, increased by about 11% during the beginning of 2010, which is an increase of 20% compared to 2009. In 2010, 256 mbf of lumber was manufactured in the Montana area, whereas in 2009, it was only 212 mbf (Mciver 2012).

The logging community in the Bitterroot Valley has been severely hit by the recession and economic downturn from 2006-2010. This employment reduction can be attributed to a reduction in timber availability as well as changes in housing trends in the United States (Erikson 2010).

Presently, Montana is one of the top producers in softwood log production, which is mainly processed into lumber at sawmills in the state. However, recent decreases can be seen in plywood production, Christmas tree industry, and lumber production (The Economy).

Table 2.3.1. Employment in Timber, 2010 | Source: http://headwaterseconomics.org/tools/epshdt

Employment in Timber, 2010

	County Region	U.S.
Total Private Employment	534,361	111,970,095
Timber	6,667	796,810
Growing & Harvesting	1,759	64,011
Forestry & Logging	1,239	53,525
Support Activities for Forestry	520	10,486
Sawmills & Paper Mills	3,397	255,152
Sawmills & Wood Preservation	1,969	78,563
Pulp, Paper, & Paperboard Mills	345	111,635
Veneer, Plywood, & Engineered Wood	1,083	64,954
Wood Products Manufacturing	1,511	477,647
Other Wood Product Mfg.	1,208	206,771
Converted Paper Product Mfg.	283	253,464
Gum & Wood Chemical Mfg.	0	2,412
Wood Cabinet Mfg.	16	1,489
Wood Office Furniture Mfg.	4	13,511
Non-Timber	527,694	111,173,285

Percent of Total

Timber	1.2%	0.7%
Growing & Harvesting	0.3%	0.1%
Forestry & Logging	0.2%	0.0%
Support Activities for Forestry	0.1%	0.0%
Sawmills & Paper Mills	0.6%	0.2%
Sawmills & Wood Preservation	0.4%	0.1%
Pulp, Paper, & Paperboard Mills	0.1%	0.1%
Veneer, Plywood, & Engineered Wood	0.2%	0.1%
Wood Products Manufacturing	0.3%	0.4%
Other Wood Product Mfg.	0.2%	0.2%
Converted Paper Product Mfg.	0.1%	0.2%
Gum & Wood Chemical Mfg.	0.0%	0.0%
Wood Cabinet Mfg.	0.0%	0.0%
Wood Office Furniture Mfg.	0.0%	0.0%
Non-Timber	98.8%	99.3%

ANALYSIS OF TIMBER EMPLOYMENT IN THE WMC REGION

Timber employment in the WMC region is mainly supplied by growing and harvesting operations, sawmills and paper mills, and wood products manufacturing. Employment in timber operations for 2010 in the WMC region was 1.25% compared to 0.71% for the entire United States (Figure 2.3.2). Since 2004 there has been a steady decline in timber industry employment due to a decline in demand for paper and forest products. Many mills and other timber related facilities have closed costing communities jobs and leaving industrial facilities vacant (Headwaters Economics 2012).

One of the top five private employers in Broadwater County is RY Timber with 100-249 employees. For Mineral County, Tricon Timber is in the top five private employers with 20 to 49 employees. In Powell County, Sun Mountain Lumber has two operations. Sun Mountain Lumber is a top 10 private employer with 100 to 249 employees. Sun Mountain's logging operations are also in the top 10 private employers with 20 to 49 employees (Headwaters Economics 2012).

Table 2.3.1 shows the total employment in timber for 2010 in the WMC region. Sawmills and paper mills provide 0.6% of the total employment. Next, wood products manufacturing encompasses 0.3%. Non-timber is 98.8% of the total employment in the WMC region. In the United States, 0.71% of the total private employment is timber (Headwaters Economics 2012).

The percent of total private employment in timber operations has been in a decline since 2004 (see Figure 2.3.3). There is, however, a potential for increased employment in the timber industry through biomass utilization (Headwaters Economics 2012).

The current unemployment rate for 2012 in the WMC region is 6.5%. Within the WMC region, the number of unemployed people is 50,216. The labor force within the WMC region contains 772,801 people with 722,585 currently employed. Lincoln, Shoshone, Pend Oreille, and Sanders counties have unemployment rates above 10% (Headwaters Economics 2012).

There is a significant difference in the direction of timber and non-timber industry jobs in the WMC (see Figure 2.3.4). From 1998 to 2010, timber employment shrank from 13,128 to 6,667 jobs, a 49.2 percent decrease. From 1998 to 2010, non-timber employment grew from 445,210 to 527,694 jobs, a 18.5 percent increase. From 1998 to 2010, timber employment shrank by 6461 jobs (Figure 2.3.5). From 1998 to 2010, non-timber employment grew by 82,484 jobs. Jobs in the timber industry decreased by 6,461 as of 2010 (Headwaters Economics 2012).

From 1998 to 2010, jobs in timber growing and harvesting operations shrank from 3,279 to 1,759 jobs, a 46.4% decrease; sawmill and paper mill job num-

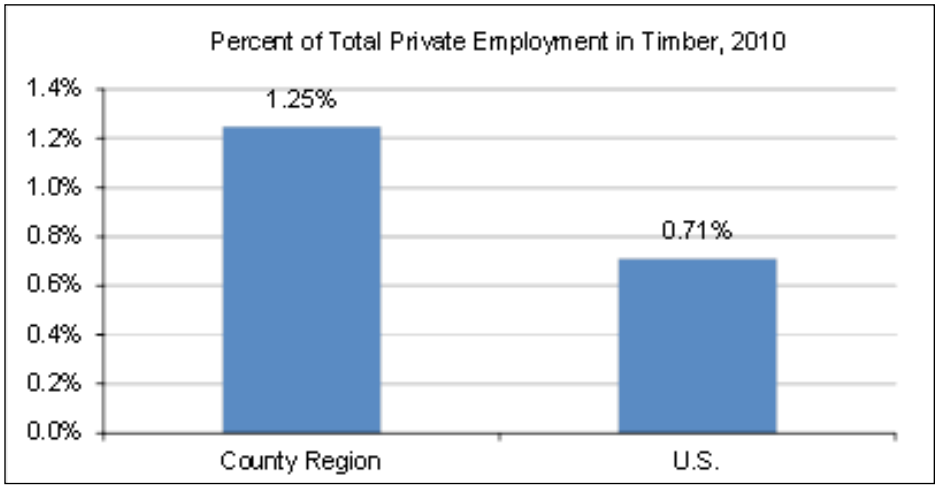

Figure 2.3.2. Percent of Total Private Employment in Timber, 2010
Source: http://headwaterseconomics.org/

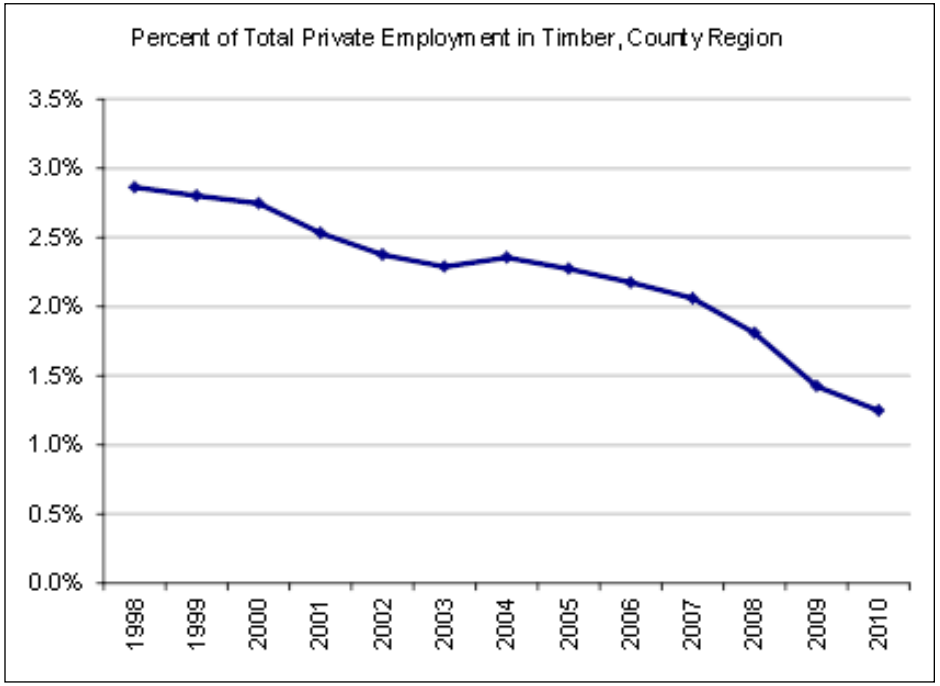

Figure 2.3.3. Source: http://headwaterseconomics.org/

bers shrank from 7,420 to 3,397 jobs, a 54.2% decrease; and wood products manufacturing job numbers shrank from 2,429 to 1,511 jobs, a 37.8% decrease (Figure 2.3.6). These industries have all seen job decreases, especially sawmill and paper mills. Because timber and wood products require mechanization, are subject to increased transportation costs, volatile prices, competition from abroad, shifting public values related to the management of public lands, and restructuring, jobs and employee income data for these industries is volatile. (Headwaters Economics 2012).

One problem with accurately reporting changes in employment is that when the economy is booming, the forest products industry provides employees with bonuses or raises instead of hiring additional workers. When the economy is in a downturn, pay gets cut and work weeks shorten instead of laying off workers. This can cause discrepancies when analyzing trends in employment and income data based on the state of the economy (Headwaters Economics 2012).

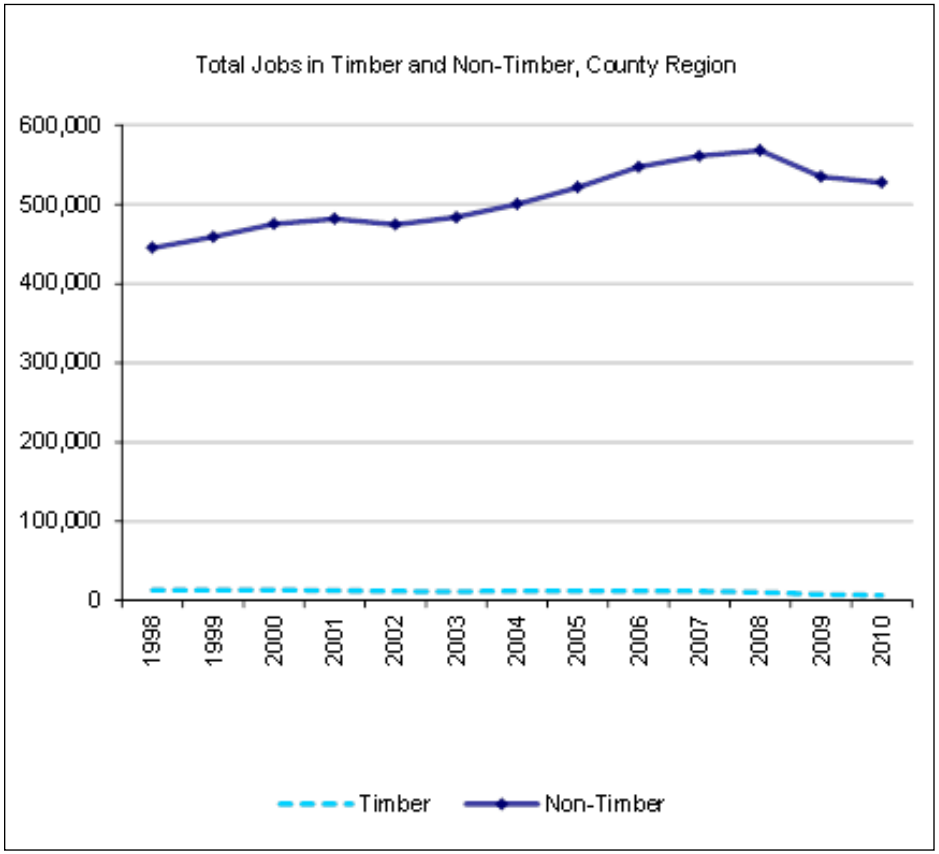

Figure 2.3.4 Source: http://headwaterseconomics.org/

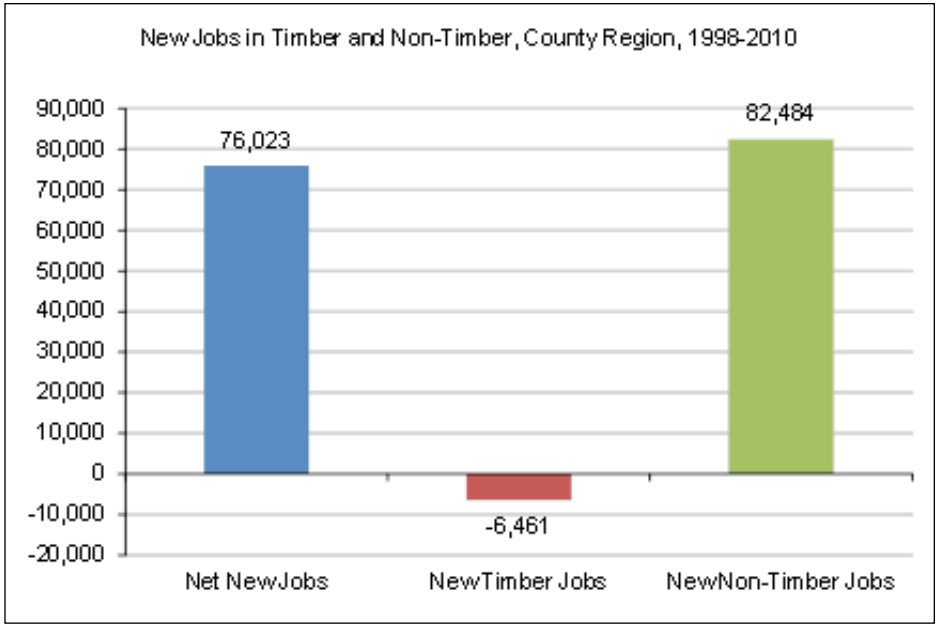

Figure 2.3.5 Source: http://headwaterseconomics.org/

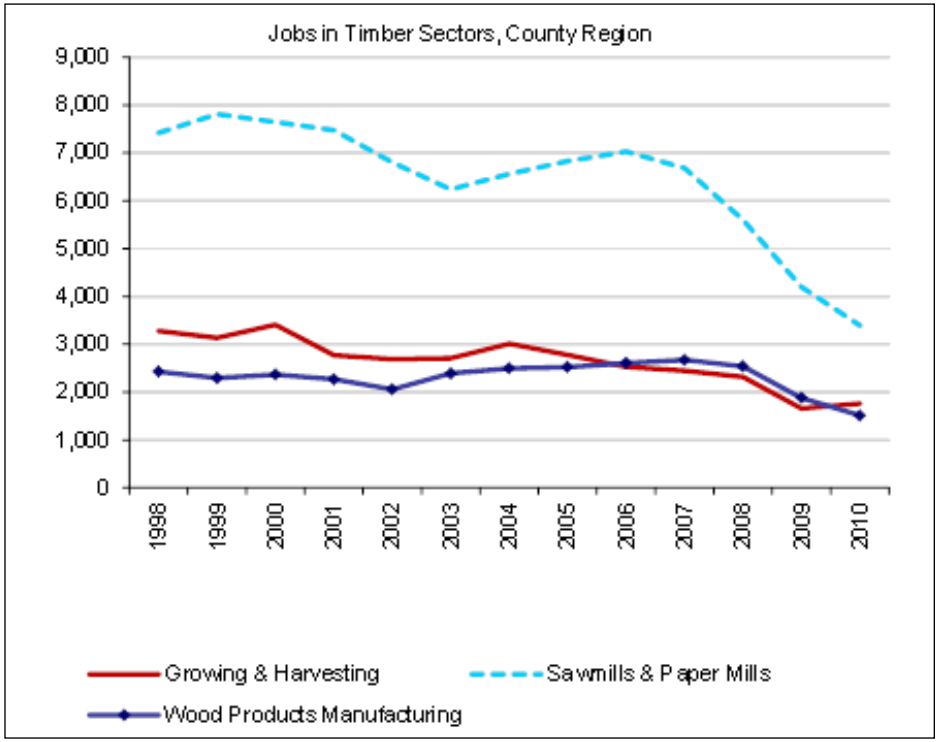

Figure 2.3.6. Source: http://headwaterseconomics.org/

LABOR INCOME

The forest products industry provides extensively to the economic base for the following nine western Montana counties: Flathead, Granite, Lake, Lincoln, Mineral, Missoula, Powell, Ravalli, and Sanders. In southeastern Montana, Broadwater, Cascade, Gallatin, Jefferson, Lewis & Clark, Madison, Park, and Yellowstone counties generate nearly $1 million in labor income from the forest products industry. (McIver 2009).

NATIONAL FOREST TIMBER SALES AND TIMBER CUTS, 1980-2010

Headwaters Economics reports that in 2010, the Kootenai National Forest produced 28,558 (mbf) in cut volume with a cut value of $1,683,536 (see Figure 2.3.7); Flathead National Forest produced 44,255 (mbf) in cut volume with a cut value of $1,453,736; Lolo National Forest produced 23,555 (mbf) in cut volume with a cut value of $197,696; and Beaverhead - Deer Lodge National Forest produced 24,963 (mbf) in cut volume with a cut value of $416,201 (Headwaters Economics 2012).

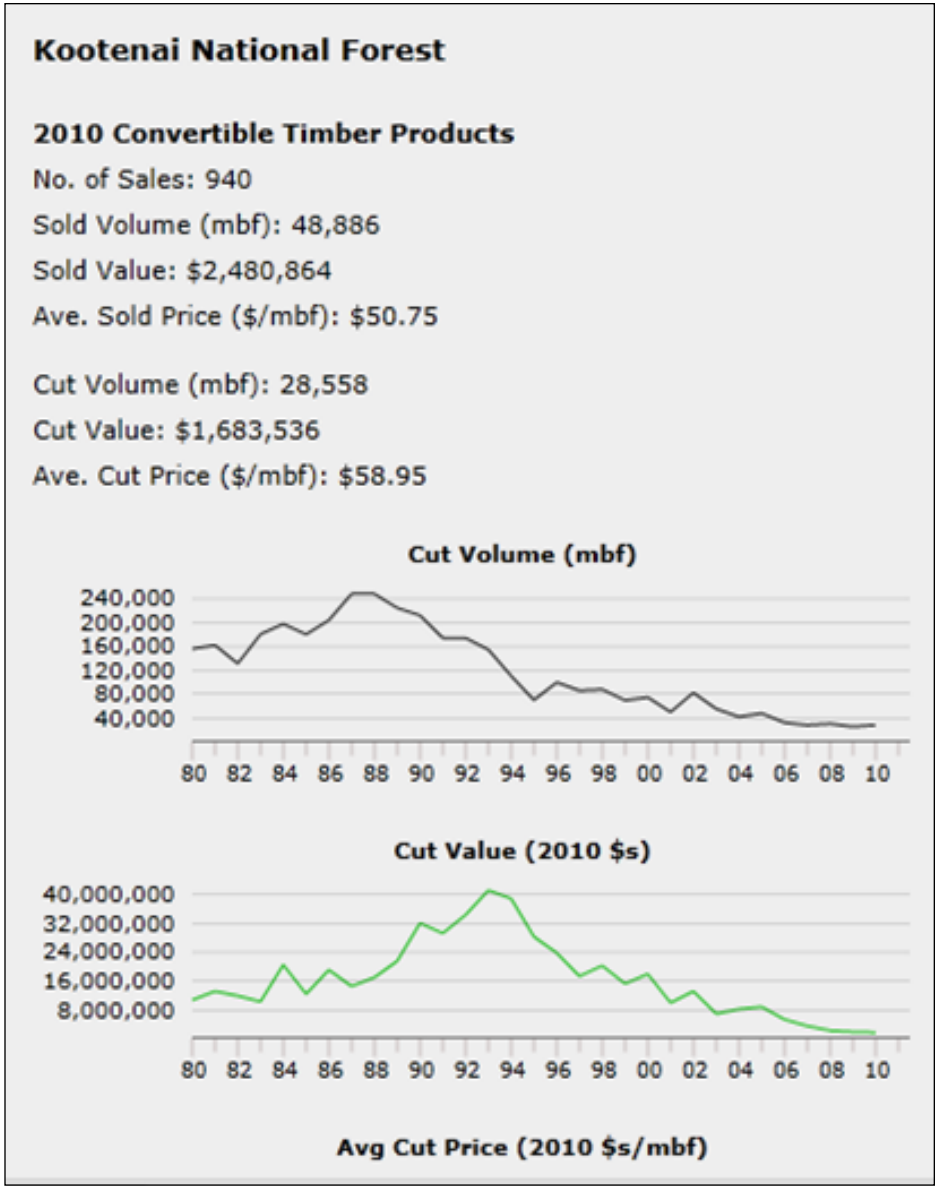

Figure 2.3.7. Source: http://headwaterseconomics.org

SMURFIT-STONE FRENCHTOWN MILL CLOSURE

Four hundred people lost their jobs initially when the Smurfit-Stone Frenchtown mill closed in 2009. Every sector of the local economy was hit by this closure including mills, haulers, loggers, truckers and landowners. Smurfit-Stone was the second largest taxpayer in Missoula County. These closure-impacts extend way beyond Missoula, and communities will continue to feel the effects for years to come (Saboe 2010)

“A lot of those folks have wound up finding work in Colorado [and] Wyoming. Some went to oil fields temporarily, parked their equipment, and others are busy,” he added. “[They’ve] been more busy than they have been historically, so you have a wide range of impacts with a great deal of uncertainty looking to the future.” Gordy Sanders (Saboe 2010).

An article from January 2010 suggests that Smurfit-Stone could become a biorefinery. There is great value in the property and the local workforce (Saboe 2010).

It is estimated that over 2,000 jobs have been lost since 2009 due to the closure of the Smurfit-Stone Frenchtown mill. The positive side of the mill closure is that it opens an opportunity to process forest residuals as woody biomass along with existing co-generation operations and other biomass usage (Saboe 2010).

The Green Investment Group, Inc. (GIGI) bought the Smurfit-Stone property for $20 million and is in the process of evaluating the environmental clean-up necessary to redevelop the property. The site has been renamed the Frenchtown Industrial Regional Park. The site contains pulp and paper facilities, a large wood yard to chip and process about one million green tons of wood per year, and a highly skilled and trained work force in the region. They have access to both railroad and truck infrastructure, water rights for up to about 25 million gallons per day, recycling facilities, power generating boilers, and steam turbines (Projects Frenchtown Industrial Regional Park 2012; Rafferty 2011)

This expansive site is also in close proximity to major markets in Montana. Furthermore, this site is about 100 miles from the state capital of Helena, near the University of Missoula Research Center, and there are three operating sawmills within 150 miles. One other major asset of this property is that there are existing tax credits in place to financially support biofuels and other biomass products. GIGI is preparing stage one of the site reconfiguration and plans to invest $5 million in this first phase. Overall, they plan to invest about $40 million into the reconfiguration process (Projects Frenchtown Industrial Regional Park 2012).

Figure 2.3.8. (Sabo, 2010)

2.3.2 REGIONAL DEVELOPMENT ASSISTANCE

Within the WMC region, there are many organizations and programs that provide economic development assistance at both macro and micro levels. Often, businesses can qualify for monetary support through grants and loans. Many of these organizations offer support for new companies or those requiring revitalization efforts. The following is an overview of some of these opportunities.

2.3.2.1 Economic Development Agencies

CERTIFIED REGIONAL DEVELOPMENT CORPORATION REGIONS

The CRDC was created in 2003 by the Montana Legislature to foster a regional approach towards economic development. CRDCs focus at the local level, identifying the needs of the community and helping develop a strategic plan for successful local economies. The following are other services commonly provided by a CRDC:

- Responsible for development strategies collaborated by business leaders, elected officials and stakeholders.
- Required to have support from each county, including local development organizations.
- Financing and business technical assistance.
- Leverage resources from both the private and public sectors.
- Manage items such as Revolving Loan Funds.

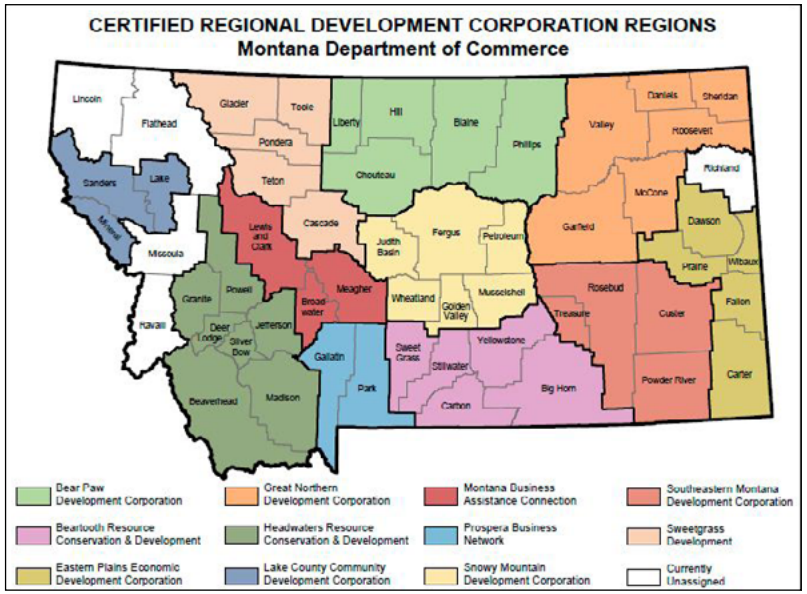

Figure 2.3.9. Certified Regional Development Corporation Regions
Source: http://businessresources.mt.gov/content/CRDC/docs/crdcmap.pdf

"A CRDC program applicant must be a private, nonprofit corporation that applies for certification as a CRDC through a competitive state Request for Proposal (RFP) process" (Montana Department of Commerce 2012, 1) (Figure 2.3.9).

MONTANA SMALL BUSINESS DEVELOPMENT CENTER (SBDC)

Established in 1989, the SBDC was established as part of a nationwide network to help small businesses in Montana become successful. It is "funded by the U.S. Small Business Administration, the Montana Department of Commerce, and local economic development organizations" (Montana Small Business Development Center 2012,1) (Figure 2.3.10).

Services offered by the SBDC for business starting up, existing or expanding are:

- Financial Analysis
- Business Planning
- Marketing Assistance
- Training & Workshops
- Entrepreneurial Development
- Loan Packaging Assistance

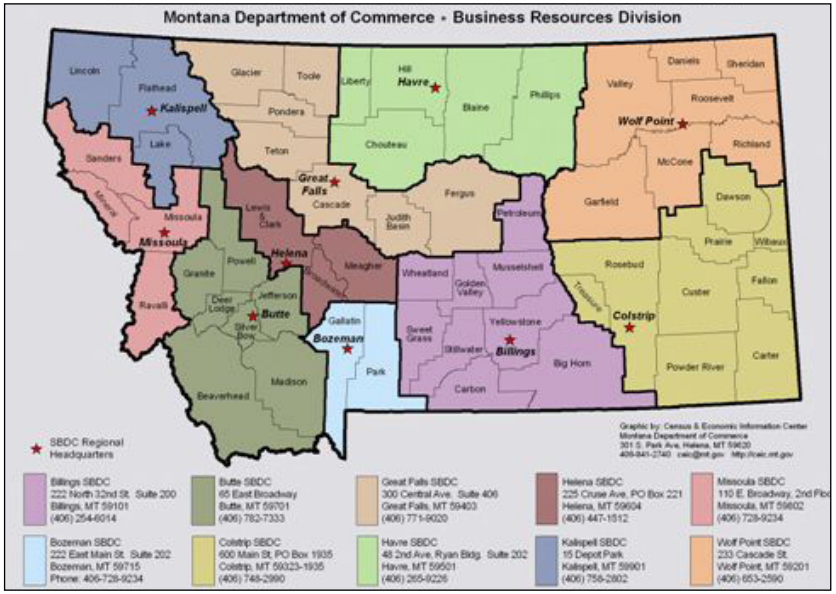

Figure 2.3.10. Montana Small Business Development Centers
Source: http://sbdc.mt.gov/content/9249,0,0.jpg

2.3.2.2 Grants and Loans

WOODY BIOMASS UTILIZATION GRANTS

A primary source of grant funding for the development of a woody biomass market is the Montana Department of Natural Resources and Conservation who offers wood product and biomass utilization grants with the purpose of increasing the use of forest products, creating jobs, and stimulating the economy as well as improving forest conditions and reducing pollution that is a direct result of open slash pile burning.

Entities that are eligible for biomass utilization grants include for-profit and non-profit organizations, public facilities and school districts, as well as state, local and tribal governments. These eligible organizations are invited by the Montana DNRC to apply for biomass utilization grants when engaging in activities such as market feasibility assessments, the development of manufacturing processes, and for the purchase of equipment to be used in the manufacture and/or utilization of woody biomass products
(Montana Department of Natural Resources and Conservation 2012).

RECENT RECIPIENTS OF MONTANA DNRC BIOMASS GRANTS

Biomass Energy Pre-Feasibility Assessments Grant:
- Broadwater Health Center
- East Helena Public Schools
- Hamilton School District
- Laurel Public Schools
- Plains Public Schools

Regional Biomass Planning Grant
- F.H. Stoltze Land and Lumber
- International BioMass Group

Biomass Fuel Purchase Grant:
- Clark Fork Valley Hospital
- Mineral Community Hospital
- Treasure State Correctional Training Center

Carbon Offset
- Clark Fork Valley Hospital
- Mineral Community Hospital

(Forest Business Network 2012)

SHADEFUND PROGRAM

As part of The Conservation Fund, the ShadeFund program functions to help companies, foundations, and individuals develop green businesses nationwide. The ShadeFund program uses tax deductible contributions to lend money to qualified businesses in amounts ranging from $5,000 to $50,000 with interest rates of 4-9%. Entrepreneurs located within the United States engaged in activities such as sustainable forestry, organic farming,and biomass or energy efficiency projects are eligible for ShadeFund loans and can continue to apply for these loans as they are successfully repaid (ShadeFund 2010).

THE MONTANA DISTRESSED WOOD PRODUCTS INDUSTRY RECOVERY AND STABILIZATION (WPIRS) PROGRAM

“The Montana Distressed Wood Products Industry Recovery and Stabilization (WPIRS) Program is a federally and state-funded loan program designed to help businesses in the wood products industry retain or create jobs. The program was established in 2009 to respond to the sudden and severe economic downturn of the national economy and the lowered demand for wood products. The WPIRS program targets areas of the state where timber jobs are most threatened, particularly in counties with lumber mills and similar facilities” (Montana Department of Commerce 2012b, 1).

The Montana Department of Commerce (MDOC), Business Resources Division administers the WPIRS program which is comprised of three funding sources:
1. Economic Development Administration (EDA), U.S. Department of Commerce,
2. The Community Development Block Grant – Economic Development (CDBGED) Program, U.S. Department of Housing and Urban Development (HUD), and
3. The State of Montana General Fund (State WPIRS).

The total amount available for loans to Montana’s wood products industry was $11.3 million.

“For State and EDA WPIRS funding, the maximum funding amount is $20,000 per created or retained job. No proposal(s) for an assisted business in any calendar year may exceed $2 million in funding requests from any WPIRS program or combination of WPIRS programs” (Montana Department of Commerce 2012b,1).

STATE WPIRS

"State WPIRS (Figure 2.3.11) funding may be loaned to individuals, including private contractors related to the wood products industry, or businesses defined as small businesses pursuant to the regulations promulgated by the United States small business administration pursuant to 13 CFR 121, et seq. Loans must be made to individuals or small businesses that are part of the critical, primary wood processing infrastructure and have suffered economic hardships. State WPIRS loans may be used for: working capital, purchase or lease of land or equipment, updating infrastructure, debt service, etc. Businesses must provide at least one non-WPIRS dollar for each dollar of State WPIRS funds requested (a 1:1 leveraged ratio). State WPIRS recipients must comply with a variety of Montana Reinvestment Act (HB 645) requirements. Please see the State WPiRS Application Guidelines for more detailed information (Montana Department of Commerce 2012b,1).

EDA WPIRS

"EDA WPIRS funding may be loaned to individuals, including private contractors related to the wood products industry, and wood product businesses. EDA WPIRS loans may be used for assistance to businesses to primarily provide working capital, equipment loans, and other activities that do not include contracted labor and construction. Businesses must provide at least two non-WPIRS dollars for each dollar of EDA WPIRS funds requested (a 2:1 leveraged ratio). EDA WPIRS recipients must comply with a variety of EDA and American Recovery and Reinvestment Act (ARRA) requirements" (Montana Department of Commerce 2012b, p.1).

Legislation requires that the funds from the state-funded Wood Products RLF be used for:

- Purchase or lease of land or equipment
- Update of infrastructure, including retrofitting old infrastructure to facilitate new uses
- Working capital
- Debt service
- Matching funds for grants or other loans that comply with the intent of the Wood Products RLF funding program
- Any other use the MDOC determines would sustain and grow the wood products industry.

(Economic Affairs Interim Committee 2012, V)

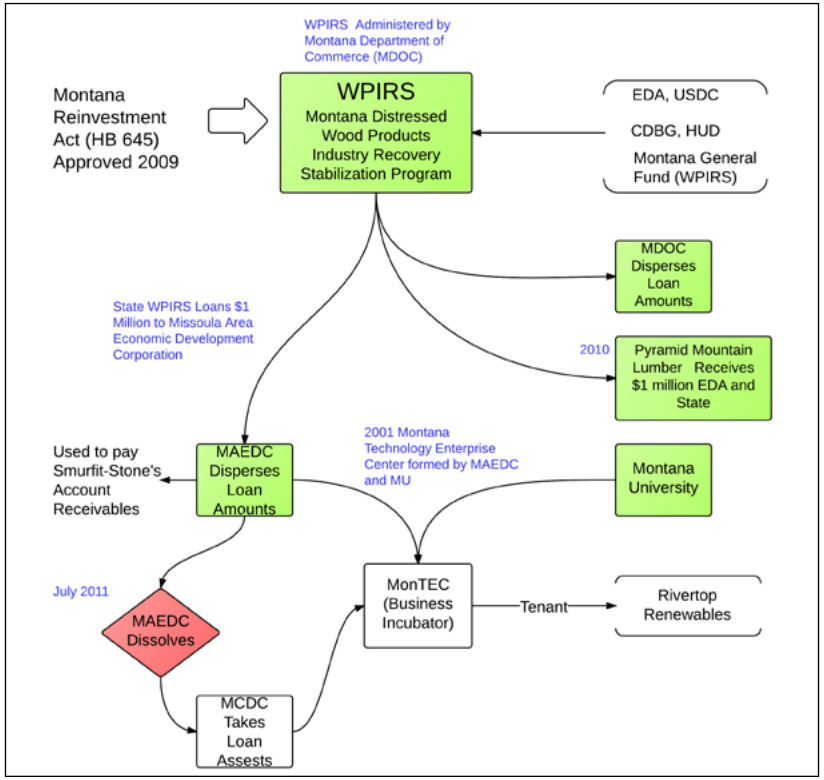

Figure 2.3.11. Source: http://recovery.mt.gov/content/Commerce/WPiRS/docs/WoodProductsRLFStatusReport

2.3.2.3 Business Incubators

Business incubators have long since established the way for industries to start up and to keep small and large towns economically alive and competitive in blocal and global economies.

WHAT IS A BUSINESS INCUBATOR?

"Business incubators nurture the development of entrepreneurial companies by helping them survive and grow during the startup period when they are most vulnerable. These programs provide their client companies with business support services and resources tailored to young firms. The most common goals of incubation programs are creating jobs in a community, enhancing a community's entrepreneurial climate, retaining businesses in a community, building or accelerating growth in a local industry, and diversifying local economies." (National Business Incubation Association 2009).

WHAT ARE THE DIFFERENT TYPES OF BUSINESS INCUBATORS?

Incubation programs come in many shapes and sizes and serve a variety of communities and markets:

- Most North American business incubators (about 93 percent) are nonprofit organizations focused on economic development. About 7 percent of North American incubators are for profit entities, usually set up to obtain returns on shareholders investments
- 54 percent are "mixed-use," assisting a range of early-stage companies.
- 37 percent focus on technology businesses
- About 6 percent focus on service businesses, serve niche markets or assist other types of businesses
- 3 percent serve manufacturing firms
- About 47 percent of business incubators operate in urban areas, 28 percent operate in rural areas and about 25 percent operate in suburban areas

(National Business Incubation Association 2009).

RESEARCH PARK VS. BUSINESS INCUBATOR

- Property-based ventures
- Promote community economic development and technology transfer
- Larger-scale projects than business incubators, often spanning many acres or miles
- House everything from corporate, government, and university labs to big and small companies
- Do not offer comprehensive programs of business assistance
- Business incubator component focused on early-stage companies

(National Business Incubation Association 2009)

SBDC VS. BUSINESS INCUBATORS

- Provide general business assistance to current and prospective small business owners.
- Often serve small businesses at any stage of development.
- Business incubators partner and share management with SBDCs to avoid duplication (National Business Incubation Association 2009)

Certain grant programs can act as a business incubator by the services they provide along with the grants they award. Perhaps the best description is a business incubator provides tailored business support, versus the more generalized support offered by other organizations or programs.

Figure 2.3.11 is an example of just one program that has aided in creating a quasi-business incubator.

2.3.3 COST OF DOING BUSINESS

This section looks at the cost of doing business in the WMC region, focusing specifically on utility rates, property tax rates, and corporate income tax rates.

2.3.3.1 Utility Rates

NorthWestern Energy provides over 90 percent of Montana's electricity, mostly in western Montana (NorthWestern). Avista Corporation serves electric and natural gas customers in eastern Washington and northern Idaho (Avista). In 2011, the average price of electricity for industrial use in Montana was $0.051/kWh, Idaho $0.046/kWh and Washington $0.041/kWh (Marketplace). The low cost of electricity is almost exclusively based on the source of power generation, namely hydroelectric power and power from natural gas. These two forms of electricity generation are currently the two cheapest methods of electricity production (US EIA 2012).

2.3.3.2 Montana Property Tax Rates

Property tax bills for the state of Montana are calculated using property values and millage rates that correlate with the level of services provided to that property within its local taxing jurisdiction. Millage rates, often discussed as mills, vary from one taxing jurisdiction to the next and are a direct result of the taxing jurisdiction's tax base and budgeting decisions (Figure 2.3.12). An individual taxpayer's property tax bill is calculated using the following formula: (Taxable Value x Mills)/ 1,000. As a result of this, each mill levied by local taxing jurisdictions will generate $1.00 of revenue for each $1000 of taxable property value within the jurisdiction (Montana Department of Revenue 2012).

Local taxing jurisdictions levy mills to generate the revenue needed to provide goods and services within the jurisdiction. Entities that levy mills against property to generate revenue include but are not limited to schools, cities and towns, counties, fire districts and other miscellaneous districts, as well as the state government. The total mill levy for a taxing jurisdiction is a sum of the mills levied by each of these entities within that jurisdiction (Montana Department of Revenue 2012).

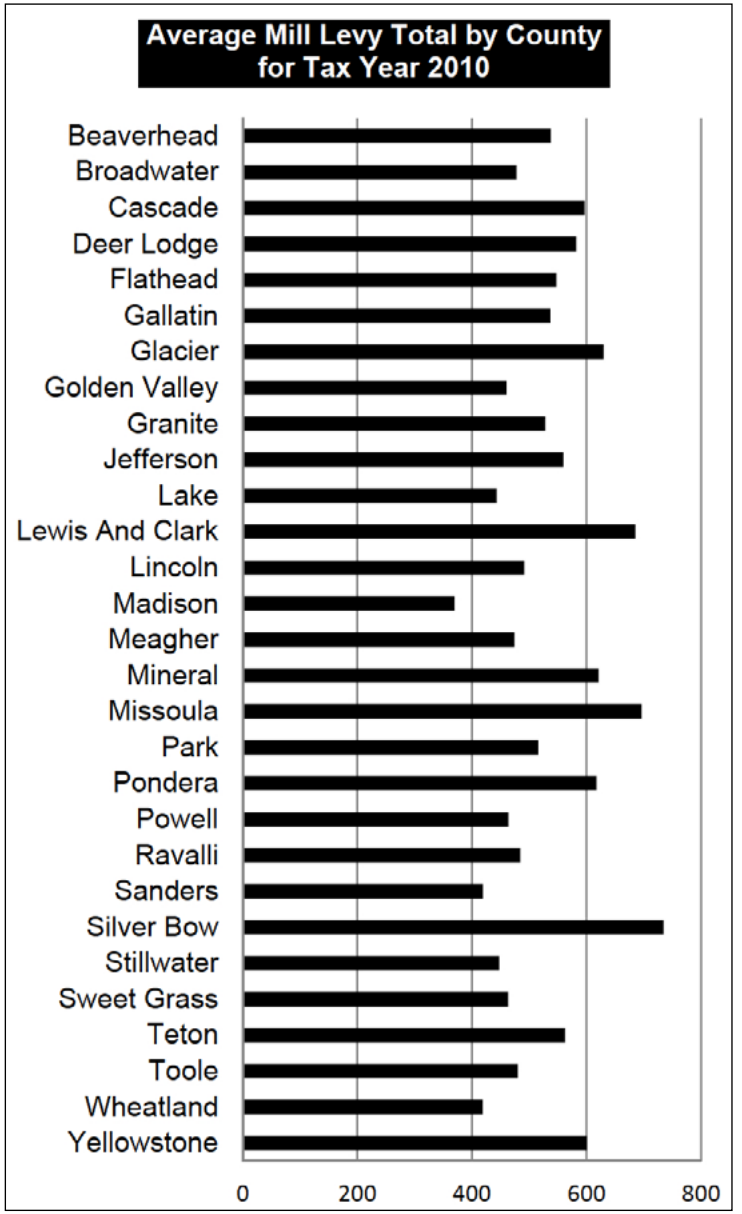

Figure 2.3.12. Average Total Mill Levy by County for Tax Year 2010

2.3.3.3 Classes of Property

Montana has sixteen different classes of property that are used to determine the taxable value of properties within the state. Each class of property has its own tax rate, expressed as a percentage that is used in taxable value calculations. Market value of the property, assessed by the Department of Revenue, is multiplied by the applicable tax rate to determine the taxable value of that property. The following classes of property may be applicable to current and future forest product or woody biomass related industries:

- Class 4
  This is the largest class in the state and includes land improvements of residential, commercial, and industrial property. Commercial properties are allowed a homestead exemption of 17.5% which allows the taxable value of the property to be based on 82.5% of the actual market value of the property. The tax rate for property within this class is 2.82%.
- Class 5
  This includes pollution control equipment, real and personal property of research and development firms, and real and personal property used in the production of gasohol. The tax rate for this class is 3.0%.
- Class 6
  This includes non-centrally assessed utilities and has a tax rate of 8.0%
- Class 8
  This includes personal property used in business such as construction vehicles, machinery, and tools. The tax rate for this class is 3.0%
- Class 9
  Including the property of pipelines, this property is centrally assessed if crossing county lines; however, the taxable value within local jurisdictions is determined by the portion of property that is located in that jurisdiction. The tax rate for this class is 12%.
- Class 10
  This includes forest land; however, the property value is determined by the productivity of the parcel. Standing timber found on the property is not used to assess property value. The tax rate for this class is .33% of the productive value of the land.
- Class 14
  This includes property associated with the production of renewable energy such as commercial wind generation, biodiesel production, biomass gasification, coal gasification, ethanol production and geothermal energy property. The tax rate for this class is 3.0%
- Class 15
  This includes pipelines having a 90% capacity to carry fuels produced by coal gasification, biodiesel, biogas, and pipelines that connect fuel production facilities that fall into Class 14 to an existing pipeline. The tax rate for this class is 3%.

(Montana Department of Revenue 2012)

2.3.3.4 Corporate Income Tax Rates

For having the privilege of operating within the state, C corporations located and licensed within Montana are subject to a corporate license tax. This franchise tax is levied at a rate of 6.75% on net income earned within the state. Organizations that are exempt from the license tax are corporations dedicated to religious, charitable, scientific, or educational purposes. Research and Development organizations engaged in business for the first time in the state are also exempt from the corporate license tax for the first five years that they are in operation (Montana Department of Revenue 2012). Montana's corporate income tax collections for tax years 2004-2010 can be seen in Figure 2.3.13. For a look at Montana's 2010 corporate income tax rate as it compares to other states within the region see Table 2.3.2. Idaho has a slightly higher corporate income tax rate of 7.6% while Washington has no corporate income tax. However, Washington does have a Business and Occupation tax that is levied against gross receipts generated through business activities. The B&O tax rate varies dependent upon business classification.

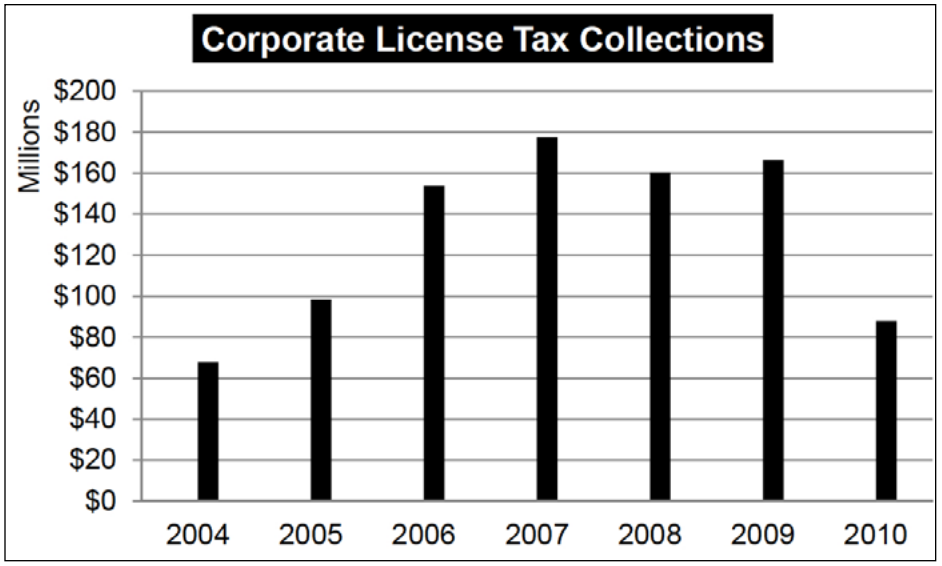

Figure 2.3.13 Montana Corporate income Tax Collections Source: http://revenue.mt.gov/content/publications/biennial_reports/2008-2010/BiennialReport-PropTax.pdf

Table 2.3.2 2010 Regional Corporate Income Tax Rates

Maximum Corporate Tax Rate Regional Ranking - Tax Year		
Rank	State	Maximum Tax Rate
1	Oregon	7.90%
2	Idaho	7.60%
3	Arizona	6.97%
4	Montana	6.75%
5	North Dakota	6.40%
6	Utah	5.00%
7	Nevada	0.00%
8	Washington	0.00%
9	Wyoming	0.00%

2.3.4 REGIONAL COMPETITIVENESS

2.3.4.1 Business Clusters

COMPARATIVE ADVANTAGE

Comparative advantage is the ability for a firm, actor or region to produce a good or service at a lower cost than other regions. The total cost of a good or service is used by summing the costs of the factors of production. Factors of production are the inputs to the production process. These factors include, but are not limited to, land, labor, capital, and technology. For example, at a sawmill, costs include the building and the equipment within the building, capital, the land the mill is built on and the land the timber is harvested on, and the workers to operate the mill. A final factor is obviously the timber that is to be sawed. These costs all contribute to the final cost of the sawmill. (Shaffer et al 2004)

Areas where these costs are lowest are in locations that have comparative advantage in the production of goods or services. One of the biggest influences in cost is the natural endowment of factor resources (Shaffer et al. 2004). Where factor resources are more productive, the natural tendency is for increased specialization based on production that relies on those factors that are relatively more productive. (Shaffer et al. 2004, 51). For example, the abundance of woody biomass in the WMC region is the most important factor in the region's comparative advantage in timber production and why the region was selected as a NARA pilot community. Of course, there are other factors that determine comparative advantage within biomass industries. Many of these are discussed in the previous sections.

BUSINESS CLUSTERS

Economic theory accurately predicts that a business will locate where there is comparative advantage in that business' product. Because of WMC's natural abundance of timber resources, it makes sense that timber-related industries would be clustered in this location . Business clusters are defined by Shaffer et al. as "a geographically bounded concentration of independent businesses that have active channels for business transactions, dialog and communications and that collectively share common opportunities and threats"(2004, 52).

There are several advantages of industry clustering. The first is increased productivity due to economies of scale. Economies of scale are achieved when, as productivity increases, cost per unit decreases. An example in the timber industry would be decreased transportation costs per unit as the amount of timber transported increases up to a point (Soirinsuo and Mäkinen 2011). Another advantage of industry clustering is, due to increased competition between firms, an increased pace of innovation. Second, business clustering drives new business development. Finally, business clusters positively influence job creation. Overall, "numerous studies show that on average, a business located in a cluster has a stronger growth and survival rate than those located outside it" (Mammone 2009).

Figure 2.3.14 shows the percent of employment in the timber industry in each county where data is available. The three sub-sectors are overlaid on the map to show business clusters. This map is useful for getting a sense of the regional development of the timber industry as a whole. It shows that Flathead, Lincoln and Ravalli counties have the highest percentage of employment in the industry and the most clustering in Lincoln, Missoula, Flathead and Ravalli counties.

Clustering in the timber industry will gives some idea of the existing infrastructure that could be utilized for biomass. In order to see the clustering within the timber industry, spatial data for three sub-sectors was collected that accounts for employment in the industry based on North American Industry Classification System (NAICS) codes. The three sub-sectors are Forestry and Logging (NAICS code 113) (Figure 2.3.15), Forestry Support Services (NAICS code 115310) (Figure 2.3.16), and Wood Products Manufacturing (NAICS code 321) (Figure 2.3.17) (North American Industry Classification System 2012).

Forestry and Logging includes firms and contractors that "grow and/[or] harvest timber on a long production cycle (i.e., of 10 years or more)." Forestry Support Activities provide services such as "estimating timber, forest firefighting, forest pest control, an consulting on wood attributes and reforestation." Wood Product Manufacturers "manufacture wood products, such as lumber, plywood, veneers, wood containers, wood flooring, wood trusses, manufactured homes (i.e., mobile homes), and prefabricated wood buildings" (North American Industry Classification System 2012).

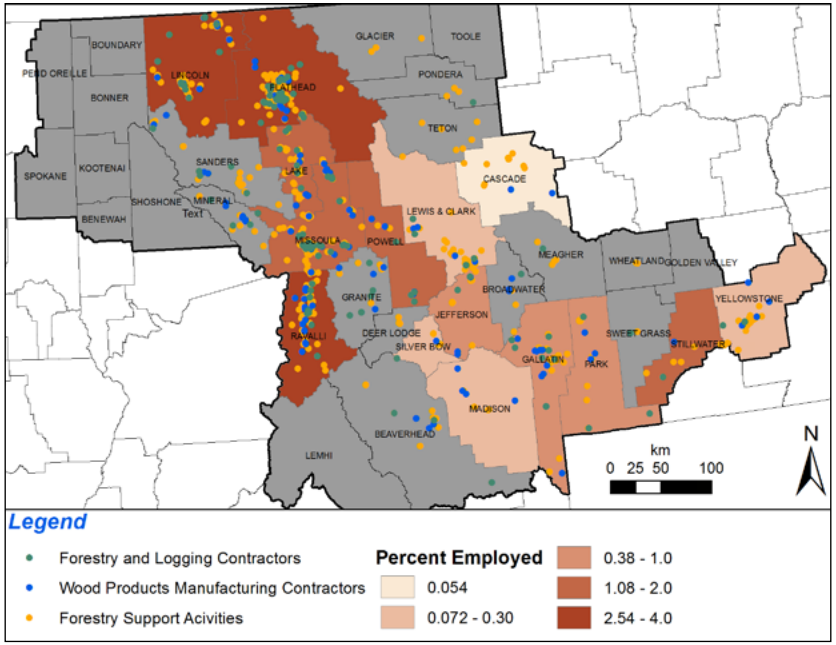

Figure 2.3.14 Percent Employed in Timber industry
Source: http://www.ourfactsyourfuture.org/cgi/databrowsing/?PAGEID=4&SUBID=273

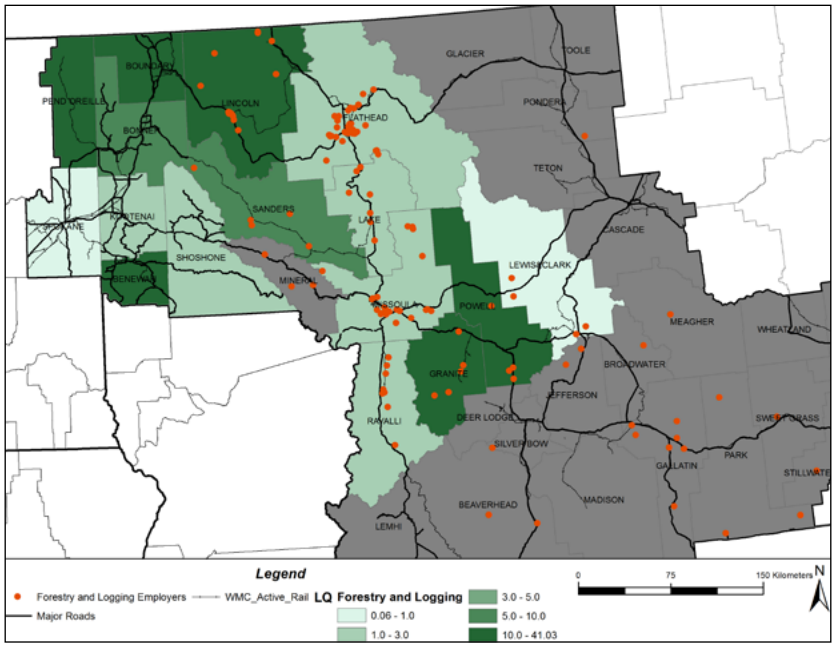

Figure 2.3.15 Location Quotients for Forestry and Logging
Source: http://data.bls.gov/location_quotient/ControllerServlet

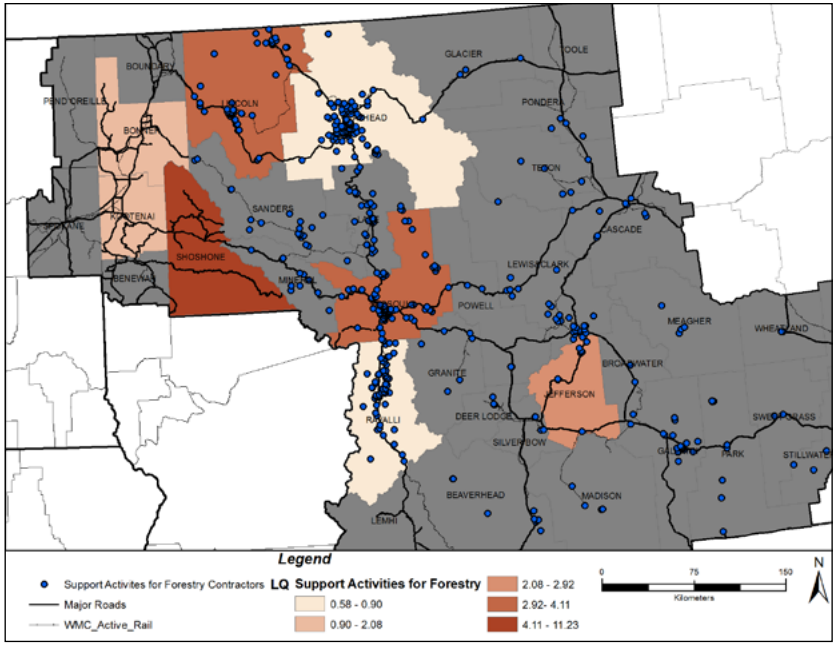

Figure 2.3.16 Location Quotients for Forestry Support Activities
Source: http://data.bls.gov/location_quotient/ControllerServlet

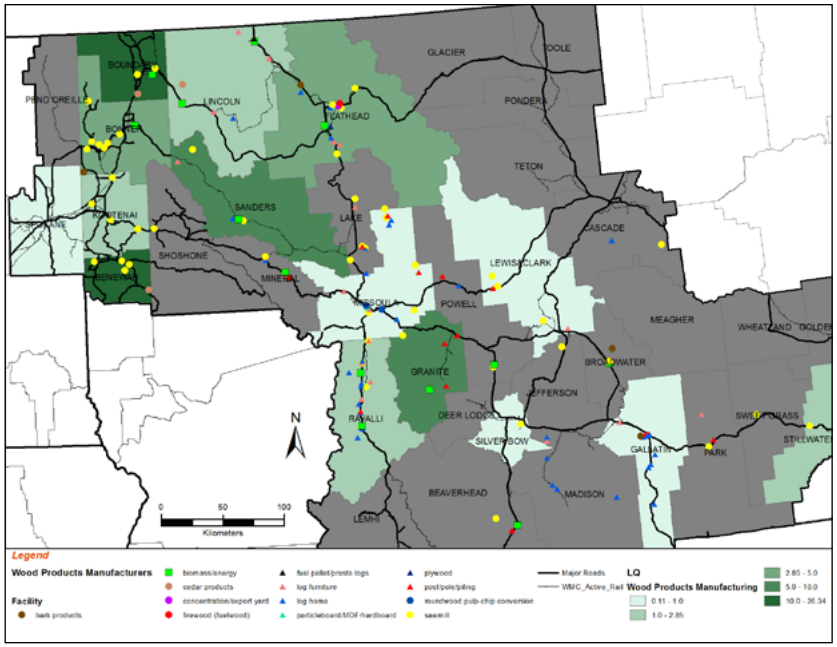

Figure 2.3.17 Location Quotients for Wood Products Manufacturing
Source: http://data.bls.gov/location_quotient/ControllerServlet

2.3.4.2 Location Quotients

WHAT ARE LOCATION QUOTIENTS?

One way to measure the comparative advantage of a certain region is by calculating a location quotient for that region. Location quotients are also useful because they can measure the degree of specialization in an industry within a given region compared to the base region. Specifically, location quotients measure the percent of employment in a given industry of specific regions against the percent of employment in that industry within the base area. The equation can be written as:

$$LQ = \frac{\varepsilon_i / \varepsilon_T}{\mathrm{E}_i / \mathrm{E}_T}$$

Figure 2.3.18 Location Quotient Equation
Source: Schaffer et al. 2004

Where ei = local employment in industry i, e = total local employment, Ei = reference area employment in industry i, and E = total reference area employment.

Therefore, if the LQ for an industry within a region is greater than one, the percent employment for that industry within the region is greater than the percent employment for that industry within the entire base area. This indicates several things. First, the demand for a good produced by that industry within the region is greater than the supply of that good produced within the region. Therefore, the region may be able to export this good. One example is a rural county in Montana that can export timber products to outside of the county because the supply of timber products produced within the county is greater than the demand for those products within the county. The second thing that an LQ of greater than one indicates is that there is a positive degree of specialization for the production of that good within the region. Third, due to the presence of specialization, we can assume that the region holds a comparative advantage for the production of that good. The opposite holds true for LQs less than one.

It is important to understand that although LQs may indicate comparative advantage, they are not a measure of productivity. There may be 100 people employed in the timber industry in a county, but if there are only 200 people employed in all industries within the county, the numerator of the LQ equation will be very high, leading to a very high LQ in the county where there are actually very few employment opportunities. LQs are helpful because harvesting and transporting biomass requires the same or at least very similar infrastructure as timber products; thus, it is useful to understand which counties within the WMC region are most suited to accommodate biomass harvest activities.

DATA COLLECTION

Location quotient data was collected from the Bureau of Labor Statistics Location Quotient Calculator for each of the 37 counties within the WMC region. For each of three industries we found industry data based on NAICS codes, Forestry and Logging (NAICS code 113), Forestry Support Services (NAICS code 115310), and Wood Products Manufacturing (NAICS code 321) (BLS 2012).

Location quotient bases were for the state of Montana and for each county in the WMC—29 in Montana, 6 in Idaho, and 2 in Washington. Shape files for the firms and contractors within each of the three industries were acquired from Chelsea Mciver at the University of Montana's Bureau of Business and Economic Research. Natalie Martinkus, a GiS specialist on the NARA project, provided the shape files for roads, trains, and counties in the WMC.

LOCATION QUOTIENT ANALYSIS

Figure 2.3.15 shows the location quotient for the Forestry and Logging sector, along with the location of Forestry and Logging firms. Lincoln, Granite and Boundary Counties have exceptionally high LQs. The firms are generally clustered in Lincoln, Flathead, and Missoula Counties. Based on the mix of LQ analysis and firm clustering patterns, Lincoln County appears to be a suitable location for forestry and logging activities. However, Missoula and Flathead counties would be optimal selections as well due to their location and population. Figure 2.3.16 shows the location quotient and firm sites for the Forestry Support Activities sector. Missoula and Lincoln counties are optimal for site location. Interestingly, Flathead and Ravalli counties, while there are many support activity firms, have an LQ that is less than one. This is possibly because of the high percentage of workers in other sub-sectors within the industry, as well as in other industries all together.

Finally, Figure 2.3.17 shows the location of all Wood Products Manufacturing firms on top of the LQ map for this sector. The different types of wood products firms were classed in order to better see the composition of firms in each region. Circular symbols represent primary manufacturing and processing facilities such as sawmills and pulping/chipping facilities. Triangular symbols represent value-added manufacturing such as log homes and post and pole facilities. Finally, biomass and bioenergy firms are indicated by a square. Based on LQ analysis and cluster observation, it appears that Flathead County is the most suitable site location. Sanders County is another possibility; however, the lack of a major road may make transportation difficult. Finally, Bonner, Boundary and Benewah Counties all provide suitable site locations on the Idaho side.

Overall, Lincoln, Flathead and Missoula counties provide excellent locations for at least one and potentially all sub-sectors of the timber industry, based on cluster observation, employment percentage and LQ analysis. Most importantly, these LQs and cluster maps provide a jumping off point for further analysis of the region's strengths and weaknesses with regards to biomass utilization.

LIMITATIONS

There were several limitations to this analysis. Perhaps the most obvious issue was acquiring data for every county within the WMC. Much of the timber employment and LQ data is classified due to the fact that in many counties there are not enough firms to aggregate employment data for certain sectors. Individual firm output is confidential, and therefore, if there are only a few firms in the count, the aggregate data must be confidential as well so as to maintain firm anonymity.

Additionally, because much of the data was provided by Chelsea McIver from the University of Montana's Bureau of Business and Economic Research, Idaho and Washington data for the Forest Support Activity and Forestry and Logging sub-sectors was absent from this analysis. This is an area in which further research should be conducted.

Perhaps the largest limitation was using the entire state of Montana as the base area. The ideal base area would have been the WMC, an area with forest resources and, more obviously, the area of study. This would have produced more relevant LQ for each county in the region. However, due to time and data limitations, we were confined to using Montana state as a base. With ample time and resources, it may be possible to acquire the data that would be necessary to create a WMC base.

Finally, further research could be done into the spatial statistics element of cluster analysis. We could then mathematically see clustering patterns and could base our decisions on more than just the visual evidence of clustering. Further research could be done to measure the extent of clustering using Moran's I or other statistical techniques. This might also prove useful for business cluster analysis discussed in the previous section.

2.3.5 RECOMMENDATIONS

The forest products industry is a substantial part of the economic base for the following nine western Montana counties: Flathead, Granite, Lake, Lincoln, Mineral, Missoula, Powell, Ravalli, and Sanders (McIver 2009). Kootenai National Forest has the highest cut volume 28,559 (mbf) and has a cut value of $1,683,536 of the National Forests in the WMC (EPSHDT 2012). Lincoln, Shoshone, Pend Oreille, and Sanders have unemployment rates above 10%. In increasing employment is a consideration, then facility placement in these counties should be considered.

The Frenchtown Mill site has high potential for a biomass conversion facility. It contains existing assets suitable for a biomass conversion facility, a strategic location and an available and skilled workforce.

Though subject to change due to possible budget increases within local taxing jurisdictions and the passing of future mill levies, Lincoln, Lake and Sanders counties have relatively low average millage rates when compared to Flathead, Missoula and Mineral counties. Consequently, the three counties with the lower average millage rates would provide more attractive property tax rates.

Grants, loans, and economic development organizations operate within the WMC and provide opportunities for both private and public funding, as well as business startup and stabilization services. New or adapting business can potentially benefit from using these services while accomodating the developing wood biomass industries.

Missoula, Lincoln, Flathead and Ravalli Counties in Montana and Bonner County in Idaho have strong clusters in the wood products sector and would be good places to recruit additional wood-based industries. These counties have a clustering of either the Forestry and Logging (NAICS code 113), Forestry Support Services (NAICS code 115310), or Wood Products Manufacturing (NAICS code 321) sectors or a combination of all three sectors.

Examining the Location Quotients (LQ) for each of these sectors across the WMC counties, we get an idea of how specialized each county is for each industry. Lincoln, Powell and Granite counties in Montana and Boundary and Benewah counties in Idaho are most specialized in the Forestry and Logging sector. Lincoln and Missoula counties in Montana and Shoshone County in Idaho are the most specialized in the Forestry Support Activities sector. Finally, Flathead, Granite and Sanders counties are the most specialized in the Wood Products Manufacturing sector. It is important to reiterate that the LQ does not indicate productivity or total employment in each sector, but rather a way to measure how specialized a county is in that sector. If a county's population is small and most are employed in the timber industry, the LQ will be much higher than a county that employs many more people in the timber industry but has an even greater overall population.

Taken together, the business clusters and LQ data indicate some potential locations for biomass utilization. Based on these indicators, Lincoln, Flathead, Missoula and Ravalli counties in Montana, and Bonner in Idaho seems best suited for biomass extraction and processing.

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2.4.0 CIVIC CAPITAL

2.4.0.1 Overview

The civic capital section looks at the WMC region's human assets including population demographics and various key educational and employment attributes associated with that population. Each county's K-12 schools were assessed, as well as the opportunities that currently exist for further education through community colleges, 4 year universities and vocational training. Employment trends and labor participation rates were gathered for each county, and these factors combined with the educational data were used to assess the readiness of the region to support a new biomass industry. In addition to the region's tangible support for the industry, this section also examines its social and cultural assets by looking at collaborations already occurring in the region. The measures of civic capital explores what the region can do for a new biomass industry and what the industry can do for the region.

2.4.1 HUMAN ASSETS

2.4.1.1 Demographics

There are a variety of population densities in the region. Figure 2.4.1 shows the total population for the WMC region. Spokane is the most densely populated county in the region, with a population in 2011 of 473,761. By comparing density totals to the Urban Rural Continuum (Figure 2.4.2) a more refined picture of the region's population is painted. The Urban Rural Continuum is defined by the Office of Management and Budget and distinguishes metropolitan (metro) counties by the population size of their metro area, and non-metropolitan counties by degree of urbanization and adjacency to a metro area" (Parker 2012).

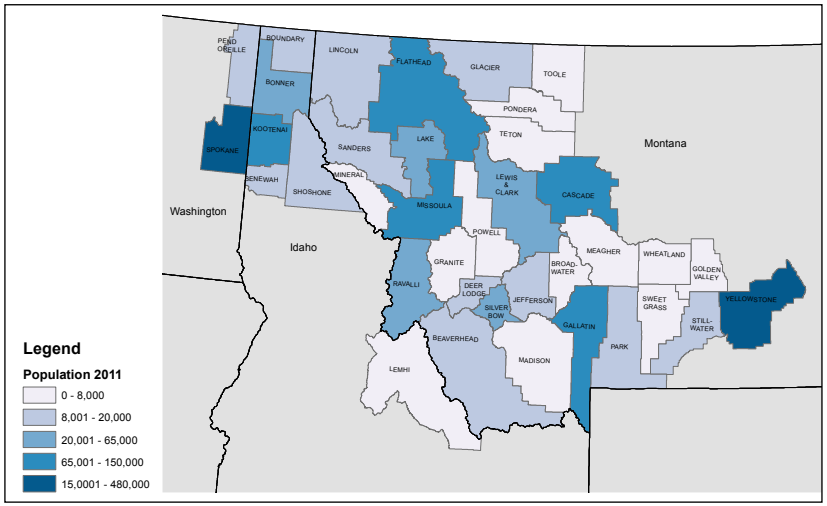

Figure 2.4.1. Western Montana Corridor Total Population, 2011

Population trends suggest whether the region is retaining its youth and if the existing population has the numbers to support a new biomass industry. Natural change (Figure 2.4.3), the difference between births and deaths, and net migration (Figure 2.4.4), the difference between how many people are moving out of an area and those moving in, point out areas in the region that have experienced a loss in population (Indicators Northwest 2011).

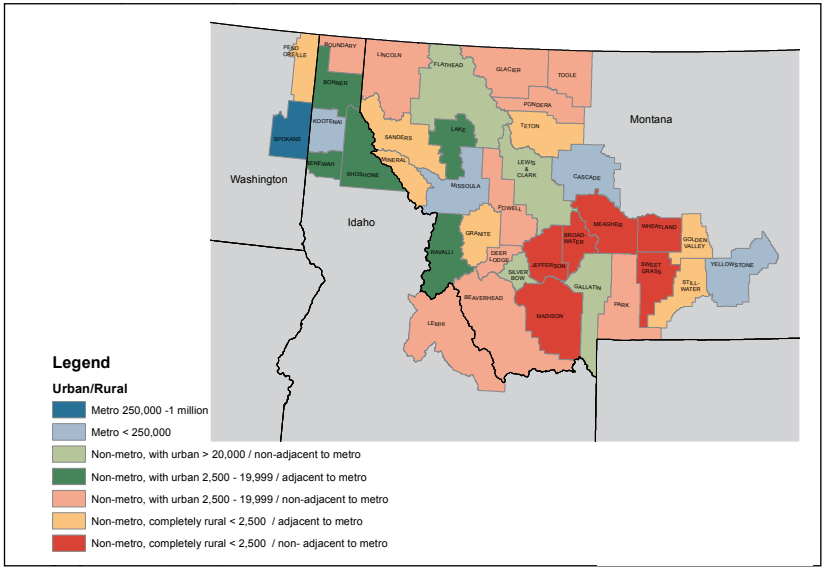

Figure 2.4.2. Western Montana Corridor Urban-Rural Continuum Code

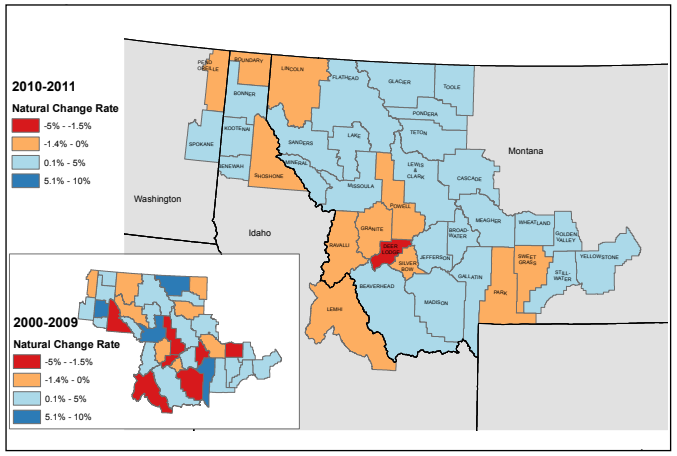

Figure 2.4.3. Western Montana Corridor Natural Change in Population

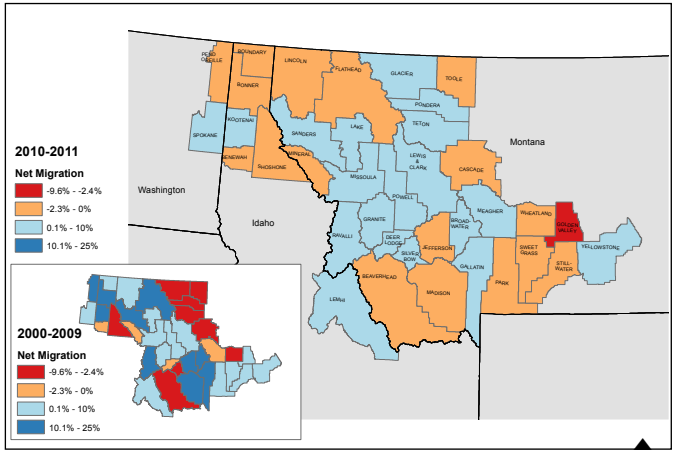

Figure 2.4.4. Western Montana Corridor Net Migration

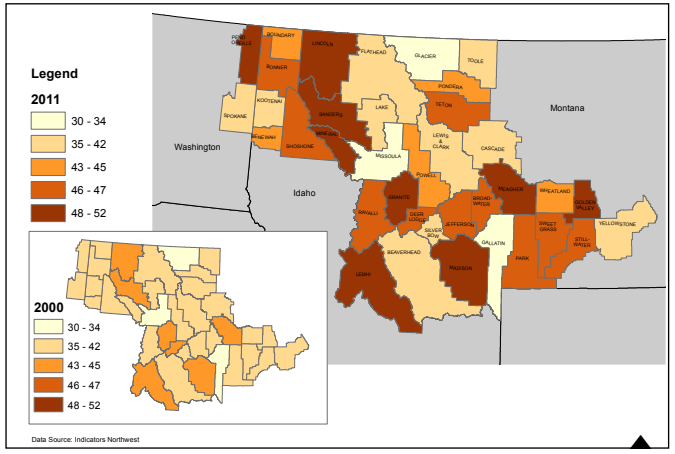

Figure 2.4.5. Western Montana Corridor Median Age

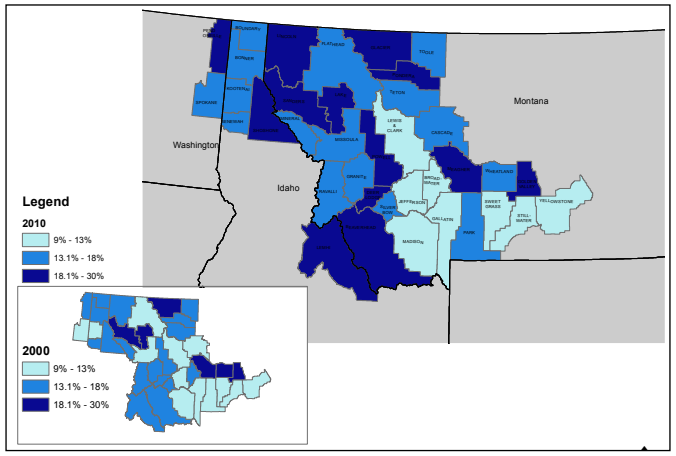

Figure 2.4.6. Western Montana Corridor Poverty Rates

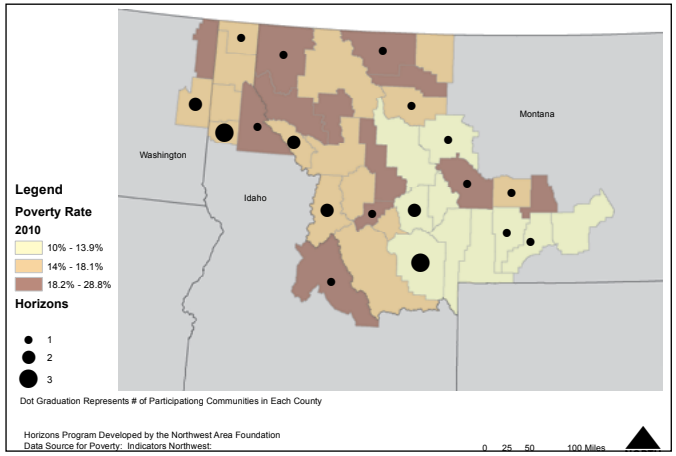

Figure 2.4.7. Western Montana Corridor unity leadership development program that tackles poverty, from the inside out. Program Horizons Communities

Figure 2.4.5 shows the median age trending map; a considerable portion of the region is getting older. A median age of 32 years is indicative of a community with a large percentage of young people that would be needed to sustain a new biomass industry (Daniels, Thomas L., Keller, John W., Lapping, Mark B., Daniels, Katherine, Segedy 2010). Only Montana Counties; Gallatin, Missoula, and Glacier have maintained a median age in this range over the last decade.

High poverty rates are considered a liability for areas of the supply chain that require advanced skill sets or could be seen as an opportunity for rural development. One example of how to view areas with high poverty differently is by looking at where the Northwest Area Foundation-funded Horizons program was facilitated (see Figure 2.4.7). Horizons is a community leadership program which focuses on areas in the country with populations below 5,000 and a poverty rate above 10%. Pilot studies have shown that strong leadership within a community prepares it to confront poverty and increase opportunities for its residents (Northwest Area Foundation 2009). Glacier, Shoshone, Lemhi, Lincoln, Meagher, and Deer Lodge all have high poverty rates, but they also each have two communities participating in Horizons programs which could be a sign of counties on the rise.

2.4.1.2 Education

INTRODUCTION

All tables in the following subsections are based on the delineations made in the zoning map depicted in Figure 2.4.8. The Western Montana Corridor is sectioned by state (Washington, Idaho and Montana). Montana is further subdivided into three groups. This zoning was done to better organize tabular data.

Low educational attainment, particularly the lack of a complete high school education as shown in Table 2.4.1, is strongly correlated with high poverty rates. Urban counties tend to have a higher rates of high school completion and lower poverty rates, while rural counties have a greater range of results of both high school completion and poverty. For example sparsely populated Meagher County has a high rate of high school non-completion and a high rate of poverty, while similarly rural Madison County has a high rate of high school completion and a low rate of poverty.

Low educational attainment is a liability to building a biofuel supply chain, which will require well educated people. Yet implementation of a biofuel economy has potential as the impetus for improved educational attainment and a higher standard of living.

Higher educational attainment, shown in Table 2.4.1, as completion of a bachelor's degree, is strongly correlated with low poverty rates. Montana's more urban counties tend to have higher rates of educational attainment, while rural counties have lower rates. However in the southwest corner of the state several rural counties near Yellowstone National Park (Beaverhead, Madison, Park, Sweet Grass, Stillwater) have high rates of educational attainment and the corresponding low poverty rates. Rural northern counties nearer the likely sites for isobutanol production (Lincoln, Sanders, Glacier, Pondera) have low rates of bachelor's degree completion and correspondingly higher rates of poverty. An educated population is an excellent resource for supply chain development and a less well educated population a hindrance. However, as mentioned before the implementation of a biofuel economy could spur populations to seek more education to better take advantage of regional economic opportunities.

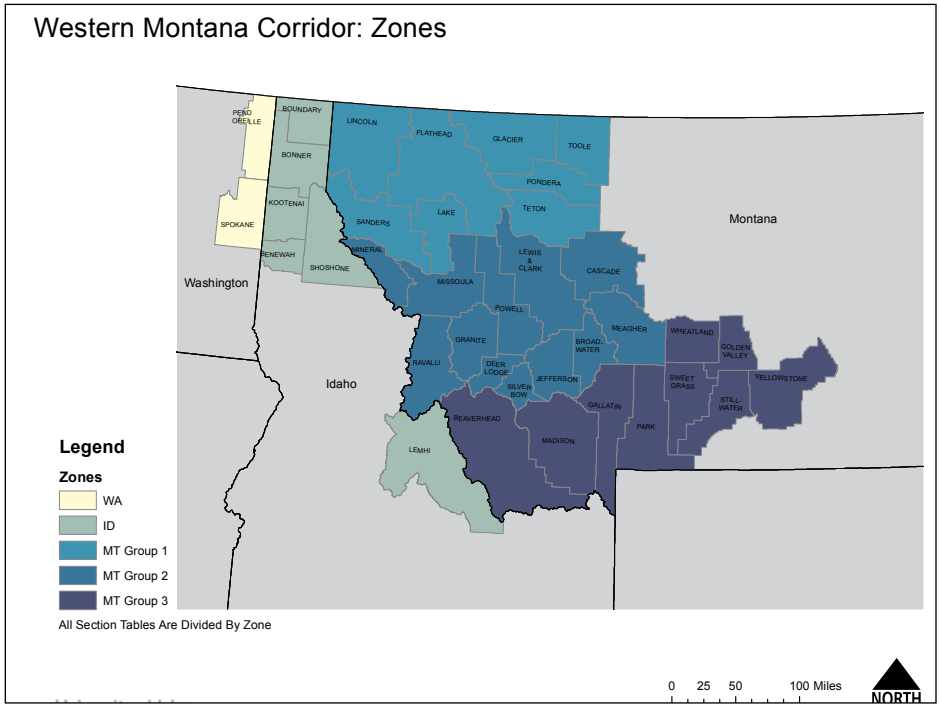

Figure 2.4.8. Western Montana Corridor Zones

HIGH SCHOOL DATA

According to data published by the National Assessment of Educational Progress and the Annie E. Casey Foundation, Montana students generally score above the national average in the subjects tested (reading, writing, mathematics), which reflects a relatively high quality of public education in the state. Idaho and Washington generally score a bit lower than Montana, yet still above the national average.

Graduation rates throughout the region have been rising in recent years, along with the improvement in the economy.

This section examines indicators of high school efficacy and quality in the Western Montana Corridor, which include: number of students, graduation rate, and Adequate Yearly Progress (AYP improvement in state test scores and graduation rates according to the No Child Left Behind Act). A low graduation rate is considered an indicator of poor quality; making AYP indicates that the school is improving test scores.

Eastern Washington shows trends that are common throughout the region: urban high schools (indicated by a large 'cohort', or the number of students scheduled to graduate in a certain year whether or not they actually do) have lower graduation rates than smaller rural schools, and also have greater difficulty maintaining AYP (Table 2.4.1.) (State of Washington Office of Superintendent of Public Instruction).

Table 2.4.1. Eastern Washington High School Data

Washington	High School	Cohort 2010-11	Graduates	Dropouts	Continuing	Graduation rate percent	Made AYP 2011
Pend Orielle	Cusick Junior Senior High School	26	24	1	1	92.3	yes
	Selkirk High Schoool	26	23	2	1	88.5	yes
	Newport High School	91	78	6	7	85.7	yes
	Newport Alternative High School	1	0	0	0	0	yes
	OVERALL	148	129	10	9	87.2	
Spokane	Liberty High School	40	37	2	1	92.5	yes
	Riverside High School	130	120	0	10	92.3	yes
	Cheney High School	280	245	24	11	87.5	yes
	Three Springs High School	20	11	6	3	55	yes
	Deer Park High School	183	147	28	8	80.3	no
	Mead Alternative High School	68	34	24	10	50	yes
	Mead Senior High School	359	342		8	95.3	yes
	Mt. Spokane High School	360	331	10	19	91.9	no
	Medical Lake High School	183	147	3	1	97.1	yes
	Medical Lake Alternative High School	20	6	13	1	30	yes
	Lakeside High School	138	131	6	1	94.9	yes
	Phoenix Alternative School	10	2	8	0	20	yes
	Freeman High School	73	68	2	3	93.2	yes
	Ferris High School	391	330	44	17	84.4	yes
	Havermale High School	379	195	138	46	51.5	no
	Lewis & Clark High School	404	329	47	28	81.4	no
	North Central High School	277	238	28	11	85.9	yes
	Rogers High School	341	259	61	21	76	no
	Shadle Park High School	300	265	11	24	88.3	no
	Central Valley High School	464	424	23	17	91.4	no
	University High School	435	374	26	35	86	no
	Spokane Valley High School	39	36	1	2	92.3	yes
	West Valley High School	182	169	6	7	92.9	yes
	East Valley High School	266	244	7	15	91.7	no
	OVERALL	**5838**	**4713**	**705**	**420**	**80.7**	

High schools in northern Idaho show a range in quality, graduation rate and improvement (see Table 2.4.2.) Although the Idaho State Superintendent of Education does not make publicly available information about cohort size and graduation rate by county, it is notable that the schools of Kootenai County (the urban area of Coeur d'Alene) show indicators of good educational quality, breaking the trend apparent in the rest of the region. High schools in northern Idaho also provide more opportunity for vocational training (Idaho State Department of Education).

Table 2.4.2. Northern Idaho High School Data

Idaho	High School	Graduation rate percent '10-'11	Made AYP 2012
Benewah	Lakeside High School	65	no
	St Maries High School	95	yes
Bonner	Clark Fork Junior/Senior High School	66	yes
	Sandpoint High School	93.4	yes
	Priest River Lamanna High School	89.8	no
Boundary	Bonners Ferry High School	91.1	no
	Riverside Alternative High School	60	no
Kootenai	Coeur d'Alene High School	95.8	yes
	Lake City High School	95.3	yes
	Project CDA High School	72.3	yes
	Bridge Academy Alternative High School	50	yes
	Coeur d'alene Charter Academy	100	yes
	Kootenai Junior/Senior High School	100	no
	Lakeland Senior High School	98	yes
	Timberlake Senior High School	99.1	yes
	Mountainview Alternative High School	100	yes
	Post Falls High School	92.5	yes
Lemhi	Leadore High School	100	yes
	Salmon High School	98.6	yes
Shoshone	Kellogg High School	94.1	no
	Mullan Junior Senior High School	100	no
	Wallace Junior Senior High School	94.1	no

Small, rural Montana high schools may have fewer resources, but they are often better able to keep track of their students since there are so few of them. This generally equates to a higher graduation rate than in more populous schools. Four small high schools in rural counties that had graduation rates of 100% have been highlighted in Table 2.4.3.

This regional trend is borne out within individual counties; Lewis and Clark County has been highlighted to illustrate that larger high schools have greater problems with student retention and yearly improvement than smaller schools within the same county (see Table 2.4.5.) However large and medium-sized schools such as Helena High School and Capital High School can offer more vocational training programs. Therefore in more urban counties such as Missoula (Missoula), Cascade (Great Falls) and Silver Bow (Butte), new training programs with relevance to jobs in the biofuel industry could be implemented in larger high schools.

Table 2.4.4. reinforces the trend by highlighting the difference in educational indicators between two rural counties (Golden Valley and Madison) and Billings (Montana's largest city).

Table 2.4.3. Montana #1 High School Data

Montana 1	High School	Cohort 2010-11	Graduates	Dropouts	Continuing	Graduation rate in percent	Made AYP 2012
Flathead	Flathead High School	384	298	72	14	77.6	no
	Glacier High School	333	265	55	13	79.6	no
	Columbia Falls High School	217	179	*	*	82.5	yes
	Bigfork High School	82	72	*	*	87.8	yes
	Whitefish High School	140	110	17	13	78.6	no
	OVERALL	**1156**	**924**			**79.9**	
Glacier	Browning High School	156	109	35	12	69.9	no
	Cut Bank High School	52	47	*	*	90.4	yes
	OVERALL	**208**	**156**			**75**	
Lake	Arlee High School	34	31	*	*	91.2	yes
	Polson High School	112	97	*	*	86.6	no
	St. Ignatius High School	27	24	*	*	88.9	no
	Ronan High School	71	57	*	*	80.3	no
	Charlo High School	35	32	*	*	91.4	yes
	OVERALL	**279**	**241**			**86.4**	
Lincoln	Troy High School	52	42	*	*	80.8	no
	Libby High School	116	104	*	*	89.7	no
	Lincoln County High School	84	67	*	*	79.8	no
	OVERALL	**252**	**213**			**84.5**	
Pondera	Conrad High School	49	44	*	*	89.8	yes
	Valier High School	12	12	0	0	100	yes
	Heart Butte High School	9	7	*	*	77.8	no
	OVERALL	**70**	**63**			**90**	
Sanders	Plains High School	34	32	*	*	94.1	yes
	Thompson Falls High School	62	54	*	*	87.1	yes
	Noxon High School	14	14	0	0	100	yes
	Hot Springs High School	12	12	0	0	100	no
	OVERALL	**122**	**112**			**91.8**	
Teton	Choteau High School	35	33	*	*	94.3	yes
	Fairfield High School	34	34	0	0	100	yes
	Power High School	13	13	0	0	100	yes
	Dutton/Brady High School	12	11	*	*	91.7	yes
	OVERALL	**94**	**91**			**96.8**	
Toole	Sunburst High School	17	15	*	*	88.2	yes
	Shelby High School	47	34	*	*	72.3	yes
	OVERALL	**64**	**49**			**76.6**	

Table 2.4.4. Montana #2 High School Data

Montana 3	High School	Cohort 2010-11	Graduates	Dropouts	Continuing	Graduation rate percent	Made AYP 2012
Beaverhead	Beaverhead County High School	106	93	*	*	87.7	yes
	Lima High School	5	4	*	*	80	yes
OVERALL		**111**	**97**			**87.4**	
Gallatin	Manhattan High School	62	57	*	*	91.9	yes
	Bozeman High School	469	394	*	*	84	no
	Willow Creek High School	4	4	0	0	100	yes
	Three Forks High School	48	40	*	*	83.3	yes
	Belgrade High School	242	187	42	13	77.3	yes
	West Yellowstone High School	16	16	0	0	100	yes
	Lone Peak High School	2	1	*	*	50	yes
OVERALL		**843**	**699**			**82.9**	
Golden Valley	Ryegate High School	4	4	0	0	100	yes
	Lavina High School	7	7	0	0	100	yes
OVERALL		**11**	**11**			**100**	
Madison	Sheridan High School	19	19	0	0	100	yes
	Twin Bridges High School	24	23	*	*	95.8	yes
	Harrison High School	9	9	0	0	100	yes
	Ennis High School	19	19	*	*	94.7	yes
OVERALL		**71**	**70**			**98.6**	
Park	Park High School	137	118	*	*	86.1	no
	Gardiner High School	29	28	*	*	96.6	yes
	Shields Valley High School	20	18	*	*	90	yes
OVERALL		**186**	**164**			**88.2**	
Stillwater	Park City High School	19	15	*	*	78.9	no
	Columbus High School	50	47	*	*	94	yes
	Reed Point High School	4	4	0	0	100	yes
	Rapelje High School	5	5	0	0	100	yes
	Absarokee High School	27	24	*	*	88.9	yes
OVERALL		**105**	**95**			**90.5**	
Sweet Grass	Sweet Grass County High School	53	47	*	*	88.7	yes
OVERALL		**53**	**47**			**88.7**	
Wheatland	Harlowton High School	19	17	*	*	89.5	yes
	Judith Gap High School	4	4	0	0	100	yes
OVERALL		**23**	**21**			**91.3**	
Yellowstone	Billings Senior High School	520	379	129	12	72.9	no
	Billings West High School	480	391	77	12	81.5	no
	Skyview High School	359	284	55	20	79.1	no
	Laurel High School	163	126	*	*	77.3	no
	Custer High School	9	9	0	0	100	yes
	Broadview High School	22	21	*	*	95.5	yes
	Huntley Project High School	49	42	*	*	85.7	no
	Shepherd High School	61	55	*	*	90.2	yes
OVERALL		**1663**	**1307**			**78.6**	

In summation, in the Western Montana Corridor rural high schools have shown consistent yearly improvement and student retention. This data illustrates that small school size is not an indicator of poor educational quality, and rural counties' lack of population should not be taken as a lack of ability for skilled jobs within that population (Montana Office of Public instruction, American Welding Society, Automotive Mechanic Schools and Training Center).

The Western Montana Corridor contains numerous institutions of higher learning, marked on the map by circles of different size (see Figure 2.4.9). Large circles indicate major state colleges and universities, medium-sized circles smaller state colleges, and small circles community and tribal colleges.

Table 2.4.10 shows degree programs offered at universities and colleges that could train the future workforce in areas relevant to biomass removal and bioenergy production.

Table 2.4.5. Montana #3 High School Data

Montana 2	High School	Cohort 2010-11	Graduates	Dropouts	Continuing	Graduation rate in percent	Made AYP 2012
Broadwater	Broadwater High School	61	52	*	*	**85.2**	yes
	OVERALL	**61**	**52**			**85.2**	
Cascade	Great Falls High School	420	291	96	33	**69.3**	no
	C. M. Russell High School	406	336	40	30	**82.8**	no
	Cascade High School	35	33	*	*	**94.3**	yes
	Centerville High School	20	20	0	0	**100**	yes
	Belt High School	27	26	*	*	**96.3**	yes
	Simms High School	33	30	*	*	**90.9**	yes
	OVERALL	**941**	**736**			**78.2**	
Deer Lodge	Anaconda High School	93	74	*	*	**79.6**	no
	OVERALL	**93**	**74**			**79.6**	
Granite	Granite High School	14	12	*	*	**89.7**	yes
	Drummond High School	20	19	*	*	**95**	yes
	OVERALL	**34**	**31**			**91.2**	
Jefferson	Whitehall High School	40	37	*	*	**92.5**	yes
	Jefferson High School	44	37	*	*	**84.1**	no
	OVERALL	**84**	**74**			**88.1**	
Lewis and Clark	Helena High School	458	373	*	*	**81.4**	no
	Capital High School	337	283	*	*	**84**	no
	Augusta High School	8	8	0	0	**100**	yes
	Lincoln High School	16	13	*	*	**81.3**	yes
	OVERALL	**819**	**677**			**82.7**	
Meagher	White Sulphur Springs High School	22	19	*	*	**86.4**	yes
	OVERALL	**22**	**19**			**86.4**	
Mineral	Alberton High School	16	15	*	*	**93.8**	no
	Superior High School	33	27	*	*	**81.8**	yes
	St. Regis High School	12	12	0	0	**100**	yes
	OVERALL	**61**	**54**			**88.5**	
Missoula	Hellgate High School	324	290	*	*	**89.5**	no
	Sentinel High School	293	261	*	*	**89.1**	no
	Seeley-Swan High School	26	23	*	*	**88.5**	yes
	Big Sky High School	253	205	*	*	**81**	no
	Frenchtown High School	85	79	*	*	**92.9**	no
	OVERALL	**981**	**858**			**87.5**	
Powell	Powell County High School	71	62	*	*	**87.3**	yes
	OVERALL	**71**	**62**			**87.3**	
Ravalli	Corvallis High School	103	91	*	*	**88.3**	yes
	Stevensville High School	96	75	*	*	**78.1**	yes
	Hamilton High School	136	114	*	*	**83.8**	no
	Victor High School	26	22	*	*	**84.6**	yes
	Darby high School	30	25	*	*	**83.3**	yes
	Forence-Carlton High School	81	68	*	*	**84**	no
	OVERALL	**472**	**395**			**83.7**	
Silver Bow	Butte High School	415	329	76	10	**79.3**	no
	OVERALL	**415**	**329**			**79.3**	

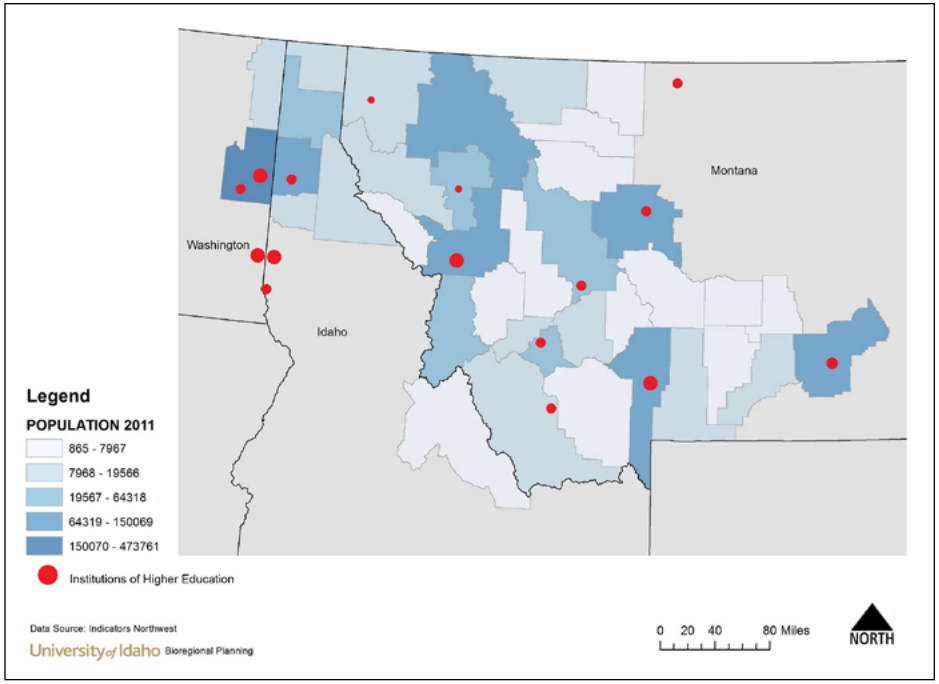

Figure 2.4.9 Regional Higher Education Opportunities

Colleges and Universities	Accounting	Architecture	Automotive Technician	Business	Carpentry	Computer Science	Computer Systems	Computer Technician	Computer Technology	Construction Technician	Diesel Technician	Energy Technology	Engineering	Environmental Science	Forestry	Heavy Equip. Operations	Industrial Technology	Industry	Law	Metals Technician	Natural Resources	Nat Re Conflict Resolution	Welding
University of Idaho, Moscow	X	X		X									X		X				X				
Washington State University, Pullman		X		X									X										
Montana State University, Bozeman		X		X									X										
Montana State University, Billings				X			X											X					
Great Falls College, Great Falls	X				X																		
Montana State University Northern, Havre													X										
Missoula College	X			X	X						X					X							X
University of Montana, Missoula	X			X		X	X		X			X		X	X		X		X			X	
University of Montana- Western, Dillon				X										X									
Montana Tech, Butte													X										
Helena College, Helena			X	X				X		X	X									X			
Flathead Valley Community College, Libby	X			X												X							X
Dawson Community College, Glendive													X										
Salish Kootenai College, Pablo				X																	X		
Carroll College, Helena													X										
University of Great Falls, Great Falls	X			X		X																	

Figure 2.4.10 Regional Higher Education Degree Programs

2.4.1.3 Workforce

Labor force participation rates look at the proportion of the population that is 16 years of age or older and is either currently in the workforce or is available to work (Indicators Northwest). The unemployment rates shown in the bottom left corner of Figure 2.4.11 indicate the proportion of the labor force population that is looking for work.

The region's workforce is analyzed by the multiple metrics shown in Tables 2.4.6. to 2.4.11.

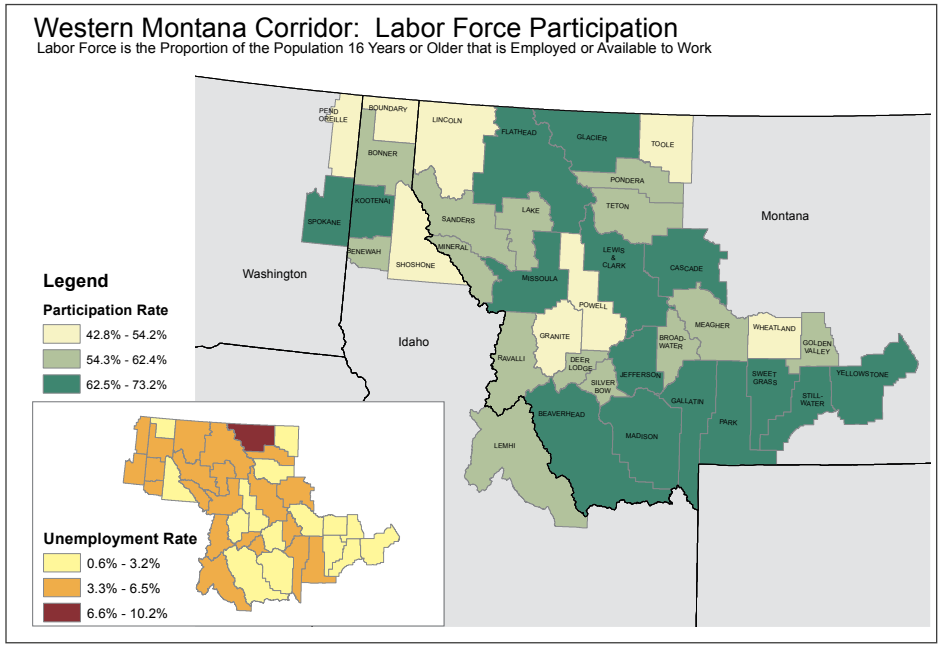

Figure 2.4.11 Western Montana Corridor Labor Force Participation

WASHINGTON WORKFORCE

Table 2.4.6. shows workforce highlights for Pend Oreille and Spokane Counties in Washington.

Washington State Region	Pend Oreille	Spokane
1999 Average Income	$15,731	$19,233
2007 Average Income	$24,745	$32,019
2008 Average Income	$38,939	$48,269
Total Personal Income	$315,000,000	$14,601,000,000
2007 Job Total Across all Industries	4,235	278,647
Number of Government Jobs	1,380	38,468
Commuter Distance in Minutes	31.5	21.2
2002 Amount of Businesses Listed	887	31,600
2009 Amount of Civilians Working	5,540	239,959
2009 Unemployment Percentage	14%	8.80%

Source: http://www.aaag.com/county/washington-wa-counties.htm

IDAHO WORKFORCE

Table 2.4.19 shows workforce highlights for the Idaho Counties of: Benewah, Bonner, Boundary, Kootenai, Lemhi, and Shoshone.

Table 2.4.7. Idaho Workforce

Idaho State Region	Benewah	Bonner	Boundary	Kootenai	Lemhi	Shoshone
1999 Average Income	$15,285	$17,263	$14,636	$18,430	$16,037	$15,934
2007 Average Income	$28,237	$29,808	$21,314	$30,719	$26,131	$28,923
2008 Average Income	$39,173	$41,630	$40,817	$49,721	$36,423	$38,293
Total Personal Income	$260,000,000	$1,222,000,000	$231,000,000	$4,123,000,000	$201,000,000	$370,000,000
2007 Job Total Across all Industries	5,372	25,646	5,587	79,527	4,996	6,748
Number of Government Jobs	1,329	2,518	1,094	10,116	854	1,081
Commuter Distance in Minutes	19.2	25.5	21.5	21.7	17.5	21.6
2002 Amount of Businesses Listed	805	4,403	1,025	11,510	933	1,061
2009 Amount of Cilivians Working	4,108	20,694	4,333	71,121	3,907	6,192
2009 Unemployment Percentage	13.90%	10.20%	12.60%	9.10%	8.40%	13.10%

Source: http://www.aaag.com/county/idaho-id-counties.htm

MONTANA WORKFORCE

Montana has seen its job totals decrease due to the decline in the resource extraction sector. The exception is areas with strong tourism which have steady, high employment rates. The challenge is that these areas suffer from low wages; tourism-related employment is the second to lowest per capita wage in the United States. Montana's minimum wage raises 0.15 cents in January 2013 to $7.80 (Headwaters Economics 2012).

Table 2.4.8. shows workforce highlights for the Montana Counties of: Flathead, Glacier, Lake, Lincoln, Pondera, Sanders, Teton, and Toole. Highlights for the additional Montana counties in the Western Montana Corridor can be located in Tables 2.4.9. - 2.4.11.

Table 2.4.8. Montana Group #1 Workforce

Montana Group #1	Flathead	Glacier	Lake	Lincoln	Pondera	Sanders	Teton	Toole
1999 Average Income	$18,112	$11,597	$15,173	$13,923	$14,276	$14,593	$14,635	$14,731
2007 Average Income	$35,185	$25,349	$25,853	$25,156	$29,282	$23,394	$34,257	$32,067
2008 Average Income	$44,012	$36,149	$38,505	$33,383	$35,718	$30,250	$40,111	$37,175
Total Personal Income	$3,053,000,000	$388,000,000	$734,000,000	$474,000,000	$175,000,000	$258,000,000	$206,000,000	$166,000,000
2007 Job Total Across all Industries	63,320	6,318	14,597	9,864	3,302	5,925	3,753	3,468
Number of Government Jobs	4,979	2,431	2,791	1,411	428	743	556	716
Commuter Distance in Minutes	19	14.9	18.4	17.6	15.8	22.3	19.2	14.2
2002 Amount of Businesses Listed	11,341	888	2,734	2,188	571	1,351	707	577
2009 Amount of Cilivians Working	44,516	5,622	11,354	7,740	2,572	4,436	3,017	2,533
2009 Unemployment Percentage	10.70%	8.70%	9.60%	13.50%	5.70%	14.20%	4.40%	3.90%

Table 2.4.9. Montana Group #2 Workforce

Montana Group #2	Broadwater	Cascade	Deer Lodge	Granite	Jefferson	Lewis & Clark
1999 Average Income	$16,237	$17,566	$15,580	$16,636	$18,250	$18,763
2007 Average Income	$26,712	$34,417	$27,316	$30,033	$34,999	$36,553
2008 Average Income	$40,104	$42,528	$34,126	$38,323	$56,650	$49,954
Total Personal Income	$122,000,000	$2,815,000,000	$241,000,000	$85,000,000	$388,000,000	$2,191,000,000
2007 Job Total Across all Industries	2,450	51,552	4,575	1,920	5,871	45,325
Number of Government Jobs	302	9,333	995	285	910	10,568
Commuter Distance in Minutes	23	15.9	21	26.4	22.4	16.7
2002 Amount of Businesses Listed	465	6,732	714	400	1,071	6,154
2009 Amount of Cilivians Working	2,398	40,485	3,909	1,256	6,008	33,893
2009 Unemployment Percentage	7%	4.90%	7%	9.20%	5.80%	4.50%

Table 2.4.10. Montana Group #2 Workforce - Continued

Montana Group #2	Meagher	Mineral	Missoula	Powell	Ravalli	Silver Bow
1999 Average Income	$15,019	$15,166	$17,808	$13,816	$17,935	$17,009
2007 Average Income	$28,356	$26,058	$33,587	$22,852	$28,511	$35,908
2008 Average Income	$30,142	$34,985	$43,260	$28,836	$43,613	$38,439
Total Personal Income	$54,000,000	$101,000,000	$3,548,000,000	$163,000,000	$1,150,000,000	$1,171,000,000
2007 Job Total Across all Industries	1,192	2,147	78,732	3,620	20,546	20,682
Number of Government Jobs	171	$354	10,568	1,135	2,222	2,517
Commuter Distance in Minutes	16.6	22.6	17.5	22.3	23	14.3
2002 Amount of Businesses Listed	158	449	11,141	606	5,193	2,883
2009 Amount of Cilivians Working	855	1,887	58,242	2,663	18,099	17,104
2009 Unemployment Percentage	7.60%	9.50%	5.70%	8.30%	8.40%	5.70%

Table 2.4.11. Montana Group #3 Workforce

Montana Group #3	Beaverhead	Gallatin	Golden Valley	Madison	Park	Stillwater	Sweet Grass	Wheatland	Yellowstone
1999 Average Income	$15,621	$19,074	$13,573	$16,944	$17,704	$18,468	$17,880	$11,954	$19,303
2007 Average Income	$30,642	$36,117	$27,449	$34,078	$32,140	$32,589	$28,448	$27,423	$38,124
2008 Average Income	$39,284	$53,042	$33,753	$45,700	$39,847	$54,493	$44,424	$30,486	$49,337
Total Personal Income	$270,000,000	$3,151,000,000	$31,000,000	$252,000,000	$517,000,000	$281,000,000	$108,000,000	$54,000,000	$5,328,000,000
2007 Job Total Across all Industries	5,879	69,055	579	6,404	10,205	5,345	3,005	1,146	103,448
Number of Government Jobs	1,062	9,243	94	562	837	514	407	198	9,344
Commuter Distance in Minutes	14	17	29.2	22.4	21.3	28.5	20.8	18.8	17.9
2002 Amount of Businesses Listed	1,135	11,588	104	1,174	2,367	911	545	199	14,009
2009 Amount of Cilivians Working	5,124	48,487	578	4,294	8,524	4,460	2,435	1,040	81,834
2009 Unemployment Percentage	4.50%	6.30%	4.70%	5.60%	7.30%	5.60%	4.20%	5.20%	4.50%

SUMMARY

Montana has a strong apprentice and training program. Specifically the program, Incumbent Worker Training (IWT) that trains employees at small businesses employing 20 people or less. This program also aids the preservation of jobs in the state of Montana.

Non-labor percent of total personal income, which is not directly earned income (e.g., dividends, interest, or retirement funds), is 41% in Montana compared to 35.2% in the United States. The government portion of total employment in Montana is 14.9% compared to 14.2% in the United States. Agriculture is the largest component of the commodity sector in Montana employment. It is 3.1% of total jobs. Mining is the smallest component of the job sector, at 1.01% in Montana. Accommodation and food are the largest component of travel and tourism related to employment, at 13.5% of total jobs.

2.4.2 SOCIAL AND CULTURAL ASSETS

Social capital is the value added to the region's population through networks and collaboration that creates trust and shared values between individuals (Bypass 2011). Every organization that creates communication links and networks within a region is adding to this asset. Internally this capital is measured through the cultural values and trust that exists in the community. These valuable assets help to create the space that trade and outside organizations need to operate successfully (Bypass 2011).

2.4.2.1 Measuring Social and Cultural Capital

Crime has long been studied in association with social capital. Lower crime rates in rural areas are seen to be an indicator of a high level of community trust and collaboration (Figure 2.4.14.

The Creative Vitality Index studies the impact that the arts have on the health of the region. The metrics used for this index are defined as all profit and nonprofit arts related creative enterprises and the key support and service industries that sustain them (Herbert, Jim Irby 2010). The index was created in the state of Washington by art leaders to understand the contribution the art community makes to the cultural capital of a region (Herbert 2010). The Economic Research Service of the United States Department of Agriculture theorizes that all towns need to attract a fraction of the creative population to be competitive in today's economy (United States Department of Agriculture 2012). Using a national benchmark of 1.0, we can compare counties within the Western Montana Corridor to each other as well as contrast the scores with the United States as a whole. There are two major building blocks to the index, the first called the 'Community Arts Participation Subindex' tracks changes through selected arts-related businesses. The second, the 'Occupational Index of the Arts' quantifies per capita clusters of arts-related employment in selected occupations (Herbert, Jim Irby 2010). The Creative Vitality Index points to nine counties in the region that are above the national average: Bonner, Flathead, Lewis & Clark, Missoula, Granite, Jefferson, Gallatin, Park, and Yellowstone (Figure 2.4.15).

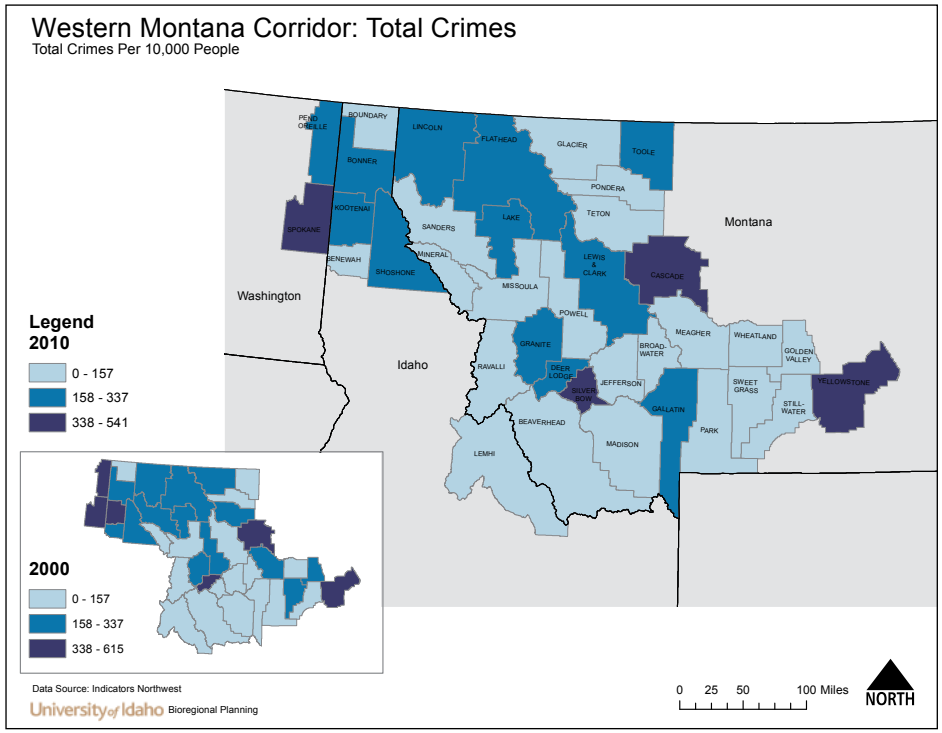

Figure 2.4.14 Western Montana Corridor Crime Rates

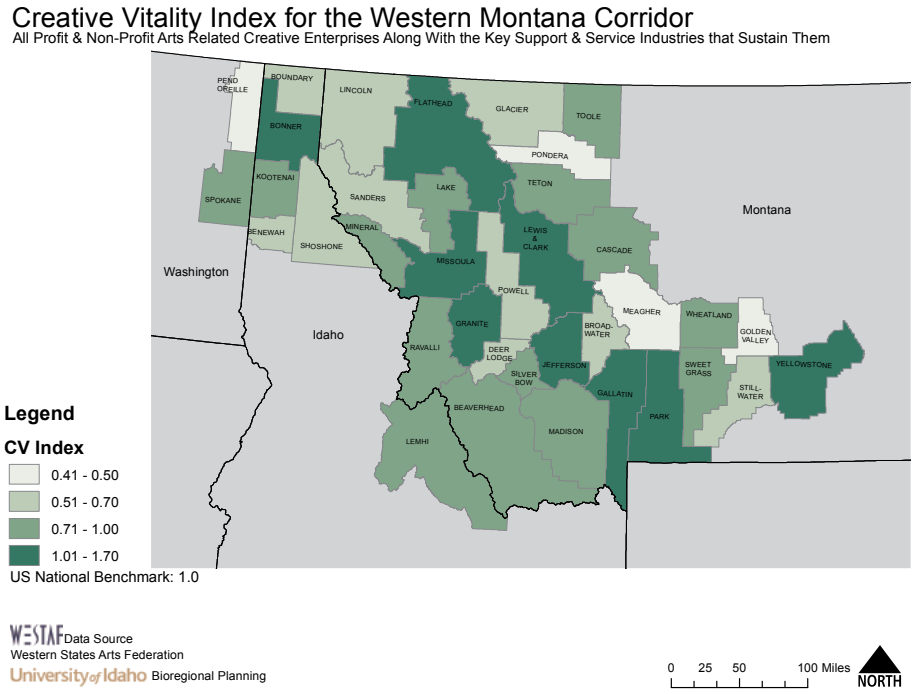

Figure 2.4.15 Western Montana Corridor Creative Vitality Index

2.4.2.2 Regional Collaborations

The WMC region has a significant number of collaborative organizations focused on forest management and restoration projects. These collaboratives groups bring together diverse stakeholders from federal, state and local government agencies to environmental groups, private companies, private landowners and the interested public to share knowledge and resources to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks (USDA BLM 2000). Figure 2.4.16 lists the collaboratives working in the WMC; Figure 2.4.17 shows the geographic scope of the collaborative groups; the numbers on the map correspond to the numbers listed in the table. These groups have been formed to find consensus on forest management processes and undertake restoration projects, while building trust and reducing conflicts, appeals and litigations. A few of the collaboratives listed in the table are discussed below in greater detail.

The **Montana Forest Restoration Committee** (MFRC), formed in 2007, consists of several individual restoration committees focused on specific Forest Service districts, including the Bitterroot, Lolo, Lincoln, and Elkhorn. The MFRC developed a set of thirteen principles that define the "zone of agreement" for restoration of Montana's national forests. The principles were developed and set forth to guide individual committees in their restoration efforts (Montana Forest Restoration Committee 2012). The thirteen principles "fall under the assumption that restoration is conducted to accelerate the recovery of ecological processes and to enhance societal and economic well being" (Montana Forest Restoration Committee 2012). The MFRC advocates that restoration does not preclude future active management; in fact, restoration efforts may enhance future options and be conducted under the principles of adaptive management (Montana Forest Restoration Committee 2012).

The **Southwestern Crown Collaborative** (SCC) forms the southern boundary of the Bob Marshall Wilderness and consists of the lower elevation forests and communities of the Blackfoot, Clearwater, and Swan River valleys (Southwestern Crown 2012). The Southwestern Crown area deals with the effects of long simmering problems in this unique community. Largely rural, it is one of the only places left in America that still provides important habitat for grizzly bear, elk, deer, lynx, gray wolf, wolverine, and a wide variety of birds species and native fish (Southwestern Crown 2012). Unfortunately, the area is also susceptible to a host of troubles that threaten the area's overall health. Natural wildfire and the continued spread of noxious and invasive plants are threatening native plants and degrading wildlife habitat (Southwestern Crown 2012).

The Southwestern Crown of the Continent was selected in 2010 by the USFS as a Collaborative Forest Landscape Restoration Project site. Over the next decade, restoration activities will focus on stream and forest habitats, removal of exotic species, bridge and culvert replacements and upgrades, road restoration and upgrades, removal of fish barriers, and stream channel manipulation (USDA FS 2012).

The **Idaho Forest Restoration Partnership** (IFRP) was formed to help strengthen collaborative forest restoration efforts across Idaho (Idaho Forest Restoration Partnership 2012). The partnership is comprised of seven separate working groups throughout Idaho who connect, inform, and support collaborative groups working to restore the resilience of Idaho's forests (Idaho Forest Restoration Partnership 2012). The IFRP advocates on behalf of collaborative forest restoration and communicates with congressional delegations in Idaho, the U.S. Forest Service and other land managers and stakeholders (Idaho Forest Restoration Partnership 2012).

Map ID	Collaborative Name	Province of Alberta	Province of British Columbia	State of Idaho	State of Montana	State of Washington	Beaverhead - Deerlodge NF	Bitterroot National Forest	Blackfoot Valley	Clearwater NF	Colville NF	Crown of the Continent Ecosystem	Elkhorn Mt. Wildlife Mangt. Area	Helena National Forest	Kootenai NF	Kootenai River Basin	Lemhi County	Lincoln District of the Helena NF	Lolo National Forest	Nez Perce NF	Payette NF	Priest Lake	Rocky Mts.	Sandpoint & Coeur d' Alene of the Idaho Panhandle NF	Seeley Lake Area	Shoshone County	Swan Valley
1	Lolo Restoration Committee (affiliated with MFRC) http://www.montanarestoration.org/lolo-committee				X														X								
2	Bitterroot Restoration Committee (affiliated with MFRC) http://www.montanarestoration.org/bitterroot-committee				X			X																			
3	Lincoln Restoration Committee (affiliated with MFRC) http://www.montanarestoration.org/lincoln-committee				X													X									
4	Elkhorns Restoration Committee (affiliated with MFRC) http://www.montanarestoration.org/elkhorns-committee				X								X														
5	Swan Lands Coordinating Committee http://northwestconnections.squarespace.com/collaboration				X																						X
6	Clearwater Resource Council https://crcmt.org				X																				X		
7	Beaverhead-Deerlodge Working Group https://sites.google.com/site/bdworkinggroup1				X		X																				
8	Kootenai Forest Stakeholders Coalition				X										X												
9	Blackfoot Challenge http://blackfootchallenge.org/Articles				X				X																		
10	Blackfoot-Clearwater Stewardship Project http://www.blackfootclearwater.org				X				X																		
11	Southwestern Crown Collaborative				X				X	X																	X
12	Southwestern Crown of the Continent CFLRP* http://www.swcrown.org				X																						
13	Kootenai Valley Resource Initiative CFLRP (affiliated with IFRP) http://www.kootenai.org/kvri.html			X												X										
14	Panhandle Forest Collaborative http://communityforests.com/forest-collaborative			X																		X		X			
15	Shoshone County Forest Health Collaborative http://scc.silvervalleyedc.com/			X																						X	

Figure 2.4.16. Western Montana Collaborative Groups

		Province of Alberta	Province of British Columbia	State of Idaho	State of Montana	State of Washington	Beaverhead - Deerlodge NF	Bitterroot National Forest	Blackfoot Valley	Clearwater NF	Colville NF	Crown of the Continent Ecosystem	Elkhorn Mt. Wildlife Mangt. Area	Helena National Forest	Kootenai NF	Kootenai River Basin	Lemhi County	Lincoln District of the Helena NF	Lolo National Forest	Nez Perce NF	Payette NF	Priest Lake	Rocky Mts.	Sandpoint & Coeur d' Alene of the Idaho Panhandle NF	Seeley Lake Area	Shoshone County	Swan Valley
16	Clearwater Basin Collaborative http://www.clearwaterbasincollaborative.org			X						X										X							
17	Selway-Middle Fork Clearwater CFLRP (affilicated with IFRP) http://www.clearwaterbasincollaborative.org			X						X										X							
18	Payette Forest Coalition CFLRP (affiliated with IRFP) http://www.spatialstories.com/PayetteForward.html			X																	X						
19	Lemhi County Forest Restoration Group (affiliated with IFRP) http://www.lemhiweb.com/tags/ lemhi-county-forest-restoration-group			X													X										
20	Northeast Washington Forestry Coalition CFLRP http://www.newforestrycoalition.org/ forestvision20-20.htm					X					X																
N/A	Crown Managers Partnership www.crownmangers.org	X	X		X							X															
N/A	Montana Forest Restoration Committee (MFRC) Collaborative Coordinating Group montanarestoration.org				X																						
N/A	Idaho Forest Restoration Partnership (IFRP) Collaborative Coordinating Group www.idahoforestpartners.org			X																							
	*CFLRP = Collaborative Forest Landscape Restoration Project http://www.fs.fed.us/restoration/CFLRP/index.shtml																										

Figure 2.4.16.-continuted Western Montana Collaborative Groups

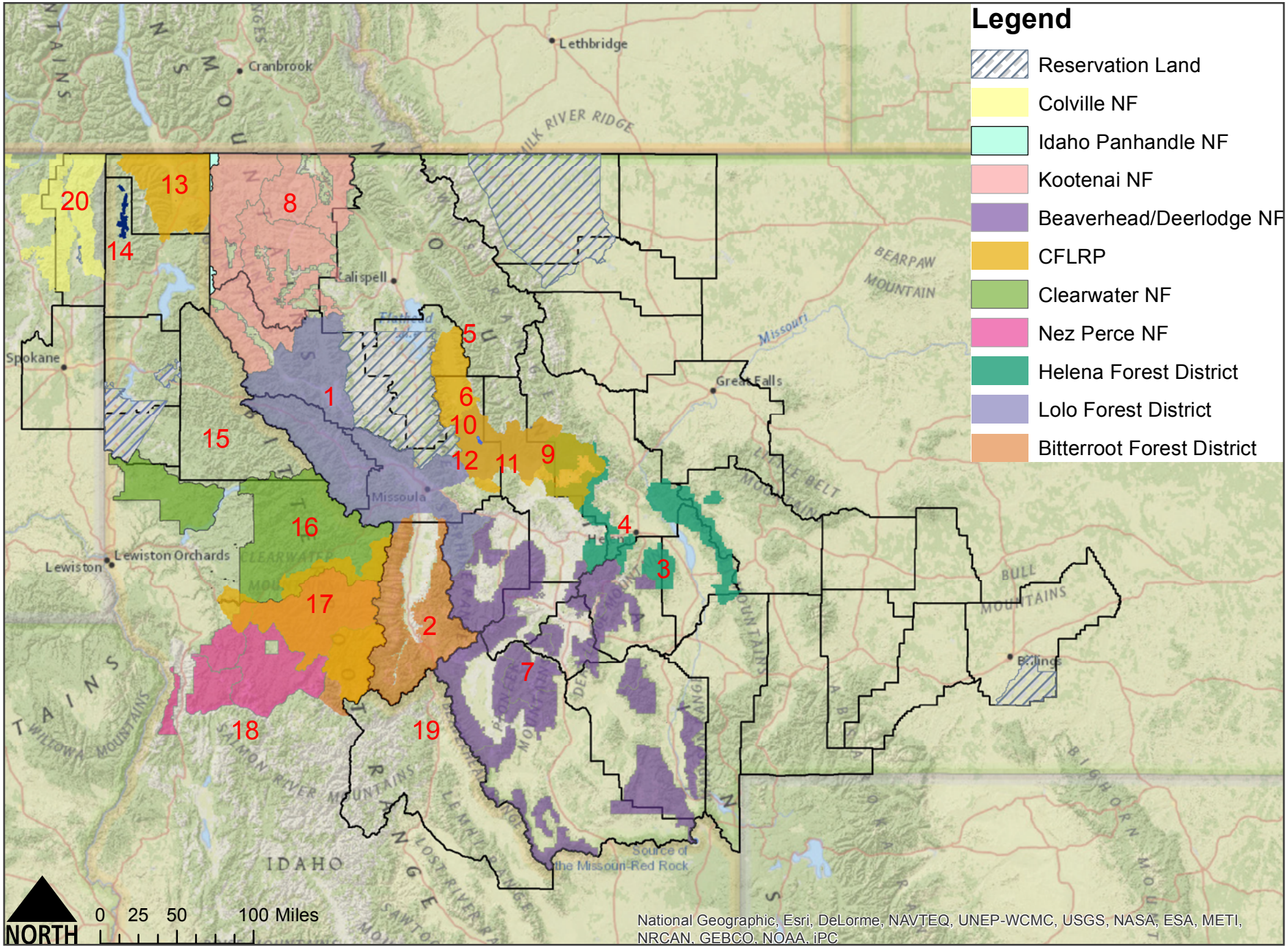

Figure 2.4.17 Map of Collaborative Groups in the Western Montana Corridor

2.4.3 HEALTH AND SUITABILITY

Throughout this section of the atlas, various measures of human, social, and cultural capital have been displayed for the region. The readiness of the region to support a new biomass region can be looked at by individual metrics suited to the different parts of the supply chain. As a way to understand the collective importance of the various individual metrics, we include two analyses the show multiple metrics, to highlight overall regional human capital suitability in the region, as shown in Figures 2.4.18 and 2.4.19.

2.4.3.1 County Health Rankings

The County Health Rankings and Roadmaps is an organization developed by the Robert Wood Johnson Foundation and the University of Wisconsin to measure the health of a county through multiple metrics. Scores are awarded for various socioeconomic and clinical factors, health behaviors, and the physical environment of the area. Each county can be analyzed by these factors one by one or the data can be compiled to give an overall health ranking ranked statewide (County Health Rankings 2012). Top scores for overall health were given to the following Montana counties: Flathead, Gallatin, Madison, Missoula, Stillwater, and Ravalli; and Kootenai County in Idaho.

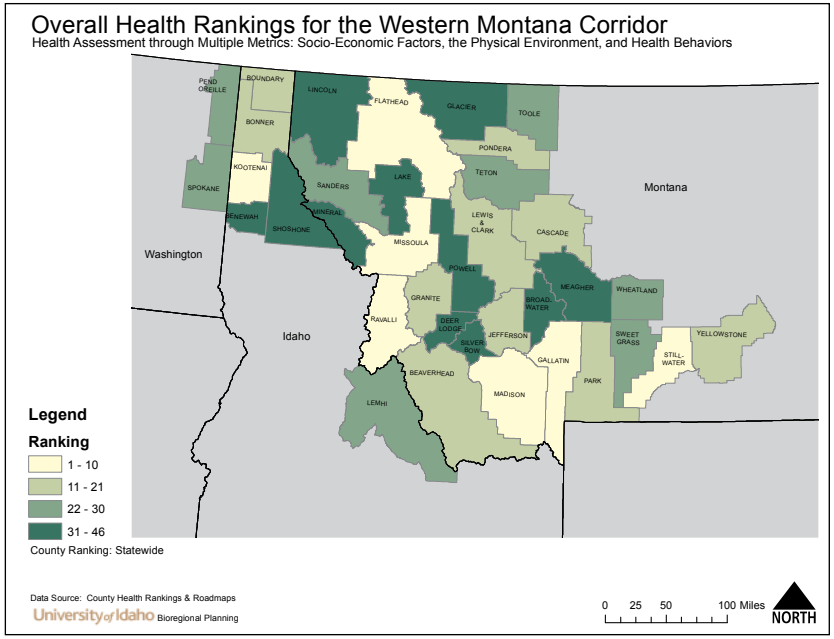

Figure 2.4.18 Western Montana Corridor County Health Ranking

2.4.3.2 Civic Capital Suitability Analysis

Like the health ranking measure, the suitability analysis quantifies multiple explanatory variables of human capital. To create the human capital suitability map, we combined median age, net migration, poverty rates, labor force participation, educational attainment, crime, the CV Index, and Horizons participation to create an overall score to suggest areas that are highest in human capital given the chosen explanatory variables. Gallatin County is ranked number one on both the health ranking and the suitability analysis. The suitability analysis also suggests that the counties of Lewis & Clark, Jefferson, Madison, Park, and Sweet Grass are also high in human capital. These are counties that could be good places to concentrate a biofuels industry, if human capital is an important variable to consider.

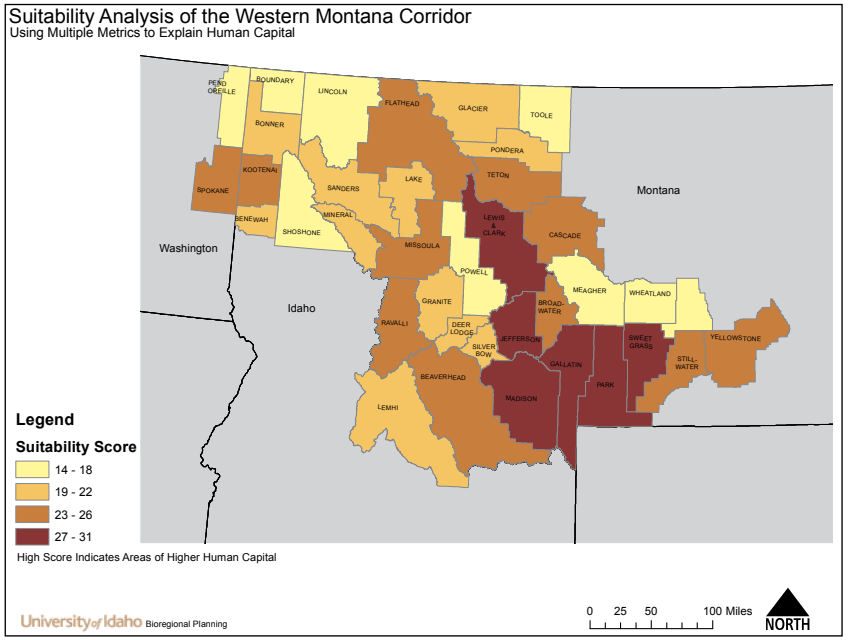

Figure 2.4.19 Western Montana Corridor Suitability Analysis

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2.5.0 POLICY CAPITAL

2.5.0.1 Overview

The Policy Capital examines regulatory frameworks at all levels of government, as well as incentives and programs relevant to biomass extraction and processing. The section focuses on western Montana counties, as well as Yellowstone County, Cascade County, four counties in northern Idaho, Spokane County in Washington, and the Confederated Tribe of the Salish-Kootenai. Additionally, this section contains information on nonprofit organizations involved with land use and biomass, multi-jurisdictional agreements, and sources of technical assistance for forest businesses. Finally, state incentives in Idaho, Washington, and Oregon which could serve as guides for future Montana incentives will be presented.

2.5.1 FEDERAL LAWS

2.5.1.1 Federal Environmental Laws

All biomass extraction and processing must follow the regulations and requirements set forth by the federal environmental laws in Table 2.5.1.

Table 2.5.1. Summary of Environmental Laws Relevant to Biomass UtilizationSource: Commission For Environmental Cooperation: "Summary of Environmental Law in America". http://www.cec.org/Page.asp?PageiD=122&ContentiD=2716&SiteNodeiD=615&BL_ExpandiD=

Title	Summary
P.L. 91-190 — National Environmental Policy Act of 1970 (NEPA)	This act requires Federal agencies to integrate environmental values into their decision-making processes by considering the impacts of their proposed actions and reasonable alternatives to those actions. For example, agencies must analyze the environmental effects of proposed actions through an environmental impact statement or other method, as specified in applicable rules. The act also established the President's Council on Environmental Quality.
16 USC 1531 et seq — Endangered Species Act of 1973 (ESA)	This act governs the process of identifying threatened and endangered species, provides protections for such species, and governs Federal actions that could affect such species or their habitat.
P.L. 93-348 — Forest and Rangeland Renewable Resources Planning Act of 1974 (FRPA)	This act requires preparation of a strategic plan for all Forest Service activities every 5 years based on an assessment of renewable natural resources on all land ownerships every 10 years.
P.L. 94-588 — National Forest Management Act of 1976 (NFMA)	NFMA requires the Forest Service to use a systematic and interdisciplinary approach to resource management. It also provided for public involvement in preparing and revising forest plans. It expanded upon the land and resource management plans (L/RMPs) outlined in the FRPA, and requires the Forest Service to do an inventory of all its lands, followed by a zoning process for suitability determination.
P.L. 80-845 — Clean Water Act of 1948	This act is a comprehensive statute aimed at restoring and maintaining the chemical, physical, and biological integrity of the Nation's waters.
P.L. 84-159 — Clean Air Act of 1955	This act was the first Federal legislation involving air pollution. This act provided funds for Federal research in air pollution. Amendments were made to this act to help control air pollution and increase the authority and responsibility of the Federal Government to help provide clean air.
P.L. 88-577 — Wilderness Act of 1964)	This act established the National Wilderness Preservation System and designated the initial components of that system. These lands are to be administered for the use and enjoyment of the American people and for the preservation of their wilderness character.
P.L. 92-463 — Federal Advisory Committee Act of 1972 (FACA)	This act governs the behavior of approximately 1,000 Federal advisory committees. In particular, the act restricts the formation of such committees to only those that are deemed essential and limits their powers to provision of advice to officers and agencies in the executive branch of the Federal Government. The act requires that administrative procedures and hearings be public knowledge.
43 USC 1701 et seq — Federal Land Policy and Management Act of 1976 (FLPMA)	This statute provides the basic policies for Federal land management and governs actions such as acquisitions, sales, exchanges, withdrawals, and rights of way.

The Western Montana Corridor has a significant amount of land managed by government agencies. The map in Figure 2.5.1 shows lands managed by federal and state agencies.

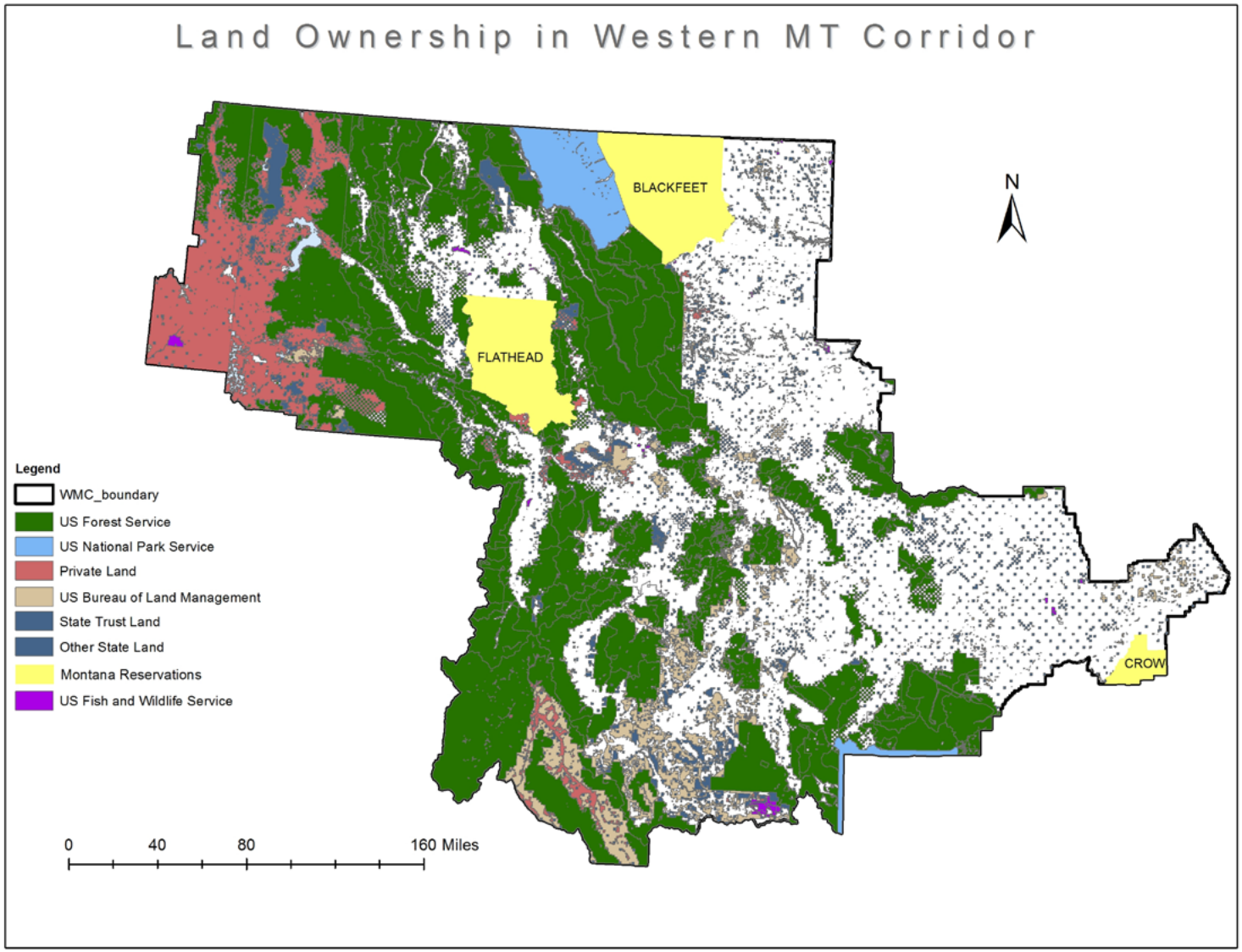

Figure 2.5.1 Federal and State Lands of the the Western Montana Corridor

2.5.1.2 Federal Biomass Utilization Policies

As outlined in the following sections, the use of woody biomass for bioenergy is strongly supported by the US federal and most state governments. Figure 2.5.2 shows the various federal laws associated with Biomass and Forestry acts.

Several of the federal government legislation, policies and incentives supporting the use of woody biomass for bioenergy are described in this section.

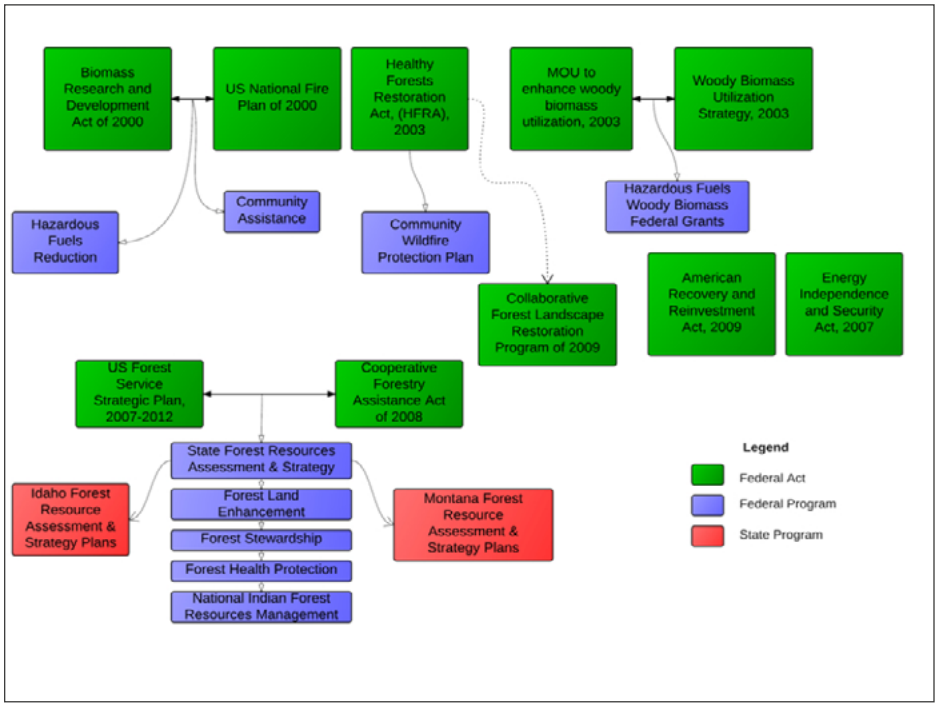

Figure 2.5.2 Biomass, Energy, and Forestry Acts Flowchart

BIOMASS RESEARCH AND DEVELOPMENT ACT OF 2000

The Biomass Research and Development Act of 2000, as revised by Energy Policy Act 2005, created the Biomass R&D Technical Advisory Committee and the Biomass R&D Board and calls for the US DOE and USDA to coordinate all federal R&D as it relates to biofuels and bio-products. The Biomass Research and Development Board is an agency of the US government created by the Biomass Research and Development Act of 2000. The Board's mission is to coordinate federal research and development activities relating to bio-based fuels, power, and products (Biomass Research and Development Board, 2011).

US NATIONAL FIRE PLAN OF 2000

The National Fire Plan, (NFP), was developed in August 2000, following a landmark wildfire season in an effort to reduce the likelihood of future catastrophic fires. The federal government passed the National Fire Plan legislation and the development of the 10 year Comprehensive Strategy and its subsequent Implementation Plan to further develop a coordinated strategy to address the threats posed by wild-land fire. Included in the plan was a commitment to provide grant money under Economic Action Programs through the USDA Forest Service State and Private Forestry to help fund pilot projects to demonstrate new uses of small diameter and underutilized woody material.

The NFP was enacted with the intent of actively responding to severe wild-land fires and their impacts to communities while ensuring sufficient fire fighting capacity for the future. The addresses five key points: Fire fighting, Rehabilitation, Hazardous Fuels Reduction, Community Assistance, and Accountability. The two areas of particular relevance to the forestry and bioenergy industries are outlined below.

HAZARDOUS FUELS REDUCTION

The NFP established an intensive, longterm hazardous fuels reduction program. Hazardous fuels reduction treatments are designed to reduce the risks of catastrophic wildland fire. Such treatments remove or modify wildland fuels to reduce the potential for severe wildland fire behavior , lessen the post-fire damage, and limit the spread or proliferation of invasive species and diseases. Treatments are accomplished using prescribed fire, mechanical thinning, herbicides, grazing, or combinations of these and other methods. Treatments are being increasingly focused on the expanding Wildland Urban Interface, (WUI) areas.

COMMUNITY ASSISTANCE

Federal and State agencies are empowered to assist communities through a variety of grant programs including Rural, State, and Volunteer Fire Assistance and Economic Action Programs. Funding can be used to develop Community Wildfire Plans and apply for Forest Stewardship grants for harvesting and removal of hazardous fuels (Forests and Rangelands, 2012).

FUELS FOR SCHOOLS AND BEYOND

The Fuels for Schools and Beyond Program arose from the National Fire Plan of 2001 as a way to promote the reduction of hazardous fuels and utilize that biomass locally for heat and power. As a partnership between the U.S. Forest Service and the Bitterroot Resource Conservation and Development Area, Inc., this program is able to provide financial and technical assistance to public and private

entities. Six states currently participate, including Montana (Department of Natural Resources and Conservation) and Idaho (Department of Lands). This program can be seen as a either a benefit or as a detriment to a forest residuals to biofuel and co-product industry. Because this program is up and running, biomass is being utilized for local heating and power, and therefore will reduce the amount of biomass available for jet fuel conversion. On the other hand, this program may boost biomass extraction as a profitable industry, mobilizing and streamlining the process. ("Fuels for Schools and Beyond Program" 2009).

HEALTHY FORESTS RESTORATION ACT, (HFRA), 2003

The HFRA contains a variety of provisions to speed up hazardous fuel reduction and forest restoration projects on specific types of Federal land that are at risk of wildland fire and/or of insect and disease epidemics. The HFRA aims to help restore healthy forest and rangeland conditions on State, Tribal, and private lands. Up to 33,060,000 hectares of land managed by the Forest Service and the Bureau of Land Management are eligible under the provisions of the HFRA which: In regards to the removal of hazardous fuels, the HFRA:

- Provides authority for expedited vegetation treatments on certain types of Forest Service and Bureau of Land Management lands that:
  (a) are at risk of wildland fire,
  (b) have experienced wind throw, or ice-storm damage,
  (c) are currently experiencing disease or insect epidemics, or
  (d) are at imminent risk of such epidemics because of conditions on adjacent land.
- Provides expedited environmental analysis of HFRA projects
- Provides administrative review before decisions are issued on proposed HFRA projects on Forest Service lands
- Encourages courts to expedite judicial review of legal challenges to HFRA projects
- Directs that when courts consider a request for an injunction on an HFRA authority project, they balance the short and long term environmental effects of undertaking the project against the effects of taking no action
- HFRA includes the first statutory incentives for the USFS and the BLM to give consideration to the priorities of local communities as they develop and implement forest management and hazardous fuel reduction projects (United States Department of Agriculture, Forest Service; United Stated Department of Interior, Bureau of Land Management, 2012).

THE CONTROL OF TIMBER SLASH AND DEBRIS LAW

"The Slash Law" (Title 76, Chapter 13, Part 4) was established in the early 1900's when woody debris left over from timber harvests was recognized as posing fire risks to communities. The Fire Hazard Reduction Agreement requires private landowners to reduce debris to state standards, and for the purchaser of the forest product to ensure the seller has completed this work. The purchaser, usually a sawmill, pays the state. Then once the Department of Natural Resources and Conservation has verified the hazardous fuel reduction work has been satisfactorily completed, the state pays the landowner ("Logging Slash Law Reduction").

WOODY BIOMASS UTILIZATION GROUP (2003)

The USDA Forest Service, through Woody BUG, produced the Woody Biomass Utilization Strategy in 2008 which aimed to increase the harvest and utilization of woody biomass and products and residues from forest and woodland health, management and restoration treatments whenever environmentally, economically, and legally appropriate. The actions proposed allow the Forest Service to facilitate predictable supplies, foster partnerships, develop new information and tools and expand markets. Additionally, these activities promote ecological restoration efforts, help mitigate the impending effects of climate change and ultimately sustain the health and resilience of America's forests. The WBU strategy has four goals: (1) identify and build partnerships through collaboration; (2) develop and deploy the needed science and technology; (3) help develop new and expanded markets for bioenergy and bio-based products; and (4) facilitate a reliable and sustainable supply of biomass. Funding to accomplish the four goals is provided by the Federal Hazardous Fuels Woody Biomass Utilization Grant Program (2010); which aims to help improve forest restoration activities by using and creating markets for, small-diameter woody biomass removed through activities such as reducing hazardous fuels, handling insect and disease affected forest or treating forestlands affected by severe weather events.

The grant program furthers the goals of woody biomass utilization through: (1) helping to reduce forest management costs by increasing the value of biomass and other forest products generated from hazardous fuels reduction and forest health activities; (2) creating incentives and/or reducing business risk for increased use of woody biomass from priority forestlands identified either by the Forest Service or through local Community Wildfire Protection Plans (or equivalent documents) as forestlands and other areas at high risk from wildfires are in need of hazardous fuels reduction work; (3) implementing projects that target and help remove economic and market barriers to using small-diameter trees and woody biomass; (4) producing renewable energy from woody biomass, including the use of new technologies; and (5) expanding working relationships between local forest products businesses and Forest Service office.

Only high priority, mapped areas are eligible for funding, based on high fire probability , high housing density, and historically high suppression costs. Communities on the Wildland-Urban Interface, (WUI), with Community Wildfire Protection Plans in place are given priority for funding of hazardous fuels reduction projects carried out under the auspices of the HFRA. However; in 2009, the USDA Forest Service

granted over $4 million to proponents of 27 Woody Biomass Utilization proposals. Grants of between US $50,000 and $250,000 were made for a broad range of projects. Eligible projects included those which developed and/or upgraded biomass businesses, purchase of equipment for biomass harvesting and utilization etc. Applicants in 2010 need to demonstrate at least 20% matching funds from non-federal sources for the total project cost. Furthermore, in 2008, part of the delivery of the WBUG program included the provision of technical assistance to over 800 applicants across USA (United States Department of Agriculture, Forest Service, Woody Biomass Utilization, 2008).

US FOREST SERVICE STRATEGIC PLAN, 2007-2012

The USDA Forest Service Strategic Plan sets out a number of Goals and Performance Measures which serve to increase woody biomass utilization by: (1) Increasing the number of acres brought into stewardship contracts to; (2) provide a reliable supply of forest products over time through the measurement of the number of green tons and/or volume of woody biomass from hazardous fuel reduction and restoration treatments on Federal land that are made available through permits, contracts, grants, and agreements. Such targets are helping drive woody biomass removal activities and bioenergy development (United States Department of Agriculture, Forest Service, USDA Forest Service Strategic Plan FY 2007-2012, 2007).

ENERGY INDEPENDENCE AND SECURITY ACT, 2007

The 2007 Energy Independence and Security Act requires an increase in the use of renewable fuels and set a mandatory renewable fuel standard that requires fuel producers to use at least 36 billion gallons, (136 billion liters) of biofuels by 2022, with an increasing reliance on the use of “advanced biofuels”, i.e. using non-food feedstocks.

Section 207 authorizes US$500 million for the period of fiscal years 2008 through 2015 for a grant program that: (1) makes awards to the proposals for advanced biofuels with the greatest reduction in life-cycle greenhouse gas emissions compared to the comparable motor vehicle fuel life-cycle emissions during calendar year 2005; (2) does not make an award to a project that does not achieve at least an 80% reduction in such life-cycle greenhouse gas emission.

Section 223 authorizes grants for research, development, demonstration, and commercial application of biofuel production technologies in States with low rates of ethanol production, including low rates of production of cellulosic biomass ethanol, as determined by the Secretary.

Section 224 amends Section 932 of the Energy Policy Act of 2005 stating that the “Secretary shall establish a program of research, development, demonstration, and commercial application for increasing energy efficiency and reducing energy consumption in the operation of biorefinery facilities” (United States Government Printing Office, Energy Independence and Security Act of 2007, 2007).

COOPERATIVE FORESTRY ASSISTANCE ACT OF 1978 AS AMENDED 2008 (CFAA)

The CFAA is comprehensive legislation intended to address the efficient utilization of non-Federal State and Private forest resources. For Woody Biomass utilization purposes, the Act authorizes the Secretary of Agriculture, with respect to non-Federal forest lands of the United States, to assist in the establishment of a coordinated and cooperative Federal, State, and local forest stewardship program for management of the non-Federal forest lands to encourage the production of timber. The act seeks to accomplish this objective through the prevention and control of insects and diseases affecting trees and forests; the prevention and control of rural fires; and, the efficient utilization of wood and wood residues, including the recycling of wood fiber.

Several programs provide assistance in the accomplishment of woody biomass utilization objectives, such as:

Helps private landowners manage forests to enhance and maintain productivity, health, biodiversity, soil and water resources, recreation, and aesthetics. FSP helps landowners develop sustainable management plans. FSP provides educational, technical, and financial assistance to help landowners implement their management objectives.

Forest Stewardship Contracting (FSC)

Under FSC the Forest Service and the Bureau of Land Management, via agreement or contract as appropriate, may enter into stewardship contracting projects with private persons or other public or private entities to perform services to achieve land management goals for the national forests and the public lands that meet local and rural community needs. One such land management goal is to remove vegetation or other activities to promote healthy forest stands, reduce fire hazards, or achieve other land management objectives. For the purposes of woody biomass utilization, the vegetation removed may be awarded to the private contractor as payment for services rendered.

The Forest Legacy Program (FLP)

Protects private forest lands from being converted to non-forest uses. FLP helps landowners establish conservation easements on their land.

Biomass Commercial Utilization Grant Program

Grants authority to the Secretary of Agriculture to make grants to a person that owns or operates a facility that uses biomass as a raw material to produce electric energy, sensible heat, transportation fuel, or substitutes for petroleum-based products, the Secretary may make grants to a person that owns or operates

a facility that uses biomass for wood-based products or other commercial purposes to offset the costs incurred to purchase biomass (United States Department of Agriculture, Forest Service, Laws Relating To USDA Forest Service State and Private Forestry Programs, 2011).

Collaborative Forest Landscape Restoration Program of 2009 (CFLRP)

The purpose of the Collaborative Forest Landscape Restoration Program is to stimulate the collaborative, science-based ecosystem restoration of priority forest landscapes in order to:

(1) encourage ecological, economic, and social sustainability;
(2) leverage local resources with national and private resources;
(3) facilitate the reduction of wildfire management costs, including through reestablishing natural fire regimes and reducing the risk of uncharacteristic wildfire
(4) demonstrate the degree to which various ecological restoration techniques achieve ecological and watershed health objectives; and
(5) encourage utilization of forest restoration byproducts to offset treatment costs, to benefit local rural economies and improve forest health.

Title IV establishes the Collaborative Forest Landscape Restoration Fund providing funding authority for requests by the Secretary of up to $40,000,000 annually for fiscal years 2009 through 2019. Up to 50 percent of the costs of carrying out and monitoring ecological restoration treatments on National Forest System (NFS) land for each proposal selected may be covered by Federal funds. However, no more that $4 million may be spent on any one project, in only two projects per year in any one FS region; and, only up to 10 projects per year nationally (United States Department of Agriculture, Forest Service, Collaborative Forest Landscape Restoration Program Overview, 2012).

2.5.2 STATE LAWS

2.5.2.1 State Environmental Laws

MONTANA

MCA 75-1-101 et seq -- Montana Environmental Policy Act of 1971 (MEPA).

MEPA requires state agencies to consider the environmental, social, cultural and economic impacts of proposals like mines, power plants, subdivisions, and timber sales, before the project is approved. The purpose of MEPA is to foster state government decisions that are informed, accountable, open to public participation, and balanced. MEPA has resulted in State agencies making better decisions based on community concerns. The MEPA process is often the only opportunity the public has to provide input on state agency decisions. Air quality and water quality laws are very limited in scope. State agencies consider the broad array of impacts a project could have on such things as cultural resources, fish and wildlife, or community safety. MEPA gives a community the ability to provide input into decision making and help resolve issues before they become a problem. No other law allows consideration of such issues.

MEPA was significantly weakened by amendments during the 2011 legislative session. Foremost is the fact that the provision allowing citizens to hold the State accountable for failing to comply with MEPA has been removed. Thus, state agencies will no longer be required to identify, understand, or mitigate environmental impacts of projects before issuing permits, licenses, or leases. The bill also weakened citizen's ability to prove standing in lawsuits, which reduces their ability to hold industry and the State accountable for poor MEPA analyses. MEPA was also amended so that during an analysis, only the direct impacts within Montana's borders can be considered (Montana Environmental Information Center, Montana Environmental Policy Act 2012).

IDAHO

I.C. 39-101 et seq -- Idaho Environmental Protection and Health Act of 1972 (IEPHA).

The Idaho Department of Environmental Quality (DEQ) is a state department created by the IEPHA to ensure clean air, water and land in the state, and to protect Idaho citizens from the adverse health impacts of pollution. As a regulatory agency, DEQ enforces various state environmental regulations and administers a number of federal environmental protection laws including the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and the Resource Conservation and Recovery Act. DEQ performs a broad range of functions including: (1) assessment of environmental problems; (2) monitoring of air and water quality; and, (3) developing and assisting in the implementation of air and water quality improvement plans. As indicated above, the agency is largely concerned with enforcement of preexisting federal environmental regulations (State of Idaho, Department of Environmental Quality, Performance Measure Report 2010).

2.5.2.2 State Biomass Utilization Resources

STATEWIDE FOREST RESOURCE STRATEGIES

The United States Department of Agriculture (USDA) Forest Service provides funding and other support to states for programs to improve the health, productivity, benefits and extent of state, private and urban forests. The programs this funding supports — including Forest Health, State Fire Assistance (including National Fire Plan), Volunteer Fire Assistance (including National Fire Plan), Forest Stewardship, Urban and Community Forestry, Conservation Education and Forest Legacy—are referred to as State and Private Forestry (S&PF) Programs. The 2008 Farm Bill and a "re-design" of State and Private Forestry programs require that each state develop a Statewide Forest Action Plan (FAP) Resource Assessment and accompanying FAP Resource Strategy across all ownerships as a requisite to receive federal funding. The primary purpose is the development of a plan that will guide State and Private Forestry investments to ensure that federal resources focus on landscape areas with the greatest opportunity to address shared priorities and achieve measurable outcomes.

A parallel purpose is to help landowners and managers in Idaho better recognize and support opportunities where working together and leveraging limited resources can address multiple critical issues of statewide importance in the areas where doing so will have the greatest impact. Stakeholders can use it to support requests and proposals for resources necessary to implement the strategies and to develop local and statewide collaborative frameworks for implementation.

MONTANA STATEWIDE FOREST RESOURCE STRATEGY

In 2009-2010, Montana Department of Natural Resources and Conservation (DNRC) conducted a Statewide Assessment of Forest Resources. The "Assessment Model" covered all forest land, regardless of ownership type, and was accomplished using geographic information system (GiS) analytic techniques. The Montana Statewide Assessment Working Group , a consortium of over 40 interested stakeholders, developed 11 separate sub-model layers based on the National Guidance objectives. Results of the analysis will direct the future deployment of the Farm Bill programs as they relate to planning, information and education, technical assistance or financial assistance activities and may be used to demonstrate the value of forests and forestry on the regional economy, environmental health, and quality of life. The analysis provides insight where future S&PF Programming may be most beneficial (Montana Department of Natural Resources and Conservation 2010).

IDAHO STATEWIDE FOREST RESOURCE STRATEGY

The Idaho Forest Action Plan (FAP) Resource Strategy is a long-term, comprehensive, coordinated strategy for investing state, federal, and leveraged partner resources (Idaho Department of Lands 2010). It addresses the issues and priority landscape areas identified in the Resource Assessment. The Forest Action Plan is statewide in scope. It is not a site specific plan.

The Idaho Forest Action Plan will help provide focus to landowners, agencies, collaborative groups, and partnership efforts in identifying projects and activities to reduce threats to, and increase the benefits of, Idaho's forestlands. From communities to rural forestlands, focusing work in the highest priority areas allows leveraging of funds and coordination across ownerships as a highly effective way to address the most critical forest resource issues in Idaho at a scale where significant, positive changes can be realized.

Idaho Department of Lands (IDL) led the effort to develop a comprehensive resource assessment and accompanying Forest Action Plan through a collaborative process involving representatives from federal and state agencies, counties, non-governmental organizations, S&PF program advisory groups, tribes, interest groups, and private citizens. Three primary teams were formed to craft the assessment and plan: a broad stakeholder group (Stakeholders) and two smaller core teams (Core Teams) made up of a cross section of the Stakeholders—one which helped with the assessment and the other with the strategies.

The Core Teams collected and analyzed data, interviewed managers and landowners, and brought together information to develop the draft and final Forest Action Plan. The Stakeholders helped steer the process, reviewed the work of the Core Teams, and provided comments, suggestions, and guidance throughout the process. Development of the FAP involved several video conference meetings with agency and partner personnel from the identified Priority Landscape Areas. During these meetings, the Core Strategy Team shared information from the assessment and asked the local representatives to further characterize the issues and conditions of the area and share plans and strategies they felt were the most important for these areas. This team then synthesized the information and, working with the Stakeholders, developed a cohesive five year Forest Action Plan for Idaho.

It is imperative to recognize that the FAP is an iterative document and a dynamic process. Resources and priorities evolve as new information becomes available and conditions in Idaho's forests change. This document will be updated periodically to reflect adjustments and remain relevant and useful, and new Forest Action Plans, including the assessment and strategy development, will be completed at five year interval (Idaho Department of Lands 2010).

2.5.3 LOCAL LAWS

2.5.3.1 County Comprehensive Plans

Table 2.5.2 provides a summary of local plans related to biomass extraction for the counties of the Western Montana Corridor. For each county listed, the comprehensive plan (known as Growth Policies in Montana) was analyzed for five criteria: availability of forest resources inside the county, historical and current forest industry in the county, economic development goals consistent with the forest industry, and whether the county's environmental policies accept biomass extraction and/or is a need for hazardous fuels reduction stated.

Figure 2.5.3 was created based on the results of Table 2.5.2 and demonstrates that for the majority of the counties of the Western Montana Corridor, local policies are beneficial to biomass extraction. Each county's forest product industry feasibility is further explained below.

LINCOLN COUNTY, MONTANA

Lincoln county is predominantly working forest land: 73.5% of the land area is Kootenai National Forest, and another 12.5% belongs to Plum Creek Timber company. However, with legal proceedings halting harvests, mill closures in 2005, and Plum Creek selling land for development, the forest product industry has declined dramatically. The predominant economy has returned to mining. With the loss of the timber economy, the county is no longer able to provide adequate services county-wide and relies on assistance from the Secure Rural Schools and Community Self-Determination Act. In 2006, Lincoln County received $5.98 million to cover services like school funding and road maintenance ("Lincoln County Growth Policy" 2009).

Lincoln county would like to diversify their economy, and the comprehensive plan places emphasis on expanding cellular and Internet coverage. While Lincoln County doesn't have specific goals to reinvigorate their forest industry, their goals do include maintaining historic and recreational land uses and rural lifestyles. In addition, they are open to public-private partnerships to provide for the public good and recognize the need for fuel management as their land is 91.6% conifer forest. Currently, Lincoln is addressing the potential threats of large fires through HFRA and a Community Wildfire Protection Plan ("Lincoln County Growth Policy" 2009). The removal of woody debris is especially important in this county as the biggest impact on land use is Plum Creek Timber selling parcels for development, placing more homes in the wildland-urban interface. For these reasons, Lincoln County may be open to revitalizing their forest product industry for biomass utilization.

Table 2.5.2. Comparison of County Growth Policies

Municipality, State	Forest resource available in county	Past forest product industry	Current forest product industry active	Open to economic development for forest products	Environmental goals accepting of biomass extraction/ Hazardous fuels reduction goal
Flathead, MT	Y	Y	Y	Y	Y
Missoula, MT	Y	Y	Y	Y	Y
Mineral, MT	Y	Y	Y	Y	Y
Lincoln, MT	Y	Y		Y	Y
Ravalli, MT	Y	Y		Y	Y
Sanders, MT*	Y	Y		Y	Y
Lake, MT	Y	Y			Y
Cascade, MT		limited		Y	Y
Yellowstone, MT				Y	
Boundary, ID	Y	Y	Y	Y	Y
Bonner, ID	Y	Y	Y	Y	Y
Kootenai, ID	Y	Y	Y	Y	Y
Shoshone, ID	Y	Y	Y	Y	Y
Spokane, WA	Y	Y	Y	Y	Y
*Nonoperational, bankrupt biomass boiler in Thompson Falls, recipient of Fuels for Schools Funding & Beyond					
Source: See county comprehensive plans/growth policies in Resources.					

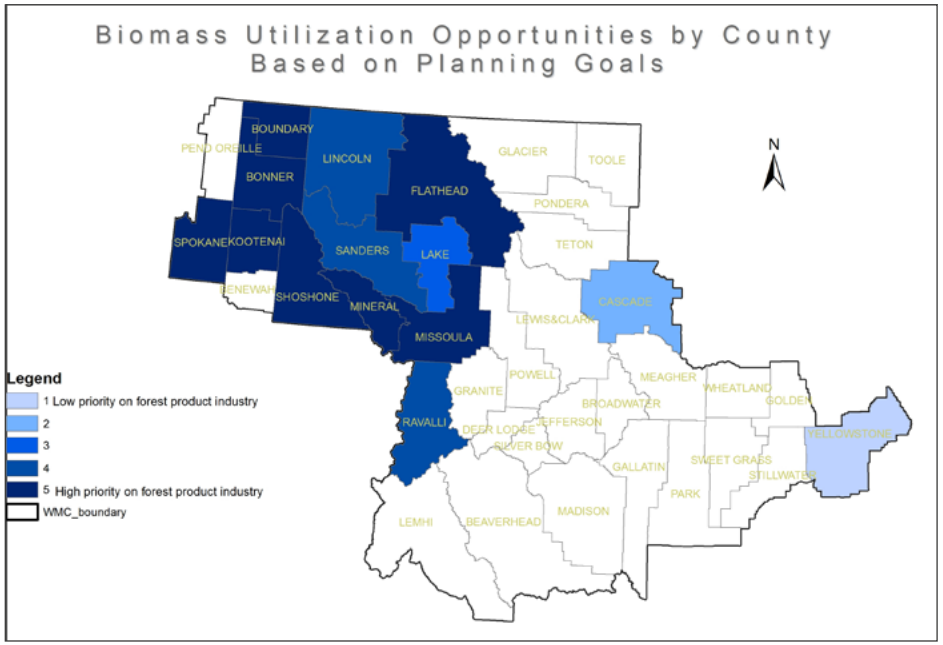

Figure 2.5.3 Map of Western Montana Corridor Counties

FLATHEAD COUNTY, MONTANA

Flathead County benefits from a diversified economy. In addition to traditional natural resource-based industries, Flathead has a thriving tourism economy. Therefore, this county seeks a fine balance between policies which foster the forest product industry and maintaining view sheds, recreational opportunities, and environmental quality. Furthermore, the comprehensive plan emphasizes encouraging industrial land uses which do not affect the area's water quality or Glacier National Park's Class I air-shed, and an active but sustainable timber industry. This county seeks to develop cooperative agreements with Montana Department of Natural Resources and Conservation to provide forest landowners with options to reduce development of these lands. To boost the forest resource industry and reduce fire danger, the following strategies have been implemented: the Subdivisions Regulation and Wildland Urban Interface Zoning Overlay, Flathead County Natural Resource Use Policy-Custom and Culture Document, and the Rural Lands Policy and Regulation Advisory Committee ("2012 Flathead County Growth Policy" 2012).Therefore, Flathead has been listed as a recommended county for collaboration.

MISSOULA COUNTY, MONTANA

Missoula County successfully maintains a diversified economy while also placing high value on environmental protection and open space. Seventy nine percent of respondents in one citizen survey want to protect forest and agriculture business from residential development, so the Agricultural and Forest Protection Zoning was implemented ("Missoula County Growth Policy" 2005). While Missoula hopes to protect water, wildlife, and views, it also supports "clean industries" and the use of raw forest products to boost the economy, especially if there is longterm potential. Biomass utilization would likely be viewed favorably by this county.

RAVALLI COUNTY, MONTANA

Ravalli County is ringed by the Bitterroot National Forest, and 76% of the land is state and federal lands. However, the timber economy has dropped significantly over the last 30 years, and now the county hopes to shift to a service-based economy ("Bitterroot Valley Resource Use Plan" 2012). In the first decade of the new century, labor earnings from forest products in Ravalli dropped by more than double. Due to an expanding outdoor recreation tourism industry, this county seeks to boost the traditional forest industry but not degrade the experience for outdoor recreation tourists. Since the developed areas of Ravalli sit nearly surrounded by forest, controlling fuel buildup is especially important here, and fuel management goals include harvesting 80% of annual mortality and to utilize woody debris for alternative power ("Bitterroot Valley Resource Use Plan" 2012). This county wants to increase tax incentives for new resource industries, but is not particularly interested in stewardship contracting as it does not contribute to the local economy. The Bitterroot Valley Natural Resource Plan supports resource use with sensible environmental and economic plans.

CASCADE COUNTY, MONTANA

Cascade County contains Malmstrom Air Force Base and Great Falls International Airport, which is serviced by five airlines and FedEx. Because of limited forest resources, the historical economy in Cascade is agriculture, not timber. This county was included here for its value as a manufacturing, processing, and transportation hub. Economic development goals encourage sustainability, utilizing preexisting assets, and the use of alternative energy sources, all consistent with biomass utilization ("Cascade County Growth Policy" 2006).

YELLOWSTONE COUNTY, MONTANA

Yellowstone County is in the plains of Montana. Currently the local economy is focused on agriculture and mineral resources. There are three oil refineries in Billings: Conoco Philips, Exxon Mobil, and the CHS Refinery. Yellowstone County is considered a processing and transportation hub and due to these assets, it is therefore included in the Western Montana Corridor. (Yellowstone County and City of Billings Growth Policy Update" 2008)

FLATHEAD RESERVATION — CONFEDERATED TRIBES OF THE SALISH-KOOTENAI, MONTANA

In the Flathead Reservation, home of the Confederated Tribes of the Salish-Kootenai, all goals and decisions are guided by tribal values, collaboration, and longterm sustainable goals. Forest management decisions will be based on an ecosystem approach and to reduce wildfire hazards ("Flathead Reservation Comprehensive Resources Plan: Policies"). With the Tribal Natural Resources Department Ordinance, the Tribal Natural Resources Department seeks a balance between economic development and environmental protection and to use scientific expertise in decision making. The Timber Use Policy Statement, the Flathead Indian Reservation Fuels Management Plan of 1989, and the Annual Fire Management Plan all manage fuel loads, maintain a sustainable harvest, and direct the utilization of "unmerchantable" biomass ("Flathead Reservation Comprehensive Resources Plan: Policies"). The Tribe is open to working with industries for environmentally-responsible energy source development.

SANDERS COUNTY, MONTANA

Sanders County Community Development Corporation's mission is to study and promote existing businesses and improve community infrastructure as a means of meeting the economic needs of rural Sanders County. SCCDC develops, promotes and coordinates educational programs, technical assistance and research on retaining and expanding existing businesses. As a strategy to improve the rural economy in Montana, SCCDC focuses on implementing "value added" processing of Montana's raw products.

MINERAL COUNTY, MONTANA

Mineral County's goal is to protect and conserve the natural resources, clean air and water. Mineral County is also planning to include allowances for light industrial development as well as improvement of retail trade opportunities. Because the timber and transportation service industries represent a significant share of county income, there is a need to designate adequate land for a continuation of local services for these enterprises. Preference should be given to preserving the existing operations with good access and that do not produce negative long term impacts.

LAKE COUNTY, MONTANA

The economy is no longer based on natural resources however goals still protect the natural resources and the character of the different parts of Lake Count . When the need arises they will call on local scientific experts to help review development proposals. They also plan to implement best management practices for development along water bodies, wildlife habitat and forested areas to make development more compatible with resource areas.

BOUNDARY COUNTY, IDAHO

Boundary County features an abundance of forested land. Most of Boundary County's land base is forested, and over half the land base in the county is managed by the U.S. Forest Service. The harvest of timber and other products from forest land in Boundary County is essential to the local economy. Planning decisions seek to encourage multiple uses of forest resources and promote harvest, thinning and other silvicultural practices to ensure safety and to improve the health and diversity of forest land. Timber, harvested from both public and private land, plays a critical role in the Boundary County economy, and county policy decisions support and promote sound silvicultural practices to allow continued access to public forest land for the harvest of timber and timber products at the highest sustainable level in areas deemed suitable for logging. The abundance and variety of natural resources in Boundary County is the foundation of the county's economy and the basis for the quality of life enjoyed by it's citizens. All public policy is shaped to protect these natural resources to provide for the economic needs of the citizenry while sustaining the health and diversity of the environment to ensure that these resources will be enjoyed and cared for by succeeding generations (Boundary County, Idaho, 2007).

BONNER COUNTY, IDAHO

Approximately 70 percent of Bonner County is forestland, a majority of which is composed of the Kaniksu National Forest and the Priest Lake State Forest. Private holdings and a small percentage of land owned by the U.S. Department of Interior and the Bureau of Land Management, make up the remainder of Bonner County Forest Land. Bonner County encourages economic diversity for the financial health of the community and maintenance of its rural atmosphere. Natural resource based industries such as mining, timber production, woodworking plants and agribusiness are recognized as viable components of Bonner County's economic health and are encouraged to develop. Bonner County places a high value on its natural resources and amenities and desires to protect these features that make the county unique place to live, work and play. The county recognizes that natural resources, such as pure water, clean air and diverse wildlife, are important to preserve and once lost, they may not be recovered. Bonner County strives to manage its natural resources to attain the greatest long term public benefit (Bonner County, Idaho, 2007).

KOOTENAI COUNTY, IDAHO

Kootenai County has a large and diverse economic base. However, it seeks to preserve the strength of the existing forest, mining, and agricultural industries. It seeks to encourage high value added resource-based products and businesses, which might make it a good candidate for conversion facilities. As such, it is willing to work cooperatively with relevant agencies to, identify and protect productive timber resource lands. The County also seeks to encourage the retention of timberland using incentives, including, but not limited to, conservation easements through the transfer, donation, acquisition, or trade of development rights and encourages development regulations, which require mitigation of conflicts between natural resource based land/uses and non-natural resource based lands/uses by developing creative options of buffering (Kootenai County, Idaho, 2010).

SHOSHONE COUNTY, IDAHO

Shoshone County is in a transitional phase and its comprehensive plan is being revised. Other resources such as the Shoshone County Forest Health Collaborative Biomass Committee are better suited for our current purposes. The Biomass Committee has the responsibility to investigate the various options of using woody biomass generated from forest health restoration projects to provide sustainable economic development. The committee addresses topics such as: (1) the cost associated with acquiring and processing woody biomass; (2) markets and end products; (3) potential partners; (4) Economic sustainability; and (5) ecological sustainability (Silver Valley Economic Development Corporation, 2011).

SPOKANE COUNTY, WASHINGTON

Spokane County, Washington places high value on rural lands and environmental protection. While there is little public forest land, Spokane values its private forest landowners; tax incentives exist to keep density low within the Spokane County Forest Resource Lands of Long Term Community Significance ("Spokane County Comprehensive Plan" 2007). Though Spokane enjoys a diverse economic base, the historical lumber and paper industries are still considered important. Therefore, lands supporting long term commercial resources are being identified for economic development. Additionally, Spokane County is an important transportation node.

2.5.4 AGENCY PROGRAMS

2.5.4.1 U.S. Forest Service Stewardship Contracting

Stewardship Contracting (Section 323 of Public Law 1087) trades goods for services in an effort to improve ecosystem health and reduce the risks of catastrophic wildfire. The Forest Service or Bureau of Land Management contracts small businesses, nonprofit organizations, tribal governments, communities, resource advisory committees, or other agencies to remove trees and under-story vegetation to meet restoration goals and reduce wildfire fuels. In return, the contractor may sell the small-diameter woody biomass as partial payment ("P.L. 1087 (16 USC 2104 Note) " 2003). This biomass is currently utilized for paper, pulp, furniture, plastics, or ethanol production. Contracts may last up to 10 years and are coordinated by the district ranger ("Stewardship Contracting" 2012). Best Value contracting compares various proposals, and if the value of the service is less than the value gained from the sale of the biomass, the Forest Service receives these costs in excess receipts to use in future contracts. Stewardship Contracting is an opportunity for communities to be involved with the federal lands within their borders, revitalize forest-based economies while becoming more sustainable economically and environmentally, and to reduce wildfire threats. The first stewardship contracting project was in the Western Montana Corridor, the Clearwater Stewardship Project in the Seeley Lake Ranger District ("Clearwater Stewardship Contract".

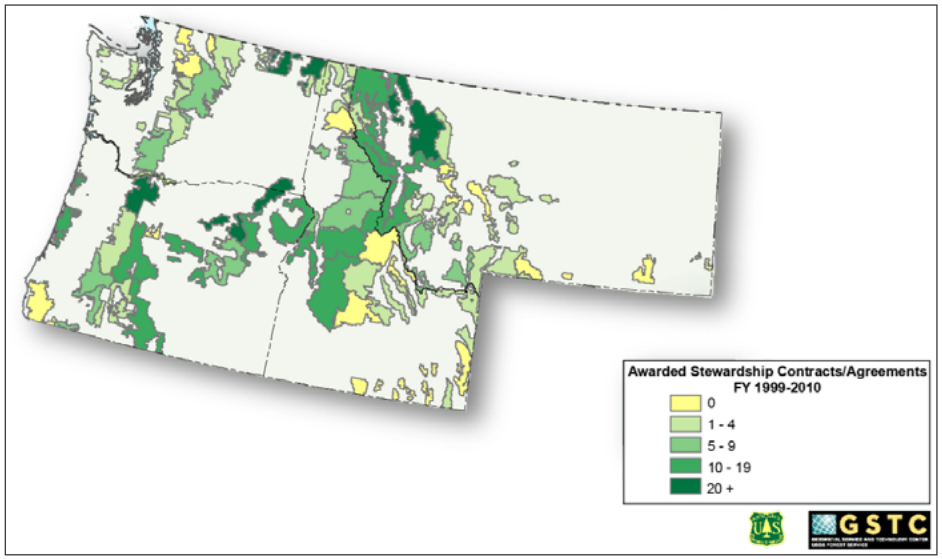

Figure 2.5.4 Map of Stewardship Contracting

2.5.5 TECHNICAL ASSISTANCE AND INCENTIVES

2.5.5.1 Technical Assistance

IDAHO OFFICE OF ENERGY RESOURCES

Idaho Governor's Office of Energy Resource has a full-time technical staff person to assist those interested in bioenergy project development. The technical assistance includes evaluation of plans, referral to equipment vendors, referral to other technical experts and an assessment of biomass feedstock supply and bioenergy product markets.

www.energy.idaho.gov/renewableenergy/bioenergy.htm

NATIONAL ASSOCIATION OF CONSERVATION DISTRICTS

National Association of Conservation Districts (NACD) provides a Woody Biomass "Desk Guide and Toolkit." The Woody Biomass Desk Guide and Toolkit provides an overview of woody biomass production and utilization. It also has tips on how to provide effective outreach for your clientele, and educational handouts. The purpose of the guide is to enhance professionals knowledge with ways to increase awareness of the use of woody biomass for energy in the United States.

http://www.nacdnet.org/resources/guides/biomass/

BITTERROOT ECONOMIC DEVELOPMENT DISTRICT

BitterRoot Economic Development District, Inc (BREDD) is partnering with Craig Rawlings and Forest Business Network to provide technical assistance to regional forest businesses. Assistance includes:

- Assistance with financial and marketing plans to sawmills, loggers and other forest-related businesses impacting BREDD's service area.
- Maintenance of a centralized, accessible source of technical and marketing information for forest products and businesses.
- Development of biomass energy businesses at Montana sawmills.
- Coordination and communication with public and private sector to optimize forest products sector diversification in the state

http://www.bredd.org
https://www.forestbusinessnetwork.com/ourpartners/

TRIBAL ENERGY PROGRAM

Tribal Energy Program provides technical assistance to federally recognized Indian tribes, bands, nations, or other organized groups and communities —including Alaska Native villages or regional and village corporations—with renewable energy and energy efficiency project.

Technical assistance is typically limited to 40 hours and may include, but is not limited to the following:

- Renewable energy technology information
- Renewable resource information
- Energy efficiency technique
- Project support
- System performance modeling
- Policy information
- Design review
- Special studies
- Strategic energy planning
- Training.

To apply complete the technical assistance request form:

http://apps1.eere.energy.gov/tribalenergy/technical_assistance.cfm

Table 2.5.1 Montana Technical Assistance

MONTANA			
Sponsor Agency	**Program Name**	**Description**	**Weblink**
Department of Revenue	New or expanded Industry Tax Credit	Businesses engaged in the production of energy by means of an alternative renewable energy source are eligible for the new or expanded industry tax credit against corporate income tax. *	http://www.deq.mt.gov/Energy/renewable/taxincentrenew.mcpx#15-31-124
Department of Transportation	Tax incentive for production of alcohol	There is a 20 cents a gallon tax incentive for alcohol produced in Montana from 100 percent Montana agricultural products, including Montana wood or wood products. The amount of the incentive is reduced proportionately if agricultural or wood products not from Montana are used in the production of the alcohol.*	http://www.deq.mt.gov/Energy/renewable/taxincentrenew.mcpx#15-70-522
Department of Environmental Quality	"Clean and Green" Property Tax Incentives	Property tax incetives for energy projects with less environmental impact than conventional facilities. If qualified the facility could be taxed at 2.25% or 3% of market value.*	http://www.deq.mt.gov/Energy/PropertyTaxIncentives.mcpx
		* Description used from website	

MONTANA GRANTS AND LOANS

Montana Government offers Grants and Loans for businesses that

1. Have potential to diversify or add value to a traditional basic industry of the state's economy,
2. Show promise for enhancing technology based sectors or commercial development of discoveries,
3. Employ or take advantage of existing research and commercialization strengths,
4. Have realistic and achievable project design,
5. Employ an innovative technology,
6. Are located in the state,
7. Have a qualified research team
8. Have scientific merit based on peer review, and
9. Includes research opportunities for students.

These grants can help cover the cost of training employees for businesses and financing infrastructure. Grants do not need to be repaid.

http://business.mt.gov/BusinessAssistance/grants.asp

2.5.5.2 State Incentives

State programs from Washington and Oregon are provided as examples of possible Incentive Programs for other states to look at, particularly the Oregon Biomass collection policy, which provides $10 per green ton (for woody biomass) when collected and used in the production of fuel (Table 2.5.2).

Table 2.5.2

OREGON			
Sponsor Agency	**Program Name**	**Description***	**Weblink**
Oregon Business Development Department	Biofuels Production Property Tax Exemption	Property used to produce biofuels may be eligible for a property tax exemption if it is located in a designated Renewable Energy Development Zone	http://www.afdc.energy.gov/laws/law/OR/6273
Oregon Department of Energy	Alternative Fueling Infrastructure Tax Credit From Businesses	Business owners and others may be eligible for a tax credit of 35% of eligible costs for qualified alternative fuel infrastructure projects. Qualified infrastructure includes facilities for mixing, storing, compressing, or dispensing fuels for vehicles operating on electricity, ethanol, natural gas, and propane. Unused credits can be carried forward up to five years.	http://www.afdc.energy.gov/laws/law/OR/9555
Oregon Department of Energy	Biomass Production/Collectio	The Oregon Department of Energy provides a tax credit for collectors of biomass. The credit can be used for eligible biomass used to produce biofuel; biomass used in facilities such as those producing electricity from anaerobic digestion, pellets, or torrefaction also qualifies.	http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=OR144F&re=0&ee=0
WASHINGTON			
Sponsor Agency	**Program Name**	**Description***	**Weblink**
Department of Revenue	Reduced B&O Tax Rate	Reduced business and occupation tax rate for manufacturing fuels from wood biomass. The amount of tax is equal to the value of wood biomass fuel manufactured, multiplied by the rate of 0.138%.	http://apps.leg.wa.gov/RCW/default.aspx?cite=82.04.260
Department of Revenue	Property/Leasehold Tax Exemption for Manufacturers of Biodiesel/Alcohol Fuel, etc	For six years after the facility becomes operational all property, machinery, and equipment used for the manufacturing of alcohol fuel, bio-diesel fuel, bio-diesel feed-stock, or the operation of an anaerobic digester, are exempt from property taxation.	http://apps.leg.wa.gov/RCW/default.aspx?cite=84.36.635
		*Descriptions used from websites.	

2.5.6 INTER-AGENCY AGREEMENTS

2.5.6.1 Memorandum of Understanding to Enhance Woody Biomass Utilization

In 2003, a formal Memorandum of Understanding, (MOU), titled "Policy Principles for Woody Biomass Utilization for Restoration and Fuel Treatment on Forests, Woodlands, and Rangelands", to encourage the use of woody biomass by-products as sources of renewable energy, was signed between the three Departments of Energy, Interior and Agriculture. The MOU establishes consistent policies and procedures across the three agencies to support the use of these byproducts.

The MOU focuses on the use of byproducts from land management practices, such as fuels treatment and hazardous fuels reduction that reduce the rate of spread, intensity, resistance to control and crowning potential of wildfires by reducing available fuel. Woody biomass includes trees and woody plants, including limbs, tops, needles, and other woody parts that grow in a forest, woodland, or rangeland area, that are byproducts of ecological restoration and hazardous fuel reduction treatment activities. The MOU calls for: (1) communicating to employees and partners that the harvest and utilization of woody biomass byproducts is an effective restoration and hazardous fuel reduction tool that delivers economic and environmental benefits and efficacies; (2) promoting consideration of woody biomass utilization from restoration and fuels treatment instead of burning or other on-site disposal methods; and, (3) encouraging development of new mechanisms that increase the benefits and efficiencies woody biomass utilization.

This MOU established eight policy principles in support of woody biomass utilization:

- Include local communities, interested parties, and the general public in the formulation and consideration of WBU utilization strategies.
- Promote public understanding of the quantity and quality of woody biomass that may be made available from Federal lands and neighboring Tribal, State and private forests, woodlands, and rangelands nationwide.
- Promote public understanding that WBU may be an effective tool for restoration and fuels treatment projects.
- Develop and apply the best scientific knowledge pertaining to WBU and forest management practices for reducing hazardous fuels and improving forest health.
- Encourage the sustainable development and stabilization of WBU markets.
- Support Native American Tribes, as appropriate, in the development and establishment of WBU within Tribal communities as a means of creating jobs, establishing infrastructure, and supporting new economic opportunities.
- Explore opportunities to provide a reliable, sustainable supply of woody biomass.
- Develop and apply meaningful measures of successful outcomes in WBU.

This MOU led to the establishment of the federal Woody Biomass Utilization Group (United States Department of Agriculture, United States Department of Energy, United States Department of Interior, 2003).

2.5.6.2 Memorandum of Understanding Between the State of Montana and the Province of British Columbia — Cooperation on Environmental Protection, Climate Action and Energy

This cross-border agreement encourages sustainable forest management, reduction of greenhouse gas emissions, and the pursuit of trans-boundary renewable energy sources, including biomass. The agreement recommends cooperation with scientists, tribal nations, and environmental groups and supports low carbon energy development with the Western Governors' Association's Western Renewable Energy Zones Project ("Memorandum of Understanding and Cooperation on Environmental Protection, Climate Action, and Energy" 2010).

2.5.7 SUMMARY

From a policy perspective, the future appears encouraging for biomass utilization in the Western Montana Corridor (WMC). The WMC possesses strengths across all capitals levels. Natural Capital is abundant. And although many economies of the region have been deeply affected by recent downturns in the timber products industry, the regions' communities appear eager to welcome the influx of economic capital that a woody biomass utilization market could bring. In addition, both the social and physical capital of the communities appear poised to fill the vacuum left by the industry downturn.

Fortunately, the policies that once lead to peak use of the region's forest resources, and have subsequently led to its decline, are changing in a positive direction for woody biomass utilization purposes. Incremental legislation over roughly the past three decades has been transitioning from policies that create confrontation over forest resources, to policies that create collaboration among the many diverse parties with a forest resource interest. The passage of the Cooperative Forestry Assistance Act (CFAA) in 1978 marks the beginning of the transition to policies that encourage regional partnerships among federal, state, and private interests to better manage regional forest resources. The implications of the policies subsequently born of the CFAA have taken time to find their full expression. However, two collaborative programs in particular seem to be gaining significant traction. The Healthy Forest Restoration Act (HFRA) facilitates community collaboration on local forest restoration activities and implements these activities by allowing "stewardship contracts" to allow the exchange of services for goods. The agency accomplishes the restoration work they seek, and the community utilizes the woody biomass left over from the treatment. Similarly, the Collaborative Forest Landscape Restoration (CFLRP) program encourages collaboration among diverse community partners in the management of federal programs as well.

Recently, the Chief of the USDA Forest service announced that at least 80 of the over 190 million acres of Federal land are in need of forest restoration work to contend with recent increased wildfire severity. As such, he hopes to increase forest resource utilization by 20% over existing standards. Finally, he noted that recent collaboratively based policy changes have enabled regional partnerships to make a difference in what is happening on the ground and that he could continue to push for the funding that helps enable cooperation. Woody biomass utilization interests stand only to benefit from the present policy trends.

In reviewing the data we collected for the policy section, we used a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis to summarize the existing policy environment for biomass utilization.

The Policy and Political Capital of the Western Montana Corridor are generally supportive of a biomass-to-biofuel industry.

National policies addressing forest restoration and fuels reduction offer a biomass supply. Energy and biomass utilization policies encourage the use of the biomass for community economic development and alternative energy development. State programs and incentives, forest stewardship contracting, and technical assistance provide additional financial and technical support in the region.

Most counties in the Western Montana Corridor support, and even seek, a forest product industry which could simultaneously reduce wildfire risk. Certain counties in the region have suffered from a faltering forest product industry for three decades and now hope to diversify their economies. However, these counties in particular could benefit from a new source of income from the woody biomass industry.

Washington and Oregon have multiple incentives which encourage the removal and sale of woody debris. Montana and Idaho could model similar incentives from these states. Unfortunately, Idaho incentives have expired recently.

Biomass utilization hopes to reduce the threats to the global environment, but processing and conversion must first follow the requirements of our federal environmental laws. Fuels for Schools may be either a threat or an ally for the biojet industry. As an ally, it can retain the biomass to bioenergy supply chain in regions that have historically relied on the timber industry. If the biojet project eventually becomes a reality, the Fuels for Schools program could be seen as a competitor for biomass resources.

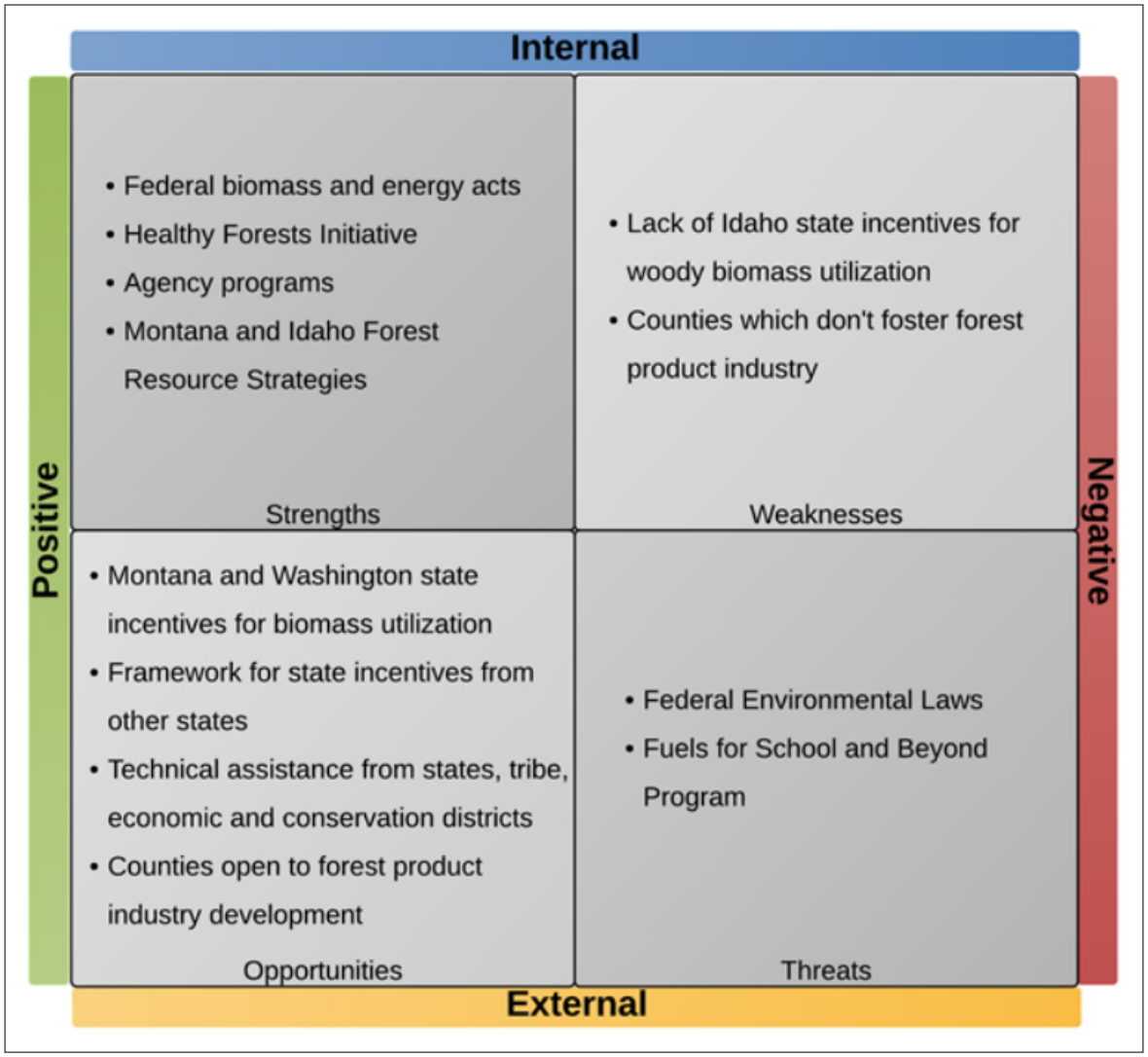

Figure 2.5.5 Strengths, Weaknesses, Opportunities, and Threats

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2.5.9 ACRONYM APPENDIX

Acronym	Explanation
NFP	National Fire Plan
USDA	United States Department of Agriculture
WUi	Wildland Urban interface
HFRA	Healthy Forests Restoration Act
MOU	Memorandum of Understanding
WBUG	Woody Biomass Utilization Group
USFS	United States Forest Service
CFAA	Cooperative Forestry Assistance Act
CFLRP	Collaborative Forest Landscape Restoration Program
FAP	Forest Action Plan
S&PF	State and Private Foresters
IDL	Idaho Department of Lands
IDEQ	Idaho Department of Environmental Quality