Transition Strategies
for
Western Montana's
Forest Products Industry

Report # 1 –
Forest Restoration & Stewardship Opportunities

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Executive Summary

There are 10.3 million acres of private and public forests in the seven counties of western Montana that comprise the project's Target Study Area. Forty percent (40%) of the forested land in Montana is located within these seven counties (Flathead, Lake, Lincoln, Mineral, Missoula, Ravalli and Sanders). These forests provide many social, recreational, ecological and economic benefits to the 295,000 residents that live within the TSA and to those who visit. Commercial timber harvest on these lands has historically and continues to annually generate significant amounts of wood fiber available for utilization by the area's existing forest products infrastructure. This industry remains an important component of western Montana's economic base.

The U.S. Forest Service administers the largest percentage (67.4%) of the Timberland in the TSA. Forest management that involves timber harvest is allowed on 40% of National Forest System lands. Xxxx acres are reserved for other uses, including xxx acres of land within the National Wilderness System.

Private forest lands are the second largest ownership category. Twenty-seven percent (27%) of the forest land within the TSA is owned by private entities that include tribal governments, forest products companies, individual resident and out-of-state citizens and non-profit conservation organizations. Private lands have historically provided the majority of commercial wood fiber in the TSA.

Significant forest health issues are currently impacting the TSA's forest lands. Forest fires have burned 1.5 million (15%) of the TSA's forested acres during the last ten years. Forest insects affected 263,000 acres in 2008. These natural forces diminish forest productivity, impact property values and also affect air & water quality, wildlife habitat, outdoor recreation and tourism. Sustainable management of the TSA's forests also represents a way to protect the health of the planet through the sequestration of carbon.

Appropriate levels of sustainable forest management activities are required to mitigate the factors that are negatively affecting the TSA's forests and associated resources. Applied forest restoration and stewardship methodologies represent an opportunity to protect and enhance those resources. Utilization of the wood fiber generated from these practices will be examined in Report #2 of this project.

Introduction & Objectives

The "Transition Strategies for the Montana Forest Products Industry" project was structured to supplement and enhance the economic and workforce development efforts undertaken by the numerous entities involved in the Montana Region One Rural Innovation Grant (RIG) process. The major objective of this project is to help facilitate the long-term retention of western Montana's forest-based manufacturing infrastructure supply chain and its associated labor force through sustainable forest management of public and private lands. It is also intended to help foster the accelerated regional expansion of value-added, non-cyclical, carbon-neutral wood-products manufacturing, bio-energy production and associated workforce opportunities when and where feasible.

The project addresses an important but currently threatened natural resource-based manufacturing activity currently providing significant direct and indirect employment throughout the seven counties in Montana that comprise the Target Study Area (Flathead, Lake, Lincoln, Mineral, Missoula, Ravalli and Sanders). Todd Morgan, director of the University of Montana's Bureau of Business and Economic Research, reported to the Missoulian on February 21, 2009, that in the fourth quarter of 2008, "…compared to 2005, when U.S. housings starts were at their peak, Montana lumber production has fallen by 32 percent". He also said there were 2,716 people employed at Montana timber processing facilities at the end of 2008 and that "Total 2008 production wages have declined 17 percent since 2005, from $135.6 million to $112.2 million. Those employment numbers and wages do not include the impacts on several thousand people who work in logging, trucking and other jobs related to the industry.

In addition to important economic benefits, this industry also provides the infra-structure needed to properly manage the ten million acres of forests within the Target Study Area (TSA). These forests, and associated resources, help shape the lifestyles of the 295,000 people residing in the TSA and also lure many other in-state and non-resident visitors at all times of the year. Forest habitats are home to a diverse array of wildlife species and provide clear, clean water for native fisheries, agricultural activities and drinking water. However, Mother Nature is not always kind, and when undesirable forest or climatic conditions exist, events such as wildfires or forest insect epidemics often result.

This phase of the Project will evaluate the opportunities to sustain the critical balances between ecological, economic and social issues by applying

suitable restoration and stewardship practices on public and private forest lands in western Montana. It will identify the potential to achieve combinations of public and private sector benefits related to:

- Forest Fuels Mitigation
- Reduction of Fire Suppression & Rehabilitation Expenses
- Insect & Disease Control
- Fisheries and Wildlife Habitat Protection & Enhancement
- Outdoor recreation & Tourism
- Carbon Sequestration

Forest Resource Characteristics

Montana is the fourth largest state in the United States with a total land and water area of 94.1 million acres. Twenty five million acres or twenty-seven percent (27%) of the State is forested. Of this acreage, 19.8 million acres are classified as "non-reserved timberland". Certain forested areas, such as federally-designated Wilderness areas, Research Natural Areas, designated Wild and Scenic Rivers and National Parks are permanently "reserved".

The seven county Target Study Area (TSA) of western Montana is more heavily forested than the rest of the State – 82% of the TSA is forested. There are 10.3 million forested acres within the TSA - 40% of Montana's forested land is contained within these seven counties. The TSA is best characterized as "forested" – it also has 25% of Montana's water as measured by surface area. The county-level distribution of the TSA's forests is depicted below:

County	Forest (Acres)	% of Total
Flathead	2,780,033	26.9
Lake	550,401	5.3
Lincoln	2,175,374	21.0
Mineral	743,248	7.2
Missoula	1,409,899	13.6
Ravalli	1,241,699	12.0
Sanders	1,446,585	14.0
TSA Total	10,347,239	100

Timberland

Forest land is a specific forest resource classification used to define areas where trees are the predominant vegetation on the land. Within that classification, a separate sub-set of forest land is known as Timberland, a category based on the land's potential to grow trees. Timberland that portion of Forest land that is capable of producing at least 20 cubic feet of growth per acre per year. Eighty-four percent (84%) or 8.66 million acres of the TSA's forest land is classified as Timberland.

County	Timberland (Acres)	% of Total
Flathead	1,694,678	19.7
Lake	472,934	5.5
Lincoln	2,134,575	24.8
Mineral	743,248	8.6
Missoula	1,266,295	14.7
Ravalli	978,421	11.4
Sanders	1,370,598	15.9
TSA Total	8,660,749	100

Timberland Ownership

There are five major categories of Timberland ownership in the TSA. They are:

Category	Acres	% of Total
U.S. Forest Service	5,836,533	67.4
Bureau of Land Management	12,222	0.1
State of Montana	488,654	5.6
County	8,999	0.1
Private	2,314,341	26.7
TSA Total	8,660,749	100

The U.S. Forest Service administers the largest percentage (67.4%) of the Timberland in the TSA. These are lands in the Kootenai, Flathead, Lolo and Bitterroot National Forests. Private lands, the second largest ownership category at 26.7%, are represented by Tribal timberland, Industrial timberland (such as Plum Creek Timber Company & Stoltze Land & Lumber) and Non-Industrial Private Landowners.

Timberland acres by county for each of the major ownerships are detailed below:

County	USFS	BLM	State	County	Private
Flathead	1,074,479	0	162,350	0	457,849
Lake	121,948	0	45,113	0	305,873
Lincoln	1,723,623	0	46,630	0	364,322
Mineral	628,839	0	25,461	0	88,948
Missoula	570,518	12,222	139,053	8,999	535,503
Ravalli	835,710	0	33,932	0	108,779
Sanders	881,416	0	36,115	0	453,067
TSA Total	5,836,533	12,222	488,654	8,999	2,314,341

There are 9,100 non-industrial private landowners (NIPFs) who own 914,000 acres of private forest land in the TSA. The county-level data is presented below and can be accessed via the Montana Cadastral Database at: http://nris.mt.gov/nsdi/nris/cadastral.html

County	NIPF Acres	# of Landowners
Flathead	408,394	2,546
Lake	56,709	525
Lincoln	112,547	1,775
Mineral	32,865	451
Missoula	117,773	1,435
Sanders	83,968	961
Ravalli	101,778	1,410
Total	914,034	9,103

Twenty-five percent (25%) of these acres are held by individuals living out-of-state.

Lands classified as Industrial Timberland within the TSA are owned by Plum Creek Timber Company, Inc., Stimson Lumber Company, Inc., F.H. Stoltze Land and Lumber Company, RY Timber Inc. and Montana Forest Products, LLC. The county-level distribution of industrial forest in the TSA is illustrated below:

County	Industrial Timberland (Acres)	Percent
Flathead	677,059	38.8%
Lake	100,744	5.8%
Lincoln	334,475	19.2%
Mineral	57,338	3.3%
Missoula	397,369	22.8%
Sanders	170,107	9.8%
Ravalli	6,597	0.4%
Total	1,743,689	100%

Major changes are currently affecting industrial timberland ownership patterns in and adjacent to the TSA. The Blackfoot Community Project, a partnership between the Blackfoot Challenge, The Nature Conservancy and Plum Creek Timber Company started with the purchase of 88,000 acres of Plum Creek forest land by The Nature Conservancy. Guided by a collaborative process, these lands are being resold to public agencies and private owners to help keep timber and conservation values intact. Five thousand, six hundred acres (5,600 acres) of this former industrial forest land

will be owned by the Blackfoot Challenge and managed by a 15-member Council. Uses of this land (known as the Blackfoot Community Conservation Area) include public hunting access, regulated motorized recreation and the use of sustainable forestry practices to achieve desired forest and range conditions.

The Montana Legacy Project involves another significant change in timberland ownership within the TSA. In partnership, The Nature Conservancy and the Trust for Public Land are purchasing 320,000 acres of Plum Creek timberland in western Montana. The goals of this project are to protect clean water and fish & wildlife habitat, keep forests in productive timber management and promote public access for outdoor recreation.

Timberland Growing Stock

Forest growing stock is a metric used to quantify the volume of live trees. Two commonly used tree volume measurements are board feet and cubic feet.

The board foot measurement is a specialized unit of volume for measuring lumber in the United States and Canada. This unit of measure has also been adopted to measure the volume in trees and logs that are of sufficient size to be classified as sawtimber. Trees that are nine inches DBH or larger are included in this measurement system. DBH is a term used to standardize the location at which a tree's diameter is measured. It stands for Diameter-at-Breast Height, which has been determined to be 4.5 feet from ground level.

There are 83.9 billion board feet of softwood sawtimber growing stock on forest lands within the TSA. This amount represents 55% of the total sawtimber growing stock in the state of Montana. Douglas-fir is the most common tree species, representing 28% of the total sawtimber growing stock in the TSA. Western larch is the second most common tree species in the TSA, followed by Engelmann spruce, True firs and western hemlock, Ponderosa pine and Lodgepole pine.

A cubic foot of growing stock is a solid cube of wood that is one foot in length on all sides of the cube. This metric has been adopted in recent years partly in order to include the volume of all trees that are of sufficient size to be classified as commercial products. Trees that are five inches DBH or larger are included in this measurement system. There are 19.953 billion cubic feet of commercially sized softwood trees growing within the TSA.

Forest Productivity

Forest productivity is a quantitative metric used to classify the productivity potential of a forested site. Forest productivity is primarily dependent upon soil type and the amount of moisture a site receives. Forest productivity is expressed in cubic feet per acre per year. The timberland in the TSA is significantly more productive than timberland in other areas of Montana. Sixty-six percent (66%) of the timberland in the TSA can produce in excess of 50 cubic feet per acre per year. All of the 150,000 acres of timberland in Montana that can produce more than 120 cubic feet per acre per year are located within the TSA.

Net Annual Growth

Forest productivity is correlated with annual growth, but net annual growth is also a function of actual site stocking levels and the negative impacts of wildfire, forest insects and disease that either slow tree growth or are the cause of tree mortality. Net annual growth of sawtimber within the TSA timberland is 1.572 billion board feet per year.

Harvest Levels

The following table illustrates the annual timber harvest amounts in the State of Montana, by ownership. One MMBF equals one million board feet.

Montana Timber Harvest History by Ownership Class (MMBF)

	1976	1981	1988	1993	1998	2004
NIPF	222	209	235	353	263	266
Industry	398	352	398	305	354	285
Tribal	38	23	57	36	24	51
Total Private	658	584	690	694	641	602
% of Total	57%	56%	56%	69%	74%	77%
USFS	483	413	497	282	191	117
Other Public	20	39	50	25	38	66
Total Public	503	452	547	307	229	183
% of Total	43%	44%	44%	31%	26%	23%
Total	1,161	1,036	1,237	1,001	870	785

Private lands have historically provided the majority of timber harvest within the TSA. Over the last ten years, private lands have provided approximately 75% of the timber harvest in the TSA.

This table illustrates timber harvest history within the TSA counties.

Timber Harvest History, by County, for TSA (MMBF)

County	1976	1981	1988	1993	1998	2004
Flathead	232	245	255	150	148	156
Lake	42	28	53	53	38	33
Lincoln	293	267	324	208	153	119
Mineral	50	45	40	32	20	41
Missoula	146	120	141	136	129	109
Ravalli	35	41	36	40	23	13
Sanders	153	93	93	107	76	75
TSA Total	951	839	942	726	587	546
MT Total	1,161	1,036	1,237	1,001	870	785
TSA %	82%	81%	76%	73%	67%	70%

The TSA historically provided in excess of 75% of the States timber harvest until recent years, when that amount dropped to 67% in 1998 and then increased slightly to 70%. The forests of the TSA continue to provide the majority of the timber harvest in the State of Montana.

Forest Health

Forest management involves the process of assessing a forest and acting accordingly to provide for its sustainability. Kolb (2004) describes a healthy forest as "...defined by the natural history of the site and the growth characteristics of the naturally occurring tree species. In general, a healthy forest has a majority of trees that are vigorous and resistant to insects and diseases, and the ability to sustain itself as a forest when affected by wildfire."

The ability of western Montana's forests to remain and/or become healthy, beautiful, resilient and sustainable is directly tied to proper management of forest structure, tree spacing and species composition. Trees in the forest over-story and understory compete for water, sunlight and nutrients - overcrowded stands of old and/or young trees do not grow at optimal rates and thus are more susceptible to forest insects and diseases that further reduce their vigor or result in premature mortality. Forest fuel levels are directly correlated with forest structure and tree density – thick stands of old and/or young trees are more susceptible to wildfire events, especially where understory trees provide a ladder for ground fires to reach the crowns of larger trees.

Forest conditions in western Montana have been significantly affected by a 60 year cool-wet cycle, wildfire suppression and decreased forest management activity on public lands. The result of these factors across the region is the current predominance of large areas of dense forests consisting of unusually high numbers of shade tolerant small trees in the forest understory. These fuel conditions, combined with a current warm-dry climate shift, have allowed wildfires of uncharacteristic size to develop with tremendous impacts on forest ecosystems, natural resource businesses and property values. The strategic reduction of forest fuels is of paramount importance in order to lessen the negative effects of uncontrolled wildfires.

Wildfire

It is well documented that wildfire has historically impacted the TSA's forest resources. The changes in forest structure and density noted above, combined with drier, warmer climatic changes, have resulted in an increase in the size and intensity of recent wildfires. Over the last ten years, over four million acres have burned in Montana, with 1.5 million acres (35%) of that land in the TSA. The majority (82%) of wildfire impacts within the TSA have occurred on U.S. Forest Service and other federal lands.

Owner	TSA Acres	Montana Acres	TSA Percent
U.S. Forest Service	1,081,360	2,062,443	52%
Other Federal	247,678	816,295	30%
State Lands	120,705	757,652	16%
Private	22,025	542,256	4%
Total	1,471,768	4,178,646	35%

Wildfire Suppression Costs

The cost of fighting recent wildfires has significantly affected the capability of the U.S. Forest Service to fund other natural resource management programs associated with their annual stewardship objectives. Programs such as weed control, road and trail maintenance, campground maintenance and improvements, pre-commercial thinning and timber sale preparation are sometimes delayed, as up to 45% of a U.S. Forest Service national budget can be consumed during a prolonged, difficult wildfire season. Fire suppression costs also negatively impact State of Montana budgets.

Over the last five years (2004 – 2008) the total costs to suppress wildfires occurring in the TSA has been $139.8 million, an average of $28 million per year. During that time, 510,514 acres in the TSA were affected by wildfire.

Forest Insects

The four most prevalent forest insects species affecting forest health in Montana and in the TSA, are, in order of forested acres affected, the Mountain Pine Beetle (*Dendroctonus ponderosae*), the Western Spruce Budworm (*Choristoneura occidentalis*), the Western Balsam Bark Beetle (*Diyocoetes confusus*), and lastly the Douglas-fir Bark Beetle (*Dendroctonus pseudotsugae*). Statewide, these insects impacted 2.4 million acres of forested land in 2008. Within the TSA, 262,885 acres of forest land were affected by these insects. County-level acreage statistics for each insect species are listed below:

County	Mountain Pine Beetle	Spruce Budworm	Balsam Bark Beetle	Douglas-fir Bark Beetle	Total (acres)
Flathead	27,198	1,602	14,024	7,621	50,445
Lake	7,898	0	2,014	879	10,791
Lincoln	1,640	23,046	1,478	181	26,345
Mineral	24,711	0	41	4	24,756
Missoula	79,605	1,176	2,521	1,849	85,151
Sanders	40,416	11,103	76	55	51,650
Ravalli	9,070	1,162	2,848	667	13,747
Total	190,538	38,089	23,002	11,256	262,885

Mountain Pine Beetle is the primary insect impacting forest health in all counties except for Lincoln County, where the Spruce Budworm is the primary insect. There are significant Western Balsam and Douglas-fir Bark Beetle issues in Flathead County. The below table illustrates that 86% of the forest insect impacts within the TSA are on federal lands.

County	Federal	State	Private	Total (acres)
Flathead	45,493	1,425	3,527	50,445
Lake	9,541	407	843	10,791
Lincoln	22,334	101	3,910	26,345
Mineral	23,776	16	964	24,756
Missoula	67,142	6,705	11,304	85,151
Sanders	44,518	1,005	6,127	51,650
Ravalli	13,096	93	558	13,747

Total	225,900	9,752	27,233	262,885
% of Total	86%	4%	10%	100%

Habitat Restoration & Enhancement

Suitable forest, range and aquatic habitat conditions, on private and public lands, are essential to sustain Montana's fish and wildlife populations. Numerous federal and state agencies, including the U.S. Forest Service, BLM, the U.S. Fish & Wildlife Service and the Montana Department of Fish, Wildlife & Parks invest financial resources aimed to protect, restore and enhance habitat conditions on the lands they manage. Common resource management practices include weed control, prescribed burning, riparian area fencing and stream restoration. These agencies are increasingly integrating appropriate forest management practices into their habitat restoration and enhancement efforts. Such practices include tree thinning, rejuvenation of aspen stands and removal of forest encroachment where coniferous tree growth affects historic grassland and shrub ecosystems.

Non-profit conservation organizations in Montana also invest in fish and wildlife habitat restoration and enhancement efforts through partnerships with federal/state agencies and private landowners. The Rocky Mountain Elk Foundation (RMEF) launched its Habitat Stewardship Services program to accelerate elk habitat enhancement on federal lands managed by the U.S. Forest Service and the Bureau of Land Management. The program's many achievements include the establishment of a Master Stewardship Cost Share Agreement with Region One of the U.S. Forest Service, an accomplishment that provides RMEF with a mechanism to manage Forest Stewardship projects as a general contractor. As an example, RMEF has recently partnered with the USFS on a Stewardship Project in the Flathead National Forest. The project will enhance wildlife habitat through the selective harvest and thinning of Lodgepole and Ponderosa Pine currently and potentially affected by the Mountain Pine Beetle, reduce tree density in overstocked stands to improve wildlife forage and reduce hazardous fuels, and treat noxious weeds within the project area. Other wildlife conservation groups, such as the Mule Deer Foundation and the National Turkey Federation, are also involved in habitat restoration projects that entail forest management practices.

Forging mutually-beneficial public/private partnerships with private landowners is a key factor in the restoration and enhancement of fish and wildlife habitat. The Big Blackfoot Chapter of Trout Unlimited actively

engages private landowners in the TSA to restore native fish habitat, using a combination of private donations and public funding to accomplish mutual objectives. An effort initiated by the U.S. Fish & Wildlife Service in 1987 also promotes land conservation and habitat restoration practices on private lands through its Partners for Fish and Wildlife Program. This program is active in the TSA where its efforts have also benefitted forest resource management.

The USDA Natural Resources and Conservation Service (NRCS) also administer cost-share funding for private lands forest management throughout the TSA. This program has resulted in forest fuels reduction, tree thinning to enhance forest health and aspen rejuvenation.

Outdoor Recreation & Tourism

Forest health, forest restoration and forest stewardship affects outdoor recreation and tourism. Outdoor recreational opportunities benefit the quality of life for many residents of western Montana. These same opportunities are also attractive to many non-residents – in 2007 more than 10.6 million non-resident tourists visited Montana, according to the University of Montana's Institute for Tourism and Recreation Research (ITR). These visitors also help fuel many local economies. State-wide, non-resident tourists now expend more $1.5 billion annually. Non-resident tourism expenditures within the seven county TSA were $803 million in 2007. The expenditures within these seven counties represent 51% of Montana's total non-resident tourist expenditures.

State-wide, non-resident tourism is increasing at an annual rate slightly in excess of 2% annually, as measured by numbers of non-resident visitors. ITR Research Report 2009-2 states the "Natural disasters such as wildfires that have plagued western Montana nearly every other year since 2000 have been presented to the public as having a bad effect on the tourism industry and hence the economic well-being of the state." ITR data indicates that the rate of increase falls sometimes falls below the 2% per year increase during the severe wildfire years. In 2000, the rate of increase was 0.4%, in 2001 the rate of increase was 0.9% and in 2003 the actual number of visitors fell below the previous year. However, in 2007, which was also a severe wildfire year, the rate of increase was above the average rate of increase, at 2.9%, so no clear correlations are evident.

The Parks Division of the Montana Department of Fish, Wildlife and Parks (FWP) has proactively addressed forest health and human safety concerns at several State Parks within the TSA. FWP has conducted several forest

restoration projects at State Parks on Flathead Lake and at Lost Creek State Park near Anaconda. Additionally, the USFS has worked to reduce wildfire threats at several campground sites in the Seeley Lake – Swan Lake corridor.

Carbon Sequestration

There are many economic, ecological and social benefits achieved as a result of employing sustainable forest management practices. Sustainably managed, healthy forests also help mitigate the effects of increases in greenhouse gases.

Greenhouse Gases – Carbon dioxide (CO_2) is one of several compounds included in the category known as "greenhouse gases". Greenhouse gases include water vapor, carbon dioxide, methane, ozone and chlorofluorocarbons (CFCs). Greenhouse gases absorb infrared radiation emitted by the sun and re-emit that captured heat into the atmosphere. Greenhouse gases are essential to helping determine the Earth's temperature – without greenhouse gases our planet would be about 60 degrees (Fahrenheit) colder than the earth's average temperature of about 45 degrees according to the Pew Center on Global Climate Change. www.pewclimate.org

Greenhouse Effect – Carbon dioxide (CO_2) is released into the atmosphere by the burning of fossil fuels and other natural events. Many scientists believe that the increase in amounts of certain greenhouse gases resulting from the Industrial Revolution and human population growth have caused an "enhanced greenhouse effect". An enhanced greenhouse effect, combined with changing amounts of solar radiation emitted by the sun, may be the cause of climate change or global warming.

Carbon Sequestration- Carbon sequestration involves storing carbon dioxide through biological, chemical or physical processes in order to mitigate the accumulation of atmospheric CO_2. Methods of carbon capture and storage (CCS) include relatively untried concepts in geologic and marine environments.

Sustainable management of forest lands, reforestation of deforested areas and utilization of manufactured wood products for construction and packaging provide methods to enhance natural sequestration of carbon. Through the natural photosynthetic process, as trees grow they absorb CO_2 and emit oxygen. Trees remove CO_2 from the atmosphere and store it during and after their lifespan. Globally, forests are a major terrestrial carbon "sink", as they store about twice the amount of carbon that currently exists

in the atmosphere. In the United States in 2004, forests sequestered about 10.6% of the CO_2 released by the combustion of fossil fuels during that year.

When trees die from natural causes, the stored carbon is slowly released. If trees are consumed during a wildfire, the stored carbon is suddenly released in large amounts. Furthermore, if trees are harvested and their products are utilized, such as a wooden 2x4 in a new home, the stored carbon remains inert within the home and is not released into the atmosphere.

According to a Journal of Forestry article, "Sustainable management practices keep forests growing at a higher rate over a potentially longer period of time, thus providing net sequestration benefits in addition to those of unmanaged forests." Ruddell, Steven; et al (September 2007). "The Role for Sustainably Managed Forests in Climate Change Mitigation". *Journal of Forestry* **105** (6): 314-319. A study conducted by the government of Canada noted that reduction of harvest in Canada's sustainably managed forests would not impact CO_2 emissions due to the combination of stored carbon in manufactured wood products along with the re-growth of harvested forests. At the international level, the Intergovernmental Panel on Climate Change (IPCC) concluded that "a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber fibre or energy from the forest, will generate the largest sustained mitigation benefit."

A description of the potential economic benefits associated with using the TSA's forests to sequester atmospheric CO_2 is included in the Milestone 2 report of this project.

Forest Restoration & Stewardship

Forest restoration is, according to various groups:

- "A planned process that aims to regain ecological integrity and enhance human wellbeing in deforested or degraded forest landscapes." *WWF/IUCN Forest Landscape Restoration. 2000. WWF/IUCN first international workshop on forest restoration initiative "Forests Reborn", 3-5 July 2000, Segovia, Spain.*
- "A management strategy applied in degraded primary forest areas. Forest restoration aims to restore the forest to its state before degradation (same function, structure and composition)." *ITTO. 2002. ITTO guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests. ITTO Policy Development Series No 13. ITTO, Yokohama, Japan.*

- The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed."
  Society for Ecological Restoration Science & Policy Working Group. 2002. The SER Primer on Ecological Restoration.
- "Attempting to recreate the original forest ecosystem by reassembling the original complement of plants and animals that once occupied the site." *Lamb, David. 1994. Reforestation of degraded tropical forest lands in the Asia-Pacific region. Journal of Tropical Forest Science 7 (1): 1-7.*

Stephen Ambrose, an American historian, well-known author and Montana forest landowner, writes "In the 19th Century we devoted our best minds to exploring nature. In the 20th Century we devoted ourselves to controlling and harnessing it. In the 21st Century the best minds are working on how to restore nature." At the Governor's Restoration Forum in Billings in 2006, Governor Schweitzer identified the emergence of a new Montana economy, one that provides new business opportunities based largely on work to restore landscapes and ecosystems. Montana's Restoration Initiative acknowledges that ecological integrity is a significant contributor to our quality of life and economic growth and it will seek to improve, enhance, conserve and heal natural environments by helping to reestablish ecological processes.

Forest stewardship is defined as a forest management strategy or activities intended to protect, restore or enhance forest resources. These resources include timber, air quality, water quantity and quality, fish and wildlife habitat & populations, livestock forage, cultural artifacts and recreational opportunities. Together, the restoration and stewardship of Montana's forest lands are a critical component of Montana's future. The following sections describe efforts to restore and steward forests on public and private lands in Montana.

Forest Restoration & Stewardship – Public Lands

Management Areas –There are eleven Management Area Descriptions that now govern how the USFS designates the proper roles for management activities.

1.1 Designated Wilderness – Wilderness areas designated by Congress.

1.2 Recommended Wilderness – USFS has recommended to Congress that these areas be included in the Wilderness System, managed to protect wilderness qualities.

2.1 Designated & Eligible Wild, Scenic & Recreational Rivers – Segments of rivers that Congress has designated or USFS has recommended for inclusion in the Wild, Scenic and Recreational River system

2.2 Backcountry Areas **–** these are generally roadless landscapes with little or no evidence of recent human-caused disturbance and are generally suitable for non-motorized recreation opportunities. Ecological processes such as natural succession, fire, insects and disease occur with little human interference.

3.1 Special Interest Areas, Special Areas, and Experimental Forests and National Recreation Areas **–** Special Interest areas protect unique scientific values. Recreation is the underlying value of Special Areas. Experimental Forests provide areas for management-based research. National Recreation Areas are Congressionally-designated areas with high recreation values and are managed to protect and enhance public recreation use.

3.2 Research Natural Areas – The RNA's are a network of representative forest habitats with special or unique characteristics of scientific importance.

3.3 General Forest: Mixed Use Emphasis, Low Intensity Management – management in these areas emphasize ecosystem management goals using a wide variety of methods. Vegetation is managed at low intensities although initial entries in areas with moderate to high fuels may be managed more intensively to reduce the hazard.

4.1 General Forest: Mixed Use Emphasis, Moderate Intensity Management- These are areas suited for timber production and generally suitable for providing a mix of fish and wildlife habitat, a relatively natural visual quality setting with moderate evidence of human management activity, a wide range of recreational opportunities and a variety of other goods and services.

5.1 General Forest: Mixed Use Emphasis, High Intensity Management – These areas are generally suitable for providing a broad mix of forest products.

5.2 Residential and Forest Intermix – These areas are characterized by public lands intermingled with private lands where private use and developed residential use adjoins National Forest System lands.

6.1 High Use Recreation Complexes or Use Areas – Recreation in the priority of these management areas.

Management Area	National Forest (Acres) Lolo	Flathead	Bitterroot	Kootenai	Total	Percent
1.1	120,317	1,020,200	714,786		1,855,303	30.8%
1.2	263,674	138,785	74,764		477,223	7.9%
2.1	70,408	86,628	52,702		209,738	3.5%
2.2	315,538	327,765	293,101		936,404	15.5%
3.1	18,470	29,449	1,187		49,106	0.8%
3.2	3,730	8,749	6,386		18,865	0.3%
3.3	211,514	277,925	65,980		555,419	9.2%
4.1	802,946	216,621	319,001		1,338,568	22.2%
5.1	176,059	189,967	61,446		427,472	7.1%
5.2	70,449	32,961	0		103,410	1.7%
6.1	27,896	19,105	5,699		52,700	0.9%
	2,081,001	2,348,155	1,595,052		6,024,208	100.0%

Timber management is an objective in Management Areas 3.3, 4.1 and 5.1, which comprises xxx,xxx acres or approximately 39% of National Forest System Lands in the TSA. Timber harvest is not an objective but is an allowed use for non-timber purposes, such as fuels mitigation or possibly wildlife habitat improvements, in Management Area 5.2, which comprises 1.7% of the National Forest System Lands in the TSA.

National Fire Plan – Soon after the 2000 wildfire season, the National Fire Plan was passed by the U.S Congress, which authorized federal funding to the Departments of Agriculture and the Department of Interior. The National Fire Plan increased fire suppression capabilities and sought to reduce hazardous fuels to mitigate wildfire hazards on public and private lands. The National Fire Plan also specifically addressed rehabilitation of burned areas and the restoration of landscapes.

Healthy Forests Restoration Act (HFRA) – The HFRA was passed by Congress in 2003. Its purpose is to support projects that implement hazardous fuels reduction treatments in and around at-risk communities or watersheds. One of the results of the HFRA has been the preparation of Community Wildfire Protection Plans (CWPP) by all the counties in the

TSA. The CWPPs for Flathead, Lake, Mineral, Missoula and Ravalli counties are located at www.dnrc.mt.gov/forestry/fire/NFP/cwppdefault.asp

These plans are developed in collaboration with numerous stakeholders, including local government, local fire departments and MT DNRC, with technical support and resource management input provided by the U.S. Forest Service and Bureau of Land Management, where applicable. Through the CWPP process, each county has defined and mapped an area known as the Wildland-Urban Interface (WUI). The WUI is a zone where undeveloped wildland meets or intermingles with man-made structures. Within each county's WUI, priority fuels treatment areas are identified, based on risk assessments that consider potential fire behavior, ignition probability and Fire Regime Condition Classifications.

Integrated Restoration and Protection Strategy – The Northern Region of the U.S. Forest Service (Region One) has developed a comprehensive "Integrated Restoration and Protection Strategy" approach to public lands resource management that will provide:

- Restoration and maintenance of high-value watersheds
- Restoration and maintenance of wildlife habitats, including restoration of more resilient vegetation conditions, where appropriate, to meet ecological and social goals.
- Protection of people, structures and community infra-structure (roads, bridges and power corridors), in and associated with the wildland-urban interface (WUI).

The Integrated Restoration Strategy is directly tied to the U.S. Forest Service's National Strategic Goals, which are:

- Reduce the risk from catastrophic wildland fire. Restore the health of the Nation's forests and grasslands to increase resilience to the effects of wildland fire.
- Reduce the impacts from invasive species. Restore the health of the Nation's forests and grasslands to be resilient to the effects of invasive insects, pathogens, plants and pests.
- Provide outdoor recreational opportunities. Provide high-quality outdoor recreational opportunities on forests and grasslands, while sustaining natural resources, to meet the Nation's recreational demands.
- Help meet energy resource needs. Contribute to meeting the Nation's need for energy.

- Improve watershed conditions. Increase the number of forests and grassland watersheds that are in fully functional hydrologic conditions.
- Conduct mission-related work in addition to that which supports the agency's goals.

The Integrated Restoration Strategy categorizes National Forest lands within the TSA into three groups:

1. Wildland-Urban Interface (WUI)
2. Backcountry (including Wilderness) and
3. Roaded Lands outside of the WUI (Forest & Grassland Matrix)

Several tools are available to help achieve desired conditions for vegetation within these areas:

- Wildland fire use
- Prescribed burning
- Mechanical fuel treatments
- Road restoration
- Elimination or reduction of exotic species.

The outcomes of this Integrated Restoration Strategy are not yet known, but the comprehensive nature of the approach represents a new way of conducting resource management on National Forest System lands.

Federal Lands Forest Stewardship Contracting- Forest management on federal forest lands (U.S. Forest Service (USFS) and Bureau of Land Management (BLM)) is accomplished through its timber sale program in areas where forest health is affected and other ecological, economic and social benefits can be provided. Typically, financial receipts generated from the sale of commercial products such as sawlogs, post & poles and pulp are returned to the general fund of the U.S. Government. Many forest stewardship needs (such as pre-commercial thinning, wildlife habitat enhancement, etc.) are separately funded through the Service Contract budget, when funds are available.

The program known as "Forest Stewardship Contracting" is a relatively new (1999) method for federal agencies to contribute to the development of sustainable rural communities, restore and maintain healthy forest ecosystems, and provide a continuing source of local income and employment. The program began as a pilot project. At the inception of

stewardship contracting the USFS-Northern Region began with twenty-seven (27) pilot projects.

Stewardship contracting has provided the USFS and BLM with new ways to accomplish necessary work by using the financial value of the commercial products that are harvested to accomplish additional forest stewardship benefits. These stewardship activities may include forest health restoration, pre-commercial thinning, forest fuels reduction, road maintenance and road de-commissioning, expansion of dispersed recreation opportunities, water quality enhancement, noxious weed control and fish & wildlife habitat improvements, including stream restoration and controlled burning.

Congress authorized the USFS and BLM to enter into contracts to perform services to achieve National Forest System and BLM land management goals that meet local and community needs. For more complete information regarding forest stewardship contracting visit the web site at www.fs.fed.us/forestmanagement/projects/stewardship. The Forest Stewardship Handbook FSH 2409.19 – Renewable Resources Handbook, Chapter 60 also provides access to detailed contracting information at www.fs.fed.us/im/directives/fsh/2409.19/2409.19_60.doc

In 2003, Congress extended the stewardship contracting authority until September 30, 2013 under Public Law 108-7, which granted the USFS and BLM a ten-year authority to enter into stewardship contracts or agreements that will achieve agency land management objectives and meet community needs. Projects proposed under the extended authority must:

- Accomplish resource work identified through project planning and NEPA processes
- Projects must be consistent with direction established in the Forest Plan.
- Collaboration shall be part of stewardship contracting project planning and continue throughout the life of the project.
- Excess receipts generated on one project should be used for additional approved stewardship contracting projects
- Products removed may include timber, forest biomass, seeds, forage, fungi and Christmas trees.

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The new authority categorized and defined appropriate Stewardship Contracting activities as:

- Road and Trail Maintenance or Obliteration intended to restore or maintain water quality, including installation of gates, and clearing or relocation of trails.
- Soil Productivity and/or Fish & Wildlife Habitat Improvement measures, including culvert replacement, wildfire restoration, and installation of guzzlers, water catchments, nest boxes, tree cavities, and tilling of compacted soils.
- Using Prescribed Fire to improve the composition, structure, condition & health of forest stands and/or to enhance wildlife habitat through increased grass and forbs production.
- Vegetation Removal to promote healthy forest stands and reduce fire hazards or achieve other land management objectives through activities such as biomass removal, mastication of surface & ladder fuels, tree thinning to enhance growth or improve resistance to insects & disease and allowing grazing of fuel breaks outside an allotment to reduce fire hazards.
- Watershed Restoration & Maintenance such as planting vegetation & stabilizing stream banks, reintroduction of large woody debris (LWD), clean up landslide debris, and fire restoration.
- Habitat Restoration to improve habitat connectivity and/or enhance wetland habitat
- Control noxious/exotic weeds & re-establish native plants.

Collaborative Efforts

There are several important collaborative efforts underway in the TSA which are designed to break the existing cycle of appeals and litigation that often affect the efficacy of U.S. Forest Service resource management projects.

1. Kootenai Forest Stakeholders Coalition (KFSC) – This group is a broad coalition of 100 members including elected officials, private citizens and representatives of timber, mining, motorized recreation and conservation groups. Their Mission is "To demonstrate the ability of a diverse group of stakeholders to define common ground by implementing projects on natural resource issues, including community protection, forest and watershed restoration, public safety, forest health and community economic vitality." Since its inception in 2006, the KFSC stakeholders have endorsed/negotiated and completed six fuel-reduction projects which treated 6,200 acres in the Wildland-Urban Interface of the Kootenai National Forest. These projects have produced over 18.4 million board feet of timber products. KFSC is currently working towards resolution of six additional projects which would

treat 42,000 acres and produce an additional 46 million board feet of timber products.

2. Montana Forest Restoration Working Group (MFRWG**) –** This effort was launched in 2007 by the Montana Forest Restoration Committee, a group of 34 individuals representing conservation, motorized recreation, outfitters, loggers, sawmills, state government and the U.S. Forest Service. This committee agreed upon thirteen Restoration Principles www.montanarestoration.org/restoration that will be applied when planning and implementing all forest restoration work on National Forest Lands in Montana.

There are currently two Restoration Groups, one on the Lolo National Forest and the other on the Bitterroot National Forest. In existence since November 2007, the Lolo Restoration Group reports having 17 members affiliated with the timber, conservation and motorized recreation interests. They are currently working on three projects on the Seeley Lake (Auggie Project), Nine-Mile (South Fork Fish Creek) and Superior (Cedar-Thom) Ranger Districts. The Bitterroot Restoration Group is currently working with the U.S. Forest Service on three projects which are in the development and pre-analysis stages.

3. Blackfoot Stewardship Project (BCSP) – The BCSP involves the 400,000-acre Seeley Lake Ranger District of the Lolo National Forest within the Blackfoot watershed of western Montana. It also includes lands within the public-private 41,000 acre Blackfoot Community Conservation Area – parts of which are now owned by the Blackfoot Challenge group based in Ovando. Federal funding is being sought for restoration forestry projects and for a biomass energy project in Seeley Lake. Agreements have been made to add 87,000 acres to the Bob Marshall and Mission Mountain Wilderness areas. This project is endorsed by numerous organizations. Political support includes the commissioners from Missoula, Powell and Lewis & Clark counties. Private businesses such as Pyramid Mountain Lumber and other local business owners have endorsed the project. Conservation groups such as the Montana Wilderness Association, the Wilderness Society and the Rocky Mountain Elk Foundation have also extended support. See www.blackfootclearwater.org

4. Beaverhead-Deerlodge Accords - The “B-D Accords” affect an area outside the TSA but within western Montana and represent a potential model to ensure adequate funding for U.S. Forest Service timberland management, Wilderness protection, habitat enhancement and opportunities for motorized

recreation on federal land. An effort with the vision of "Creating jobs, protecting Montana's great outdoors and open spaces, and building strong communities" was founded by several timber industry businesses (Sun Mountain Lumber, Roseburg Forest, Smurfit-Stone Container, RY Timber and Pyramid Mountain Lumber) and the Montana Wilderness Association, the National Wildlife Federation and Montana Trout Unlimited. The agreement, which addresses U.S. Forest Service lands on the Beaverhead-Deerlodge National Forest, has specific proposals regarding timber harvest via Stewardship Contracting, the addition of 573,000 acres to the Forest's Wilderness system, and enhanced hunting, fishing and outdoors recreation opportunities. Critics of this effort note that not all county commissioners were included in the initial stages of the process and that certain motorized recreation groups and individual ranchers were opposed to designating additional Wilderness. This agreement, when/if approved, will revise the Forest Management Plan for this National Forest and its designation of Management Areas.

Forest Restoration & Stewardship– Private Lands

Forest restoration and stewardship have become common themes on private forest lands in Montana. Many forest management projects are initiated on private lands because landowners are concerned about forest health conditions related to stand density and species composition. Stand density is a concern related the threats of wildfire and negative impacts on wildlife habitat and livestock grazing. Species composition also relates to forest structure and the presence of shade-tolerant trees in the forest understory that can serve as fuel-ladders. Insect and disease conditions can be exacerbated by combinations of stand density and species composition, especially in terms of the current Mountain Pine beetle epidemic affecting Lodgepole pine and now spreading into formerly healthy stands of Ponderosa pine and White-bark pine. In today's world, private landowners are often likely to respond to poor forest health conditions, the danger of wildfire and the benefits of forest restoration treatments. Property protection and habitat enhancement are often the primary drivers.

Montana has an active private lands forest stewardship program. The federal Cooperative Forestry Assistance Act of 1978 authorized the Forest Stewardship Program to provide technical assistance through State forest agency partners to encourage and enable active long-term forest management on non-industrial forest land. A primary focus of the Program is the development of comprehensive, multi-resource management plans that provide landowners with the information they need to manage their forests for a variety of products and services. Montana Department of Natural

Resources and Conservation (MT DNRC) Service Foresters provide private landowners with forest management advice and assist landowners with forestry grants. DNRC Service Foresters also help protect water quality and mitigate wildfire threats through administration of Montana's Streamside Management Zone and Slash Hazard Reductions laws.

Montana, through the Montana State University Extension Forestry program, has also developed a unique approach to teaching forest stewardship to private forest landowners. The process teaches landowners how to develop their own long-range Stewardship Plan and is intended to provide the motivation to implement stewardship principles on their own forests. Since its inception in 1991 MSU Forest Extension has conducted 125 Forest Stewardship workshops attended by over 1,800 forest landowners who own 970,000 acres of private forest land in Montana. Over 1,300 stewardship plans have been developed. The Montana Forest Stewardship Steering Committee, under the direction of the Montana State Forester, coordinates the Montana Forest Stewardship Program.

MSU Forest Extension also provides numerous publications to the public to encourage responsible forest stewardship practices on private lands. They include:

- "*Management Practices for Forest Health and Catastrophic Wildfire Resistance"*
- *"Forest Ecosystem Stewardship"*
- *"Riparian Forest Stewardship"*
- *"Water Quality Best Management Practices for Montana Forests*"

The Montana Tree Farm Committee is part of the American Tree Farm System, and provides individual forestry assistance with forest management plans and has the ability to help provide forest certification through the Sustainable Forestry Initiative program. They work to help improve forest management practices and enhance forest health, water quality, wildlife habitat and recreation. There are 400 certified Tree Farms in Montana, covering 1.2 million acres. (www.mttreefarm.org)