

# SECTION ONE: HEALTHY NATURAL LANDS AND WATERS—KEY TO MINNESOTA’S PROSPERITY

**GOAL: CONSERVATION OF MINNESOTA’S NATURAL RESOURCES WILL PROVIDE A SOLID FOUNDATION FOR A STRONG ECONOMY, A HEALTHY ENVIRONMENT, AND VIBRANT COMMUNITIES.**

Minnesota has ranked in the top 5 among America’s most livable states every year since 1996.<sup>1</sup> Minnesota’s great outdoors—its forests, wetlands, lakes, and grasslands—form the foundation for a high quality of life—a healthy environment, a viable economy, and vibrant communities. Careful management is critical to ensuring the ongoing health and well-being of the natural resources that make our state great.

Managing lands enhances their ability to provide a full range of resource values including timber and non-timber forest products, minerals, real estate, and recreation in support of a viable economy and vibrant communities.

Managing watersheds ensures they will continue to be able to provide clean drinking water and flood mitigation, in addition to supporting industry and agriculture.

Sustaining forests, grasslands, and wetlands allows them to provide essential ecosystem services, from clean air and carbon sequestration to cultural and aesthetic value to pollination services critical for many agricultural crops and native plant species.

Investments in conservation provide a high return in benefits to all Minnesotans. Continued stewardship to sustain the health of our lands, waters, and other natural resources is critical to maintaining Minnesota’s high quality of life.

The following profiles illustrate the impact of Minnesota’s natural resources on the state’s triple bottom line.

## THE TRIPLE BOTTOM LINE:

• **A HEALTHY**

**ENVIRONMENT:**

HEALTHY NATURAL LANDS AND WATERS ARE THE FOUNDATION ON WHICH MINNESOTA’S NATURAL RESOURCE-BASED ECONOMIES DEPEND.

• **A VIABLE**

**ECONOMY:**

MINNESOTA’S NATURAL RESOURCE-BASED ECONOMIES PLAY AN IMPORTANT ROLE IN MINNESOTA’S ECONOMIC WELL-BEING.

• **VIBRANT**

**COMMUNITIES:**

NATURAL RESOURCE CONSERVATION AND OUTDOOR RECREATION CONTRIBUTE TO VIBRANT COMMUNITIES.

See Appendix A for the sources of information used in this section.

## ECONOMIC BENEFITS OF FORESTS



DNR offers for sale 700,000 to 900,000 cords of wood annually—about 26 percent of the state's timber harvest. The wood is used to make paper, boards, and other forest products or as fuel for generating heat and power.

Minnesota's forest products sector:

- is the state's fourth-largest source of manufacturing employment with a total economic impact of
  - \$18 billion in sales per year
  - \$7.3 billion value added per year
  - 89,500 jobs
- generates \$530 million annually in state and local income, sales, and property tax receipts
- provides a total value-added effect of \$2,280 per cord harvested
- generates a total state and local tax effect of \$166 per cord harvested

Community forests and urban trees:

- provide a return of \$3 in services — energy conservation, storm water management, air purification, increased property values — for every \$1 investment in maintenance.



## HEALTHY FORESTS, HEALTHY MINNESOTA

Native forests, community forests, and urban trees help strengthen Minnesota's economy. Healthy, productive forests support jobs in forest products manufacturing and related sectors and create a backdrop for outdoor recreation and tourism. They provide renewable alternatives to fossil fuels. They contribute to the quality of life that attracts businesses and workers.

DNR plays a prominent role in providing these diverse forest benefits. We manage 4.8 million acres of working forests and help protect 45.5 million acres from wildfires.<sup>2</sup> We offer for sale some 800,000 cords of wood per year, provide technical and financial assistance to 140,000 private family forest owners holding 5.7 million acres, and produce 5 to 10 million tree seedlings annually.

Since fiscal year 2008, timber harvested from state-managed land has accounted for about 26 percent of annual statewide harvest by volume.<sup>3</sup>

The forest products industry is Minnesota's fourth largest manufacturing sector, with a total annual economic impact of \$18 billion in sales, \$7.3 billion contribution to gross state product, and 89,500 jobs. Forest products manufacturing and related sectors generate \$530 million in state and local income, sales, and property tax payments.<sup>4</sup> In addition to property tax payments that directly support local school districts, forest products manufacturing and related sectors contribute an estimated \$235 million per year to the state's school systems through state personal and business income taxes and sales tax receipts that flow through the state's General Fund to K-12 and higher education.<sup>5</sup>

The recent housing slump and weak economy have caused great struggles in Minnesota's forest industry. We lost four large forest products manufacturing plants and many small sawmills over the past three years—a cumulative loss of more than 1 million cords of manufacturing capacity. However, Minnesota's forest economy as a whole has weathered the economic storm, in part due to our world-class paper industry, diverse wood products industry, large public land base, and increasing demands for renewable energy.

Wood-based renewable energy is a growing market that provides climate, environmental, national security, and economic benefits. In the United States, wood fiber use for renewable energy is forecast by some sources to increase from 5 percent to 40 percent of total industrial wood fiber consumption by 2022 if both the Renewable Fuels Standard (RFS) and Renewable Energy Portfolio Standards (RPS) are fully implemented.<sup>6</sup> In Minnesota, underutilized tree species (including ash and tamarack) and residues from commercial timber harvest are economically available in sufficient quantities to meet much of the potential bio-energy demand. In 2009, 10 percent of Minnesota's total statewide timber harvest went toward renewable energy production.<sup>7</sup> Besides supplying a renewable source of energy, woody biomass harvest can help restore forest habitats and reduce the risk of catastrophic wildfire.

Healthy forests provide many less quantifiable benefits as well. They help supply Minnesotans with clean and abundant water. They support habitat for over 289 wildlife species and more than 20 game species. They generate wealth through recreation and tourism. For every \$1 invested in their care, shade trees return a minimum of \$3 worth of ecosystem services—energy conservation, storm water management, cleaner air, and higher property values.<sup>8</sup>

## MINNESOTA'S MINERAL ECONOMY

Like forests, Minnesota's mineral resources play a major role in our state's economy. Minnesota is the largest producer of taconite in the United States.<sup>9</sup> Eighty percent of U.S.-produced iron ore and taconite is mined in Minnesota. Iron mining contributes more than \$1.5 billion per year to Minnesota's economy in the form of wages, rents, and profits. Iron mining employs more than 3,600 people.<sup>10,11</sup> Indirect values related to iron mining contribute an additional \$1.6 billion, for a total impact of more than \$3.1 billion per year.<sup>10</sup>

Part of the direct value of the state's iron mining industry for the state's economy is its payment of taxes and royalties. In 2008 the industry paid \$148.7 million in taxes. Of this, \$56.9 million benefited education in Minnesota (see "Natural Resources and Education" sidebar, p.4).<sup>12</sup> Mining represents 4 to 5 percent of Minnesota's gross domestic product and an even greater proportion of northeastern Minnesota's gross regional product—34 percent in 2007.<sup>10</sup>

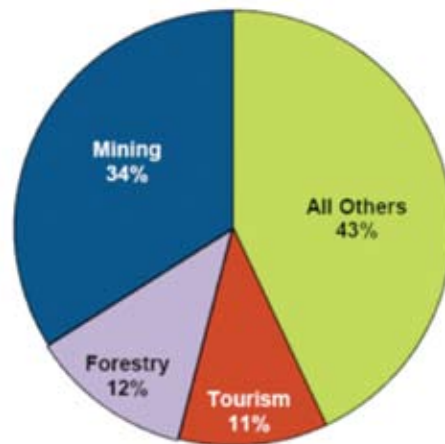
The iron ore mining sector is growing to meet increasing global demand for iron ore. This construction is estimated to add \$5.2 billion to the state's economy.<sup>10</sup>

## FORESTS CONTRIBUTE TO EDUCATION

- Minnesota's forest products industry provides an estimated \$235 million per year to the state's schools through income and sales taxes deposited into the General Fund.
- Timber revenue from school trust land (see "Natural Resources and Education" sidebar, p.4) provides an average of an additional \$10 million per year to schools.



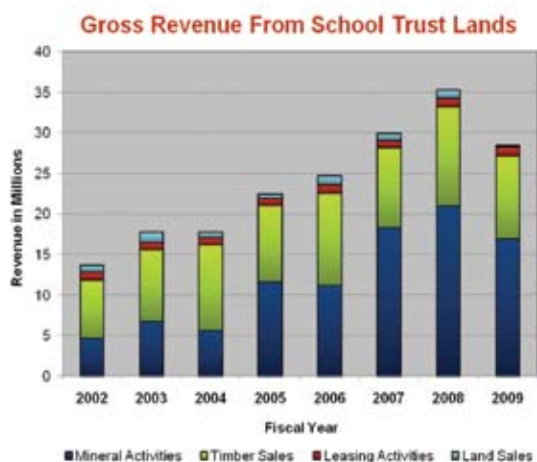
Sector Percentages of Total GRP  
Northeast Minnesota 2007



Mining contributes 4 to 5 percent of Minnesota's gross domestic product; however, its regional impact in northeastern Minnesota is much larger – 34 percent of the gross regional product. Forestry and tourism provide 12 percent and 11 percent, respectively.

## NATURAL RESOURCES AND EDUCATION: THE SCHOOL TRUST FUND

WHEN MINNESOTA BECAME A STATE IN 1858, THE FEDERAL GOVERNMENT GRANTED SECTIONS 16 AND 36 OF EVERY TOWNSHIP, OR THEIR EQUIVALENT, TO THE STATE FOR THE USE OF SCHOOLS. THE MINNESOTA CONSTITUTION ESTABLISHED THE PERMANENT SCHOOL FUND TO ENSURE A LONG-TERM SOURCE OF FUNDS FOR PUBLIC EDUCATION IN THE STATE. DNR MANAGES ABOUT 2.5 MILLION ACRES OF SCHOOL TRUST LANDS AND 1 MILLION ACRES OF SCHOOL TRUST MINERAL RIGHTS. REVENUE FROM MINERAL ROYALTIES, TIMBER SALES, SURFACE LEASING ACTIVITIES, AND LAND SALES FROM THESE LANDS IS DEPOSITED INTO THE PERMANENT SCHOOL FUND. IN FY 2009 THESE LANDS GENERATED \$28.4 MILLION. MINERAL ROYALTIES AND TIMBER SALES CONTRIBUTE THE MOST; IN 2009 THEY GROSSED \$16.88 MILLION AND \$10.20 MILLION, RESPECTIVELY.<sup>12</sup>



FY 2009 mining revenue, 98 percent of which was generated by the taconite industry, reflects the beginning of global recession that began in late 2007; FY 2010 revenue was lower. DNR expects mineral revenue will begin to increase as the U.S. and global economies recover, reflecting the globalization of the mineral industry and attendant commodity pricing.

Minnesota's mineral resources stretch far beyond iron ore. For instance, the 1.1 billion-year-old Duluth Complex, which extends along the northern shore of Lake Superior, is a nationally and internationally significant reserve for copper-nickel and titanium resources, as well as other strategic minerals such as chromium and platinum. It contains all of the known U.S. reserves of nickel, most of cobalt reserves, and more than half of platinum reserves. With the recent, dramatic growth in world demand for metals—spurred mostly by growth in Asia and emerging markets—the Duluth Complex has drawn significant interest.





Three mineral deposits on school trust lands in the Duluth Complex contain resources that could generate royalties of \$1.4 billion at today's metal prices if mined over a period of 25 to 30 years.<sup>13,14</sup> With increased demand for electronics and other products, advances in processing technology, and environmental impact mitigation, extraction is now economically and environmentally viable.

Minnesota's mineral commodities also includes aggregate resources- sand, gravel, and crushed stone. Aggregate is typically found along river and stream floodplains. It is used to build and maintain roads, bridges, water and sewer systems, and buildings.

Aggregate resources play an important role in the nation's and Minnesota's economy. Nationally, 19.5 direct and industry supported jobs are created for every \$1 million of output from the aggregate industry.<sup>15</sup>



DNR works to protect the economic health of the mining industry to ensure continuation of operations, protect jobs, and maintain the industry's contributions to the state's triple bottom line. DNR works to ensure competitive royalty rates, environmentally sound mining practices, and complete utilization of leased ore. DNR maps aggregate resources to provide local units of government and others with the information to make environmentally sound aggregate mining decisions.

## ECONOMIC BENEFITS OF MINERAL DEVELOPMENT

### Minnesota's mining sector:

- represents 4 to 5 percent of Minnesota's gross domestic product
- is the largest contributor to northeastern Minnesota's gross regional product
- produces 80 percent of U.S.-mined iron ore and taconite

Iron mining employs more than 3,600 workers and has a total impact of more than \$3.1 billion annually. Education is the beneficiary of 38 percent of the taxes (\$56.9 million in 2008)

In FY 2009, aggregate resources generated \$1 million for the Permanent School Trust Fund.



## THE DULUTH COMPLEX

The Duluth complex represents all of the known U.S. reserves of nickel, most of cobalt reserves, and more than half of the platinum reserves.

### Uses of Duluth Complex Minerals:

**COPPER** - electrical applications, plumbing, construction

**NICKEL** - stainless steel, rechargeable batteries

**COBALT** - household magnets, hybrid vehicles

**PLATINUM & PALLADIUM** - catalytic converters to reduce automobile pollution

**GOLD** - jewelry, dental and medical applications, computers, other electronics

## MINNESOTA'S OUTDOOR RECREATION ECONOMY

Minnesota's history is rooted in the great outdoors. From trading between Native Americans and European fur traders hundreds of years ago to the establishment of major outdoor recreation-based businesses, Minnesota is an outdoors state. We have the highest per capita participation in fishing and boating in the nation, and numbers of hunters, park visitors, trail users, and wildlife watchers in Minnesota are far above the national average.

Outdoor recreation boosts the economy through economic growth, business acquisition and retention, increased property values, and reduced health costs.

DNR provides a diverse outdoor recreation system and experiences that connect Minnesota residents and visitors to the outdoors and make a major contribution to Minnesota's outdoor recreation economy.

Minnesota's parks and trails system attracts visitors who spend money, pay taxes, and create jobs. The economic impact from parks and trails can be particularly significant for small communities. State trail use contributed 0.3 percent to gross regional product in the Twin Cities metropolitan area, but in the northeast it contributed 2.6 percent to gross regional product.<sup>19</sup> Similarly, campers accounted for 1 percent of all tourism spending in the Twin Cities metro area, but 11 percent in southern Minnesota.<sup>20</sup>

The total economic impact of watercraft and boat trip spending in Minnesota is \$4 billion per year. This includes spending on watercraft-related products, lodging, trip supplies such as groceries, and all secondary effects related to these sales.<sup>21</sup>

Fishing, hunting, and wildlife watching generate \$4.3 billion each year in Minnesota.<sup>22</sup> Angling alone contributes about \$2.8 billion each year in direct expenditures to the state's economy, while nearly half a million deer hunters generate \$236 million of retail spending per year. Waterfowl hunting and viewing contribute \$100 million annually.

Snowmobile users and cross-country skiers are the primary sources of trail-related revenue during winter. Purchases of equipment, supplies and trail passes where necessary boost local and statewide economies during the winter season.

In addition to these direct economic impacts, outdoor recreation opportunities contribute to a high quality of life that can attract new business and talented workers and help keep established businesses competitive. Small business owners have cited quality of life as a key reason for choosing a particular location.<sup>25</sup> Park, recreation, and open space amenities are among the most important components of a high quality of life.

### ECONOMIC BENEFITS OF OUTDOOR RECREATION INCLUDE:

- economic growth and jobs
- business acquisition and retention
- increased property values
- reduced health costs

#### Parks & Trails Economic Benefits

- In 2001 the state park system stimulated \$218 million in spending and supported nearly 3,400 jobs.<sup>16</sup>
- Trail users in Minnesota spent \$3.3 billion, contributed \$2.8 million in local taxes, and accounted for 43,000 jobs in 2008.<sup>17</sup>
- From June 2007 through May 2008, 670 public and private campgrounds in Minnesota sold 2 million site nights, and campers spent a total of \$627 million.<sup>18</sup>

#### Fishing & Hunting Economic Benefits

- Fishing, hunting, and wildlife watching generate \$4.3 billion each year in Minnesota.<sup>22</sup>
- Spending by hunters and anglers supports 55,000 jobs, providing \$1.6 billion to working residents across the state.
- Southeastern Minnesota's 181 coldwater streams draw an estimated 53,000 angler-trips annually, generating an economic impact of almost \$30 million in sales and \$18 million in income.<sup>23</sup>

#### Winter Activity Economic Benefits

- In 2008, snowmobile trail users in Minnesota spent \$277 million, contributed \$23 million in local taxes, and accounted for 3,400 jobs.<sup>24</sup>
- Cross-country skiers spent \$50 million, contributed \$4.6 million in local taxes, and accounted for 700 jobs.<sup>24</sup>



Parks, trails, and open spaces can also boost market values of nearby properties. This particularly holds true for large, high-quality, natural resource-based areas that are well maintained and to which residents are passionately attached.<sup>26</sup> Increased property values benefit local, regional, or state government by increasing real estate tax revenue.

Boosting opportunities for outdoor recreation can also reduce health-care costs by increasing physical activity. Enhanced access to places for physical activity combined with informational outreach has been linked to increased physical activity.<sup>27</sup> Just one additional day of physical activity per week has been associated with a 4.7 percent reduction in medical charges.<sup>28</sup>

### **HEALTHY WATERSHEDS: CLEAN, ABUNDANT WATER AND FLOOD PROTECTION**

Minnesota's DNR-administered water appropriation program develops and manages water resources to ensure adequate supplies for domestic, municipal, industrial, agricultural, fish and wildlife, recreational, power, navigation, and water quality control purposes. DNR also helps keep watersheds healthy and protects and restores wetlands, upland forests, and grasslands, reducing the risk of floods.

Clean, abundant water supports industry, agriculture, and community growth and development. The largest use of water in Minnesota is power generation. In 2008 power generation alone required 838 billion gallons of water. Other industries used an additional 167 billion gallons, public water suppliers used 217 billion gallons, and agriculture used 117 billion gallons of water for irrigation.<sup>29</sup>

Flood mitigation is critical for public safety and avoiding costly damages. The 1997 Upper Minnesota River and Red River flooding caused public infrastructure damages of approximately \$300 million, with total flood damages and associated economic impacts estimated as high as \$2 billion. Every \$1 spent on mitigation saves an average of \$4 in damages prevented.<sup>30</sup> For example, a federally constructed levee in the Red River Valley city of Oslo cost approximately \$2 million to build in 1984, but has since prevented an estimated \$51 million in damages.<sup>31</sup>

DNR's technical and financial assistance to 450 local governments to administer floodplain ordinances is critical for flood control. DNR's increasing focus on watersheds also provides opportunities for implementing projects that have flood mitigation, clean water, and wildlife habitat benefits.



### **THE ECONOMIC VALUE OF ECOSYSTEM SERVICES: WATER EXAMPLES**

- The Decorah Edge is a unique woodland-wetland ecosystem overlying a shale bed covering 200 miles in southeastern Minnesota and northeastern Iowa. The ecosystem provides a natural filtration process purifying drinking water for 18 Minnesota communities including Rochester. If this natural process were disturbed, Rochester would need to pay up to \$5 million per year to properly clean its drinking water.<sup>34</sup>
- Intact wetlands have significant economic value, likely ranging between \$300 and \$10,000 per acre. Restoration of wetlands produces a number of economic benefits by mitigating flooding, improving water quality, and boosting wildlife habitat and associated recreational opportunities. Wetlands have been estimated to provide \$341 to \$507 per acre in flood mitigation value in the Red River basin.<sup>35</sup>
- A Bemidji State University study showed that lake water clarity is significantly related to lakeshore property values. The same study noted that as native shoreline habitat is lost to development, shorelines lose their ability to support the fish, wildlife, and clean water that are so appealing to the people attracted to Minnesota's waters.<sup>36</sup>

## UNQUANTIFIED BENEFITS

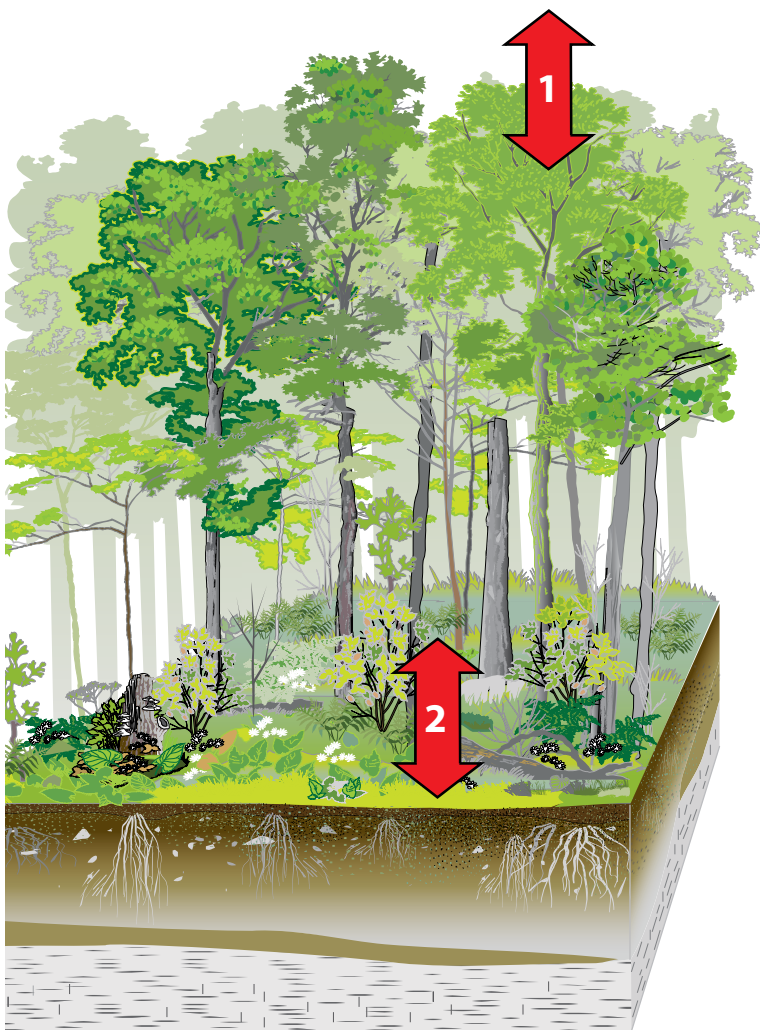
Nature provides many benefits to communities and economies that are not usually quantified in economic terms or included in cost-benefit analyses. Economists have recently begun to quantify the economic value of these services; as this practice expands, DNR's work to sustain natural processes and thus support these so-called ecosystem services will take on additional economic value. Two examples are biological carbon sequestration and pollination.

**Biological carbon sequestration** reduces the concentration of greenhouse gases in the atmosphere, helping to mitigate global climate change. It occurs when plants remove carbon dioxide from the air during photosynthesis and incorporate it into plant tissues. Minnesota ecosystems store vast amounts of carbon above and below ground in living and dead plant material and in soils. Peatlands, forests, and grassland soils are particularly important reservoirs of carbon. Increasing the

size of, and appropriately managing, these reservoirs is one approach to reducing the threat of climate change. Changing land use in ways that favor natural vegetation (e.g., expanding forests, establishing permanent vegetation on former agricultural or mining lands), restoring the hydrology of peatlands, and increasing tree growth via silviculture expand the carbon sequestration potential of Minnesota ecosystems while providing other ecosystem services.

**Pollination** is critical to the production of many foods that we eat. In the United States pollinators, primarily bees, are required for 15 to 30 percent of the foods and beverages we consume. They provide U.S. crops \$20 billion of pollination services annually.<sup>32,33</sup> In Minnesota pollination services are critical for the production of apples, blueberries, melons, tomatoes, alfalfa seed, and cranberries. Natural habitats such as prairies, wildflower meadows, woodlands, and brushlands around and within agricultural areas are critical for supporting the bees and other insects that provide pollination services.

## ECOSYSTEM SERVICES PROVIDED BY NATURAL LANDS



- 1** - intercepts and slows precipitation  
- removes carbon and other pollutants  
- releases oxygen  
- moderates climate by releasing water into the air and providing shade
- 2** - stores carbon, nutrients and water  
- prevents erosion  
- moderates floods

These listed ecosystem services are often unquantified in economic terms. They are in addition to services that are typically quantified, such as the provision of forest products and outdoor recreation.