

**ISSUE 5: FUNDING**

Kentucky forests are home to invaluable resources from which a variety of benefits to Kentucky residents – both ecologic and economic – are derived. Our forests provide the base for timber production, wildlife habitat, quality water, recreation opportunities, and aesthetic beauty for residents and tourists alike. Kentucky is the third largest hardwood-producing state,<sup>10</sup> producing over \$6.3 billion in 2004 from the wood products manufacturing sector and employing over 22,500 Kentuckians.<sup>8</sup> While financial gains from timber production are perhaps the most obvious, the abundant forested areas of Kentucky simultaneously provide woodland wildlife habitat and recreation opportunities, both of which can translate to tourism dollars (*e.g.*, an estimated \$3 billion are derived annually from fishing, hunting, and wildlife watching in and adjacent to Kentucky forests).<sup>10</sup> The total direct, indirect, and induced benefits of the forest products industry was estimated to be nearly \$8.7 billion in 2003.<sup>8</sup>

While these uses and their associated benefits are varied, proper management of the resource can result in a healthy, productive forest ecosystem that is the source of long-term sustainable revenue and benefits to landowners as well as the state. Although forested areas account for nearly half of the land use in Kentucky, public apathy may be an unfortunate result of this apparent abundance. Much of it is unhealthy (*i.e.*, composed of invasive species, trees of low timber and wildlife value, infested with pests and disease). Since 1988, Kentucky forests have decreased an estimated 729,000 acres.<sup>8</sup> Several factors attributable to the decline include increased development, land use changes, and mining. Proper management does not come without a cost, and this has never been more so than it is today.

To ensure proper management, the Commonwealth must work with many different individuals or entities to bring forests under a management plan. Kentucky forests are primarily owned by private individuals, and many own plots less than 50 acres in size.<sup>8</sup> The resultant repetition in producing numerous management plans is costly.

**TABLE 5 – FORESTRY PROGRAM FUNDING SUPPORT, 1998 – 2008**  
(Thousands of Dollars)

FUNDING SOURCE	2008	2006	2004	2002	1998
Federal	\$ 5,338	\$ 2,692	\$ 3,905	\$ 3,535	\$ 1,421
State	\$10,801	\$ 11,375	\$ 10,640	\$ 10,458	\$ 8,462
Product Sales Revenue	\$ 518	\$ 593	\$ 997	\$ 900	\$ 370
Service Charge Revenue	-	\$ 246	-	-	-
Other Revenue	\$ 2,618	\$ 2,868	\$ 2,898	\$ 589	\$ 482
Revenue Total	\$ 3,136	\$ 3,707	\$ 3,895	\$ 1,489	\$ 852
Total	\$19,275	\$ 17,773	\$ 18,440	\$ 15,482	\$ 10,735

(Source: <http://www.stateforesters.org/publication-type/stats>)

**A. *Current Status of Kentucky Division of Forestry Funding***

Funding for Kentucky forests should be driven by one goal – proper forest management that results in a healthy, productive forest ecosystem that is the source of long-term sustainable revenue and benefits to all of Kentucky. The economic benefits realized by landowners and industry will benefit Kentucky's economy as well. While the forest uses and their associated benefits are varied and necessary, proper forest management driven by sustainable development will lead to the creation of reliable income to landowners and in turn increased tax revenues to the state and local communities, forestland wildlife habitat, improved water quality, and recreational opportunities from an aesthetically-pleasing forest.

The KDF is the primary state agency charged with accomplishing this goal. The sources of its funding, shown for 1998 to 2008 in Table 5, are primarily from state and federal funds and to a lesser degree revenues. While these numbers seem to indicate a gradual increase in available funding from 1998 to 2008, funding levels have decreased since 2008 due to the poor economy in recent years. The increase from 2006 to 2008 was due to two million dollars in federal funds, received for the acquisition of the Marrowbone State Forest and not available for other operations. Also in FY 2009-2010, the state issued a \$3.315 million appropriations reduction to the Energy and Environmental Cabinet, of which KDF is part. The National Association of State Foresters continues to request funding at the national level that would allow Kentucky, and all states, to maintain appropriate services to forest owners. Kentucky will receive a portion of the \$4.6 billion in 2010 appropriations bill<sup>137</sup> signed on Nov. 3, 2009 that included:

- \$71 million for Forest Inventory and Analysis
- \$110 million for State Fire Assistance
- \$60 million for Cooperative Forest Health Management
- \$30 million for Urban and Community Forestry
- \$29 million for Forest Stewardship
- \$79 million for Forest Legacy

Despite the funding levels currently available, there is not enough money or staff to fund all KDF's many programs and services that are mandated by KRS 149. The forestry expenditures and staffing levels over the past decade are shown in Table 6 and Table 7, respectively. Personnel levels have steadily decreased at the KDF. Initially in 2006 the managerial staff levels were reduced although temporary and technical staffing levels were increased. However, in 2008 professional and technical staffing levels also dropped. The result has been a reduction of 42 employees since 1998, excluding seasonal and temporary employees. Without proper staffing and funding, KDF has struggled to meet its mandates as outlined in KRS 149. State funding for forestry programs is not likely to improve in the foreseeable future given the current state government budget deficient.

One example of this lack of resources problem is timber harvesting requirements of the Kentucky Forest Conservation Act (KFCA) of 1998. Under this Act, commercial timber harvesting loggers and operators are required to use appropriate BMPs and have a Kentucky Master Logger on site and in charge of all commercial logging operations. The KDF is required to inspect all logging operations for compliance with both provisions. Although these actions are progressive, the General Assembly did not provide for an increase in staff or funds to KDF for the inspection of commercial timber harvest. KDF had to redirect personnel performing other duties to the commercial timber harvesting inspection and enforcement program. This program was and continues to be an unfunded mandate.

**TABLE 6 – KENTUCKY FORESTRY EXPENDITURES, 1998 – 2008**  
(Thousands of Dollars)

PROGRAM	2008	2006	2004	2002	1998
Fire Control / Prevention / Protection / Management	\$ 6,625	\$ 5,351	\$ 4,962	\$ 4,500	\$ 5,659
State Forest Management	\$ 360	\$ 2,800	\$ 396	\$ 380	\$ 50
Cooperative Forestry Management / Landowner Assistance					
State Programs	\$ 4,100	\$ 3,069	\$ 617	\$ 600	\$ 2,161
USFS Programs	\$ 931	\$ 803	\$ 4,175	\$ 3,250	-
Farm Service Agency / NRCS Programs	\$ 527	\$ 10	\$ 142	\$ 125	\$ 21
Forest Products Utilization and Marketing	\$ 100	\$ 50	\$ 98	\$ 60	\$ 307
Forest Health	\$ 650	\$ 322	\$ 496	\$ 400	\$ 110
Urban & Community Forests	\$ 310	\$ 599	\$ 476	\$ 400	\$ 651
Resource Conservation & Development	N/A	N/A	\$ 24	\$ 5	\$ 106
Nursery	\$ 900	\$ 721	\$ 998	\$ 995	\$ 1,132
Economic Action / Forest Recreation	\$ 40	N/A	\$ 380	\$ 380	N/A
Forest Inventory and Analysis	\$ 401	\$ 844	\$ 675	\$ 475	N/A
Watershed / Water Quality Protection / BMP	\$ 2,117	\$ 31	\$ 2,978	\$ 2,700	N/A
Other	\$ 2,214	\$ 3,173	\$ 2,023	\$ 1,212	\$ 184
<b>Total</b>	<b>\$19,275</b>	<b>\$ 17,773</b>	<b>\$ 18,440</b>	<b>\$ 15,482</b>	<b>\$ 10,380</b>

(Source: <http://www.stateforesters.org/publication-type/stats>)

**TABLE 7 – FOREST PROGRAM PERSONNEL, 1998 – 2008**

STAFF CLASSIFICATION	2008	2006	2004	2002	1998
Managerial	27	28	46	43	43
Professional	52	61	57	58	61
Technician	99	117	110	110	113
Administrative / Clerical	21	22	25	27	24
Seasonal / Temporary	106	106	90	90	80
<b>State Total</b>	<b>305</b>	<b>334</b>	<b>328</b>	<b>328</b>	<b>321</b>

(Source: <http://www.stateforesters.org/publication-type/stats>)

A recent study<sup>77</sup> indicated that overall silvicultural BMP implementation was only 56% in 2004 to 2005 but improved to 68% in 2006 to 2008. This same study indicates KDF inspects only about half of the timber harvesting operations and, as stated above, the division has lost positions that would perform these inspections. Thus, it is expected that fewer logging operations will be inspected and compliance with BMPs could drop.

While this survey documents BMP implementation under the KFCA, which targets loggers and operators, no data are available on the rates of proper implementation of forestry BMPs by landowners under the Agriculture Water Quality Act. Landowners who physically cut and harvest their own timber are exempt from the provisions of KRS 149.342 and KRS 149.344, but are covered by Agriculture Water Quality Act.

Similarly, the KFCA of 1998 established the Forest Stewardship Incentive Fund to serve as a way to provide financial assistance to landowners for stewardship practices. This fund should have helped to promote the implementation of management plans among private forest landowners. However, the program has never been fully funded since the only monies in the fund are the fines collected for violations of the KFCA.

Funding constraints have resulted in the reduction in the number of KDF forest ranger technicians to inspect timber harvesting operations to ensure appropriate use of BMPs. Without funding and staff to inspect harvest sites, increase logger education, and pursue enforcement actions, BMP use is not likely to improve and could result in an impact to water quality in rivers and streams located near harvesting sites.

Since insufficient funding has been available for implementation of existing legislation, it is not surprising that the implementation of forestry task force recommendations has been hampered as well. Although fire control and management accounts for approximately one-third of the current KDF expenditures, Kentucky still has the highest rate of deliberately set wildland fires in the southern U.S.<sup>26</sup> In 2006, the Wildland Arson Task Force recommended a two-fold approach of increased law enforcement and education to address the problem, but neither of the recommendations was funded.<sup>26</sup>

In 2008, the Kentucky Forest Health Task Force (KFHTF)<sup>10</sup> noted that Kentucky's forest health priorities for funding include:

- Surveys – Aerial and ground surveys of Kentucky's threatened resources, including old growth hemlock, oak and ash
- Detection – detection surveys for invasive species
- Management – including traditional and novel approaches (natural enemies for hemlock woolly adelgid control, goats for suppression of invasive species)
- Education – inform Kentucky citizens of the role humans play in spreading invasive species
- Restoration – Replanting and restoring natural, urban and municipal areas

The KFHTF indicated that, to curtail the explosive growth of invasive species, \$10 million in funding (\$2 million for each of the next 5 years) would be needed to address these priorities. In 2008, forest health expenditures totaled \$650,000, as listed in Table 6.

Increased funding levels are important, particularly because private landowners (including non-timber corporate owners) control approximately 89% of the forested land in Kentucky.<sup>8</sup> About 32% of these private holdings represent small plots of 50 acres or less. These smaller parcels are highly fragmented and more difficult to manage for timber and wildlife resources, as well as protecting watersheds and underground karst systems.<sup>138</sup> However, these small parcels have significant value. In 2006, privately-owned Kentucky forests created 6.3 jobs per 1,000 acres and generated \$206 in payroll per acre when the direct, indirect, and induced benefits are included. Per acre, these forests also produced \$7.61 in state taxes, \$635 in annual sales, and contributed \$239 to the GDP.<sup>139</sup> While these values are significant, they are below regional averages<sup>139</sup> and therefore could be improved with proper forest management. However, only an

estimated 12% of private landowners have sought professional advice on forest management.<sup>8</sup> Mismanaged, poorly managed, or unmanaged forests are less productive. Funding supporting education, outreach and development of management plans for these private landowners is crucial in enhancing the quality of Kentucky's forests.

Funding is also important due to the high degree of fragmentation in Kentucky's forests. As discussed in Issue 3, large tracts of continuous forest lead to healthier, more productive forests that are more ecologically functional and aesthetically pleasing. Small, scattered tracts of forests are more difficult to manage and of limited value to wildlife and outdoor enthusiasts. Managing small, scattered forests requires more time and money (*e.g.*, traveling between sites, management plan development, etc.). Therefore, funding in the form of federal, state, and local programs must address these small forests to be effective in managing all of Kentucky's forest resources for the future.

Requests for additional funding are ongoing, but in the economic hardships of recent years many interests are competing for funding. In September 2009, representatives from Kentucky Woodland Owners Association and the University of Kentucky met with the Interim Joint Committee on Natural Resources and Environment with specific legislative and funding requests for FY 2010-2011.<sup>140</sup> Specifically they addressed requests for:

- Establishment of the Forest Health Board
- Provisions in potential biomass legislation to allow for the effective production of woody biomass
- Effective reduction of timber theft

The Forest Health Board would be administratively tied to the KDF. Establishment of this board may be the first step towards funding of the priorities mentioned above and discussed in Issue 1. Costs to develop economically viable and environmentally sustainable methods of woody biomass conversion to fuel sources would likely be deferred to the private sector.

Timber theft may be genuinely malicious (theft of valuable timber) or relatively benign (trespass due to misunderstanding of or dispute over property boundaries), but regardless of the reasons the problem is unfortunately common and largely unchecked in some areas of Kentucky.<sup>140</sup> Timber trespass and theft are costly to forest owners in the loss of timber value as well as in the financial burden of pursuing restitution through civil courts of law. The legal process is time-consuming, undeniably stressful, and largely unsuccessful – thieves are rarely caught or prosecuted. Properties that are not visited frequently are at an increased risk for theft and trespass. Reduction in rates of timber theft, like reduction in arson, would require additional funding.

As mentioned, many programs within the KDF would benefit from increased funding. In particular, funding could be targeted for forest assessments and monitoring, conservation assistance programs to landowners including the Forest Stewardship Program, cost-share programs, Kentucky HLCF, and the Urban and Community Forestry Program.

#### ***B. Current Status of Funding for Other Public Agencies***

The KDF works with many partners to provide services for Kentucky's forests. Many of these partners have also been affected by the economic downturn and have not been able to address many forestry concerns.

**1. Department of Parks**

The Kentucky Department of Parks manages approximately 50,000 acres of land as well as several thousand acres of lakes, river frontage, and streams. While funding to the department has decreased over the past decade, threats have increased. Because of poor water quality and the white nose syndrome affecting bats, the Department of Parks has had to close many waterfronts and cave areas and cancel events, decreasing visitation rates and revenues dramatically. Unanticipated disasters, such as the 2009 ice storm, have further sapped hundreds of thousands of dollars in order to repair facilities, clear trails and roads, and ensure visitor safety. Together, these factors have left few remaining funds to address forestry concerns. The Kentucky State Parks Commissioner says, "The department has implemented a restrictive firewood policy to help deter the introduction of the Emerald Ash Borer. However, once introduced, the Department does not have the necessary funding to remove the number of trees necessary to eliminate the safety hazard from the parks. There is no budget to address the Hemlock Woolly Adelgid in the eastern parks, or any of the other hundreds of invasive exotic plants threatening our natural areas."<sup>141</sup> Thus, the forest health concerns are largely unaddressed in state parks.

**2. Land Between the Lakes National Recreation Area**

The USFS's Land Between the Lakes National Recreation Area (LBL) is covered by 92% forest, most of which is oak and hickory. Sixty percent of the 171,000 acres in the LBL are located in Kentucky. In December 2004, the LBL Land and Resource Management Plan (Area Plan) was approved. This document is designed to direct management to increase wildlife habitat, enhance recreational opportunities, promote ecologically sound management practices, demonstrate sustainable forest management, and support ecosystem management research. The Area Plan estimates an average annual timber harvest of 6,600 CCF (CCF is the equivalent of 100 cubic feet) or 2,200 acres per year, and average annual fuels treatments (including prescribed fire) on about 10,000 acres per year. To this point, such goals have not been met due to a variety of factors.<sup>142</sup>

Extreme weather events including straight-line winds, tornadoes, 100-year rainfall storms, and ice storms have cause time and resources to be redirected to address these time-sensitive events. Staff turnover including four changes in the lead forester over ten years has caused a reduced operating capacity due to time redirection to orientation, hiring, information gathering, and site familiarity. The legal process of environmental analysis has delayed implementation in addressing litigation against programs. Finally, the economic downturn over the last three years has limited the prospective timber buyers to one or no bidders. All of these factors have cumulative prevented achievement of the goals of the management plan.<sup>142</sup>

The emerging biomass market shows encouraging signs for the future in this area. The LBL used funds from the American Recovery and Reinvestment Act to stimulate two alternative energy demonstration projects in Trigg and Lyon counties. These projects have helped the LBL to learn how to prepare, sell, and market woody biomass and have increased the local community business interest.<sup>142</sup>

Table 8 shows LBL funding levels and the timber harvests (in CCF, hundred cubic feet) over the past five years.<sup>142</sup>

**TABLE 8 – LAND BETWEEN THE LAKES FUNDING LEVELS, 2005 – 2009**

	FY09	FY08	FY07	FY06	FY05
Timber Management	\$72,500	\$105,200	\$113,300	\$81,900	\$156,000
Vegetation and Watershed Management	\$124,500	\$105,200	\$213,600	\$164,200	\$200,000
Wildlife and Hazardous Fuels	\$108,300	\$82,400	\$85,000	\$62,000	\$82,000
Timber Sales Receipts	\$0	\$0	\$154,214	\$37,800	\$0
<b>Total Funding:</b>	<b>\$305,300</b>	<b>\$292,800</b>	<b>\$566,114</b>	<b>\$345,900</b>	<b>\$438,000</b>
Timber Harvest (ccf)	3,037	2,173	2,638	474	917

### 3. *Daniel Boone National Forest*

The USFS’s approximately 708,000-acre Daniel Boone National Forest (DBNF) extends over 140 miles along the western edge of the Cumberland Plateau across 21 counties in eastern Kentucky. The Forest is located within three major river basins—the Licking, Kentucky and Cumberland.

The DBNF faces threats today that are much different from those in the past. Many areas of the forest are now in a stressed condition because of overcrowding, the spread of non-native invasive plants, insects and diseases, and the reduced role of fire as a key ecological process in much of our forested ecosystems. Climate change may place the Forest under increasing stress that exacerbates the threats of fire, disease, and insects. Restoring forest ecosystems through a combination of forestry and prescribed fire treatments, particularly in our fire-adapted oak-pine and drier oak forests, will make the DBNF more resilient to climate-induced stresses and ensure that our Forest continues to supply abundant, clean water, high quality wildlife habitat, outstanding scenery, and valuable wood products. The threats facing our forests do not recognize property boundaries. 10-25% of rural Kentucky lands located within 10 miles of the DBNF are projected to undergo increases in housing development by 2030. This increased development will put added pressure on fish and wildlife, increase the likelihood of spread of invasive species, negatively impact water quality, and increase demand for recreation services on the DBNF.<sup>143</sup>

In April of 2004, the DBNF Land and Resource Management Plan (Forest Plan) was approved. The Forest Plan was developed with the participation and input of many Kentucky citizens and organizations. It employs strong conservation measures to protect, maintain, improve, and restore our sources of clean water; habitat for all native plants and animals; old growth conditions; and the unique scenic beauty of the Forest. It maintains and restores a healthy, resilient forest to reduce risks from wildfire, insects, disease and other threats.

Timber harvesting in the Forest Plan is used first and foremost as a tool to achieve desired ecosystem conditions, including thinning to reduce overcrowding and restore open woodlands with native grasses flourishing under the tree canopy. Project proposals that move us towards the desired ecosystem conditions spelled out by the Forest Plan determine when and where timber harvesting is used. The Forest Plan estimated a maximum average annual timber harvest of 22,900 CCF, or 1,553 acres per year. The emerging biomass market will provide future opportunities for increased and more economical thinning and restoration work.

Table 9 shows DBNF funding levels and the timber harvests (in CCF, hundred cubic feet) over the past five years.

**TABLE 9 – DANIEL BOONE NATIONAL FOREST FUNDING LEVELS, 2005 – 2009**

	FY09	FY08	FY07	FY06	FY05
Timber Management	\$544,521	\$598,273	\$1,108,080 <sup>+</sup>	\$878,197	\$294,972
Vegetation, Forest Health and Watershed Management	\$1,395,231	\$1,288,147	\$858,774	\$985,687	\$929,053
Wildlife	\$666,507	\$665,907	\$697,991	\$791,172	\$739,697
Hazardous Fuels	\$709,717	\$687,834	\$663,336	\$404,312	\$394,678
<b>Total Funding*</b>	<b>\$13,548,099</b>	<b>\$13,474,675</b>	<b>\$12,545,475</b>	<b>\$14,106,495</b>	<b>\$9,665,707</b>
Timber Harvest (ccf)	13,300	13,900	15,400	13,800	2,340

\* Total Funding includes additional Budget Line Items such as recreation, lands, and road maintenance.

<sup>+</sup>FY07 Timber Management funding included “Timber Sale Pipeline” funding, a special Congressional allocation to be used for the preparation of timber sales not funded by annual appropriations with the expectation that this money will be paid back upon the successful sale of the timber.

#### *4. Kentucky State Nature Preserves Commission*

The KSNPC was established in 1976 with the legislative mandate to inventory the state’s rare species and natural communities and protect the best remaining examples in a statewide system of nature preserves. Funding for land acquisition to meet this mandate was not appropriated by the legislature until 1990 and a dedicated source of consistent revenue did not appear until 1995. Fifteen years ago, the KSNPC holdings amounted to little more than 10,500 acres. Since 1994, the agency has added 14,500 acres to the state nature preserve system. The increase in protected acres was mainly the result of receipts from the Kentucky HLCF that was established in 1995.<sup>144</sup>

Despite the gains in land acquisition, the KSNPC funding levels have not kept pace with the need to acquire significant representatives of Kentucky’s natural heritage. Greater rates of land acquisition are necessary to combat the high rate of habitat loss. Also, staffing for adequate management lags far behind acreage gains. Only three regional preserve managers are responsible for the 25,000 acres in the preserve system. There have been no additional field managing positions added in 11 years although acquisitions are ongoing. One manager is responsible for 48% of the land managed by the Commission, and the majority of these preserves are the most remote and inaccessible of the 60 preserves in the system. Budget reductions have also eliminated staff positions responsible for identifying and evaluating natural areas for consideration. Additional cuts have restricted staff travel which is critical for a program with a statewide mandate. Nor have funds been sufficient to effectively address management needs including invasive species control, prescribed fire management, rare species habitat management and visitor use. Considering that only one-tenth of one percent of Kentucky’s 25.8 million acres still retain high quality representations of the natural heritage which once graced the entire state, the KSNPC is ill-equipped to counterbalance the trend of disappearing quality habitat, which it is its statutory mission to protect.<sup>144</sup>

#### *5. University of Kentucky Department of Forestry*

The University of Kentucky (UK) maintains the state’s only forestry program accredited by Society of American Foresters. Adequate and properly targeted funding is required to provide for the education and training of foresters, conduct relevant forest and forestry based research, and share forestry related information to the Kentucky’s citizens.

In 2009, the Department of Forestry faculty were engaged in research and extension activities using 30 active grants totaling \$1.66 million dollars. These awards are from 13 different sponsors encompassing federal, state, and private sources. Long-term trends in funding (2003 to 2008) show that annual grant funding has ranged from a maximum of \$2.14 million in 2004-05 to a minimum award of \$783,000 in 2007-08.

While the Department of Forestry continues to sustain a vigorous research program with extramural funding, the department lacks state funding for much needed graduate student stipends. The department has difficulty in reaching graduate student capacity because it lacks sufficient stipends for students, and university rules associated with graduate tuition and stipends have caused road blocks. More state funding for graduate stipends is needed.

Much of the department's research work in the ecology of hardwood forests, water quality and hydrology, forest operations, wildlife conservation and management, silviculture, forest policy, and management has direct application to forest resources and is a critical component to the proper management of Kentucky's forest resources. More graduate students would allow the department to increase the information flow in key areas of importance to forest owners, practitioners, and natural resource professionals.

Full faculty staffing is required to meet instructional needs of the Bachelor of Science forestry program and the cooperative extension land grant responsibilities. To this end, it is important to maintain all positions and fill the vacancies that currently exist. No indications of eliminating open positions or staff reductions are anticipated; however, the deteriorating economic climate may result in fiscal pressures that can only be alleviated through the loss of faculty. Currently the department has four fewer faculty positions than 10 years ago. On top of faculty losses, two extension staff positions were lost in primary forest industry assistance and forest/environmental education. These losses directly resulted in reduced capacity to provide continuing education and applied research in these subject areas with important reductions in their capacity to assist eastern Kentucky communities, forest owners, and improve and protect the forest ecosystem.

The UK Department of Forestry must maintain a productive faculty and staff that is teaching, researching, disseminating information and providing solutions for critical issues that relate to forest resources. Limited state funding for graduate studies is hampering the full development of the department's graduate program. While forestry extension efforts and programs have been recognized as robust and relevant, the loss of faculty and staff have constrained growth of the cooperative extension effort and delivery of new awareness, education, and training programs in the commonwealth.

*C. Economic Overview of Kentucky's Timber and Non-Timber Industries*

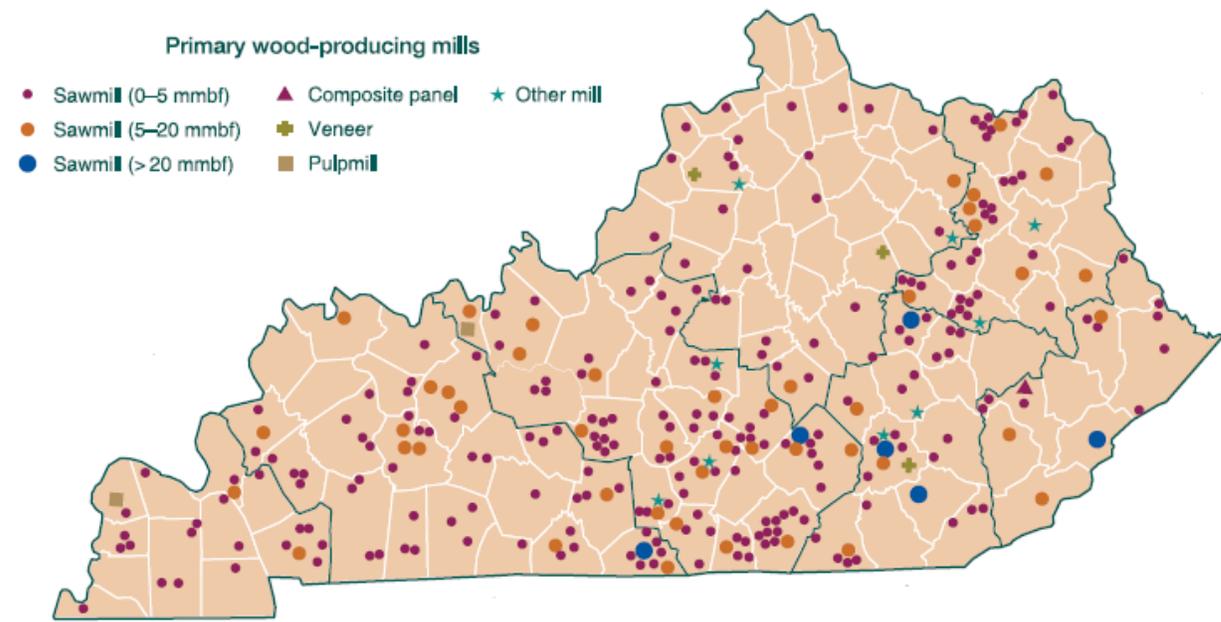
Kentucky's forests provide an essential revenue stream throughout all levels of the state and local economies. Proper forest management driven by sustainable development will lead to the creation of reliable income to landowners and in turn increased tax revenues to the state and local communities. Proper forest management does not happen in a vacuum. Funding is often needed to provide education and service programs to assist property owners in making the right decisions for their forestlands and to combat threats to the health of the forests. However, the prospect of increased economic returns due to forest management can be a promotional tool to accomplish these same ends. A brief overview of the importance of Kentucky's timber and non-timber forest products industries to the state's economy follows.

### 1. Timber Industry

Most Kentuckians do not realize the importance of the timber industry to the overall economy of the state. In 2003, more than 21,500 individuals were directly employed at wood-processing facilities, with a total annual payroll of approximately \$714 million. That same year, the total value of wood products manufactured in Kentucky was in excess of \$5.8 billion. In 2004, these numbers increased to 22,500 individuals employed at approximately the same number of wood processing facilities. Annual payroll increased to \$788 million, and the value of shipments totaled more than \$6.3 billion.<sup>8</sup> These facilities are spread throughout the state, as shown in Figure 41. For comparison, sales of all tobacco in 2005 generated \$342.5 million in cash receipts to Kentucky farmers.<sup>145</sup> Though timber production is often overlooked, it is a major component of the Kentucky economy.

Ninety-five percent of the total roundwood (logs, bolts, or other round sections cut from trees) output in 2007 came from non-industrial private forestlands. Forest industry lands contributed 3% and public lands made up the remaining 2% of roundwood output.<sup>146</sup> These numbers underscore the importance of the small private sector in the timber industry.

The most common timber species in Kentucky include yellow-poplar, oak, hickory, maple, beech and black locust (hardwoods); shortleaf pine, Virginia pine, loblolly pine, eastern red cedar, and baldcypress (softwoods).<sup>8</sup> Red and white oak combined accounted for 49% of total hardwood output. Yellow-poplar (14%) and hickory (11%) also contributed to hardwood production. Other documented hardwood species were maple, beech, and sweetgum. Yellow pines accounted for 91% of the total softwood output. Loblolly and shortleaf pines accounted for 5%. Remaining documented species include eastern white pine, redcedar, and hemlock.<sup>146</sup>



(Source: Turner et al., 2004)

**FIGURE 41 – PRIMARY WOOD-USING MILLS OF KENTUCKY, 2003**

The most recent assessment for Kentucky’s timber industry, produced by USFS and released in 2009, compared the industry from 2005 to 2007. A summary of the findings for all timber products follows:<sup>146</sup>

- Between 2005 and 2007, timber product output from both roundwood and utilized plant byproducts were down 3% to 186 thousand cubic feet (mcf) and 88 mcf, respectively
- Output of hardwood roundwood products decreased 3% to 174 mcf, and output from softwood roundwood products was down 8% to 12 mcf
- Saw-logs and pulpwood were the principal roundwood products in 2007; combined output of these products accounted for 91% of Kentucky's total roundwood output
- Total receipts at Kentucky mills, which included roundwood harvested and retained in the Commonwealth, as well as roundwood imported from other states, declined 7% to 200 mcf; at the same time, the number of primary roundwood-using plants in Kentucky declined from 292 in 2005 to 253 in 2007
- Across all products, 85% of roundwood harvested was retained for processing at Kentucky mills; Kentucky was a net importer of roundwood, importing 14 mcf

While saw-logs and pulpwood comprise 91% of Kentucky's roundwood output, veneer logs comprised 3% of the roundwood timber product output volume. In 2007, veneer log output was down 13%, likely due to the housing and furniture slow-down. Yet Kentucky was still a net exporter of roundwood veneer logs, exporting 6 mcf and retaining 7% of its veneer-log production for processing within the state.

Other products include composite panels (down 37% to 9 mcf), and other industrial products (poles, posts, mulch, firewood, etc.), which comprise less than 1% of Kentucky's timber product output.

In 2004, Kentucky's forests contained 18.9 billion cubic feet of growing-stock volume (which was 86% of the live tree volume). Since 1988, the volume of growing stock has increased by 14%.<sup>8</sup> The advantage to forest landowners is that they are not restricted to seasonal harvesting of their crop. If prices are low, they can limit timber harvest until prices rebound. Holding timber can increase yields, resulting in a more favorable return if the landowner can afford to delay harvest. Yet timber values could be increased with proper management.

Economic data are not yet available for the 2008-2009 period. Yet it is certain that the declines posted above will continue and may be significant in some sectors. Given the steep decline in the housing market and related industries, the demand for timber has likewise declined, with a resulting downward pull on Kentucky's economy.

## *2. Nontimber Forest Products*

Kentucky's forests are rich in nontimber forest products (NTFP) such as herbs, roots, sap, bark, fruit, and wood gathered from, but not cut from, timber. Harvesting these products has been practiced for centuries, and it provided an important source of income for pioneer families. Renewed interest in herbal remedies and the herbal medicinal industry, as well as for ornamentals and food sources, has led to increased harvest of these resources by Kentuckians as well as non-residents. While the beneficial effects of some of these herbs remains anecdotal, demands are high for herbal remedies such as ginseng, black cohosh, bloodroot, coneflower, goldenseal, passionflower, slippery elm, and witch-hazel. Interest in acquiring native plants for ornamental and landscape restoration purposes has increased. While some of these products can be cultivated in nurseries, wild-dug plant sales continue. High demand for orchids, trilliums, and other difficult-to-cultivate plants has attracted out-of-state people to Kentucky's forests. It is not known the direct impact or long-term effect of these harvests on the current populations. However, anecdotal evidence

suggests that the number of plants being taken annually is significant, which may be detrimental to the survival of these species.<sup>15</sup>

Ginseng has been harvested from Kentucky's forests for centuries. Twenty-eight counties (mostly in Eastern Kentucky) harvest ginseng. The highest producers were Knox, Harlan, Bell, Pike, and Perry counties in 2003.<sup>8</sup> Since 1995, Kentucky ranked the leading supplier of wild-harvested ginseng and supplied approximately 25% of the total amount of wild-harvested ginseng in the United States.<sup>8</sup> From 1981 through 2004, more than 465,000 pounds of wild-harvested ginseng were sold, or an average of 21,200 pounds a year. At \$300 a pound, ginseng thus contributes approximately \$6.4 million each year in direct payments to Kentucky's economy.<sup>8</sup> While input/output analysis has not been performed for the NTFP industry due to the difficulty of tracking harvest and sales, using a multiplier of 1.5 is a starting point. Thus, the cumulative economic effect of the ginseng harvest annually may exceed \$9.6 million.

Other decorative and edible NTFPs complement the medicinal products taken from Kentucky's forests. These products include Christmas trees and related products (vines, foliage, moss, needles, limbs, boughs, and cones), berries, mushrooms, wild onions, nuts, and sap. Of these, Christmas trees and nuts (particularly black walnuts) are the only two NTFPs that may readily be tracked. In 2002, Kentucky had 123 harvesting Christmas tree farms, with another 107 farms that anticipated beginning harvesting in the next several years. The harvest that year comprised approximately 1.5% of the total number of trees harvested in the South. The 2003 estimated value of this industry was between \$500,000 and \$750,000 direct sales annually.<sup>8</sup>

The sale of black walnuts may also be readily documented. In 2003, about 3.2 million pounds of walnuts were collected from the forests and along roadsides and sold by pickers for \$320,000 and then by hullers for \$432,000. The value added sale of walnuts that year was estimated at \$2.096 million, taking into account prices paid to picker and hullers as well as for shells and nutmeat.<sup>8</sup>

Although Kentucky is a major supplier of NTFPs in the U.S., takings are for the most part unregulated. No laws protecting NTFPs or regulations governing their harvest are present in Kentucky. It is not known how many pounds of all NTFPs are harvested annually.<sup>15</sup> Yet a partial measure of the NTFP harvest is the number of firms licensed to do business as an NTFP enterprise in Kentucky. A survey conducted in 2003 by county extension offices revealed that there were 4,921 NTFP firms. Kentucky ranked second to North Carolina in the region for NTFP enterprises, and accounted for 19% of the number of enterprises. The survey targeted firms that sold edible, specialty wood, floral and decorative, landscape, and medicinal products. Kentucky ranked first in the South for firms specializing in medicinal plant and specialty wood products, second for edible forest products, third for floral and decorative products from wild-harvested materials, and seventh for native plant collection and use for landscaping.<sup>8</sup>

Another measure, although tenuous, of NTFP harvest is the permits sold by the DBNF to allow harvest of some NTFPs, including fuel wood, Christmas trees, roots, moss, herbs, and vines. The sale of permits is a small source of revenue; in 2004 it was approximately \$4,300.<sup>8</sup> A conservative estimate is that the market value that year was more than \$42,000. Yet market valuation for NTFPs has not been fully developed, and of course nothing is known about products taken out of the forests without a permit (theft).<sup>8</sup> Given the current economic climate and the street value of the harvest, it is likely significant.

Yet it is known that unscrupulous diggers trespass onto federal-, state-, and privately-owned plots to harvest NTFPs. The issue of non-regulation makes the nature of these activities hazy at best, but the fact remains that this practice constitutes theft, as does timber theft, another serious problem in Kentucky's forests. Given the value of permits sold, the cost of a permit is miniscule compared to the potential market value of products sold. Implementation of regulations governing the harvest and sale of NTFPs in Kentucky may result in a significant funding source for Kentucky's forests, yet it is a field that is difficult and perhaps costly to regulate.

*D. Public Benefits*

Funding of proper forest management that results in a healthy, productive forest ecosystem will provide many benefits to all Kentucky residents. Forests are a multifaceted renewable resource, yet they cannot be maintained without cost, nor should those who enjoy them expect that forests are self-sustaining. By maximizing a forest's sustainability for the numerous end-users, a reliable long-term tax base can be generated. The value of Kentucky's timber and NTFP industries are discussed above. Taxes generated from the timber and tourism industry can have a synergistic effect, as funds are re-invested into forest management and land acquisition, resulting in larger, more functional, and more productive forests.

In addition to tax generation, there are additional benefits of forestry funding to be realized by local residents, especially forest landowners. Educational and outreach programs are often the first to be eliminated in a budget shortfall, yet they are perhaps the most important for the long-term benefit of Kentucky's forests. The need continues for program coordinators devoted to forestry education programs at district or regional levels to easily reach Kentucky's forest landowners. Educational outreach can help landowners develop a forest management plan and teach local residents the inherent value of their forests. Cost-share programs (*e.g.*, EQIP) can be used to help landowners implement forest management plans via several avenues such as removing exotic pest plants and planting valuable forest tree species. Additionally, living in and adjacent to forested areas often increases property values as residents tend to view them as more aesthetically pleasing. Property values associated with forested areas are typically 6 to 15% higher than those that are not.<sup>60</sup>

Kentucky is home to one national forest (DBNF), two national recreation areas (Big South Fork and Land Between the Lakes), three national parks (Mammoth Cave, Cumberland Gap, and Big South Fork), eight state forests (Green River, Kentenia, Kentucky Ridge, Pennyriple, Tygarts, Knobs, Marrowbone, and Rolleigh Peterson Educational Forest), 82 wildlife management areas, 43 state nature preserves, and seven state park nature preserves. Most of these holdings are at least partially forested. Kentucky also has large public forested land on military grounds including the Blue Grass Army Depot, Fort Knox Military Reservation, and Fort Campbell Military Reservation. The benefit to Kentucky citizens of these public holdings is significant and the importance of preserving their forestland is high.

Because hunting, fishing and wildlife watching are significant social and economic activities in Kentucky, their enhancement should continue. Residents and non-residents alike use Kentucky's federal- and state-owned forests, parks, and wildlife management areas extensively for hunting, fishing, wildlife viewing, camping, hiking, horseback riding, mountain biking, and numerous other recreational activities. These activities, as well as tourists visiting the forests, represent a significant economic benefit to the Commonwealth. As well, these activities improve the quality of life for those who seek solitude or adventure in Kentucky's forests.

*E. Direct Threats and Contributing Factors*

The threats to the forests of Kentucky have been identified in each of the forest issues. Additional funding would be required to address many of these issues. Some threats, however, are more directly tied to funding or the traditional timber and NTFP industries and are discussed below.

*1. Economic Pressures to the Timber Industry*

Kentucky's timber industry is closely tied to the global markets. As imports of wood products continue to rise, the demand for domestic wood products has declined. The further economic slowdown has dampened demand for wood products from house construction to furniture, and recycling efforts have further reduced demand for pulpwood products.<sup>65</sup> This reduced demand has hurt prices and corresponding business strategies in the local timber industry. It will also result in older forest stands, altering habitat and biodiversity. Implementation of forest management plans will improve existing stands to maximize income derived from the timber source.

Conversely, a shift from traditional hardwood products to fuel sources derived from woody biomass has potential to alter how forests are harvested. Large-scale production of woody biomass for various types of fuel could alter the age class of forests, with more focus on rapidly growing softwood species at the expense and loss of larger, more valuable timber. A change in species diversity in the forests due to harvesting targeted towards biomass production would also negatively impact certain terrestrial species' habitat.

*2. Emerald Ash Borer*

Threats of invasive species have been discussed in other sections of this Forest Assessment, particularly in Issue 1. Yet the emerald ash borer (EAB) poses a direct threat to exports of Kentucky's ash harvest. Currently, 20 counties have been quarantined, and EAB has been collected in seven counties (Campbell, Fayette, Franklin, Greenup, Henry, Jefferson, Jessamine, Kenton, Oldham, Owen, and Shelby). The quarantine prevents the transportation of all hardwood species of firewood, ash trees, lumber, nursery stock, or other material where EAB is suspected into a non-quarantined area without a certificate or limited permit. No permit is needed for movement within the quarantined area and untreated products may be moved out of a quarantined area with a permit between October and March.<sup>147</sup>

It is likely that EAB will migrate to the vast forests of southeast Kentucky. Since 2002, when the pest was first discovered in Michigan, states with EAB infestations have lost tens of millions of trees. Ash is highly valued as a timber tree and is used for furniture as well as flooring and cabinetry. White ash and green ash rank 11<sup>th</sup> and 14<sup>th</sup> respectively in terms of total standing volume in Kentucky.<sup>8</sup> The implementation of quarantines on the major timber-producing counties of Kentucky, as well as the loss of valuable trees, will negatively impact the timber industry. Foresters can mitigate for the loss of ash trees by planting other species, yet this is a long-term process to recoup the investment. In the short term, foresters can harvest mature ash trees prior to the arrival of EAB. Yet all these decisions are difficult to make and benefit from assistance from county extension agents. Funding to preserve these services is essential to the health of the Kentucky timber industry.

Loss of mature ash trees will also negatively impact the urban forests of Kentucky, where the loss of these large trees will be more readily noted by the general population. Notwithstanding the loss of aesthetic value that these beautiful trees represent, the cost to cities and counties to remove dying trees and replace them with other species poses a daunting challenge for already stressed municipal budgets.

### **3. *Unsustainable Harvest of NTFP***

The long-term health of the traditional timber and NTFP industries suggests an increase in technical assistance, regulation, and oversight. Current harvest of some NTFP species may already be at levels that will lead to extirpation in Kentucky's forests. Proper management will allow continued harvests while maintaining the species for the economic benefit of the Commonwealth. Yet regulation is often met with either skepticism or even hostility by those for whom it might benefit. Because of Kentucky's long history of unregulated NTFP collection by rural communities, changing from a short-term benefit (immediate income) to a long-term vision (sustain income stream for decades to come) is difficult to understand. Education is an essential tool to changing this mindset. The funding needed for this effort is likely significant and, at the present time, not available.

### **4. *Woody Biomass Harvesting***

Woody biomass offers great economic promise as alternative fuel source for vehicles and electrical power, particularly in the short-term. Industries that sell pulpwood and other low-value factory lumber could divert it to biomass production. However, over-harvesting and poor management resulting from the emergence of this sector could threaten Kentucky's forests, the sustainability of the emerging industry, and the existing forest industries. As the market for woody biomass grows, it may reduce the availability of lumber for production of pallets, charcoal, railway ties, etc. Long-term effects include the potential for reduction in quality sawtimber by short-term introduction of chip markets in traditional hardwood sawtimber territories. More intensive harvesting leads to younger timber lots and loss of the older, larger classes of timber. But it is clear that a profitable, thriving woody biomass market may alter Kentucky's forest industry.<sup>79</sup>

### **5. *Competition for Funding and Public Apathy***

Competition for forestry funding is particularly strong in light of a global recession that has seen cutbacks in government budgets and spending in Kentucky, across the country, and around the world. As budgets have declined, public opinions have naturally shifted from support of line items providing a sense of well-being (*e.g.*, forest conservation, tree planting) to those providing a sense of security (*e.g.*, health care, job security). Public apathy towards forest management is also a result of the apparent abundance of forest, albeit with unhealthy conditions (*i.e.*, composed of invasive species, trees of low timber and wildlife value, infested with pests and disease). These conditions are easily overlooked by someone unaware of the difference between a healthy, productive, functional forest and one that is of less value.

Further threatening forest funding is the nature of the investment. An investment in Kentucky's forest is a long-term investment. Human nature is prone to selecting options that provide the most immediate benefit even if an investment in something more long term will provide vastly greater benefits. This is so with Kentucky forests. Though the investment is high and long-term, the resource is renewable, reusable, sustainable, and can be enjoyed by a multitude of end users (*e.g.*, timber industry, wildlife, nature enthusiasts).

### **F. *Opportunities***

Investments in Kentucky forests are an investment in Kentucky's future. Kentucky is the third largest hardwood lumber producing state with more than \$6.3 billion in total value of wood products (2004). Non-forest products derived from the forest include ginseng (most valuable, with annual harvests of several million dollars), bee products, native and exotic mushrooms, maple syrup, craft materials, fence posts, and fuel wood. The forest industry as a whole contributed \$8.7 billion to the Commonwealth's economy.<sup>8</sup> Such

economic benefits cannot be ignored. Forest users run the gamut from industrial to recreational and include timber companies, sportsmen, wildlife enthusiasts, hikers, and other outdoor recreational enthusiasts. Due to the great diversity in end-users of forests and the variety of products derived from them, opportunities for investment in our forests are as abundant as the benefits they may yield.

### *1. Cost-share and Education Opportunities for Private Forest Owners*

While funding opportunities that support and maintain federal lands is important, it is critical that more of Kentucky's forestland be covered by management plans due to the predominance of privately-owned lands. Insect pests, invasive plants, infectious disease, and wildfire are a constant threat to the health of our forests. KDF's programs currently in place provide assistance to forest landowners and education to the public on the consequences of exotic invasives plants and arson.

As previously mentioned, 78% of Kentucky's forests are owned by privately individuals and 11% by corporations.<sup>8</sup> Currently, only an estimated 1% of the family landowners have a written management plan and only 12% have sought professional advice on proper forest management.<sup>8</sup> Funding cost-share programs such as Habitat Improvement Program, Kentucky Soil Erosion and Water Quality Cost-Share Program, CRP, EQIP, Wildlife Habitat Incentive Program, Quail Unlimited and National Wild Turkey Federation, and Local Wildlife Enhancement Projects can help private landowners more effectively manage their forested lands. The NRCS provides an immediate opportunity for enhancing technical assistance to private landowners from the both public and private sectors through its fully funded Technical Service Providers.

Persuading private landowners to adopt management plans requires educational outreach. Funding for UK and the NRCS district offices should be preserved and preferably enhanced. Utilizing the State Stewardship Coordination Committee's role as a subcommittee of the NRCS State Technical Committee may assist in the funding of forestry cost share and Technical Service Providers in the public and private sector. Landowners who own and harvest small plots of forestland often do not realize the impacts of poor management practices, fragmentation, and over harvesting. Because of the large number of these private landowners, the cumulative beneficial impact of educational outreach could be significant.

A properly managed forest will also produce more timber of better quality, provide better wildlife habitat, and be more appealing to outdoor enthusiasts, all of which has the potential to generate revenues for the state. More high quality timber will result in higher tax revenues. Enhanced wildlife habitat will lead to an increase in the number of hunters and wildlife enthusiasts visiting forested areas. License fees from hunters (and potentially wildlife enthusiasts), as well as money spent in communities within and adjacent to forested areas, will also generate revenue. Similarly, creation of regulated outdoor facilities (*e.g.*, ATV parks, equestrian and mountain biking trailheads) will generate revenue.

### *2. Ecosystem Services Markets*

In addition to hunting fees, recreational tourism, and increased timber revenues, ecosystem service markets are emerging as an additional revenue stream. As UK's Dr. Morgan Robertson indicates, the development of ecosystem markets is difficult due to challenges such as debate about market-led versus state management, differences in the logics of economics, law, and science, confusion over value of natural resources and price, and the difficulty in developing standard and non-controversial measures of the services. However, "certain elements of nature, when properly quantified and described, may enter

the economy as commercial goods/services, fixed capital or sources of rent – but this is only ever a subset of the entirety of nature.”<sup>148</sup>

The United States Department of Agriculture (USDA) Office of Ecosystem Services and Markets was created in an effort to push forward the development of the ecosystem services markets legislated under Section 2709 of the Food, Conservation, and Energy Act of 2008. According to Sally Collins, Director of the Office of Ecosystem Services and Markets, the work of the office is organized around four goals:

1. Shaping the development of national market infrastructure for emerging carbon, water, wetlands, and biodiversity markets
2. Fostering collaboration around market-based conservation, within the USDA and across government
3. Establish informational platforms and sharing tools that facilitate market transparency, landowner participation, and collaborative decision making
4. Helping the USDA and other land management agencies to use an ecosystem services approach that guides their programs, partnerships, and decisions<sup>149</sup>

The first ecosystem service to be examined by this new office is carbon sequestration, but other services such as wetland mitigation banking, biodiversity credits, renewable energy, sustainable timber, and water quality credits would be further developed as commodities. It proposes a portfolio approach to forest management where multiple streams of revenue are generated by traditional food and fiber products, eco-labeling such as forest certification, and woody biomass and alternative energy in addition to ecosystem markets for species habitat, standing carbon, water quality, and wetlands.<sup>149</sup>

In Kentucky, some of these ecosystem markets have already been developed and could be further expanded. Although no water quality credits have been traded in Kentucky to date, multiple wetland mitigation banks have been established throughout the state driven by Section 404 of the Clean Water Act. The Kentucky Transportation Cabinet (KYTC) Stream and Wetland Mitigation Program is one such bank established in order to provide compensatory mitigation for unavoidable wetland impacts. The KYTC provides funds for the restoration, creation, enhancement, or preservation of wetlands in advance of impacts in order to provide greater ecological benefits and reduce the time involved with permit review, reporting, and monitoring.<sup>150</sup> Over 500 wetland mitigation banks similar to this program, worth three billion dollars, have been established in 42 states.<sup>149</sup>

The KYTC has also successfully developed a conservation fund in order to comply with the Endangered Species Act. Though payment into an Indiana Bat Conservation Fund, mitigation for projects that adversely impact this endangered species can be directed towards projects that will aid in the recovery of the species. In the United States, a total of 113 biodiversity banks have been created worth \$370 million.<sup>149</sup>

Unlike the water, wetland, and biodiversity markets that are driven by regulatory protection, the carbon market is driven by voluntary participation. However, the market nearly doubled in 2008 to a worth of over \$705 million. Carbon sequestration represents an avenue to assist with afforestation and reforestation programs since trading on the Chicago Climate Exchange represents an additional revenue stream.

### *3. Woody Biomass*

Another emerging opportunity comes from the biofuels market. The trend towards reducing petroleum fuel use in vehicles in favor of ethanol also represents a potential benefit for Kentucky's wood industry.

Currently, ethanol is produced primarily from corn, but the resulting impacts on the price of corn for human and animal consumption are expected to make ethanol production from woody biomass a more cost-effective option. Although the technology to convert woody biomass to ethanol is not currently commercially viable, such a conversion would benefit Kentucky's forest owners. Sources for these biofuels include unextracted wood and bark from current timber harvest, debris from urban sources, woody material from thinnings and other forest improvement treatments, and biomass energy plantings.<sup>79</sup>

While additional sources of revenue are needed, Kentucky's wood products industry must be watchful that a secondary effect of the "Green Revolution" – development of a commercially viable woody biomass industry – does not inflict long-term damage to the quality and sustainability of Kentucky's forests or negatively impact its water quality. Yet the opportunity to develop a new, clean industry using abundant renewable natural resources gives Kentucky an advantage over states with less abundant resources. The benefit of clean fuel to future generations and the environment is incalculable.