

Land Conservation Spending in Missouri in Relation to the State Wildlife Conservation Strategy

A REPORT PREPARED FOR THE NATIONAL COUNCIL FOR SCIENCE
AND THE ENVIRONMENT

WILDLIFE HABITAT POLICY RESEARCH PROJECT

DEFENDERS OF WILDLIFE
TRUST FOR PUBLIC LAND

MaryBruce Alford, Frank Casey, Molly Cheatum, Andrew duMoulin,
Mitchel Hannon, Janet Mackey, Katie Theoharides



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I. Introduction

This report describes and analyzes land conservation expenditures in the State of Missouri for 1998-2007. The report constitutes one of five state studies to examine how land conservation expenditures were aligned with each state's wildlife habitat Conservation Strategy (State Strategy). For Missouri, we investigate the extent to which land conservation expenditures overlapped with that state's Conservation Opportunity Areas (Opportunity Areas) that make up its State Strategy. The report addresses three topics: a spending efficiency analysis; a financial efficiency analysis of land protection costs; and a policy analysis.

Under federal legislation, each state was required to complete a state wildlife conservation strategy by October of 2005 in order to remain eligible for federal State Wildlife Grant funds. These strategies were required to address eight congressionally mandated elements, including identifying species and habitats of greatest conservation need. Many states took the opportunity to map Opportunity Areas that represented the best areas for conservation of multiple species and habitats. The states used various methods to identify Opportunity Areas. Many states made it clear that these Areas were not intended solely for acquisition and emphasized that maps illustrate sites of high biological significance and opportunity for a variety of conservation actions. In Missouri, Opportunity Areas are composed of a range of habitat types and land uses, including natural and semi-natural landscapes, agricultural and forestry lands and existing developed or excavated areas. Developed and excavated lands are excluded from our analysis.

The spending efficiency analysis has three primary components: (1) to the degree possible, to describe and analyze public and private land conservation expenditures between 1998-2007; (2) to spatially map expenditures and acreages to determine the amount of geographic overlap with the Opportunity Areas identified in the State Strategy, and (3) to determine the percentage and amount of total conservation spending and acreage that aligned with the Opportunity Areas. The financial efficiency analysis examines the relative costs of protecting Opportunity Areas lands that had not been conserved as of 2007. These costs were estimated by consulting public and private expenditure data associated with public and private land protection programs. Three types of land protection costs are compared: fee-simple purchase, permanent easements, and land rentals. In addition, land management costs associated with fee-simple purchases and transaction costs for easements are included. The policy analysis looks at ways in which the state uses its resources, programs and policies to direct funding towards activities that will achieve the state's land and habitat conservation goals, including the State Strategy. The policy analysis also examines how the state is guiding conservation spending towards the Opportunity Areas.

The next section reports our findings with respect to spending efficiency in Missouri by employing descriptive and spatial analyses. Section III provides a policy analysis with respect to land conservation expenditures and their alignment with designated Opportunity Areas. Section IV provides estimates of what it would cost to conserve remaining Focus Areas that were not protected as of 2007. The last section offers some preliminary conclusions and recommendations for aligning land conservation funding with the State Strategy, and which financial instruments may be more cost-effective in conserving unprotected Opportunity Areas.

II. Description and Analysis of Land Conservation Expenditures in Missouri

The description and analysis of land conservation spending in Missouri is composed of two interrelated topics. First, we provide estimates of the amounts spent and acreages protected by various public and private land conservation entities in Missouri for 1998-2007. Second, we provide, to the extent possible, a spatial analysis that illustrates the amount of overlap between expenditures and acres in land conservation and the location of Conservation Opportunity Areas (Opportunity Areas) identified in the Missouri State Strategy. It should be noted, however, that the State Strategy was only adopted in 2005, so any alignment between conserved lands from 1998-2007 would be relatively recent. Therefore, the description and analysis of alignment with the Opportunity Areas really serves more as a baseline rather than as an indicator of how strategic land conservation has been for the purpose of implementing the State Strategy.

A. Conservation Expenditures in Missouri, 1998-2007

This section provides descriptions of the public and private land conservation funding sources in Missouri and provides data on the size of protected areas, and related expenditures, by source of funding for 1998-2007. Major data sources include The Trust for Public Land's (TPL) Conservation Almanac, and TPL's LandVote database.

The following sections disaggregate the total funding and acreage reported above into five categories: state-level sources, federal programs that are and are not coordinated by a state agency, local government funding sources, and private land trusts. Describing and analyzing expenditure data using these categories informs our policy proposals to improve the alignment of conservation spending with Missouri's Opportunity Areas.

State Government Land Conservation Expenditures

In 1976, voters approved Missouri's first statewide tax for conservation purposes. A permanent 1/8 of one-cent sales tax was approved to bring in approximately \$25 million a year for conservation projects. The sales tax actually brings in approximately \$90-\$100 million a year and is placed in the Conservation Commission Fund to be administered by the Missouri Department of Conservation. The money goes to the "Design for Conservation" plan that includes land acquisition for wildlife habitat and parks, and environmental education, among other purposes.¹

In a 1984 special election, voters approved a new Soil and Water Conservation tax managed by the Department of Natural Resources. The one-tenth of one percent sales and use tax is evenly split between soil and water conservation and state park purposes. Voters have granted a series of extensions to the sales tax, the last one occurring in 2006. This sales tax is not used to acquire land for conservation, but rather for park improvements. The Department of Natural Resources (DNR) land acquisition budget is funded exclusively from a state parks earnings fund. The monies in this fund are from fees charged for camping, lodging, tours and from the sale of merchandise (such as firewood, souvenirs, food). The Department receives approximately \$1 million from the state every two years for land

¹ Constitution of Missouri Article IV, § 43

acquisition, which is limited to purchasing land adjacent to existing state parks and state historic sites.

From 1998 to 2007, the state of Missouri spent about \$26.1 million and conserved roughly 27,430 acres of land using Conservation Commission funding, state appropriations, and state parks earnings funds (Table 2.1). The Conservation Commission Fund accounted for over 73% of total expenditures and more than 85% of the acres conserved over this time period. These data do not include projects that may have been authorized, but not completed at the time of this report.

Table 2.1: Missouri state land conservation expenditures and acreage, 1998-2007

<i>State Program</i>	<i>Coordinating Agency</i>	<i>Expenditures (\$millions)</i>	<i>Acres</i>
Conservation Commission Fund	Missouri Department of Conservation	\$19.1	23,412
State Parks	Department of Natural Resources	\$7.1	4,018
Total		\$26.1 million	27,430 acres

Federal Conservation Programs

Federal government funding programs are broken into three categories: 1) federal land conservation programs coordinated solely by state agencies for which a state match may be necessary; 2) programs coordinated by the federal government that work with various partners, including state agencies; and 3) programs operated solely for and by federal land agencies with no state involvement. An example of federal funds coordinated by the state is the Cooperative Endangered Species Conservation Fund (CESCF) which issues grants to states to support habitat conservation projects. Individual projects are selected by a designated state agency. Examples of federal programs that involve public and private partners, and are coordinated by the federal government, are the USDA Farm and Ranchland Protection and the Wetland Reserve Programs. Under both programs, the federal government must approve specific projects before funding is distributed. Lastly, there is federal funding used only for and by federal land agencies, such as the U.S. Forest Service, to purchase land that add to the public domain and/or implement land management activities on federal lands.

Federal Conservation Programs Implemented by State Agencies

There were two federal conservation programs whereby the state of Missouri played a coordinating role with respect to land conservation activity and expenditures, the CESCF and the Land and Water Conservation Fund. Table 2.2 summarizes acreage conserved and

expenditures for each of the programs for 1998-2007. The majority of funding (77%), and probably acres, came through the CESCOF.

Table 2.2: Federal land conservation programs implemented by state agencies, 1998-2007

<i>Program Name</i>	<i>Missouri State Agency</i>	<i>Program Spending (\$)</i>	<i>Acres Protected</i>
Cooperative Endangered Species Conservation Fund	Missouri Department of Conservation	\$763,504	Not available ¹
Land and Water Conservation Fund	Missouri Department of Natural Resources, State Parks	\$228,700	40
National Scenic Byways and Recreational Trails	Missouri Department of Transportation	Not available	Not available
TOTAL		\$992,204	Not available

¹The U.S. Fish and Wildlife Service tracks program benefits in terms of species, not number of acres protected.

Cooperative Endangered Species Conservation Fund (U.S. Fish and Wildlife Service)

Grants offered through the Cooperative Endangered Species Conservation Fund (authorized under section 6 of the Endangered Species Act) support participation in a wide array of voluntary conservation projects for candidate, proposed, and listed species. There are two grant programs, the Habitat Conservation Plan (HCP) and Recovery Lands Conservation Grant.

HCP conservation grants provide funding to states and territories explicitly for land acquisitions that complement approved HCPs. These grants are available only for fee-simple purchases that go above and beyond the conservation responsibilities that non-federal partners already bear under the terms of the HCP. These grants complement but do not replace private mitigation responsibilities contained in HCPs. Protected acres have important benefits for listed, proposed, and candidate species and for the ecosystems that support those species.

Recovery Land grants provide funds to states and territories for the acquisition of habitat, through both fee-simple purchase and easement, in support of federally listed threatened and endangered species recovery. Funds must contribute to the implementation of a finalized and approved recovery plan for at least one species under the Endangered Species Act.

The Cooperative Endangered Species Conservation Fund was used to conserve land at a cost of approximately \$763,504 from 1998-2007. The U.S. Fish and Wildlife Service measures program accomplishments in terms of benefits to species, and not acres. Additionally, the number of acres conserved is not reported because of the sensitivity of identifying specific locations where endangered species exist.

Land and Water Conservation Fund (National Park Service)

The Land and Water Conservation Fund provides a 50 percent match to states for planning, developing and acquiring land and water areas for natural resource protection and recreation enhancement. Funds are distributed to states based on population and need. Once the funds are distributed, each state selects projects, with the approval of the National Park Service. Eligible grantees include municipalities, state agencies and tribal governments, each of whom must provide at least 50 percent matching funds in either cash or in-kind contributions, and develop a detailed project implementation plan. Between 1998 and 2007, the Missouri Department of Natural Resources State Parks spent about \$228,700 of Conservation Fund monies to protect approximately 40 acres.

National Scenic Byways Program and the Recreational Trails Funds (U.S. Department of Transportation, Federal Highway Administration)²

The National Scenic Byways Program and the Recreational Trails Funds are coordinated by the Department of Transportation's Federal Highway Administration. Under the Byways program, the U.S. Secretary of Transportation recognizes specific roads as "National Scenic Byways" or "All-American Roads" based on significant archaeological, cultural, historic, natural, recreational, and scenic qualities." Discretionary grants are also provided for scenic byway projects to aid in planning, designing and developing a State scenic byway program.

Funding for Recreational Trails is derived from the Federal Highway Trust Fund, which is sustained in part through a portion of the motor fuel excise tax collected from non-highway recreational fuel use (i.e. fuel used by snowmobiles, all-terrain vehicles, off-highway motorcycles, off-highway light trucks). Funding is provided to States to develop and maintain recreational trails and facilities for all types of trail use, some of which include hiking, bicycling, in-line skating, equestrian, and snowmobiling.³ There is no available acreage or expenditure data for this program in Missouri.

Federal Land Conservation Programs with Partners

There are four federal land conservation programs active in Missouri, which are managed by Federal government authorities, but involve an array of various partners. The Federal agencies involved include the Departments of Agriculture and the Department of Interior U.S. Fish and Wildlife Service. These programs require state matching funds (Table 2.3). In the case of agriculture, land conservation programs involve individual crop and livestock producers as partners. From 1998-2007, federal-partner land conservation programs accounted for expenditures of nearly \$74 million and protected almost 91,000 acres. The

² This National program is not included in Table 2.2 because acreage and expenditure data were not available.

³ <http://www.ntfp.net/FHWAntp.html>

vast majority of acres conserved (70%) and expenditures (90%) came through the USDA Wetland Reserve Program.

Table 2.3: Federal and partner land protection programs in Missouri, 1998-2007

<i>Federal Program</i>	<i>Program Spending (\$millions)</i>	<i>Acres Protected</i>
Farm and Ranch Lands Protection Program	\$0.8175	172
North American Wetlands Conservation Act	\$5.9	34,475
Wetlands Reserve Program	\$67.2	56,044
Grassland Reserve Program	Short term rentals	Short term rentals
TOTAL	\$73.9 million	90,691 acres

Farm and Ranch Lands Protection Program (USDA/National Resource Conservation Service)

The USDA Farm and Ranch Lands Protection Program (FRPP) provides matching funds for the purchase of development rights to keep productive farm and rangeland in agricultural uses. FRPP works with state, tribal, or local governments and non-governmental entities. Grants are awarded by the Natural Resource Conservation Service (NRCS) to states, local governments and non-governmental entities on a competitive basis, according to national and state criteria. The program requires up to a 50 per cent non-NRCS match to cover the cost of an easement. Up to 25 per cent of donated land value can be counted as the match.

Between 1998 and 2007, \$817,500 was spent on FRPP easements to conserve approximately 170 acres.

Grasslands Reserve Program (USDA)

The NRCS, the Farm Services Agency (FSA) and the U.S. Forest Service coordinate the Grasslands Reserve Program (GRP). The GRP is a voluntary program offering landowners an opportunity to protect, restore, and enhance grasslands on their property through the use of rental agreements or easements (term and permanent).

In Missouri, about 822 acres were protected through GRP up to 2007, with a federal cost of \$561,824. However, all this acreage is under 10-20 year rental agreements, and not permanently protected.

Wetlands Reserve Program (USDA/National Resource Conservation Service)

The NRCS administers the Wetlands Reserve Program (WRP), a voluntary program offering landowners the opportunity to “address wetland, wildlife habitat, soil, water, and related natural resource concerns on private lands in an environmentally beneficial and cost-effective manner.”⁴ The WRP offers agricultural landowners a choice of entering into either 30-year or permanent conservation easements and also provides cost-share assistance for restoration.

Between 2002 and 2007, approximately 56,044 acres were conserved under WRP through permanent easements in Missouri. Another 13,809 acres were protected under 30-year easements between 1998 and 2007. Expenditure data is not available prior to 2002. The total amount spent for permanent and term easements was approximately \$67.2 million. Location information is not shown in the mapping analysis due to the confidential nature of the data.

North American Wetlands Conservation Act (U.S. Fish and Wildlife Service)

The North American Wetlands Conservation Act (NAWCA) was passed in 1989 to provide matching grants for the acquisition, restoration, and enhancement of wetland ecosystems for the benefit of waterfowl and other wetland dependent migratory species. Administered by the U.S. Fish and Wildlife Service, grants are available to nonprofit organizations, state and local agencies, tribes, and private individuals in the U.S., Canada, and Mexico. Two types of grants are awarded; small grants for up to \$75,000 and standard grants for up to \$1 million. There is a 1:1 non-federal match requirement for each grant although the average match of successful proposals is over 2:1. Between 1998 and 2007, about \$5.9 million of NAWCA funds were spent in Missouri conserve approximately 34,500 acres.

Land Conservation by Federal Land Management Agencies

The land conservation funding described in this section pertains to Federal agencies that protect land solely for and by their own agencies, with no involvement by the state of Missouri or private partners. These agencies include the Bureau of Land Management, the Bureau of Reclamation, the National Park Service, the U.S. Fish and Wildlife Service, the Army Corps of Engineers, and the U.S.D.A. Forest Service. Annual funding and acreage figures could not be obtained from the Bureaus of Land Management or Reclamation. The Bureau of Land Reclamation (BLR) is administered by the U.S. Department of the Interior and buys and owns land to build dams, power plants, and canals. However, expenditure and acreage data pertinent to these lands was not included because of their uncertain status as conserved lands. Expenditures and acres protected are shown in Table 2.4. Across all agencies, the federal government spent almost \$44 million to conserve nearly 32,000 from 1998 to 2007. The Army Corps of Engineers accounted for the majority of expenditures (60%) and protected about 44% of the total acreage.

⁴ Natural Resource Conservation Service United States Department of Agriculture – Farm Bill 2002, Wetlands Reserve Program, Key Points - http://www.nrcs.usda.gov/Programs/WRP/2007_ContractInfo/2007WRPKeyPoints.pdf

Table 2.4: Land conservation programs managed by federal agencies, 1998-2007

<i>Source of Funding</i>	<i>Program Spending (\$millions)</i>	<i>Acres Protected</i>
National Park Service	\$2.1	177
U.S. Fish and Wildlife Service	\$6.2	6,775
U.S. Forest Service	\$9.4	10,859
U.S. Army Corps of Engineers, Missouri River Fish and Wildlife Mitigation Project	\$26.2	14,155
TOTAL	\$43.9 million	31,996 acres

National Park Service (U.S. Department of Interior)

The National Park Service (NPS) was created in 1916 and now comprises 390 areas covering more than 84 million acres in every state (except Delaware), the District of Columbia, American Samoa, Guam, Puerto Rico, and the Virgin Islands. These areas include national parks, monuments, battlefields, military parks, historical parks, historic sites, lakeshores, seashores, recreation areas, scenic rivers and trails, and the White House. Between 1998 and 2007, the NPS spent about \$2.1 million and protected approximately 177 acres in Missouri through the Land and Water Conservation Fund.

U.S. Fish and Wildlife Service (U.S. Department of Interior)

The National Wildlife Refuge System of the U.S. Fish and Wildlife Service (USFWS), established over 100 years ago, has grown to nearly 95 million acres. It now includes 540 refuges and more than 3,000 waterfowl production areas spread across the 50 states and several U.S. territories. From 1998 to 2007, approximately \$6.2 million was spent by the USFWS in Missouri, conserving almost 6,800 acres.

U.S. Forest Service (U.S. Department of Agriculture)

The U.S. Department of Agriculture (USDA) Forest Service was established in 1905. At present, it is comprised of 155 national forests, 20 national grasslands, five national monuments, the National Tallgrass Prairie, and six land utilization projects. These units are located in 44 states, Puerto Rico, and the Virgin Islands, and encompass over 192 million acres. From 1998 to 2007, the USDA Forest Service spent about \$9.4 million in Missouri for the conservation of approximately 11,000 acres.

Missouri River Fish and Wildlife Mitigation Project, U.S. Army Corps of Engineers (U.S. Department of Defense)

In the early 1900s efforts began to stabilize the Missouri River in order to provide a navigation channel. Since 1912, seven separate acts of Congress provided for the construction of a channel and bank maintenance. The collection of projects, constructed and maintained by the US Army Corps of Engineers, is known as the Missouri River Bank Stabilization and Navigation Project (BSNP).

In the early 1980's, the Kansas City District of the US Army Corps of Engineers completed a study that determined that it was economically feasible to mitigate fish and wildlife resources lost to the construction of the BSNP. In 1986, Congress authorized construction of the Missouri River Fish and Wildlife Mitigation Project. As a result, the Army Corps of Engineers has participated in the acquisition of thousands of acres for the purpose of restoring fish and wildlife habitat. The majority of these properties are managed by the Missouri Department of Conservation.

Between 1998 and 2007, the Army Corps of Engineers spent approximately \$26.2 million to acquire just over 14,000 acres in fee simple status.

Land Conservation Expenditures through Local Governments

Many local governments in Missouri, counties and municipalities, have bonding/taxing authority for the purposes of land conservation. Between 1998 and 2007, 10 local governments passed 12 conservation finance measures generating almost \$500 million in funds for new land acquisition, mostly for parks and open space.⁵ Due to time constraints, and the fact that Missouri has not had very active local governments conserving land across the state, we chose to focus primarily on the sales tax passed in the City of St. Louis, St. Louis County, and St. Charles County for the Great Rivers Greenway District. We also analyzed Greene County, including the city of Springfield, which passed 2 five-year sales taxes for parks and recreation. The funds generated from the Great Rivers Greenway District tax account for three-quarters of all local funds created at the local level in Missouri.⁶ The District was established in November 2000 by the successful passage of the Clean Water, Safe Parks and Community Trails Initiative ("Proposition C") in St. Louis City, St. Louis County and St. Charles County. The Great Rivers Greenway District is funded by a 1/10th of 1-cent sales tax.

The Great Rivers Greenway District works for a clean, green, connected St. Louis region. To deliver its mission, the District spearheads the development of The River Ring, an interconnected system of greenways, parks and trails that will encircle the St. Louis region,

⁵ Estimates are based upon 20 years of revenue if there is no sunset to the tax. These dollars also represent dollars generated as opposed to dollars spent. They do not take into likely revenue fluctuations or other variables.

⁶ Other local government entities that either passed bonds sales taxes to fund land conservation, but for which we did not have enough time to gather data, include Platte County and the municipalities of Columbia, Rolla, Lee's Summit, and Bel-Ridge, amongst others.

enhancing the quality of life for residents and visitors.⁷ Table 2.5 shows the amount of funding and acres conserved through these entities between 1998 and 2007. The table also depicts the funding mechanism used and year approved by local voters. All combined, these local governments protected over 2,000 acres at a cost of almost \$28 million.

It should be noted that not all dollars expended through these programs are used to acquire conservation land. Funds may be used for restoration and/or management of habitat, but also for the acquisition of urban parkland (and park improvements) that has minimal wildlife habitat benefits. The degree of impact by local government conservation activities on wildlife habitat is a topic for further research.

Table 2.5: Local government land acquisition programs, 1998-2007

<i>Local Government</i>	<i>Program Spending (\$million)</i>	<i>Acres Protected</i>	<i>Funding Mechanism</i>	<i>Year Approved</i>
St. Louis, St. Louis County, St. Charles County (Great Rivers Greenway)	\$24,880,517	1,837	Sales tax	2000
Greene County	\$2,960,463	339	Sales Tax	2001, 2006
Total	\$27,840,980	2,176 acres		

Because many local governments, including those listed above, take advantage of state and federal conservation funding there is a risk of double counting acres. The same acquired parcel may appear on local, state and federal government ledgers, simultaneously. To avoid double-counting, credit for any parcel acquisition with multiple funding sources is given to the entity providing the majority of funding for that parcel.

Private Land Conservation

Private funding sources consist of various land trusts and/or private donors throughout the state. In Missouri, The Nature Conservancy was the most active private entity for private land conservation. Many other land trusts mostly accept donations, and spend minimal amounts on fee-simple purchase. Conservation activity for TPL was not included because it does not use organization dollars to acquire land for easement or purchase. Acres that TPL help protect have likely been captured in other program and/or agency data. Acres and dollars that were solely land trust acquisitions are provided in Table 2.6. During 1998-2007, the Missouri Chapter of The Nature Conservancy, along with several smaller land trusts and private individuals, accounted for about 92% of all private sector spending and 63% of all acres protected,

⁷ Excerpted from <http://www.greatrivers.info/AboutUs/Mission.aspx>

Table 2.6: Private conservation expenditures and acres protected, 1998-2007

<i>Conservation Organization</i>	<i>Program Spending (\$million)</i>	<i>Acres Protected</i>
TNC, Missouri Chapter	\$12,500,000	21,900
Stream Stewardship Trust Fund/Missouri Conservation Heritage Foundation ¹	\$1,149,907	553
Ozark Regional Land Trust	\$121,300	16,956
Other ²	\$11,633,615	21,718
Total	\$25,404,822	68,127

¹These numbers include only perpetual easements. The SSTF does acquire some easements for terms of 30 years.

²Represents unassigned spending by other private Land Trusts, other non-governmental organizations, and/or private individuals in Missouri

Missouri Conservation Heritage Foundation's Stream Stewardship Trust Fund

The Stream Stewardship Trust Fund (SSTF) is an in-lieu-fee program approved by the US Army Corps of Engineers. Developers in Missouri who cannot mitigate damages on site, with Corps permission, may mitigate through an approved mitigation bank or pay into the SSTF. The SSTF is funded by these payments, with all funds (except for small administrative fees) funneled into land acquisition and stream improvement projects. It is important to know that in accepting the funds, the Missouri Conservation Heritage Foundation (MCHF) also accepts the mitigation responsibility. To meet this responsibility, MCHF approves and funds stream improvement projects, and secures long-term protection on them. Credits lost through development are offset by credits gained through stream acquisition and improvement.

Stream improvement projects may be on public lands not owned by Missouri Department of Conservation (MDC), or on private lands. Projects on private or public lands not owned by MDC are secured by perpetual or long-term easements or maintenance contracts. MCHF has funded acquisition projects that are new areas and additions to existing MDC areas. MCHF does not own land or hold easement land; these are held primarily by the MDC.

Ozark Regional Land Trust

The Ozark Regional Land Trust (ORLT) is a non-profit conservation land trust operating throughout the Ozark region, which includes portions of Arkansas, Illinois, Kansas, Missouri, and Oklahoma. ORLT's mission is to empower people to protect the natural resources of the Ozarks. This is accomplished through various methods, including conservation easements, nature preserves, and support to community land trusts. From 1998-2007, the ORLT has conserved about 17,000 acres and spent about \$121,000 on land conservation in Missouri. Most of the land acquired by the ORLT has been through donated easements.

Summary of Land Conservation Expenditures in Missouri

Overall, we estimate that approximately \$198 million were spent on conserving about 203,000 acres in Missouri from 1998 to 2007 (Table 2.7). Land conservation programs involving the federal government accounted for 60% of all expenditures and more that 52% of all acres protected. These federal estimates are low because we have not accounted for expenditures or acres for the National Scenic Byways Program or Recreational Trails fund, nor have we accounted for the number of acres protected under the CESCO.

Table 2.7: Summary of land conservation funding in Missouri, 1998-2007

<i>Source of Funding</i>	<i>Program Spending (Millions)</i>	<i>Program Spending as a % of Total</i>	<i>Acres Protected</i>	<i>Acres Protected as a % of Total</i>
State Funding	\$26.1	13%	27,430	13.5%
Federal Funding with State Coordination	\$0.992	0.5%	Not Available	-----
Federal Funding with Partners	\$73.9	37%	90,691	45%
Federal Agency Only	\$43.9	22%	14,155	7%
Local	\$27.8	14%	2,176	1%
Private	\$25.4	13.5%	68,127	33.5%
TOTAL	\$198.092		202,579 acres	

State expenditures, primarily funded through sales taxes, accounted for 13% of all expenditures and was used to protect about 12% of all conserved lands from 1998-2007. The vast majority of state conservation activity came through the Missouri Conservation Commission Fund.

Local government funding, which captures just four Missouri jurisdictions, accounted for 14% of all expenditures, but just 1% of the acreage protected. The low percentage of land is likely due to the fact that land in urban areas is more costly.

Private foundations and land trusts accounted for 13% of all expenditures and 31% of the acreage protected. Fifty three percent of the total acres conserved was through fee simple purchase.

Due to the lack of data for some funding sources, total expenditures and acres protected are underestimated. We could not obtain annual land conservation expenditures or acreages from the Bureau of Land Management, or from some local governments and land trusts. Similarly, our estimates of acres protected are low due to not having acquisition data for lands protected by the federal CESCO, the National Scenic Byways Program, or the Recreational Trails Fund.

B. Spatial Analysis of Acres Conserved and Expenditures in Missouri

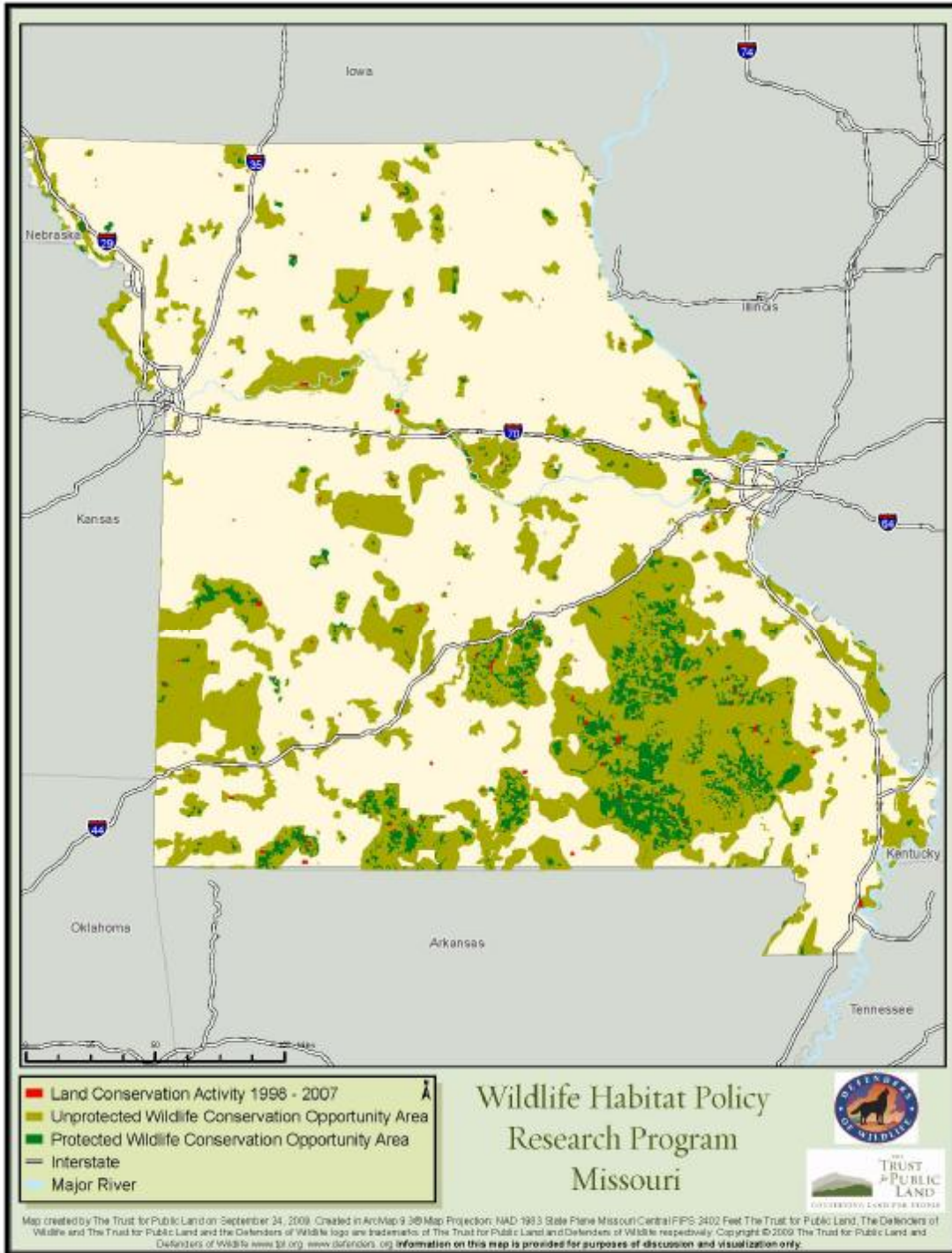
This section provides a description and analysis of the spatial efficiency of land conservation in Missouri with respect to implementation of the state wildlife action plan. We measure spatial efficiency by the geographic alignment between the Conservation Opportunity Areas identified in the State Strategy with the level of conservation spending between 1998 and 2007, *for those expenditures and associated acreages that could be mapped*. To investigate this alignment we first collected spatial parcel data for lands conserved between 1998 and 2007 and overlaid these parcels with the state Conservation Opportunity Areas map. A description of the Opportunity Areas, the methods used for this spatial analysis, and our results are described below.

In Missouri, Conservation Opportunity Areas were developed by the Department of Conservation using both a scientific assessment and partner input. Missouri developed a spatial data product, called the Heritage Hotspot layer, which produced a neighborhood analysis for species and natural communities of conservation concern. This analysis led to the development of a continuous grid of Heritage elements identified and mapped across the state and allowed an expert review team to describe and name the highest concentrations of Heritage elements. Through this process, 89 hotspots were identified. Following this analysis, Missouri gathered information on existing partner conservation plans, such as Nature Conservancy portfolio sites, and supported development of new partner plans and assessments (e.g. Audubon Important Bird Areas). Each partner's approach for identifying priorities was slightly different and therefore numerous priorities were identified across the state. Using Geographical Information System (GIS) technology, the state overlaid the various plans and assessments to determine the locations of overlapping conservation priorities. Using this information the state constructed a statewide view of Conservation Opportunity Areas to work collaboratively with conservation partners. The product is a

spatial layer of key habitats and communities that sustain species of conservation concern. These Conservation Opportunity Areas are landscapes where conservation goals can be identified and where there is a high likelihood of successful conservation action due to opportunities for collaboration with partners.⁸ Each Conservation Opportunity Area has been profiled and key conservation actions, threats and biological information has been recorded for the area.

Map 2.1 displays the Missouri Conservation Opportunity Areas and the protection status of these areas. Light green shows unprotected Opportunity Areas and dark green shows Opportunity Areas that are classified as already protected. The map also shows land conservation activity (in red) from 1998-2007 that we were able to map.

⁸ Missouri Comprehensive Wildlife Strategy. 2005. Missouri Department of Conservation.



Map 2.1: Protected and Unprotected Conservation Opportunity Areas

The Missouri Conservation Opportunity Areas were mapped using GIS data provided by the Missouri Department Conservation. Protected Areas (Map 2.1) are based on the Public Ownership shape file from the state of Missouri public data website. Public protected areas include lands owned by the Bureau of Land Management, Missouri lands administered by

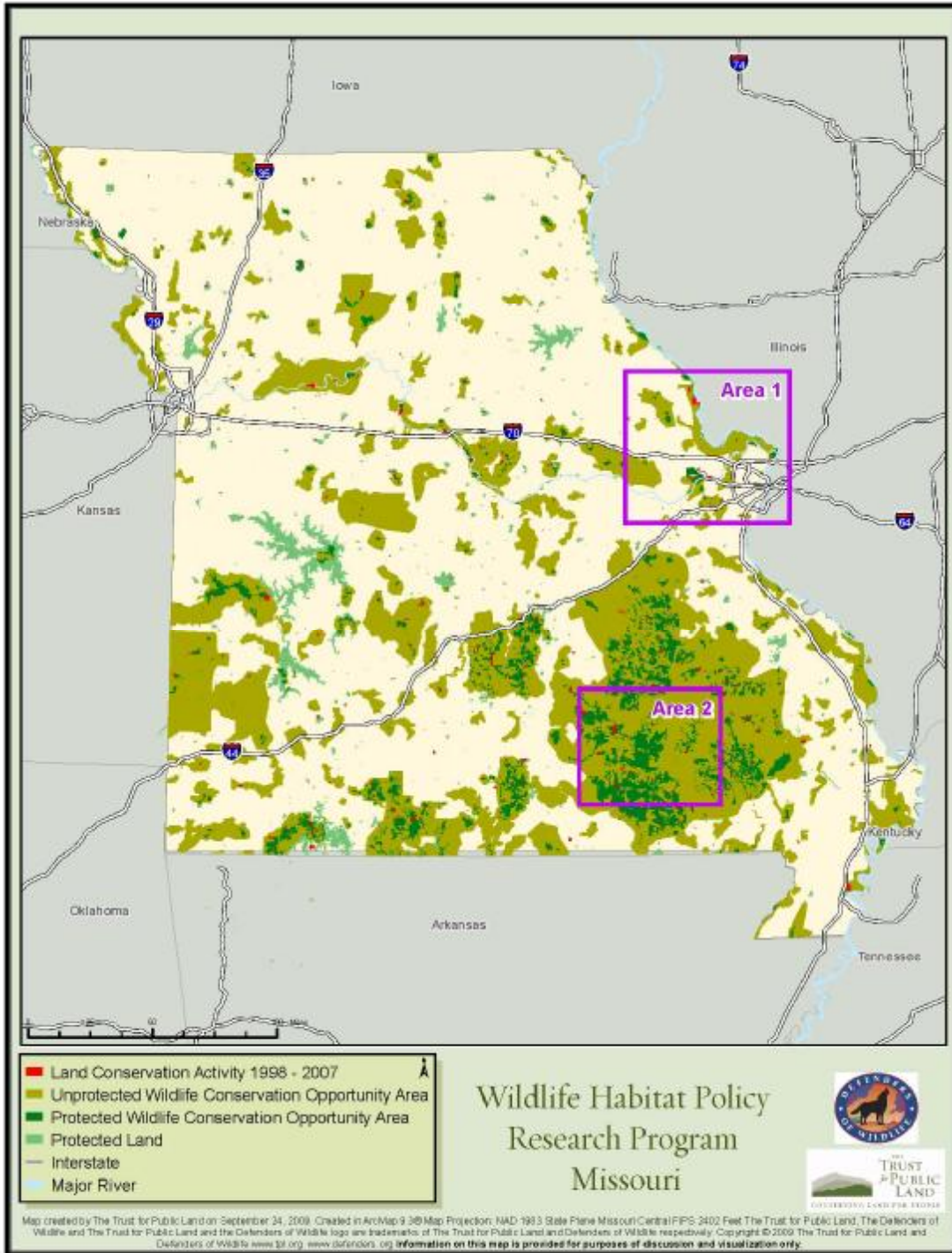
BLM, USDA Forest Service Lands, state lands, military or Army Corps of Engineers lands, Bankhead and Jones Indian Reservation lands, county Lands, national grasslands, national parks and monuments, and national wildlife refuges.

To determine the alignment between conserved lands and the Opportunity Areas we created a spatial database of land conservation activity in Missouri for the years 1998 to 2007. The database delineates the physical boundary of each property and records the cost (expenditure), the date that the transaction was completed, the source of funds used to protect the acreage, type of purchase, and the management entity. Collecting this data required a variety of methodologies due to the diversity in the spatial data and the ease with which a spatial data record could be matched to corresponding expenditure information.

Spatial data representing boundaries of parcels conserved were provided by St. Louis County, St. Charles County, Greene County, the City of St. Louis, the U.S. Fish and Wildlife Service, and the USDA Forest Service. The Missouri Department of Conservation and Missouri Department of Natural Resources were able to provide spatial records that delineated the larger boundary of the managed area but not the individual parcels that constituted that area. This data was used to identify 74 parcel boundaries for these agencies.

For the other transaction records we were able to create generalized boundaries of the parcel as most of the managed areas were either completely within Opportunity Areas priorities, or did not contain any Opportunity Areas priority acreage. Thus, a spatial record could be created within the larger managed area boundary that was of the same acreage as reported in the transactional data and that could be used to calculate the percentage of overlap with Opportunity Area priorities. With this approach we were able to create an additional 216 spatial records that could be used in this analysis. Ducks Unlimited, the Ozark Land Trust, and the Nature Conservancy provided spatial data but were not able to provide parcel-specific transactional information to align to these spending records, so they could not be included in the analysis. We were not able to obtain spatial data for the other spending programs listed in this report.

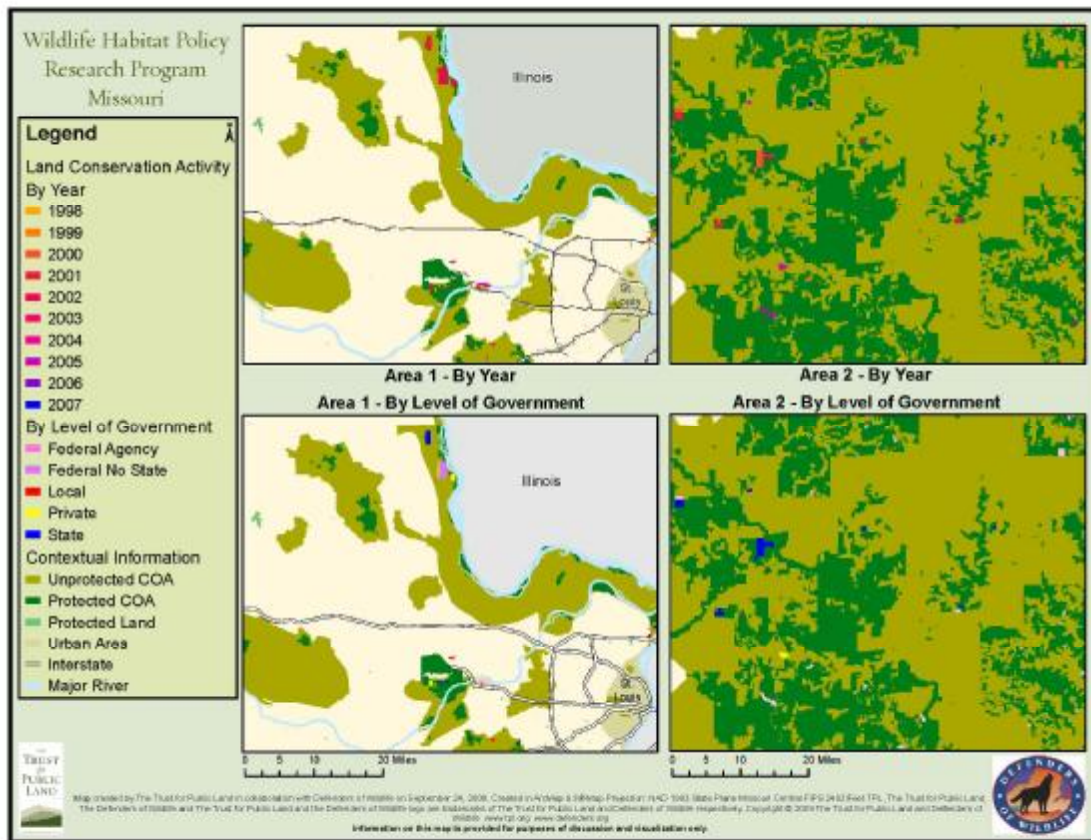
Once the shapefiles for the spatial database were compiled, we entered all corresponding attribute cost data into the spatial database. We used a quality control process to make sure that there were no duplicate records for information from different sources. This was completed by using the GIS “select by location” tool to identify any projects that overlapped. Once these were identified, the duplicate records were removed and noted in a work log.



Map 2.2: Protected and unprotected Conservation Opportunity Areas and areas for further examination.

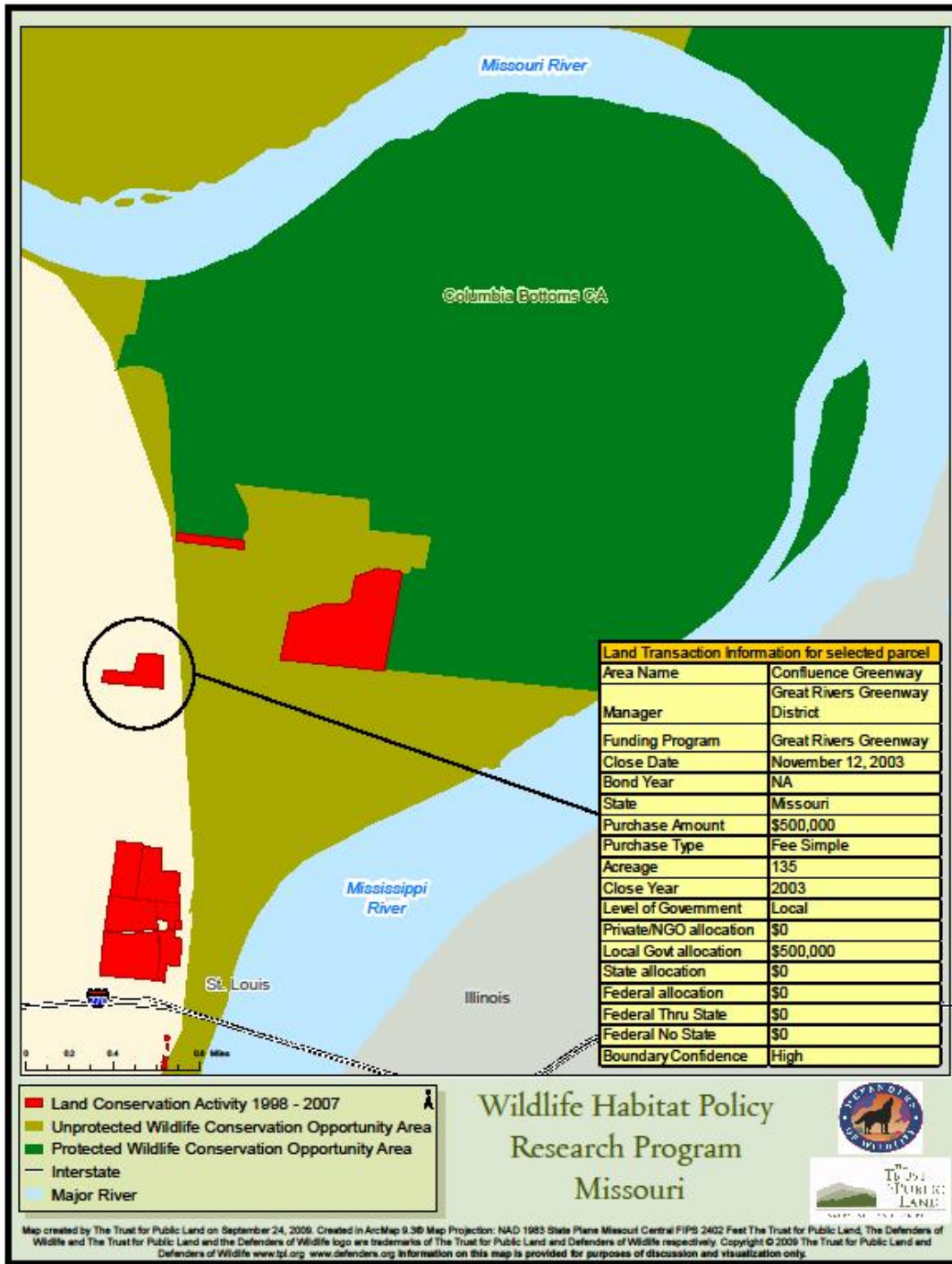
We used the spatial database to determine how these conservation projects were aligned with the Conservation Opportunity Areas in a GIS analysis. Map 2.2 shows land conservation activity from 1998-2007 (in red) in addition to the Priority Areas and protected status and highlights two areas that will be examined in more detail in Map 2.3 below. We used the

intersect tool, which allows the user to calculate the acreage of land conserved (in red in Maps 2.2. and 2.3) that overlap Missouri's Opportunity Areas. It is important to note that the State Strategies were not completed until 2005. Thus, there is no a priori reason to expect that conservation spending and Opportunity Areas will align. It is likely that a diversity of objectives, priorities and opportunities have determined the spatial pattern of conservation in Missouri between 1998 and 2007. Land acquisition through easements and fee simple purchases may have occurred in these areas for a number of reasons including prior recognition that these areas were important for conservation, landowner donation or interest in easement programs, or other conservation interests in these areas. There are always many factors that go into land acquisition decisions at federal, state and local levels.



Map 2.3: Land conservation activity (fee-simple acquisitions and easements) by year overlaid with protected and unprotected Conservation Opportunity Areas and the level of government that provided funding.

We analyzed the percentage of total acreages protected and dollars spent on land acquisitions within the Opportunity Areas by year (between 1998 and 2007) and by funding source. Funding sources were categorized as private sector/NGO, local government, state agency or program, federal agency budget, a federal program with no state partner, and a federal program with a state partner. All information on funding source, management agency, purchase type, etc was recorded as attribute information for each parcel recorded in the GIS database (Map 2.4).



Map 2.4: An example of a representative acquisition parcel and the attribute information that is recorded for each parcel.

Expenditures and acres conserved were calculated using the GIS intersect tool to identify the segments of each property that overlapped with the Priority Areas. The overlap percentage was then used to calculate the percent of the total cost of the property which aligned with the Opportunity Area. For example, if 100% of a property was designated as a wildlife

habitat Opportunity Area, then the entire project cost was credited to that property. However, if only 50% of the property fell within an Opportunity Area, then only 50% of the project costs were applied. The dollars spent on for Opportunity Area conservation were then calculated by year and by type of conservation organization.

Applying acreages by type of conservation organization was more difficult, as many projects received funding from multiple organizations. In this analysis, we applied project acreages to the largest funding entity. For example, if 100 acres were protected using funds from a private donor that gave \$50,000, and the state allocated \$100,000, then the 100 acres were credited to the state. If two funding programs provided equal funding, then the acres were credited to the more local level government entity, as local dollars were required for a state match.

We recorded a total of about 222,430 acres that were protected between 1998 and 2007 in Missouri through fee-simple purchases and permanent easements (Table 2.8). Of this area, we were able to map approximately 28% of the total (about 61,400 acres).

Table 2.8: Protected acreage and overlap with Missouri Opportunity Areas, 1998-2007

<i>Source of Funding</i>	<i>Protected Acreage</i>	<i>Acreage with Spatial data</i>	<i>Percent Acreage with Spatial Data</i>	<i>Mapped Opportunity Area Acreage</i>	<i>Percent Opportunity Area Acreage Mapped</i>
Fed thru State	40	0	0%	0	0%
Fed with Partners	90,691	1,638	1.8%	1,638	100%
Fed Agency	31,996	24,711	77%	22,166	90%
Total Federal	122,697	26,349	21.5%	23,804	90%
State	27,430	25,744	93.8%	21,487	83%
Local	2,176	509	23.4%	172	34%
Private	68,127	8,815	12.9%	6,090	69%
TOTAL	220,430	61,417	27.9%	51,553	84%

Of the acres that could be spatially mapped, about 51,600 acres (or 84%) overlapped with Missouri's Opportunity Areas. When improved spatial data is available to track land acquisitions it is likely that alignment will increase.

For total federal protected acreage (about 123,000 acres) we could only map about 22% of all acquisitions, with most of these coming from the federal agency category. There was no spatial data available for the federal-thru-state category. Only a small percentage (about 2%) of acres conserved through the federal partnership category could be mapped. For all federal acres that could be spatially mapped, 90% (about 24,000 acres) aligned with Missouri's Opportunity Areas.

Ninety-four percent of all acres acquired by the state (27,430 acres) could be mapped. Of the acres that could be mapped, 83% (about 21,500 acres) aligned with the state's Opportunity Areas.

Local government land conservation efforts accounted for about 2,200 acres, but only about a quarter of these could be spatially mapped. Of these, 34% fell within the Opportunity Areas.

Private land acquisitions (i.e. land trusts) accounted for the second largest category of protected acres at 68,000 acres. However, only about 13% of these acres could be spatially located. Of the land area that could be mapped (about 8,815 acres), almost 70% fell with Missouri's Opportunity Areas.

Table 2.9 shows the total amount of expenditures by source of funding over the 1998-2007 time frame, the dollars and percent of funding that we were able to map and include in our spatial analysis, and the amount and percentage of the mapped funding that aligned with Missouri's Opportunity Areas. For all conservation expenditures in the state which we could record from 1998 to 2007 (over \$198 million), about 30% could be mapped. Of those expenditures that could be mapped, 71% fell within the state's Opportunity Areas.

Table 2.9: Conservation spending and overlap with Missouri Opportunity Areas, 1998-2007

<i>Source of Funding</i>	<i>Total Spent (\$millions)</i>	<i>Spending with Spatial Data (\$millions)</i>	<i>Percent Spending with Spatial Data</i>	<i>Expenditures with Spatial Data in Opportunity Areas (\$millions)</i>	<i>Percent Opportunity Area Expenditures with Spatial Data</i>
Fed thru State	\$0.992	\$0	0%	\$0	0%
Fed Partners	\$73.9	\$1.7	0.02%	\$1.7	100%
Fed Agency	\$43.9	\$20.5	47%	\$16.3	80%
Total Federal	\$118.792	\$22.2	19.1%	\$18	79%
State	\$26.1	\$22.2	85%	\$15.4	69%
Local	\$27.8	\$4.9	18%	\$1.8	37%
Private	\$25.4	\$8.9	35%	\$6.2	69%
TOTAL	\$545.5	\$58.4	29.4%	\$41.6	71%

Federal programs combined spent about \$119 million over the 1998-2007 timeframe. However, only about 19% of those expenditures could be mapped. This was mostly due to either the unavailability or the inaccessibility of spatial data for federal conservation expenditures that were managed by state agencies or in which the federal government partnered (e.g. the NRCS conservation programs or those programs administered by the US Fish and Wildlife Service). The majority of mapped acres at the federal level are associated with federal agency land conservation programs (47%).

Of the \$26.1 million dollars spent by the state of Missouri between 1998 and 2007, we could spatially depict about \$22.2 million, or about 85% of total state expenditures. Of the \$22.2 million, over \$15 million (69%) aligned with Missouri's Opportunity Areas.

Conservation spending at the local government level was estimated to be about \$28 million, but less than 5% of this amount could be spatially represented. Furthermore, of the \$4.9 million that could be mapped, only \$1.8 million (37%) was aligned with the state's Opportunity Areas.

The private sector (i.e. land trusts) provided over \$25 million from 1998 to 2007 for land protection in Missouri. Similar to the case for local government, the percentage of

expenditures that could be spatially aligned was not very high (35%). Of those expenditures which could be mapped, 69% (about 6.2 million acres) aligned with the Missouri's Opportunity Areas.

III. Policy Analysis of Land Conservation in Missouri

A key component of land conservation is the way in which states use policies and programs to direct funding towards activities that will achieve their land conservation goals. In this section, we examine Missouri's land conservation policies and programs to help explain the spatial patterns of land protection described in Section II. We seek to determine the degree to which policy is used to align expenditures for land acquisition in Missouri with protection of priority habitats identified in Missouri's Comprehensive Wildlife Conservation Strategy (State Strategy). In other words, we will examine whether the state is guiding spending towards protecting the areas it considers the most important for wildlife habitat. We look at a state's conservation policy environment in terms of a policy framework that considers five factors: funding, land protection approaches, land selection approaches, the level of engagement of the state with non-state funding programs, and management of land conservation information. Each of these factors is discussed below.

A. Funding for State programs

Missouri funds both of its state agencies that deal with conserving land – the Missouri Department of Conservation (MDC) and the Division of State Parks, within the Department of Natural Resources – with funds from dedicated sales taxes. Public support for these taxes demonstrates that the citizens of Missouri appreciate the outdoors and are willing to use their money to protect it.

The Conservation Sales Tax provides MDC with the proceeds of a 1/8 of 1% sales tax, making MDC one of the best funded conservation departments in the country. This fund is to be used for conservation purposes, including “control, management, restoration, conservation and regulation of the bird, fish, game, forestry and wildlife resources of the state, including the purchase or other acquisition of property” (Missouri State Constitution Section 43(a)). This tax was passed in 1976 and does not have a sunset date attached to it. Because it does not require periodic reauthorization, the tax is a very stable source of funding. The sales tax makes up about 60% of MDC's budget. Most of the remainder of the funds comes from hunting, fishing and trapping permits.

Only a small amount of the sales tax is spent for land acquisition. Although more than 90% of Missouri's land is privately owned, the public generally objects to the government owning more land. The state requires a willing seller for land purchases financed with proceeds of the tax. Also, the state makes payments in lieu of taxes to local governments for properties acquired.

Missouri also has a Parks-and-Soils Sales Tax of 1/10 of 1% that is split evenly between the Division of State Parks and the state's Soil and Water Conservation Program. This tax was approved in 1984 and has been reauthorized by the electorate in 1988, 1996, and 2006. The tax funds about $\frac{3}{4}$ of the park system's budget, but the money may not be used for land acquisition, just for park improvements. Acquisitions must be funded using other budgetary sources such as park fees. The Parks Division receives much of its land as donations by private property owners. More than half of the park acres that have been added came to the Division as donations. The Parks Division focuses its acquisitions activity on in-holdings and properties adjacent to existing State Park properties.

B. Land protection approaches used by the State

Both MDC and the Division of Parks recognize that significant money and staff are required to manage protected lands. Costs of ongoing land management activities (including management planning, restoration, and operations and maintenance) and enabling public access are considered when land acquisitions are proposed. Acquisitions are considered for properties adjacent to currently protected land or for in-holdings. Concern about the agencies' ability to manage additional lands also has limited both agencies' willingness to accept donations of property. The state prefers to avoid acquisitions of small parcels or parcels that do not offer easy public access.

The state of Missouri has relied on purchases of conservation land as its primary protection strategy and has not protected much land with conservation easements. Because the state has had dedicated acquisition funding available, state agencies historically have not explored the use of other land protection tools such as easements. The general public has shared a hesitation about using easements, not fully trusting the concept. Although easements ensure that the conservation values found on a property are maintained, easements do not obligate the landowners to undertake restoration actions. Where active land management will be required on land being targeted for conservation, such as where prairie remnants need to be restored, an agency capable of conducting the restoration will need to own land through fee-simple purchase.

Nevertheless, the state may move towards purchasing more easements in the future. There are positive examples in Missouri of successful easement programs. The Wetland Reserve Program and other federal conservation programs protected 74,000 acres with easements between 1998 and 2007, which is twice the number of acres protected by the state with acquisitions. Private organizations, including TNC and others in the land trust community, have also put easements on purchased conservation lands and resold the properties. MDC has set up an easement working group that is investigating easements associated with stream protection. In 2009, the Missouri Conservation Easement Act was introduced in the Missouri Legislature to allow the creation and enforcement of conservation easements. All of these developments point towards increased future interest in the use of easements to protect land.

Missouri actively engages landowners in land conservation activity. This study is focused on fee simple acquisitions and purchases of conservation easements and not at other mechanisms for conserving privately owned property. Although we do not explore the State's use of private landowner initiatives for habitat conservation, these are very important to the States overall habitat protection strategy.

C. Land selection approaches used by the State

Both of Missouri's land protection agencies are more strategic than opportunistic with spending on land protection. MDC focuses on priority geographies and considers the extent to which a potential acquisition would build on the habitat initiative of the relevant Opportunity Area. MDC also is looking at creating a reserve network of connectivity to protect all wildlife in the face of uncertainties tied to climate change. For example, in the boot heel area of the state, which is primarily agricultural, MDC is looking at buying

domesticated lands and using them to restore connectivity among fragments of remaining forest. Additionally, the MDC considers purchases of in-holdings or properties adjacent to a protected parcel that might resolve a boundary issue.

The Division of Parks relies on management plans for each of its properties, and those plans identify desirable in-holdings or adjacent properties for acquisition.

D. Level of engagement of the State with non-State funding programs

The state of Missouri actively engages conservation partners from the federal government, local governments, and private conservation organizations such as land trusts. MDC places a great deal of value on partnerships and collaboration, and it has created structures to enable partners to talk together, even if privacy concerns restrict sharing of information. MDC wants to influence the land protection decisions of other conservation organizations and help them find the money to be able to ensure successful implementation of the State Strategy.

MDC has organized coordinating groups for each Opportunity Area to bring together conservation partners. By organizing around the Opportunity Areas, the state has focused federal and private land conservation spending on priority habitats.

Missouri takes full advantage of Farm Bill programs for conservation. MDC works closely with NRCS in the state, including funding staff positions to support NRCS programs. Missouri has the highest number of WRP-protected acres of any state in the country. The Department is committed to priority geographies, and directs Farm Bill money to areas that are consistent with the habitat initiative. Historically, NRCS money was spent where individual landowners wanted it to go without guidance from the state as to which areas would provide greatest benefit to priority habitats and wildlife.

MDC also does outreach to local governments that are in priority geographies to encourage their support for the strategy. Local governments were not very involved in developing the strategy. Few jurisdictions outside urban areas have shown much interest in long-term land protection for wildlife other than considering access to fishing lakes and streams. The availability of state acquisition funds through MDC may have encouraged local jurisdictions to rely on the state for land protection rather than seeking funds locally. A challenge remains for the state to engage local governments – outside the major urban areas – in land protection for wildlife habitat. There may be opportunities for the state to work more closely with local jurisdictions, not just to focus local conservation efforts on priority habitats, but also to encourage local jurisdictions to consider bond initiatives to fund local land conservation.

The Division of Parks works towards a complementary relationship with local governments, particularly in urban areas. This extends to passing along LWCF funds to municipalities for their own parks, and working on linking state and local trails.

Both MDC and the Division of Parks have active relationships with private organizations such as TNC, the Prairie Foundation, and other non-profits and land trusts. Non-governmental organizations (NGOs) are credited with helping the state identify properties

for protection and better understand the conservation and wildlife values of properties. They are involved in writing grant proposals, and they also can act quickly to acquire a property when it becomes available and then transfer it to the state when the state has the financing in place. MDC has been engaging conservation organizations in a discussion about establishing a Missouri Land Trust Coalition which could provide another avenue for MDC to influence the shape of land protection in the state.

E. Management of land conservation information

There are many concerns about privacy when dealing with private property, so it is not always possible to provide all the data to those that might find it useful. However, meetings organized by MDC seem to provide an opportunity for information to be shared without violating privacy concerns.

Missouri does not have a centralized data base of all land conservation spending in the state nor spatial data for all the acreage protected. The state agencies maintain records about their own properties, but they have not established any statewide repository of information about land protected by state, federal, and local governments and by private entities such as NGOs and land trusts. A staff member at TNC had been driving an effort to formalize collection of land conservation data, but the individual moved from the state and that effort has stalled.

To measure progress against the goals in the State Strategy, the state needs to have a clear baseline and the tools to measure alignment with habitat goals by all funding sources. The state will have access to the data collected through this project which establishes a partial baseline. It would be worth considering what the state could do to build on this data. The state has an opportunity to work with each set of Opportunity Area partnership groups to establish standardized mechanisms for collecting data on land protection within each Opportunity Area – both spending data and spatial data. By providing data collection guidelines that each Opportunity Area group could use, the state could avoid duplication of effort among the large number of conservation partners involved in the many Opportunity Areas and simplify consolidation of information. The state could aggregate the data from the Opportunity Areas which would provide a good step towards creating a centralized view of statewide conservation activity.

Similarly, while Missouri begins to ramp up interest in conservation easements, the state may want to establish a system for collecting basic data on easements. The system recently developed in Montana, where 75% of the acres protected within the state were protected with easements, may offer Missouri some ideas about how to structure such as program.

Missouri has made a significant investment in the creation of its State Strategy and continues to invest in its implementation. The state is actively engaging non-state conservation partners in pursuit of the strategy which should help Missouri yield alignment between State Strategy goals and the land protected using all sources of funding. To better understand all the funding sources and the degree of alignment of each with State Strategy goals, the state would benefit from developing processes to collect and analyze land conservation information that links funding sources and dollars invested with spatial data on the acres protected.

IV. Estimated Costs of Conserving Un-Protected Conservation Opportunity Areas in Missouri

The purpose of this section is to provide a general (average), statewide cost estimate for conserving lands within Missouri's Conservation Opportunity Areas (Opportunity Areas), which, as of the end of FY 2007, had not yet been protected. Because we are not including 2008 and 2009 land conservation activity the costs reported here may be somewhat overestimated.

To determine the cost of conserving unprotected Opportunity Areas we calculated the acreage of protected and unprotected Areas using the Protected Areas Database of the United States (PAD-US). PAD-US is a digital map of stewardship boundaries that combines attributes of ownership, management, and a measure of intent to manage for biodiversity. The map includes: (1) geographic boundaries of public land ownership and voluntarily provided private conservation lands; (2) land owner/manager, management designation descriptor, parcel name, and source of geographic information of each mapped land unit; (3) GAP Status Code conservation measure of each parcel based on USGS National Gap Analysis Program (GAP) protection level categories which are intended to provide a measurement of management commitment for long-term biodiversity conservation derived from land management plans or land manager interviews; and (4) IUCN category for a protected area's inclusion into UNEP-World Conservation Monitoring Centre's World Database for Protected Areas. With the PAD-US database we completed an overlay analysis in GIS using the intersect function to determine the total unprotected Opportunity Area acreage across the state. All lands with a GAP status from 1-3 were considered already protected, while lands with a GAP status of 4-5 or lands not included in the PAD-US database were considered unprotected. Unprotected Opportunity Area acreage was estimated to be approximately 10.1 million acres as of 2007.⁹

Following this analysis, we estimated land conservation costs based on three separate investment strategies: fee-simple purchases, conservation easements, and land rentals. We estimated the costs associated with these three strategies on both a one-time basis and over a thirty-year time period. For the thirty-year time period we assumed that the total amount of acres to be protected are done so in 30 equal increments and assumed a 3% annual increase in land prices over-and-above inflation. For our fee-simple purchase estimates we added annual management costs. For the easement strategy, we accounted for up-front, one-time transactions costs.

We first discuss the methods we used for estimating state wide average prices for the three conservation strategies and then report the results.

⁹ This excludes impervious, high intensity urban, low intensity urban, barren, and open water land cover categories because we consider them unsuitable for terrestrial wildlife habitat.

A. Cost Estimation Methods

Fee-Simple Purchase Acquisitions

Cost data on fee-simple purchase acquisitions comes from three sources: (1) expenditure data that TPL collected from federal, state, local, and private sources; (2) data compiled by the National Agricultural Statistics Service (NASS) on private commercial transactions involving crop and pasture land; and (3) data compiled by the Census of Agriculture on the market value of farm land for Missouri counties (Table 4.1).

The TPL data consists of 111 land acquisitions in Missouri between 2006 and 2007. These acquisitions include donated lands, which were not included as part of our cost analysis. All 2006 acquisitions were adjusted to reflect 2007 price levels

Table 4.1: Fee-simple costs per acre in Missouri (\$2007)

<i>Data Source</i>	<i>Cost per Acre</i>
TPL Spending Data	\$2,255
NASS cropland data	\$2,450
NASS pastureland data	\$1,820
The Census of Agriculture cropland data	\$2,179

Calculating Statewide Fee-Simple Costs

We estimated statewide average per acre fee-simple costs by weighting costs by land cover types found within the unprotected Opportunity Areas. For this analysis we used a GIS dataset called Lulc05. This database was created by the Missouri Resource Assessment Partnership in 2005. The land cover classification is based on 2000-2004 satellite imagery, and ancillary data for stream networks, the National Wetlands Inventory, and the Wetlands Restoration Programs lands were used in a post-hoc fashion to improve mapping of open water, woody-dominated wetland, and herbaceous-dominated wetland. Total acreage of cropland/pastureland, grassland, forest, wetland, and woody/herbaceous was calculated within the unprotected Opportunity Areas.

To determine costs by land cover type we overlaid the TPL land acquisition parcels from 2006 and 2007 with the Opportunity Areas and used the subset of parcels that fell within these Areas. We then determined the land cover for each parcel using the Lulc05 database described above. Spending data was only collected from acquisitions that had over 65 percent of one land cover type.¹⁰ From this analysis we were able to calculate acreage costs for grassland, forest, and wetland, but not for cropland and pastureland because not enough parcels within this category matched our criteria. The cost per acre for cropland and pastureland was calculated by averaging the NASS and Census of Agriculture data collected in Table 4.1. We consolidated all other land cover categories into an “other” category and used the average cost per acre from the TPL spending data, since the majority of these

¹⁰ For a more complete analysis of how the spending and spatial data was collected, see Section II of this report.

acquisitions had mixed land cover. The land cover percentages are as follows: cropland and pasture at 18.5%; grassland at 30.4%; forest at 44.5%¹¹; wetlands at 2.5%¹²; and “other” at 4.1%¹³ (Table 4.2).

Table 4.2: Weighted fee-simple costs for Missouri (\$ 2007)

<i>Land Cover</i>	<i>Percentage</i>	<i>Acres</i>	<i>Cost per Acre</i>	<i>Total Cost</i>
Cropland and Pastureland	18.5%	1,874,650	\$2,150	\$4,029,873,516
Grassland	30.4%	3,071,916	\$1,392	\$4,277,074,498
Forest	44.5%	4,506,086	\$1,480	\$6,669,063,176
Wetland	2.5%	253,093	\$1,133	\$286,739,452
Other	4.1%	414,604	\$2,255	\$934,754,142
Total	100.00%	10,120,349	\$1,600	\$16,197,504,784

Across all land types, we estimated the average cost for fee-simple land purchase in Missouri to be about \$1,600 per acre.

Management Costs in Missouri

We define management costs as all practices/investments which contribute to the overall integrity of the habitat protected, including site construction, biotic surveys, habitat restoration, habitat maintenance, public services, reporting, office maintenance, field equipment, operations, as well as contingency and administration (unforeseen costs and overhead).¹⁴

To estimate future habitat management costs for unprotected Opportunity Areas we contacted land trusts, local governments, state agencies, and the National Wildlife Refuge System. Table 4.3 shows per acre cost estimates from various public and private land conservation organizations. Due to time and budget constraints, we could not conduct an in-depth analysis of every cost involved in managing fee-simple purchases. We relied on readily available data from annual budgets and management plans. Some land management entities, however, could not provide cost data either because: (1) they did not keep track of these types of costs as separate from other expenditures; (2) management costs varied significantly from one property to another for a variety of reasons (i.e. land cover, organization’s goals); and/or (3) the available data only represented the portion of the properties’ total management cost that a particular agency funded.

We estimate the average statewide management costs by weighting the costs reported by each organization by the total acreage managed by that organization. Based on these

¹¹ This includes deciduous forest, evergreen forest, and mixed forest as defined within the GIS land cover data.

¹² This includes woody-dominated wetland and herbaceous-dominated wetland as defined within the GIS land cover data.

¹³ This includes deciduous woody/herbaceous and woody-dominated wetland as defined within the GIS land cover data.

¹⁴ Personal communication. Joanne Rodriguez, Center for Natural Lands Management, August, 2008.

calculations, the average annual costs of managing land acquired through fee-simple purchases in Missouri is about \$28 / acre (Table 4.3).

Table 4.3: Habitat management costs in Missouri (\$2007)

<i>Data Source</i>	<i>Total Costs</i>	<i>Total Managed Acres</i>	<i>Cost per Acre</i>
Ozark Regional Land Trust ¹	\$4,000	40	\$100.00
James River Basin Partnership ²	\$85,425	240	\$355.94
Greenbelt Land Trust ³	\$970	77	\$12.60
National Wildlife Refuge System ⁴	\$4,283,248	80,310	\$53.33
Missouri Department of Natural Resources ⁵	\$236,000	75,000	\$3.15
Missouri Department of Conservation ⁶	\$26,799,006	987,950	\$27.13
The Nature Conservancy ⁷	No data	No data	\$16.00
Missouri Prairie Foundation ⁸	\$180,000	2,000	\$90.00
Total Cost per Acre	\$31,680,527	1,145,617	\$27.65

¹ Personal communication, Ted Heisel, Ozark Regional Land Trust, March, 2009. This figure reflects one prairie reserve.

² Personal communication, Holly Neil, James River Basin Partnership, April, 2009. This figure is the proposed budgeted amount to manage and restore 240 acres of riparian corridor along the James and Finley Rivers.

³ Personal communication, Jeff Barrow, Greenbelt Land Trust, April, 2009. This figure represents two managed properties and reflects the NRCS estimated cost of volunteer time (\$18/hour). Not including the NRCS contribution, this Trust pays \$3.25/acre to manage lands.

⁴ Personal communication, Genevieve LaRouche, NWRS, September, 2008. Provided FY 2008 base budget and permanent position costs per refuge in Missouri.

⁵ Personal communication, Ken McCarty, Missouri Department of Natural Resources, May, 2009. This cost may be underestimated because staff and overhead are not included in the cost.

⁶ Personal communication, Dennis Figg, Missouri Department of Conservation, June, 2009. This figure includes the management budget for both the forestry and wildlife departments.

⁷ Personal communication, Kurt Homeyer, The Nature Conservancy, June, 2009. This is a general estimate based on select properties. The primary restoration management tool and management cost is prescribed fire.

⁸ Personal communication, Paul Cox, Missouri Prairie Foundation, June, 2009.

For nearly all sources in Table 4.3, estimated costs are adjusted to 2007 dollars. Some of the costs, however, could not be associated with a particular year and were not adjusted.

While the management costs shown in Table 4.3 provide adequate estimates, there are other issues to consider. First, the level of detail with respect to the types of management activities varied significantly from one organization to another. Some organizations provided general management costs with little or no detail. Other organizations provided a very detailed breakdown of the costs of management activities. There is little uniformity between the information sources, making it difficult to compare cost estimates or to understand why some costs are higher or lower than others. Table 4.4 shows the range of activities/investments for the management costs for each organization listed in Table 4.3. Secondly, some organizations may exclude certain activities which we believe are necessary for the adequate habitat management, while others include activities that are not directly relevant for habitat conservation.

Table 4.4: Types of habitat management activities for Missouri

<i>Data Source</i>	<i>Form of Data</i>	<i>Management Activities</i>
Ozark Regional Land Trust	Average annual land management and restoration cost per acre.	- Prescribed burning and volunteer time
James River Basin Partnership	This is a proposed budget for MO DNR Section 319 grand funding. Includes restoration costs.	- Labor - Tree/grass plantings and streambank stabilization - Travel - Fencing - Alternative watering systems
Greenbelt Land Trust	Average annual land management and restoration cost per acre.	- Insurance - Invasive species management - Volunteer time
National Wildlife Refuge System	Estimated Base Budget and Permanent Positions for Refuges in Missouri; Also included special accounts for fire and maintenance	- Refuge Complex's Base Budget and Staff
Missouri Department of Natural Resources	Average annual land management and restoration cost per acre. Staff and overhead are not included.	- Restoration - Invasive species removal - Routine maintenance - Biological surveys - Research
Missouri Department of Conservation	Land management budget for FY07, includes only the Forestry and Wildlife budgets, not the overall department.	Did not break down the management costs by activity
The Nature Conservancy	Average annual land management cost for two reserves.	- Prescribed fire management - Invasive species removal
Missouri Prairie Foundation	Average annual budget for land management and restoration.	- Invasive species removal - Salary, overhead, and fuel

Cost of Establishing Conservation Easements

Cost estimates for establishing conservation easements are based on expenditure data from the USDA's GRP and WRP programs. There were four GRP easement agreements completed in 2006. The WRP data includes an unknown number of easements because dollars and acres for 2006 and 2007 are in the form of what was appropriated and not actually spent. We calculated the average cost for conservation easements by weighting the total cost of easements for each organization by the total acreage of land protected.

Table 4.5: Conservation easement cost per acre in Missouri (\$ 2007)

<i>Data Source</i>	<i>Number of Easements</i>	<i>Total Acreage</i>	<i>Total Cost</i>	<i>Cost per Acre</i>
Grasslands Reserve Program (GRP)	4	185	\$122,724	\$663
Wetlands Reserve Program (WRP)	Unknown	12,287	\$21,415,422	\$1,743
Total	-	12,472	\$21,538,146	\$1,727

With the limited data available, our calculations show that the average cost of an easement is estimated to be approximately \$1,727/acre (Table 4.5). We do not consider this to be a reliable estimate due to the paucity of observations and the fact that this estimated value exceeds our estimates for fee-simple purchase. More research on the conservation easement option is necessary.

Easement Transaction Costs in Missouri

We define transaction costs as all those practices involved in the establishment of a conservation easement. These include initial site visits/pre-closure "walk through"; landowner negotiations; appraisals; project planning, coordination, and documentation; agency coordination; title evaluation; escrow; legal assistance: drafting and recording of the easement; and initial baseline property report.¹⁵

Two other types of easement-related costs to consider are stewardship endowment and enforcement costs. A stewardship endowment is necessary to insure that the land being put in easement will be managed according to easement conditions in the future. Many land conservation organizations will not consider holding an easement if there is not a proper endowment. Enforcement costs are incurred when a dispute or violation of an easement agreement arises. According to the Land Trust Alliance, a land conservation organization should set aside a minimum of \$50,000 for a legal defense fund to effectively enforce approximately fifteen easements. An additional \$1,500 to \$3,000 is needed for every additional easement (Doscher, 2007). While our analysis does not consider stewardship endowments or enforcement costs, these are significant to the overall viability of easements as a habitat conservation tool.

¹⁵ Personal communication, Joanne Rodriguez, Center for Natural Land Management, August, 2008.

Transaction costs associated with establishing conservation easements were obtained by contacting land trusts and federal conservation programs. As with management costs some land trusts could not provide transaction cost data either because they did not keep track of them as separate from other expenditures, or because costs varied significantly from one property to another due to their characteristics. Thus, an “average” cost would be misleading. Table 4.6 illustrates transaction costs per organization.

Table 4.6: Easement transaction costs in Missouri (\$2007)

<i>Organization</i>	<i>Costs per Easement</i>
Ozark Regional Land Trust ¹	\$4,430 - \$11,100
Greater Rivers Greenway District ²	\$32,000
James River Basin Partnership ³	\$10,467 - \$15,700
Greenbelt Land Trust ⁴	\$500
Ozark Greenways ⁵	\$2,380 - \$4,500
Ducks Unlimited ⁶	\$10,368 - \$31,796
The Nature Conservancy ⁷	\$7,000 - \$22,000
MO Prairie Foundation ⁸	\$4,250
Average Transaction Cost	\$8,924 - \$15,231

¹Personal communication, Ted Heisel, Ozark Regional Land Trust, March, 2009.

²Personal communication, Janet Wilding, Greater Rivers Greenway District, April, 2009. This cost represents one easement that was especially high due to probates. Usually, transaction costs are approximately 5-12% of the purchase price.

³Personal communication, Holly Neil, James River Basin Partnership, April, 2009. This figure is the proposed budgeted amount to acquire 10-15 easements over a 4-year period. The total transaction costs for the four years was calculated to be \$157,000.

⁴Personal communication, Jeff Barrow, Greenbelt Land Trust, April, 2009. This figure was for a 5- and 20-acre lot, lawyer fees were pro bono.

⁵Personal communication, Terry Whaley, Ozark Greenways, May, 2009.

⁶Personal communication, George Seek, Ducks Unlimited, June, 2009.

⁷Personal communication, Kurt Homeyer, The Nature Conservancy, June, 2009.

⁸Personal communication, Paul Cox, Missouri Prairie Foundation, June, 2009.

We calculated the statewide transaction cost per easement by adding up the costs provided by each organization and then dividing it by the number of these organizations. When necessary, we adjusted the costs to 2007 dollars. Easement transactions costs in Missouri are estimated to range between \$9,000 and \$15,000 per easement.

Our original intent was to identify transaction costs on a per acre basis. However, the majority of agents with whom we spoke indicated that there is little relationship between the acreage of an easement property and associated transaction costs. Most organizations

provided an average cost or range of costs per project. While several factors influence the level of transaction costs (relationship with the landowners, permitted rights, distance of property from office, how extensive the baseline survey is, to name a few), overall costs tend to be within the same range for each project within an organization. Because of the difficulty in estimating per acre transaction costs, the figures reported in Table 4.6 are not incorporated into our overall estimate of the costs of conserving unprotected Opportunity Areas via the easement strategy. However, it should be noted that transaction costs per easement property can be substantial, and should therefore be recognized as an additional cost element.

Table 4.7 shows the types of activities and administrative requirements associated with preparing easements.

Table 4.7: Transaction activities and cost elements for Missouri

Data Source	Form of Data	Management Activities/Investments
Ozark Regional Land Trust	Average transaction costs per easement	<ul style="list-style-type: none"> - Baseline documentation report - Closing costs - Recording fees - Staff time
Greater Rivers Greenway District	One easement	<ul style="list-style-type: none"> - Attorney fees - Staff-time - Assessment
James River Basin Partnership	This is a proposed budget for MO DNR Section 319 grand funding.	<ul style="list-style-type: none"> - Labor - Legal fees - Appraisal fees - Land Survey - Travel
Greenbelt Land Trust	Transactions costs from two sample properties	<ul style="list-style-type: none"> - Baseline Documentation Report - Photos - Legal / Recording Fees
Ozark Greenways	Average transaction costs per easement	<ul style="list-style-type: none"> - Site Visits - Project Planning - Mapping - Title Searches - Negotiations - Appraisals - Baseline documentation reports - Environmental site assessments - Recording of easements - Survey
Ducks Unlimited	2007 Land Transaction Report	<ul style="list-style-type: none"> - Baseline Documentation Report - Legal Fees - Survey
The Nature Conservancy	Average transaction costs per easement	<ul style="list-style-type: none"> - Environmental Assessment Phase II - Closing fees, - Baseline Documentation Report - Title - Monitoring Costs - Site Visits - Staff
MO Prairie Foundation	Average transaction costs per easement	<ul style="list-style-type: none"> - Survey costs - Title insurance - Recording fees

Cost of Rental/Lease Agreements

Rental/lease rates for Missouri were estimated using data compiled by the NASS on private commercial cropland rental rates, from the USDA Conservation Reserve Programs, and Missouri cash rental rate data from the University of Missouri (Table 4.8). The CRP data is specifically for General Sign-up enrollment in Fiscal Year 2007.

Table 4.8: Land rental/Lease rates in Missouri (\$2007)

<i>Source</i>	<i>Rental rate \$/acre</i>	<i>Type of Land Use</i>
NASS	\$79.00	Cropland/Non-Irrigated
	\$26.00	Pastureland
Conservation Reserve Program	\$65.27	Cropland
Grassland Reserve Program	\$13.45	Grassland
University of Missouri	\$78.40	Cropland
	\$18.79	Pasture
Average	\$46.82	

Comprehensive data on the land area rented by land use type was not available. As a result, a weighted statewide average rental rate based on land cover type could not be estimated. Our overall estimate represents an average of rental rates for a limited number of Missouri land use types. Information on Missouri land rental rates is limited to agricultural lands, and does not, for the most part, include land cover types such as forestlands, wetlands, etc. As a result, the statewide average rental rate may be biased toward the cost of renting crop and pasture lands. We estimated an average rental/lease rate at about \$47/acre.

B. Estimated State Wide Costs for Missouri

Table 4.9 summarizes the estimated per acre and total costs for conserving currently unprotected Opportunity Areas in Missouri. The figures in the second column represent the estimated cost of the Opportunity Areas if they were all purchased, or were rented in *one year*. Because of the lack of reliable data described above, we could not estimate the cost of a conservation easement. The figures in the third column represent the estimated cost of protecting these lands over a 30-year period. For the 30-year costs, we assumed that the total acreage to be protected would be divided into 30 equal annual increments. With the exception of the base year, we also assumed a 3% annual increase in land costs and that all protection strategies are equally viable in all parts of the state.

Table 4.9: Costs per Acres and Total Costs per Protection Strategy in Missouri (\$ 2007)

<i>Protection Strategy</i>	<i>Cost per Acre</i>	<i>Total One-Time Cost (Millions)</i>	<i>Total 30-Year Costs (Millions)</i>
Fee-Simple Purchase	\$1,600	\$16,198	\$25,687
Management Costs	\$27.65	\$280	\$444
Fee-Simple Purchase + Management Costs	\$1,628	\$16,477	\$26,131
Conservation Easement	-	-	-
Rental Agreements	\$46.82	\$474	\$751

The estimated 30-year cost of protecting all currently un-protected Opportunity Areas through fee-simple acquisitions (including management costs) is the most expensive option at approximately \$26 billion. Rental agreements would cost about \$751 million over 30 years. However, rental costs would continue to be incurred after the 30-year time period. In contrast, land protected through fee-simple purchases and perpetual conservation easements require no further payments, with the exception of the cost of land management. The least cost option would be to pay existing landowners to manage for biodiversity values. Management costs, over a 30-year period, would be approximately \$444 million. To complete a more thorough comparison of all land conservation strategies, more data is required to estimate the costs of easements.

V. Policy Recommendations

Based on our analysis of Missouri's spending and spatial data, as well as the state's policy environment, we offer the following recommendations to increase the protection of Missouri's critical habitat, as defined by their Conservation Opportunity Areas. The project's focus of this research project has been on making recommendations that would increase the alignment between those lands conserved and the defined Opportunity Areas.

Although the state of Missouri has well-established and stable sources on land conservation funding, efforts should be made to either increase state funding or to increase the leverage other financial resources from the federal, local government, and private sectors. Even though we could not account for all programs spending due to missing or incomplete data, the estimated level of spending for land conservation of almost \$200 million over the 1998-2007 time period is still fairly low.

There are opportunities for the state to increase the amount of land being conserved within the defined Opportunity Areas. First, the state could increase use of conservation easements as a land protection tool, which would result in protecting more acres per dollar and avoid popular objections to large amounts of publicly-owned land. Second, the state could increase its support for local government bonding initiatives, if only to provide information to the public about the economic benefits associated with land conservation. Third, the state could more aggressively pursue and manage federal funding sources beyond Farm Bill programs, especially those funds associated with the Cooperative Endangered Species Conservation Fund and the National Scenic Byways and Recreational Trail funds.

Like all states, Missouri could develop a better understanding of where land protection has taken (and is taking) place throughout the state. This will necessitate a more coordinated data collection and management system with respect to both acres conserved and expenditures, regardless of funding source. The state needs to have better access to land conservation spending and acres, especially from federal entities. There needs to be better more spatial information on spending and the actual acres conserved in order to better estimate the alignment of these resources with Missouri's Conservation Opportunity Areas. The Conservation Opportunity Area Partnerships that the state has formed could serve as a focal point for standardized data collection since the partnerships have access to funding and acreage data. However, the Missouri Department of Conservation should make sure that the Partnerships have a consistent data collection and management system and avoid the problems associated with each entity collecting similar sets of data in different ways.

In the past, there has tended to be a concentration of land conservation spending and acres protected in a few geographically limited areas. This is partially due to the fact that so much land in Missouri is privately owned. However, the state could ensure that all priority Opportunity Areas get attention, even if there is not yet a well-organized Opportunity Area Partnership.

Although we encountered a lot of missing or incomplete data, the level of conservation funding and acres that could be spatially represented appears currently to be very low. In this

study, we found that only 30% of all spending data and only 28% of the all acreage for the 1998-2007 timeframe could be spatially represented. However, for both expenditures and acreage *that could be spatially mapped*, there was a high degree of alignment with Missouri's Opportunity Areas. The exception to this was the low degree of alignment in acres protected and expenditures at the local government level. There appears to be an opportunity for the state to do more outreach to local governments to inform them of the states wildlife habitat conservation priorities and to leverage local government resources in meeting these priorities.

To measure progress against the goals in the State Strategy, the state needs to have a clear baseline and the tools to measure alignment with habitat goals by all funding sources. The state will have access to the data collected through the analyses reported in this project, data which establishes a partial baseline. It would be worth considering what the state could do to build on this database. An excellent mechanism by which to accomplish this would be to participate in The Conservation Registry, now housed at the Northwest office of Defenders of Wildlife. The state has an opportunity to work with each set of Opportunity Area partnership groups to establish standardized mechanisms for collecting data on land protection within each Opportunity Area – both spending data and spatial data.

Lastly, more data needs to be collected and analyzed with respect to the costs and viability of conservation easements. This study did not have access to a reliable conservation easement data set and we could not conclude whether this conservation strategy was a realistic option to fee-simple purchase. However, since easements may be a lower cost approach to conserving the lands in the Conservation Opportunity Areas, we recommend that this strategy be investigated further.

VI. References

Center for Natural Lands Management. October 2004. Natural Lands Management Cost Analysis. 28 Case Studies. Prepared by the Center for Natural Lands Management for the Environmental Protection Agency. Grant # x83061601.

Cooperative Endangered Species Conservation Fund (CESCF) Grants to States & Territories (authorized under Section 6 of the Endangered Species Act), U.S. Fish and Wildlife Service (FWS) Endangered Species Program, U.S. Department of the Interior
<http://www.fws.gov/endangered/grants/section6/index.html>

Council of Economic Advisers. January 2009. Economic Indicators.
<http://www.gpoaccess.gov/indicators/index.html>.

Farm and Ranch Lands Protection Program (FRPP), National Resource Conservation Service (NRCS) Commodity Credit Corporation, U.S. Department of Agriculture
<http://www.nrcs.usda.gov/programs/frpp>

Forest Legacy Program (FLP), U.S. Forest Service, U.S. Department of Agriculture
<http://www.fs.fed.us/spf/coop/programs/loa/flp.shtml>

Grasslands Reserve Program (GRP), National Resource Conservation Service (NRCS) and Farm Service Agency (FSA), U.S. Department of Agriculture
<http://www.nrcs.usda.gov/programs/grp/>

Land and Water Conservation Fund (LWCF) State Assistance Program, National Park Service (NPS), U.S. Department of the Interior
<http://www.nps.gov/nrcr/programs/lwcf/>

National Coastal Wetlands Conservation (NCWC) Grants, U.S. Fish and Wildlife Service (FWS). U.S. Department of the Interior
http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home

National Scenic Byways Program and the Recreational Trails Fund of the Transportation Equity Act for the 21st Century (TEA-21), Federal Highway Administration (FHA), U.S. Department of Transportation
<http://www.bywayonline.org/program/>

North American Wetlands Conservation Act (NAWCA) Grants Program, U.S. Fish and Wildlife Service's (FWS) Division of Bird Habitat Conservation, U.S. Department of the Interior
<http://www.fws.gov/birdhabitat/grants/nawca/index.shtml>

Readiness and Environmental Protection Initiative (REPI) to Buffer Installation Encroachment, Department of Defense
<https://www.denix.osd.mil/portal/page/portal/content/range/Compatible/REPICongress/>

Administration (NOAA), U.S. Department of Commerce
<http://coastalmanagement.noaa.gov/about/czma.html>

U.S. Bureau of Land Management (BLM), U.S. Department of the Interior
<http://www.blm.gov/or/st/en.html>

U.S. Bureau of Reclamation, U.S. Department of the Interior
<http://www.usbr.gov/>

U.S. Fish and Wildlife Service (USFWS), U.S. Department of the Interior
<http://www.fws.gov/>

U.S. Forest Service (USFS), U.S. Department of Agriculture
<http://www.fs.fed.us/>

University of Missouri Extension
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=G427>

University of Missouri Extension
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=G403>

Wetlands Reserve Program (WRP), a Commodity Credit Corporation (CCC) program administered by National Resource Conservation Service (NRCS), U.S. Department of Agriculture
<http://www.nrcs.usda.gov/Programs/WRP/>

VII. Organizational Contacts

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