



ECONOMIC
IMPACT

A Maryland Department of
Business & Economic Development

RESEARCH REPORT | 2009-2011 |

The Economic Impact of the
Maryland **2011**
Zoo *IN* **BALTIMORE**

MARYLAND OF OPPORTUNITY.®

Department of Business & Economic Development

MARTIN O'MALLEY, GOVERNOR | ANTHONY G. BROWN, LT. GOVERNOR | CHRISTIAN S. JOHANSSON, SECRETARY

The Economic Impact of the Maryland Zoo in Baltimore

Table of Contents

Table of Contents	i
Executive Summary	ii
Introduction	1
<i>Zoo Activities</i>	1
Maryland Zoo Annual Operations.....	2
<i>Operating Revenues and Expenditures</i>	2
<i>Capital Expenditures</i>	4
<i>Zoo Visitors</i>	5
Economic and Fiscal Impacts of the Maryland Zoo.....	7
<i>Fiscal Impacts</i>	8
<i>Other Zoo Impacts</i>	9
<i>Economic Impact Methodology</i>	11

The Economic Impact of the Maryland Zoo in Baltimore

Executive Summary

Set on 135 acres in Druid Hill Park, the Maryland Zoo in Baltimore is the nation's third-oldest zoo. Chartered by the state legislature in 1876, the Zoo has more than 1,500 exotic and domestic animals representing nearly 200 species. Animals are displayed in natural settings replicating their native habitats.

This study estimates the economic and fiscal impacts from the Zoo's annual operations in Maryland. The impact estimates are based on the Zoo's operating expenditures and capital improvements budget for 2009-2011. The spending by the Zoo for annual operations and capital improvements generates economic benefits throughout the regional economy. These economic impacts are measured in terms of additional output or sales, salaries and wages that accrue to workers, and jobs that are supported across the State as the initial direct spending by the Zoo is re-spent and recycled in the form of indirect and induced business activities and payroll.

In addition, spending by visitors to the Zoo represents a source of economic activity that accrues to businesses in the State. This study estimates the economic impact of visitor spending outside the Zoo for transportation, lodging, food and other travel-related incidentals. Because the spending of out-of-state visitors represents new dollars in Maryland's economy, only out-of-state visitor spending is included in the impact estimates. Spending in the Zoo is also not considered to avoid double counting as that is factored in the Zoo's revenues.

In total, The Maryland Zoo directly generates \$23.8 million in direct spending, \$9.8 million in employee income and about 330 full-time equivalent jobs. The expenditures associated with Zoo operations and the corresponding economic impacts produce substantial tax revenues for the state and local government. These revenues include state retail sales tax, state personal income tax, local personal income surtaxes, and

hotel room occupancy tax. The direct annual fiscal impact of the Maryland Zoo is estimated to be \$899,300 in selected state and local taxes. The direct economic and fiscal impacts resulting from the annual operating expenditures of the Maryland Zoo and its visitors are summarized below and expressed in 2011 dollars.

- Zoo operations generate \$12.7 million in direct spending on goods and services in Maryland per year.
- Capital expenditures for buildings and repairs generate \$4.8 million per year in direct economic impact.
- The Zoo reports a total attendance of 374,611 for 2011. Entrance surveys show that visitors came from every state in the U.S., as well as Mexico and Canada, with 19.4 percent of visitors from outside of Maryland.
- Out of state visitors to the Zoo generate \$6.2 million in direct spending on goods and services per year.
- The Zoo has a paid staff of 214 full time equivalent (FTE) employees. Visitor expenditures generate an additional 90 direct FTE jobs and capital expenditure generate FTE 30 jobs. The total employment impact of Zoo operations and visitor spending is 334 full-time equivalent jobs.

The secondary impacts of the Zoo amount to nearly \$19.4 million in sales, \$4.7 million in income and about 180 full-time equivalent jobs. The total statewide economic impact of the Maryland Zoo in Baltimore (sum of direct and secondary impacts) is estimated to be \$43.1 million in gross sales, \$14.5 million in employee income and about 510 full-time equivalent jobs. The total economic and fiscal impacts (direct and secondary) resulting from the annual operating expenditures of the Maryland Zoo and its visitors are summarized below and expressed in 2011 dollars.

- Zoo operations generate \$23.7 million in total spending on goods and services in Maryland per year.
- Capital expenditures for buildings and repairs generate \$8.5 million per year in total economic impact.
- Out of state visitors to the Zoo generate \$10.8 million in total spending on goods and services per year.
- Zoo operations generate a total of 330 FTE jobs, visitor expenditures generate an additional 120 FTE jobs and capital expenditure generate 60 total FTE jobs. The total employment impact of Zoo operations and visitor spending is 510 full-time equivalent jobs.
- The total fiscal impact of the Maryland Zoo is estimated to be \$1.26 million in selected state and local taxes per year.

2009	2010	2011
Activities		
<p>Opened Prairie Dog Town exhibit.</p> <p>Samson the baby elephant celebrated his first birthday at the Zoo.</p> <p>18 African penguin chicks were raised at the Zoo and distributed to other North American zoos.</p> <p>Animal Ambassadors made their national debut on two episodes of the Martha Stewart Show, as well as several appearances on Late Night with David Letterman.</p>	<p>Dedication of Jones Falls Zephyr train ride.</p> <p>Back-to-back twin blizzards struck the Zoo, the city and the state with historic ferocity in early February. Around the clock through both storms, Zoo staff cared for animals, cleared paths and walkways, and cleaned up damage. Both bird aviaries collapsed under the crushing weight of the snow.</p> <p>Keepers working with the cheetahs began running their exercise lure during regular Zoo hours.</p> <p>Launched a new partnership with the Baltimore Ravens to train and care for the team's live mascots, Rise and Conquer.</p>	<p>Birth of an endangered addra gazelle named Ray-Ray.</p> <p>Opened state-of-the-art Panamanian golden frog exhibit in the Chimpanzee Forest.</p> <p>Birth of a very rare Coquerel's sifaka, Otto.</p> <p>Special promotion with Groupon garnered nearly 4,000 new members for the Zoo.</p> <p>Entered into a long-term contract with Service Systems Associates to provide concession and gift shop services.</p>
CapEx/Improvements		
<p>Renovated public restrooms at Village Green and Chimp Forest. Added a family restroom for use by handicapped guests and families with strollers. The renovations also maximize water and energy conservation.</p> <p>Installed state-of-the-art fire alarm system in the Chimp Forest Building, enhancing safety for animals, staff, and guests.</p> <p>Completed a major drainage project and other behind-the-scenes modifications to the antelope and warthog exhibits, and manure pit project that overhauls manure collection and removal.</p>	<p>Upgrade of network servers; IT.</p> <p>Renovated the exterior of the historic Maryland Building. Recipient of a prestigious Maryland Preservation Award from the Maryland Historical Trust.</p> <p>Pruning and reviving trees and plants that were damaged during winter storms.</p> <p>Repairs to gutters, roofs, and broken fencing from storm damage.</p> <p>Completion of new Jones Falls train station, plaza and half-mile track.</p> <p>The African Aviary was fixed adequately for spring opening.</p>	<p>Complete interior renovation of Wild Things Gift Shop at Schaefer Plaza and Oasis snack facility near the Giraffe House. Renovations partially funded by Service Systems Associates.</p> <p>Removed the last of several underground fuel tanks.</p> <p>Extensive renovations to the Mansion House, the historic building that houses Zoo administrative offices, began with repairs to the rooftop cupola, installation of a more reliable and efficient natural gas-fired boiler and upgrading of 1950s era electrical service.</p>

2009	2010	2011
A new vulture and crane barn was built in the African Journey exhibit, equipped with heat, light, and running water.	Life support systems involving water filtration in the Polar Bear Watch exhibit were renovated.	New heaters were installed in the Rhino Barn.
Improvements in lighting, air flow, and temperature control were made to several reptile and amphibian exhibits.	The off-exhibit area at the Lion Exhibit was completely renovated to include new caging, transfer chutes, and staff facilities.	The Maryland Wilderness team modified the North American river otter exhibit to increase animal visibility.
A new misting system for the Panamanian golden frog collection was designed and installed.	The padded recovery room at the Animal Hospital was renovated.	Improvements were made to the Wading Bird Building in the Main Valley; winter holding facilities were added.

Events

Bunny BonanZOO, Brew at the Zoo and Wine Too, ZooBOOO!, and Breakfast with the Animals

Party for the Planet in conjunction with Earth Day, Cartoon Network's Get Animated Tour, and Animal Enrichment Weekends.

Samson's Birthday Bash and a new and improved Breakfast with the Animals Series.

On Earth Day, Zoo staff and volunteers engaged guests in demonstrations of energy saving choices that can be made to help the environment and reduce our carbon footprint.

Bravo Health's Senior Day, the Ravens' Greatest Race, the Got Milk? Tour, and Animal Enrichment Weekends.

International Migratory Bird Weekend.

A World Oceans Day event themed around Dr. Seuss' classic One Fish, Two Fish, Red Fish, Blue Fish.

New public programs on grounds for visitors, ranging from bird walks to special preschool toddler days.

Guided family tours were offered three times weekly starting in the spring of 2011.

Hosted Animal Awareness Days, Animal Enrichment Weekends, and Breakfasts with the Animals.

The Economic Impact of the Maryland Zoo in Baltimore

Introduction

The Maryland Zoo in Baltimore is one of the Baltimore area's most popular tourist attractions. Over 300,000 visitors a year take advantage of the Zoo as an educational experience, a beautiful green space in the middle of Baltimore City and as a cultural asset. The Zoo's animal collection encompasses more than 1,500 birds, mammals, amphibians and reptiles, representing nearly 200 species. Animals are displayed in naturalistic settings replicating their native habitats, and some travel throughout the state as Animal Ambassadors, providing educational outreach through the ZOOMobile program.

Established in 1876, the Zoo received its early animal collections from prominent Baltimoreans who wanted to enhance the experience of nature in the park. The Zoo occupies 45 acres of a 135-acre property located in Druid Hill Park in the City of Baltimore. It has 55 buildings, including a veterinary hospital. It is operated by the Maryland Zoological Society under a lease agreement with the State of Maryland.

Zoo Activities

In addition to its mission of educating and inspiring diverse audiences to engage with wildlife and the living world, the Zoo is dedicated to being a first-rate animal care facility, an advocate for animals in the wild, and a supporter of wildlife conservation locally and globally. The Zoo continues to maintain the largest colony of African penguins in North America and is active in many conservation programs, notably the Mountain Gorilla Veterinary Program and Project Golden Frog. It also aids in the rehabilitation of select birds such as bald eagles and peregrine falcons at the request of the Maryland Department of Natural Resources or local rehabilitators.

The Zoo's mission

To inspire and educate people to join with it in the active support and conservation of wild life and wild places. The Zoo is committed to serving its communities by engaging people with the wonder of the living world through personal encounters that foster lifelong harmonious relationships with nature

The Zoo is an active partner with Maryland schools, engaging tens of thousands of students each year in new ways of thinking not only about wildlife and wild places but also about math, science, language arts, and other subjects taught in classrooms across the state.

Maryland Zoo Annual Operations

The Maryland Zoo in Baltimore is a 501(c)3 nonprofit organization that relies on a combination of public and private funds to operate. The Zoo is an accredited member of the Association of Zoos and Aquariums (AZA) and continues to meet or exceed every standard for animal care imposed by government agencies and by the AZA. The Zoo also meets high standards set by the AZA for education and volunteer programs and was specifically commended by the AZA for these programs in its most recent accreditation review.

The Zoo by necessity operates 365 days a year. The Zoo employs 214 people, many of whom work year-round to care for animals and maintain Zoo facilities.

- Veterinary staff routinely examine and treat animals at the Zoo and perform studies that contribute to the understanding and preservation of species.
- The Horticulture Team, with frequent help from volunteers, completes numerous landscaping projects to further beautify and green the Zoo's campus.
- The education department creates opportunities for people of all ages to learn through school programs and outreach activities, interaction with trained staff and volunteers, on-grounds visitor experiences, and exhibit development.
- Visitor Services staff are responsible for creating an enjoyable experience for zoo visitors, from the ticket booth to the attractions and throughout the campus.

Operating Revenues and Expenditures

The 2009-2011 operating income of the Maryland Zoo is presented in Table 1. The Zoo generates an average of \$12.8 million in revenues, with 45 percent from the State of Maryland and 30 percent from earned income including admissions, membership and attractions. Admission prices range from \$10.50 to \$16.50 and generate an average of \$1.6 million, or 13 percent of revenues. Combining admissions and memberships, each visitor generates an average of \$8 in revenue. Revenues from attractions have grown as the Zoo introduced the Jones Falls Zephyr train ride in 2010.

In 1992, the City, State and Maryland Zoological Society entered into a tri-party agreement through which the City leased all of the assets of the Zoo to the State, and the State engaged the Maryland Zoological Society to manage the Zoo. Since 1993, the State has provided the bulk of the Zoo's operating support and in 2004 the name was

changed to the Maryland Zoo. State support includes an operating grant of \$5 million per year, a grant from the Maryland State Department of Education for free admissions and special programming for Maryland school children, and grants for capital expenditures. The City of Baltimore makes an annual contribution to the Zoo's operational costs as well as pays the cost of electricity. These contributions are recorded as both a contribution in revenues and an expense in operations. Other public funds represent 12 percent of revenues.

Table 1: Maryland Zoo in Baltimore Operating Revenues

	FY2009	FY2010	FY 2011
State of Maryland	\$5,910,874	\$5,728,871	\$5,722,468
City of Baltimore	1,238,882	1,266,671	976,951
Other Public Funds	440,266	409,190	410,806
Sponsorships	262,907	316,714	219,652
General Support	1,238,891	1,528,323	1,260,086
Contributed Income	9,091,820	9,249,769	8,589,963
Net Admissions	1,524,623	1,606,425	1,782,190
Membership	1,083,237	1,132,293	1,175,931
Contract Services	81,341	78,390	136,584
Attractions	195,293	220,794	340,664
Programs	383,022	545,147	512,414
Other	112,752	429,163	279,690
Earned Income	3,380,268	4,012,212	4,227,473
Revenue Total	\$12,472,088	\$13,261,981	\$12,817,436

Source: Maryland Zoo in Baltimore

The 2009-2011 operating expenditures of the Maryland Zoo average \$12.4 million per year (Table 2). Personnel costs are included in the expenses and represent approximately \$8 million of operating costs. Overall, expenditures on animal care

Table 2: The Maryland Zoo in Baltimore Operating Expenditures

Expenses	FY 2009	FY 2010	FY 2011
Animal care	\$2,782,626	\$2,809,037	\$2,852,871
General & administrative	2,068,792	2,167,116	2,320,302
Maintenance	1,110,206	1,165,588	1,170,063
Visitor services	1,407,197	1,057,068	1,174,622
Development	516,158	342,819	316,998
Events	270,812	306,184	328,335
Marketing/communications	630,840	879,658	860,372
Facilities	2,301,602	2,585,844	2,562,705
Education	907,458	945,464	950,538
Membership	124,336	137,344	166,326
Total Expenses	\$12,120,027	\$12,396,122	\$12,703,132

Source: Maryland Zoo in Baltimore

represent the largest component of expenditures, averaging \$2.8 million or about 23 percent of the total. The Zoo expenditures on facilities, at \$2.4 million annually, are the second largest component, or about 20 percent of the total. General and administrative is the third largest expense category (18 percent), followed by visitor services (10 percent) and maintenance (9 percent).

Based on the expense categories, DBED estimated the spending and jobs impacts of different activities. The largest category is personnel expenses and general operations. Generally, every \$1 of this spending generates a total impact of \$1.89. Different impacts are generated for spending on animal care, visitor services, facilities, maintenance, events and education. Generally every \$1 of spending in these areas generates a total impact of \$1.79. Every \$1 of spending for membership and development generates a total of \$2.48. The direct annual impact of Zoo operations is \$12.7 million of sales, \$6.9 million of income, and 210 full-time equivalent jobs. Including secondary impacts the total annual impact of Zoo operations is \$23.7 million of sales, \$9.5 million of income, and 330 full-time equivalent jobs.

Annual Impact from Operations

Direct spend impact	\$12,731,140	Total spend impact	\$23,750,560
Direct Salaries & Wages	\$6,866,800	Total Salaries & Wages	\$9,523,000
Direct Jobs	214	Total Jobs	330

Capital Expenditures

The Maryland Zoo has a capital budget for facilities renewal, infrastructure improvements and exhibits. The Zoo’s capital investment plan calls for \$5 million in State monies per year for basic infrastructure improvements, strategic services and exhibit improvements. The FY2012 budget for example includes funding to continue construction of the African Penguin Exhibit and various infrastructure and life/safety projects.

Capital expenditures generate economic impacts through the Maryland economy. Expenditures for construction, renovation, installation and repairs generate purchases for materials and services throughout the State. The average net capital support for FY2009-2011 is \$4.7 million. Zoo capital expenditures produce \$4.8 million of sales, \$1.2 million of income, and 30 full-time equivalent jobs. Generally, every \$1 million in direct

capital expenditures generates 6 direct jobs and 5 secondary jobs. Including secondary impacts, the total Zoo capital expenditures produce \$8.5 million of sales, \$2.2 million of income, and 60 full-time equivalent jobs.

<i>Annual Impact from Capital Improvements</i>			
Direct spend impact	\$4,835,160	Total spend impact	\$8,537,200
Direct Salaries & Wages	\$1,234,200	Total Salaries & Wages	\$2,183,500
Direct Jobs	30	Total Jobs	60

Zoo Visitors

In addition to this spending by the Zoo for annual operations and capital improvements, visitors to the Zoo represent a source of economic activity that accrues to businesses in the State. While not all visitors to zoos combine their visit with other commercial activities either before or after their visit, research has shown that some do and that this spending can be significant¹. Out of town and overnight visitors account for the majority of this spending. The economic impact includes visitor spending outside the Zoo for transportation, lodging, food and other travel-related incidentals.

Hundreds of thousands of people visit the Zoo annually to see its fascinating residents in a natural setting. In addition to exhibits, visitors may ride a camel, feed the giraffes or participate in interactive educational presentations. The average yearly attendance is 348,520. Attendance is highly dependent on weather. For FY 2011 attendance reached 374,611, the most in five years. Table 3 shows total number of visitors to the Maryland Zoo by year.

Table 3: Maryland Zoo Visitors

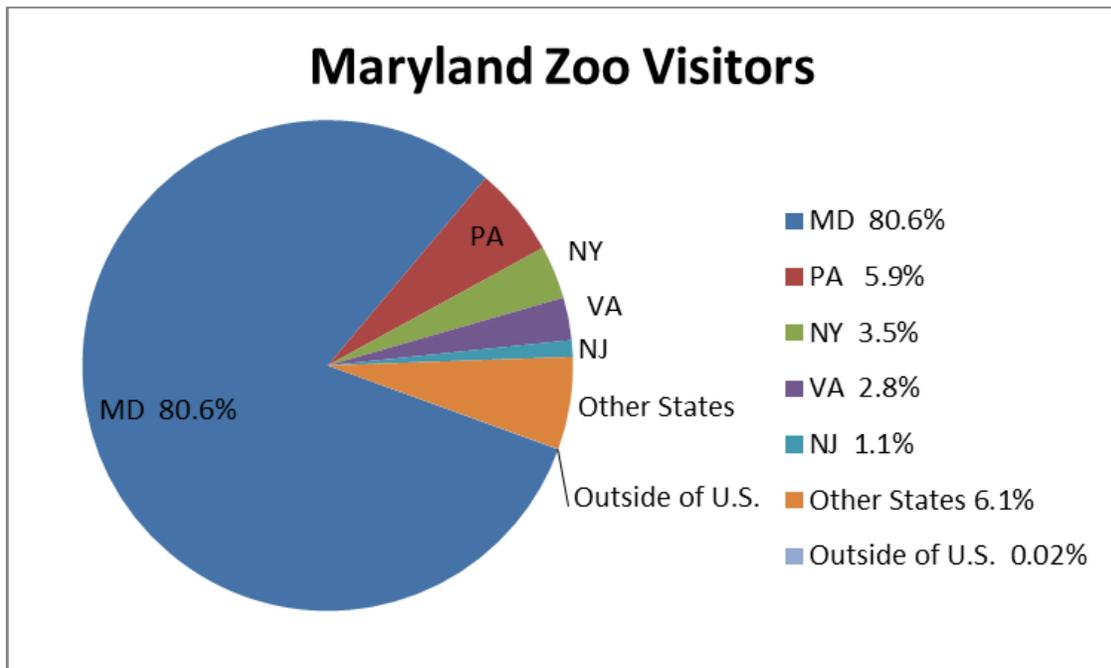
	FY2009	FY2010	FY2011
Annual Visitor Totals	330,681	340,268	374,611
School Children, teachers, chaperones	69,146	72,504	73,235
Groups	6,179	6,869	7,371
Special events	47,000	50,000	50,000

¹ The Economic Impact of Spending for Operations and Construction by AZA-Accredited Zoos and Aquariums, March 2011. Total visitation to AZA-accredited zoos and aquariums in the U.S. totaled 165.5 million in 2010 and the off-site before-and-after-visit spending impacts of this visitation has been estimated to total \$2.2 billion.

A gate survey of Zoo visitors found that visitors come from every state in the U.S. and several foreign countries. The Zoo reports total attendance of 374,611 persons for 2011. Of that total, 80.6 percent were Maryland residents. Nearly 20 percent come from out-of-state, primarily Pennsylvania and other mid-Atlantic states. Within Maryland, visitors come from all 24 jurisdictions, primarily Baltimore City and Baltimore County. The Baltimore and Washington region account for approximately 88 percent of visitors, with another 45,000 visitors, or 12 percent, from outside of the core.

Not all visitors visit Baltimore solely because of the Zoo. Some visitors are local residents who travel a short distance to visit the Zoo and other attractions. Others are residents of the greater Baltimore-Washington region who visit the Baltimore area as a day trip. The expenditures made by these in-state visitors would probably have been made within the region area regardless of whether they had visited the Zoo. Their spending is not considered new and is not included in the economic impacts.

Other visitors include tourists from out-of-state who travel at least one hundred miles or more to visit the Baltimore area. These tourists may add a Zoo visit to their planned activity as a side trip. The spending by the out-of-state visitors represents new spending in the State and part of their spending in Maryland is included in the Zoo impacts. These visitors to the Zoo generate expenditures within the entire region including monies spent on lodging, transportation, food and beverages, and other travel related incidentals.



Of the 350,000 visitors on average 2009-2011, 67,600 or 19.4 percent are estimated to be from out-of-state. Of those, 42,400 or over 60 percent are estimated to be from outside the region. The impact of visitor spending is based on 62,800 out-of-state day trip visitors and 2,970 out-of-state overnight visitors per year.

Using survey-based tourism data from Tourism Economics and Visit Baltimore, average daily expenditures were specified for both overnight and daytrip visitors. The average daily expenditures were then applied to the number of visitors in their corresponding overnight and daytrip categories to arrive at direct visitor spending in Baltimore. Visit Baltimore data indicate that, on average, overnight visitors spend about \$160 a day on transportation, food, lodging and other travel-related incidentals. Daytrip visitors spend on average \$82 a day on expenditures related to their visit. Total direct spending of \$6.2 million by these visitors generates total spending of \$10.8 million and 120 jobs.

Annual Impact from Visitor Spending

Direct spend impact	\$6,193,020	Total spend impact	\$10,850,010
Direct Salaries & Wages	\$1,688,100	Total Salaries & Wages	\$2,808,300
Direct Jobs	90	Total Jobs	120

Economic and Fiscal Impacts of the Maryland Zoo

The economic impact of the Maryland Zoo was estimated by analyzing three sources of direct spending: Zoo operations, capital expenses and visitor expenditures. Combined, the Maryland Zoo directly generates about \$24.2 million in spending, \$9.9 million in employee income and about 340 full-time equivalent jobs.

Table 4: Direct Impacts

	Output	Wages	Jobs
Zoo operations	\$12,731,140	\$6,866,800	210
Capital Expenditures	4,835,160	1,234,200	30
Visitor Expenses	6,193,020	1,688,100	90
Total	\$23,759,320	\$9,789,100	330

The direct spending associated with the operations of the Zoo and off-site visitor expenditures generate significant secondary impacts in the economy of Maryland. These impacts take place when local vendors increase their production and purchases in

order to meet additional demand imposed on them by the Zoo’s annual operations and its visitors. Furthermore, increased consumer spending by the Zoo’s staff, employees of the establishments selling directly to the Zoo visitors and the employees of all supporting businesses provide yet additional economic activity in the community. The secondary impacts of the Zoo amount to nearly \$19.4 million in sales, \$4.7 million in income and about 180 full-time equivalent jobs.

Table 5: Secondary Impacts

	Output	Wages	Jobs
Zoo operations	\$11,019,420	\$2,656,200	120
Capital Expenditures	3,702,040	949,300	30
Visitor Expenses	4,656,990	1,120,200	30
Total	\$19,378,450	\$4,725,700	180

The total economic impact of the Zoo is the sum of direct and all other secondary economic benefits. The total statewide economic impact of the Maryland Zoo in Baltimore City (sum of direct and secondary impacts) is estimated to be \$44 million in gross sales, \$15 million in employee income and about 520 full-time equivalent jobs.

Table 6: Total Impacts

	Output	Wages	Jobs
Zoo operations	\$23,750,560	\$9,523,000	330
Capital Expend	8,537,200	2,183,500	60
Visitor Expenses	10,850,010	2,808,300	120
Total	\$43,137,770	\$14,514,800	510

Fiscal Impacts

The direct expenditures associated with Zoo operations produce substantial tax revenues for the state and local government. These revenues include state retail sales tax, state personal income tax, local personal income surtaxes, and hotel room occupancy tax. Taxes paid by employees are estimated based on average income tax payments by income. The direct annual fiscal impact of the Maryland Zoo is estimated to be \$899,300 in selected state and local tax receipts. These include \$291,300 in state personal income taxes, \$402,400 in sales tax and \$185,300 in local income taxes and \$20,300 in hotel occupancy tax.

Including secondary impacts, the total annual fiscal impact of the Maryland Zoo is estimated to be \$1.26 million in selected state and local tax receipts. These include

\$425,350 in state personal income taxes, \$545,870 in sales tax and \$290,780 in local taxes.

Table 7: Fiscal Impacts by Type

Annual Tax Revenues	Direct	Secondary	Total
State Personal Income Tax	291,330	134,020	425,350
Sales Tax	402,400	143,460	545,870
Local Income Tax	185,270	85,220	270,490
Local Hotel Tax	20,290	-	20,290
Total State & Local	\$899,290	\$362,700	\$1,262,000

Table 8: Total Fiscal Impacts by Activity

	Zoo operations	Capital Expenditures	Visitor Expenses	Total
State Personal Income Tax	282,630	70,880	71,840	425,350
Sales Tax	297,340	63,630	184,900	545,870
Local Income Tax	179,740	45,075	45,675	270,490
Local Hotel Tax	-	-	20,290	20,290
Total	\$759,710	\$179,580	\$322,700	\$1,262,000

Other Zoo Impacts

Beyond the economic impacts, the Maryland Zoo in Baltimore is a resource for education, conservation and recreation. While these impacts cannot be measured in monetary terms, they are significant.

Education staff partner with teachers and students at three Baltimore City public schools through its Zoo Exchange program. Zoo educators teach classes at local elementary schools, working with close to 100 students on wildlife ecology, conservation, and career development content during the school year. Education staffs also work with teachers on animal-related projects. Education staffs offer teacher training classes and workshops, as well as pre-service learning programs for education students at Towson University. In 2011, outreach programs delivered 759 ZOOMobile presentations to 490 sites, reaching a total audience of 48,123. Of this total audience number, 10,591 presentation participants were students at Title I schools in Maryland who received programs free of charge. Even if students don't visit the Zoo, their teachers can download K -5 grade-level reading comprehension and math skills activity sheets from the Zoo's Education web page.

The Zoo furthers wildlife conservation efforts in many ways, including maintaining stable captive populations of threatened or endangered species, furthering knowledge through research, and raising public awareness. The Zoo supports breeding programs for many species in the collection, including sifaka. The Zoo has the largest captive colony of black-footed penguins in North America and supplies two-thirds of the captive population. It is world-renowned for its collaborative efforts in avian malaria research on the wild black-footed penguin population in South Africa.

The Zoo is known for its participation in research, the AZA's Species Survival Plans and other zoological activities around the world. Among current significant projects:

- Project Golden Frog: A conservation consortium among U.S. and Panamanian institutions consists of field studies, captive propagation and education with the primary goal of ensuring against the extinction of the endangered Panamanian Golden Frog due to an incurable fungal disease.
- Avian Malaria Project: Participation in several Species Survival Plan (SSP) programs, which carefully plan for the future of threatened and endangered species to ensure their genetic viability.

Zoo veterinarians and keepers partnered in the field with biologists from the Maryland Department of Natural Resources to carry out the annual census of black bear mothers and cubs for the Black Bear Project, which provides data essential to managing Maryland's population of black bears.

In addition to animal conservation, the Maryland Zoo is a steward of its own forest resources with a preserve populated by mature red oak, white oak, poplar, ash, and beech. The Zoo is a partner in the effort to bring the American chestnut back from extinction to eastern forests of the United States.

Zoo medicine

Veterinary staff treated 78 wild animals at the Animal Hospital that were either found in Druid Hill Park, injured while migrating through, or brought to the Zoo by the Maryland Department of Natural Resources or other agencies for treatment or consultation.

Since 2001, five veterinarians have graduated from the Zoo's internship program, and all five are now employed as staff veterinarians at zoos around the country.

Economic Impact Methodology

This study estimates the economic and fiscal impacts from the Maryland Zoo in Baltimore's annual operations in Maryland. The impact estimates are based on the Zoo's operating expenditures and capital budget for 2009-2011. The spending by the Zoo for annual operations and capital improvements generates economic benefits throughout the regional economy. These economic impacts are measured in terms of additional output or sales, new personal earnings (salaries and wages) that accrue to workers, and jobs that are supported across the regional economy as the initial direct spending by the Zoo is re-spent and recycled in the form of indirect and induced business activities and payroll.

The secondary impacts of the Zoo on other Maryland industries and institutions are estimated using IMPLAN-generated economic impact multipliers². This input-output model describes the inter-industry flow of goods and services within Maryland and with the outside economy. In assessing the economic impact from annual operations, we focus only on the expenditures side of the Zoo's transactions to preclude any double counting of economic impact from visitor spending.

² IMPLAN regional economic model for Maryland, Minnesota IMPLAN Group, Inc., IMPLAN System (data and software), 502 2nd St. Suite 301 P.O.Box 837 Hudson, WI 54016