

**The Houston Zoo Contribution to the Houston-Woodlands-Sugarland  
Metropolitan Area Economy**

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## **Introduction and Summary**

The Houston Zoo contributed \$242,432,755 to the Houston-Woodlands-Sugarland Metropolitan Area economy in 2018. The Zoo contribution to the Metropolitan Area economy resulted from Zoo non-capital spending on operations, from spending on Zoo capital and construction projects, and from the spending of Zoo visitors from outside the metropolitan area on accommodations, food, and transportation while visiting the region.

Part of the \$242,432,755 total contribution includes a \$73,162,958 contribution to household earnings and a \$42,606,580 contribution from zoo capital and construction spending. \$123,933,537 of the total contribution derived from visitors from outside the Metropolitan Area. Zoo 2018 spending also created 1925 jobs in 2018.

Following the guidelines suggested by the Association of Zoos and Aquariums Annual Economic Impact reports, we separate long-term capital and construction from the single year 2018 analysis. Zoo capital spending alone has a significant impact on the metropolitan area economy.

Looking at the years 2013 to 2022, actual and proposed Zoo capital spending will contribute \$524,878,652 to local output. This 2013-2020 total includes the \$42,606,580 in capital spending for the single year 2018 cited above. Part of the total \$524,878,652 capital spending impact is \$181,398,733 in household earnings with an associated creation of 3450 jobs over the period 2013-2020.

Two appendices to the report explain the methodology and calculations in more detail.

## **Background: The Role of Multipliers**

The Houston Zoo contributes to the local economy in three ways: through its expenditures to support its normal operations, through its capital project expenditures, and through the spending of visitors from outside the metropolitan area on other local goods and services while visiting the Houston-Woodlands-Sugarland Metropolitan Area.

Part of the Zoo's impact are direct Zoo purchases from local suppliers and wages paid to zoo employees to support the Zoo's normal operations. But there are also indirect impacts as Zoo expenditures trickle through the local economy. Zoo suppliers spend more on labor and other inputs purchased from their suppliers as a result of their sales to the Zoo. Thus, a complete measure of the Zoo's contribution to the local economy requires following a chain of transactions stimulated by the initial Zoo expenditures as they work their way through the local economy.

It is worth noting that the Houston Zoo follows formal policies that support purchases from local suppliers. First, the Zoo purchases fodder for its herbivore animals (about 500,000 pounds a year) from local farms. Second, the Zoo food service and hospitality contractor, SSA, sources a large portion of the food for the Zoo's cafes from vendors from within the region. This local sourcing supported the Zoo's recent successful bid for Green Restaurant certification from the Green Restaurant Association.

The U.S. Department of Commerce, Bureau of Economic Analysis, has developed a rigorous method to measure the dollar value of this chain of transactions based on the value of the Zoo's initial expenditures. The dollar value of the initial zoo purchases is multiplied by a factor that inflates the initial expenditure in order to account for the resulting chain of transactions. This factor is called a 'multiplier'.

Multipliers are derived for various industries and for specific geographic areas. This study uses the Census Bureau defined Houston-Woodlands-Sugarland Metropolitan Statistical Area which includes nine counties that are integrated into the regional economy and are clustered around the City of Houston. Census Bureau Metropolitan Statistical Areas are determined by an analysis of commuting and transportation patterns to determine the integration or 'connectedness' of geographic areas.

Multipliers also must be applied to capital expenditures. Capital projects require special treatment. Completion of a construction project may take many years, and once completed, the project's contribution to the local economy diminishes. Construction multipliers are used to measure the value of the chain of transactions stimulated by the Zoo capital expenditures during the time of the project. Since Zoo capital projects may span multiple years, the impact of capital expenditures is calculated for individual years between 2013 and 2022. The total impact over this period is large.

Finally, the Houston Zoo impacts the local economy through the purchases of food, lodging and other goods that are required to support a visit to the Metropolitan Area. Visitors from outside the metropolitan area often require local hospitality services, which when purchased by outside visitors, initiate another chain of local expenditures. Since the Zoo attracts more than one million general admission visitors a year, and since 24.41% of these visitors are from outside the Metropolitan Area, the economic impact of these visitors is large.

## **Zoo Contributions to the Metropolitan Area Economy for 2018**

Table 1. applies Bureau of Economic Analysis multipliers to Zoo non-capital spending, Zoo capital expenditures, and visitor expenditures on accommodations, food, and other goods

during their visit to the Metropolitan Area. These multipliers are derived from the BEA regional input-output model and facilitate estimation of total economic impacts by including the complete chain of transactions.

**Table 1. Total 2018 Zoo Contributions to the Metropolitan Economy**

	Output	Earnings	Employment
Non-Capital Operations	\$75,892,638	\$21,539,039	604
Capital Expenditures	\$42,606,580	\$14,724,889	280
Non-Metropolitan Visitors	\$123,933,537	\$36,889,031	1041
<b>Total 2018 Contributions</b>	<b>\$242,432,755</b>	<b>\$73,152,959</b>	<b>1,925</b>

## Zoo Contributions to the Area Economy from Capital Projects 2013-2022

Table 2. summarizes Zoo capital spending impacts for the years 2013-2022. As these expenditures are reported for different years, the estimates are adjusted to be in 2018 dollars.

**Table 2. Total 2013-2022 Capital Spending Contributions to the Metropolitan Economy**

	Output	Earnings	Employment
2013-2022 Capital Spending Contributions	\$524,878,653	\$181,398,733	3450

It should be emphasized that these are totals for the whole 2013-2022 time period. For example, 3450 is the sum total of annual employment contributed over all the years, not 3450 jobs each year.

## Conclusion

Table 1. summarizes the Houston Zoo’s contributions to the Metropolitan Area for one year, 2018. Table 2. summarizes the significant contribution of the Zoo’s innovative capital projects over the years 2013-2022.

The methodology is that prescribed by the U.S. Department of Commerce, Bureau of Economic Analysis. By application of multipliers derived from the BEA regional input-output table (RIMS II) the analysis accounts for the full economic effects stimulated by the Zoo.

The analysis does not include any estimate of the value of the Zoo experience to Zoo visitors, but only the value of output and earnings and the number of jobs stimulated by the Zoo’s

presence in region. Neither does the analysis address the value of the Zoo's contributions to education and conservation, which are no doubt significant but difficult to measure.

## References

Bureau of Economic Analysis, U.S. Department of Commerce, RIMSII: An Essential Tool for Regional Developers and Planners, December 2013.

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Daniel L. Erikkila, Economic Impacts from the Minnesota Zoo 2017, College of Food, Agriculture and Natural Resource Sciences, North Central Research and Outreach Center, Grand Rapids, MN, 55744, 2018.

Stephen S. Fuller, The Economic Impact of Spending for Operations and Construction by AZA Members in 2016, Association of Zoos and Aquariums, The Schar School of Policy and Government, George Mason University, Arlington, Virginia, 2017.

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Thijs ten Raa, The Economics of Input-Output Analysis, Cambridge University Press, 2005.

## Appendix A: How Local Multipliers Work

The Houston Zoo contributes to the Metropolitan Area Economy through its direct expenditures on non-capital operational expenses and capital projects. The Zoo also impacts the local economy by attracting visitors from outside the local area that pay for accommodations, food, and other goods. These are first round expenditures that then stimulate further rounds of expenditure from Zoo suppliers and local business catering to visitors. The total contribution of the Zoo to the local economy is the complete chain of transactions that starts with the initial Zoo or visitor expenditures.

The illustration below is taken from the Bureau of Economic Analysis, Regional Input-Output manual. The Bureau, an agency in the Department of Commerce, periodically analyzes the interrelationships between industries to measure how expenditures by one industry can stimulate further expenditures by the first industry's suppliers. The total impact of an initial expenditure by a firm in one industry plus the subsequent expenditures by suppliers is determined by a multiplier that inflates the original expenditure to account for the subsequent expenditures of suppliers to that first firm.



Initial expenditure is the height of left bar (\$1.00). Expenditures by suppliers in response to this initial expenditure are represented by the round 1 (\$0.35), round 2 (\$0.10), and round 3 (\$0.05) bars on the right. The total response is the sum of the initial expenditure and the subsequent rounds that reflect local supplier's response to the initial expenditure. The bars decline as we go from left to right reflects each industry's specific production process and also derive from

'leakages' from the local economy. 'Leakages' occur when local suppliers purchase from suppliers outside the local economy.

The multiplier summarizes the total impact on the local economy using the initial expenditure as a base. In this sense the multiplier inflates the initial expenditure to account for the further expenditures of suppliers. This reflects the complete 'chain of transactions' following the initial spending.

There are multipliers for output, earnings, employment, and value-added that reflect a similar process of inflating or multiplying an initial expenditure to determine the total 'chain of transactions' effect. Multipliers also differ by detailed industry.

The multipliers applied here are the most recent available from the Bureau of Economic Analysis and were calculated with 2017 data. (See: [RIMSII: An Essential Tool for Regional Developers and Planners](#), Bureau of Economic Analysis, U.S. Department of Commerce.)



## **Appendix B: Detailed Tables, Calculations, and Notes**

Table B1. Summary of 2018 Total Contributions and 2013-2020 Capital Contributions to the Metropolitan Area Economy.

Table B2. Zoo Annual Non-Capital and Capital Expenditures Contribution to the Metropolitan Area Economy – 2018.

Table B3. Annual Contribution of Non-Metropolitan Visitor Expenditures to the Metropolitan Area Economy – 2018.

Table B4. Zoo Actual and Projected Annual Capital Expenditures – Contributions to the Metropolitan Area Economy 2013-2020.

**Table B1. Summary of 2018 Contributions and 2013-2020 Capital Contributions**

<b>Part A. Total 2018 Annual Operating Costs Contributions to the Metropolitan Economy</b>				
	<b>Output</b>	<b>Earnings</b>	<b>Employment</b>	<b>Value Added</b>
<b>Operations &amp; Capital 2018</b>	\$118,499,218	\$36,263,927	884	\$68,803,636
2018 Operations	\$75,892,639			
2018 Capital	\$42,606,580			
<b>Non-Metropolitan Visitors 2018</b>	\$123,933,537	\$36,899,031	1041	\$73,815,858
<b>Total 2018 Annual Contributions</b>	<b>\$242,432,755</b>	<b>\$73,162,958</b>	<b>1,925</b>	<b>\$142,619,494</b>
<b>Part B. Total 2013-2022 Capital Spending Contributions to the Metropolitan Economy</b>				
	<b>Output</b>	<b>Earnings</b>	<b>Employment</b>	<b>Value Added<sup>1</sup></b>
<b>2013-2022 Capital Spending Contributions</b>	\$524,878,653	\$181,398,733	3450	\$282,478,370

Notes: 1. Value Added is the part of total output that goes to final consumers. Output includes dollar value of final consumption and intermediate consumption by other producers.

**Table B2. Zoo Annual Non-Capital and Capital Expenditures Contribution to the Metropolitan Economy - 2018**

<b>Part A. Contribution of 2018 Non-Capital Expenditures</b>			
2018 Zoo Non-Capital Direct Expenditures	\$50,124,644		
minus 2018 Grant Payments to Non-Local Recipients	\$2,950,497		
minus 2018 Depreciation	\$8,400,000		
equals 2018 Zoo Local Non-Capital Direct Expenditures	\$38,774,147		
BEA Multipliers for Museums, Historical Sites, Zoos, and Parks	output	earnings	employment
	1.9573	0.5555	15.5683
<b>2018 Non-Capital Expenditure Contribution to the Metropolitan Economy</b>	<b>\$75,892,638</b>	<b>\$21,539,039</b>	<b>604</b>
			<b>value added</b>
			<b>1.1831</b>
			<b>\$45,873,693</b>
<b>Part B. Contribution of 2018 Capital Expenditures</b>			
2018 Zoo Capital Expenditures	\$18,892,595		
BEA Multipliers for Construction	output	earnings	employment
	2.2552	0.7794	14.8243
<b>2018 Capital Expenditure Contribution to the Metropolitan Economy</b>	<b>\$42,606,580</b>	<b>\$14,724,889</b>	<b>280</b>
			<b>value added</b>
			<b>1.2137</b>
			<b>\$22,929,943</b>
<b>Part C. Total 2018 Contributions to the Metropolitan Economy</b>			
	<b>\$118,499,218</b>	<b>\$36,263,927</b>	<b>884</b>
			<b>\$68,803,636</b>

- Notes:
1. Non-Capital expenditures and depreciation obtained from John Trahan.
  2. Grant payments to non-local recipients obtained from 2018 IRS Form 990.
  3. Multipliers are from BEA 2017 tables for the Houston-Woodlands-Sugarland Metropolitan Statistical Area.

**Table B3. Annual Contribution of Non-Metropolitan Visitor Expenditures to the Metropolitan Economy - 2018**

Total Attendance 2018	2,169,027			
minus Free Entry and Member Attendance	938,390			
2018 General Admission Attendance Estimate	1,230,637			
2018 Percentage General Admission from Outside Metro Area	24.41%			
2018 Estimated General Admission Attendance from Outside Metro Area	300,398			
2018 Estimated Visitor Expenditure per Person per Day	\$209.70			
2018 Estimated General Admission Expenditure from Outside Metro Area	\$62,993,564			
BEA Multipliers for Accommodations	Output	Earnings	Employment	Value Added
	1.9674	0.5856	16.5271	1.1718
<b>Total 2018 Non-Metropolitan Visitor Contribution to the Metropolitan Area Economy</b>	<b>\$123,933,537</b>	<b>\$36,889,031</b>	<b>1,041</b>	<b>\$73,815,858</b>

- Note:
1. 2018 attendance figures from John Trahan.
  2. Percentage general admission attendance from outside Metropolitan Statistical Area is calculated from Excel spreadsheet containing survey responses for general admission attendees in 2018. Respondents reported on their state and county of residence.
  3. Estimated visitor expenditure per person day was calculated from the 2018 dashboard published on the visitthouston website.
  4. Multiplier for Accommodations Industry obtained from 2017 BEA tables.

**Table B4. Zoo Actual and Projected Annual Capital Expenditures - Contributions to the Metropolitan Economy 2013-2022**

Year	actual or projected	Expenditures	Expenditures (2018 dollars)	BEA Multiplier	Output (2018 dollars)	Earnings (2018 dollars)	Employment (jobs)	Value Added (2018 dollars)
2013	<i>actual</i>	991,772	\$1,069,042	2.2552	\$2,410,904	\$833,212	16	\$1,297,497
2014	<i>actual</i>	23,636,624	\$25,071,479	2.2552	\$56,541,200	\$19,540,711	372	\$30,429,255
2015	<i>actual</i>	6,561,435	\$6,951,494	2.2552	\$15,677,009	\$5,417,994	103	\$8,437,028
2016	<i>actual</i>	14,332,421	\$14,995,276	2.2552	\$33,817,347	\$11,687,318	222	\$18,199,767
2017	<i>actual</i>	12,956,228	\$13,272,681	2.2552	\$29,932,550	\$10,344,728	197	\$16,109,053
2018	<i>actual</i>	18,892,595	\$18,892,595	2.2552	\$42,606,580	\$14,724,889	280	\$22,929,943
2019	<i>actual</i>	14,700,821	\$14,509,846	2.2552	\$32,722,606	\$11,308,974	215	\$17,610,601
2020	<i>projected</i>	58,800,000	\$57,647,059	2.2552	\$130,005,647	\$44,930,118	855	\$69,966,235
2021	<i>projected</i>	57,450,000	\$55,219,146	2.2552	\$124,530,219	\$43,037,803	819	\$67,019,478
2022	<i>projected</i>	26,650,000	\$25,112,890	2.2552	\$56,634,590	\$19,572,987	372	\$30,479,515
<b>Total 2013-2022</b>		<b>\$234,971,896</b>	<b>\$232,741,510</b>		<b>\$524,878,653</b>	<b>\$181,398,733</b>	<b>3,450</b>	<b>\$282,478,370</b>

Notes:

1. Actual and projected capital expenditures are derived from Excel spreadsheets provided by Houston Zoo.
2. Construction multiplier obtained from BEA tables.
3. Historical Consumer Price Index for All Urban Consumers (CPI-U) obtained from Bureau of Labor Statistics. CPI-U forecast for 2020-2022 assumed at 2 percent.
4. Note that 2018 capital expenditure contribution is also included in Table B1.