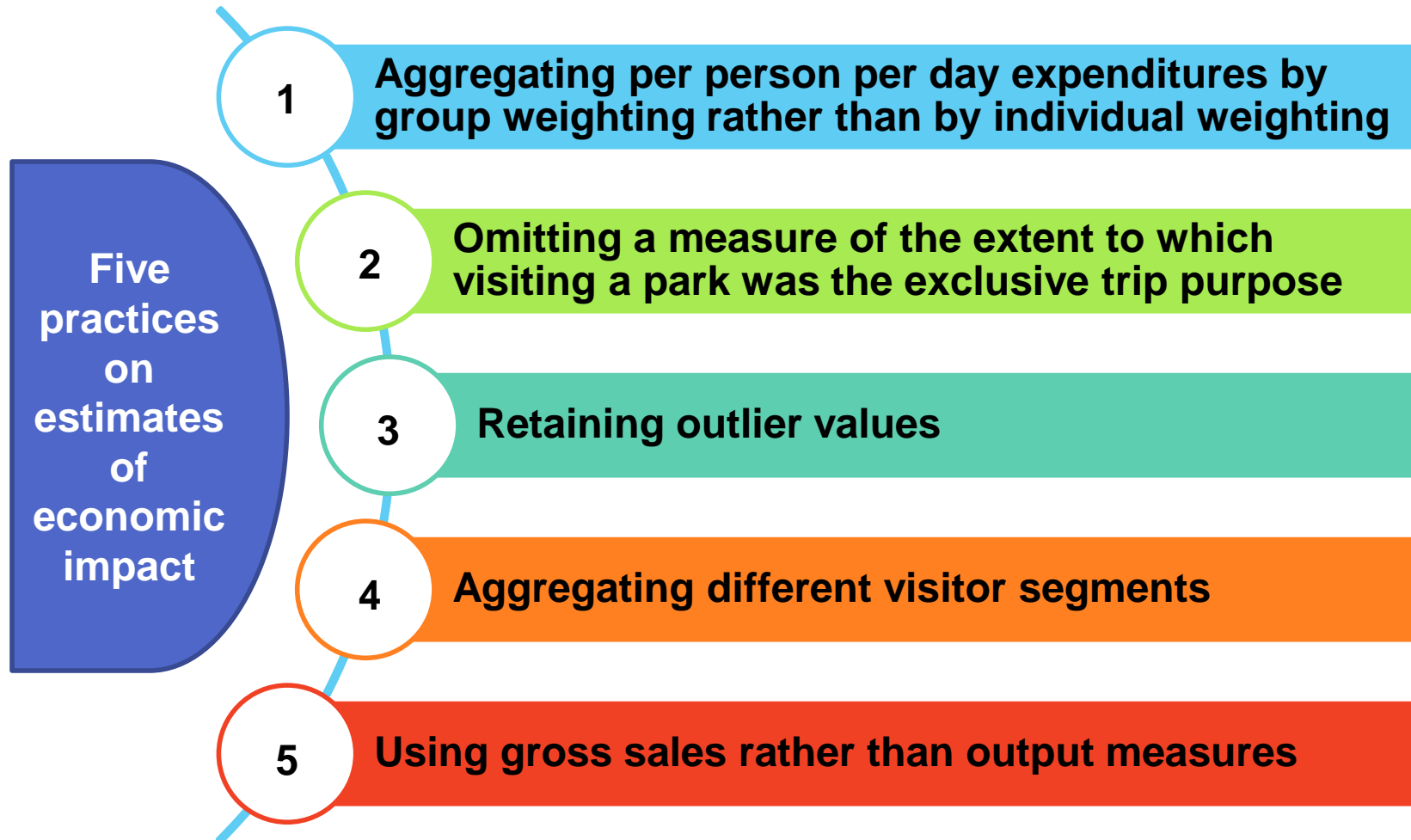# INFLUENCING ESTIMATES OF VISITOR SPENDING AND ECONOMIC IMPACT WITH INAPPROPRIATE PROCEDURES

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Are the analyses "scientific", and the results are objective?

- Economic impact analyses is an **inexact** process and the calculated numbers should be regarded as a "**best guess**".
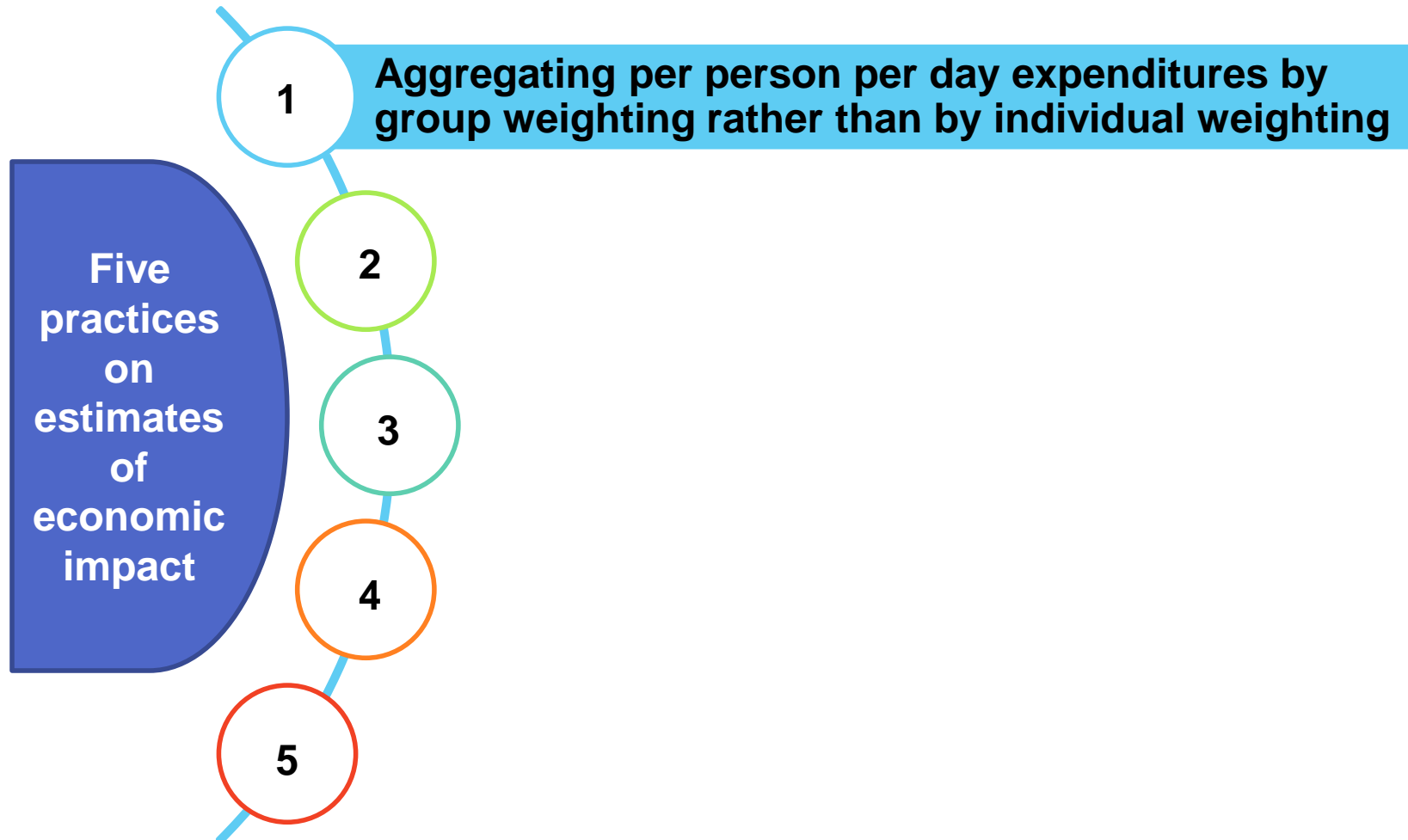
Purpose of this study is

Five practices on estimates of economic impact

1. Aggregating per person per day expenditures by group weighting rather than by individual weighting

2. Omitting a measure of the extent to which visiting a park was the exclusive trip purpose

3. Retaining outlier values

4. Aggregating different visitor segments

5. Using gross sales rather than output measures

Methods

- Data were collected at nine state parks in Texas over a four and a half month period.

- The leader of each group of visitors was asked to report the group's expenditures in the local community which was defined as "within a 20 mile radius of the park."

- The number of usable questionnaires obtained totaled 5,634

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1. Aggregating Per Person Per Day Expenditures by Group Weighting rather than by Individual Weighting

• The group weighting procedure yielded higher dollar amounts than the individual weightings.

Table 1. Average Expenditures by Individual Weighting and by Group Weighting of Overnight Visitors					
Park Name	Individual Weightings		Group Weightings		% by which group weightings exceed individual weightings
	Per person per day expenditure	Annual expenditure	Per person per day expenditure	Annual expenditure	
Daingerfield	$12.47	$242,769	$15.43	$300,405	24%
Dinosaur Valley	$8.84	$200,018	$10.35	$234,184	17%
Enchanted Rock	$6.37	$140,956	$16.59	$367,033	160%
Garner	$18.20	$4,377,092	$22.00	$5,291,013	21%
Goliad	$12.96	$219,704	$13.42	$227,470	4%
Lake Corpus Christi	$12.40	$455,380	$16.95	$622,521	37%
Lake Ray Roberts	$12.77	$2,957,729	$16.13	$3,737,297	26%
Pedernales Falls	$12.39	$680,218	$15.03	$825,001	21%
Tyler	$14.63	$1,029,806	$17.32	$1,219,308	18%

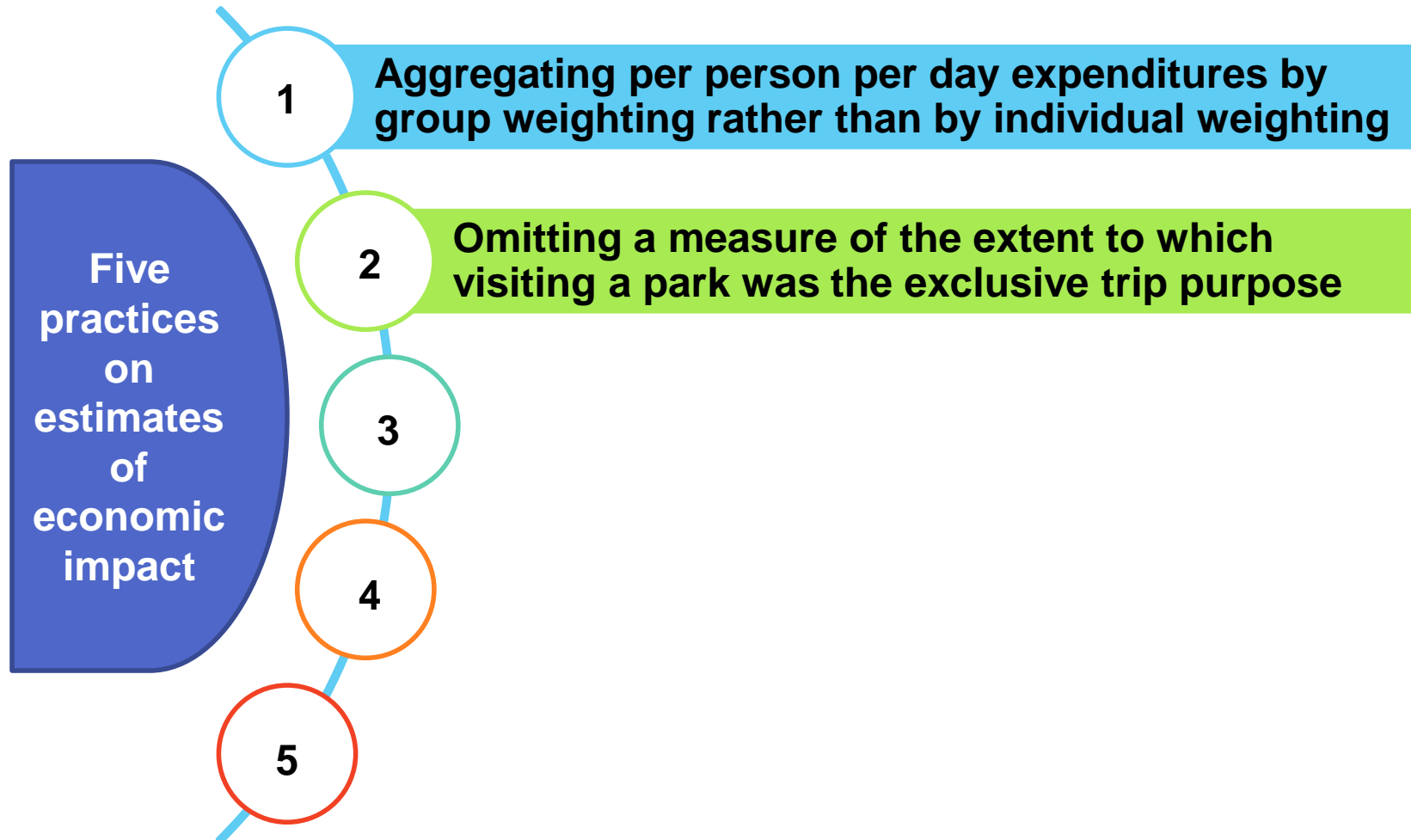# As visitor days per group increased, per person per day expenditure declined

Table 2. Pearson Correlation Analyses Showing the Relationship of the Number of Visitor days with Categories of Per person per day Spending for Overnight Visitors									
Park name	All items	Groceries	Food & Beverage	Rec. equip	Retail shopping	Gas & Oil	Other private auto	Lodging	Other
Daingerfield (N=254)	-0.17**	-0.15*	-0.02	-0.04	-0.08	-0.16*	-0.05	-0.02	0.02
Dinosaur Valley (N=81)	-0.22*	-0.26*	-0.18	0.05	-0.05	-0.14	0.14	.	0.09
Enchanted Rock (N=239)	-0.15*	-0.11	-0.12	-0.05	-0.07	-0.17**	-0.04	-0.06	-0.03
Garner (N=1,090)	-0.15**	-0.14**	-0.12**	-0.06*	-0.05	-0.17**	-0.02	-0.03	-0.04
Goliad (N=140)	-0.05	0.09	0.03	0.01	-0.02	-0.07	0.06	-0.14	-0.08
Lake Corpus Christi (N=310)	-0.36**	-0.28**	-0.21**	-0.14*	-0.11	-0.36**	-0.05	-0.08	-0.02
Lake Ray Roberts (N=276)	-0.22**	-0.16**	-0.15*	-0.11	-0.08	-0.15*	-0.02	-0.10	0.00
Pedernales Falls (N=361)	-0.15**	-0.13*	-0.06	-0.06	-0.05	-0.18**	0.12*	0.01	-0.04
Tyler (N=326)	-0.16**	-0.09	-0.12*	-0.10	-0.02	-0.18**	-0.02	-0.03	-0.04

*$p < 0.05$
** $p < 0.01$

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2. Omitting a Measure of the Extent to which Visiting a Park was the Primary Trip Purpose

- **Time-switchers** are those who were planning a trip to an area, but changed the timing of their visit to coincide with a particular event

- **Casuals** are visitors whose main reason visiting was not the park (Crompton & McKay 1994).

The Theory of Cumulative Attraction in Tourism

As the number of magnitude of attractions increased, both the number of visitors and their length of stay in an area were likely to increase (Gunn (1972)
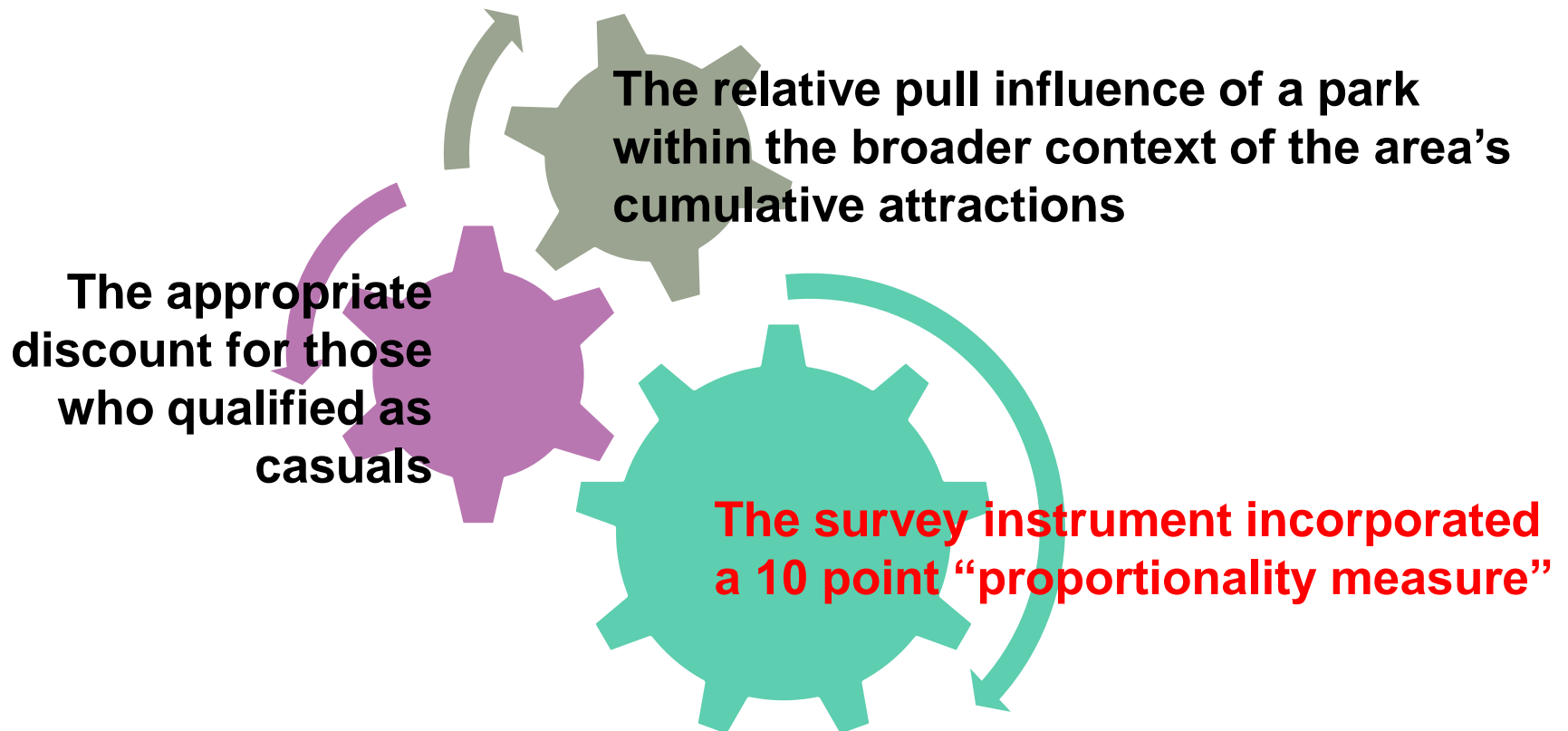
Visitors seek multiple attractions or destinations when travelling in order to experience variety (Lue, Crompton, & Fesenmaier 1993).

The strength of its influence is dependent on the number, size and quality of an area's attractions. (Kim and Fesenmaier 1990; Hunt & Crompton 2008)

2. Omitting a Measure of the Extent to which Visiting a Park was the Primary Trip Purpose

The relative pull influence of a park within the broader context of the area's cumulative attractions

The appropriate discount for those who qualified as casuals

The survey instrument incorporated a 10 point "proportionality measure"

The parks tended to be the primary reason for overnight visitors coming to the area

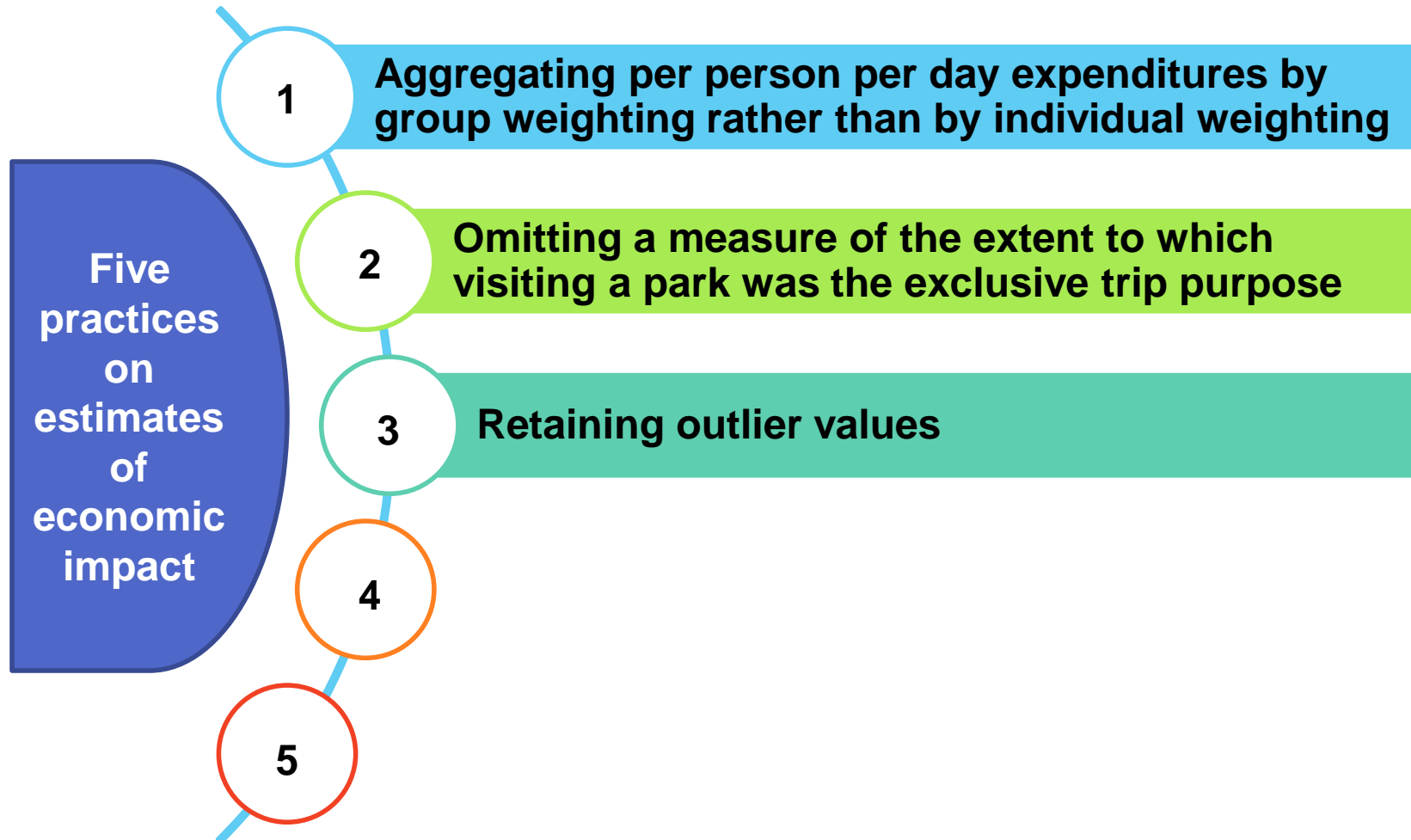| Table 3. Expenditures that Include and Exclude a Measure of the Extent to which Visiting a Park was the Primary Trip Purpose of Overnight Visitors					
Park Name	Include proportionality of spending		Exclude proportionality of spending		% by which the exclusive calculations exceed inclusive calculations
	Per person per day expenditure	Annual expenditure	Per person per day expenditure	Annual expenditure	
Daingerfield	$12.47	$242,769	$13.03	$253,658	4%
Dinosaur Valley	$8.84	$200,018	$10.03	$227,076	14%
Enchanted Rock	$6.37	$140,956	$7.56	$167,310	19%
Garner	$18.20	$4,377,092	$19.58	$4,709,476	8%
Goliad	$12.96	$219,704	$14.62	$247,723	13%
Lake Corpus Christi	$12.40	$455,380	$13.72	$504,206	11%
Lake Ray Roberts	$12.77	$2,957,729	$14.10	$3,266,906	10%
Pedernales Falls	$12.39	$680,218	$14.23	$781,319	15%
Tyler	$14.63	$1,029,806	$16.05	$1,129,621	10%

Incorporating a scale is important to reflect the importance of a given attraction in decisions to visit an area

Table 4. Expenditures that Include and Exclude a Measure of the Extent to which Visiting a Park was the Primary Trip Purpose of Day Visitors					
Park Name	Include proportionality of spending		Exclude proportionality of spending		% by which the exclusive calculations exceed inclusive calculations
	Per person per day expenditure	Annual expenditure	Per person per day expenditure	Annual expenditure	
Daingerfield	$8.88	$89,981	$11.07	$112,235	25%
Dinosaur Valley	$13.55	$1,234,921	$22.12	$2,015,772	63%
Enchanted Rock	$26.97	$6,074,482	$42.69	$9,614,497	58%
Garner	$57.04	$8,962,871	$82.33	$12,936,928	44%
Goliad	$13.62	$374,080	$18.02	$494,753	32%
Lake Corpus Christi	$31.95	$888,716	$34.58	$962,004	8%
Lake Ray Roberts	$19.09	$8,853,643	$33.96	$15,748,658	78%
Pedernales Falls	$23.85	$2,273,979	$37.41	$3,566,869	57%
Tyler	$59.02	$2,457,028	$85.40	$3,555,382	45%

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3. Retaining Outlier Values

Estimates derived from relatively small samples are extrapolated to relatively large populations

Sampling "accidents" can lead to substantial misrepresentation
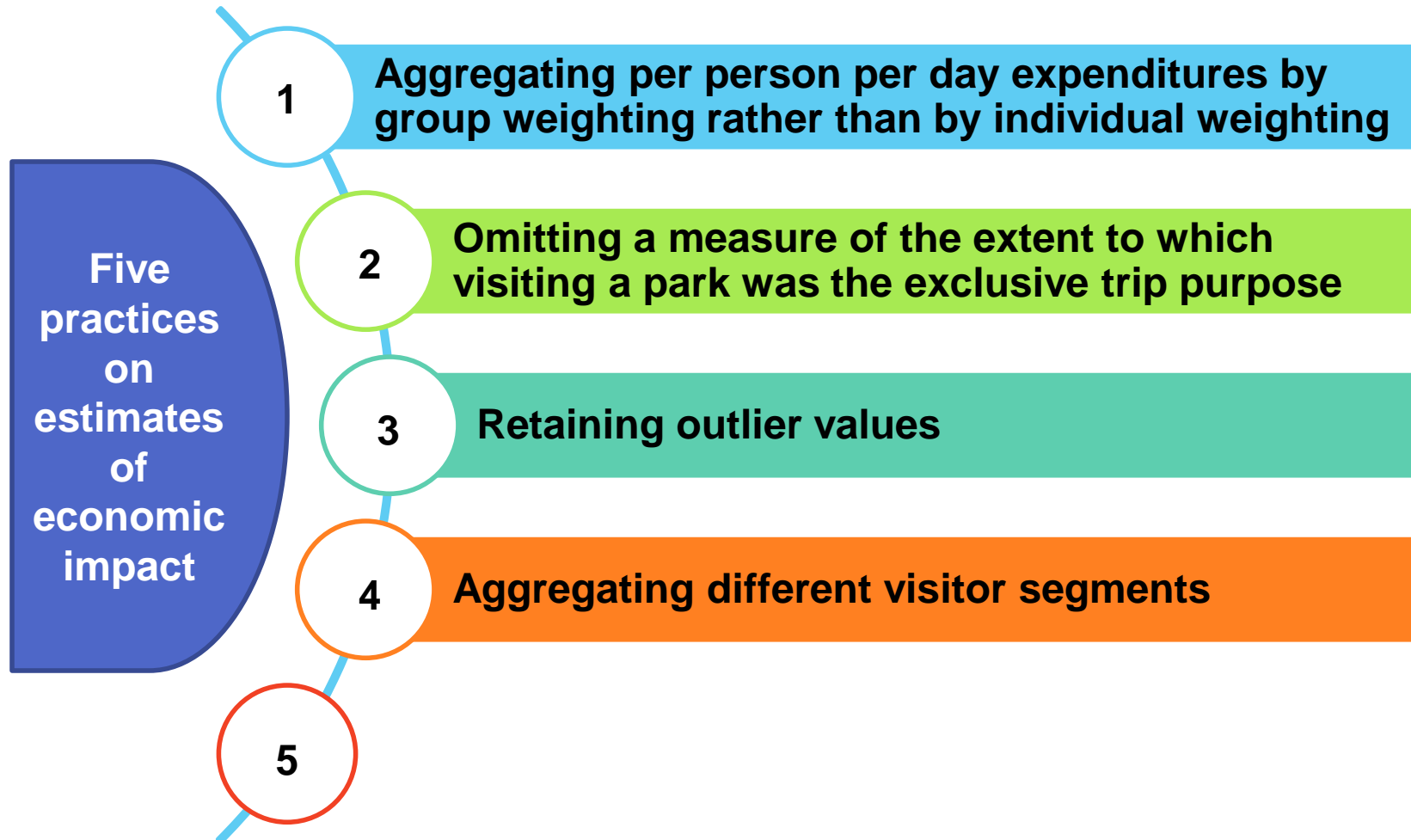
Extreme values should be omitted

Remove the top 1% and bottom 1% of expenditure estimates from the samples

Omitting 2% of the samples resulted in removal of the potential for substantially inflated estimates

Park Name	Omitted Outliers				Not Omitted Outliers				% by which analyses that did not omit outliers exceeded analyses that omitted outliers
	Sample size (N)	Visitor days	Per person per day expenditure	Annual expenditure	Sample size (N)	Visitor days	Per person per day expenditure	Annual expenditure	
Daingerfield	128	689	$8.88	$89,981	130	697	$9.56	$96,947	8%
Dinosaur Valley	425	1,409	$13.55	$1,234,921	433	1,425	$14.50	$1,321,144	7%
Enchanted Rock	947	3,198	$26.97	$6,074,482	967	3,245	$31.40	$7,071,108	16%
Garner	196	932	$57.04	$8,962,871	200	950	$61.20	$9,616,730	7%
Goliad	304	1,081	$13.62	$374,080	310	1,093	$15.19	$417,252	12%
Lake Corpus Christi	80	353	$31.95	$888,716	82	361	$35.14	$977,519	10%
Lake Ray Roberts	223	558	$19.09	$8,853,643	227	564	$90.95	$42,183,987	376%
Pedernales Falls	133	380	$23.85	$2,273,979	135	382	$142.23	$13,561,087	496%
Tyler	121	439	$59.02	$2,457,028	123	441	$60.45	$2,516,685	2%

Table 5. Analyses from Data Omitted Outliers or Not Omitted Outliers for Day Visitors

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4. Aggregating Different Visitor Segments

- Per person per day expenditures by overnight visitors were smaller than those of day visitors.

Table 6. Average Expenditures by Day Visitors and Overnight Visitors			
Park Name	Day Visitors	Overnight Visitors	% by which overnight visitors exceed day visitors
	Per person per day expenditure	Per person per day expenditure	
Daingerfield	$13.66	$15.43	13%
Dinosaur Valley	$14.86	$10.35	-30%
Enchanted Rock	$33.33	$16.59	-50%
Garner	$59.23	$22.00	-63%
Goliad	$15.54	$13.42	-14%
Lake Corpus Christi	$39.55	$16.95	-57%
Lake Ray Roberts	$22.88	$16.13	-30%
Pedernales Falls	$30.78	$15.03	-51%
Tyler	$81.27	$17.32	-79%

Day and overnight visitors have different expenditure patterns

**Overnight groups remained in the parks
for a longer period of time**

**This translates into more visitor days,
which results in economies of scale.**

**Per person per day expenditures by overnight visitors
were smaller than those of day visitors**

The visitor expenditures at 8 of the parks were lower, when the two segments were aggregated.

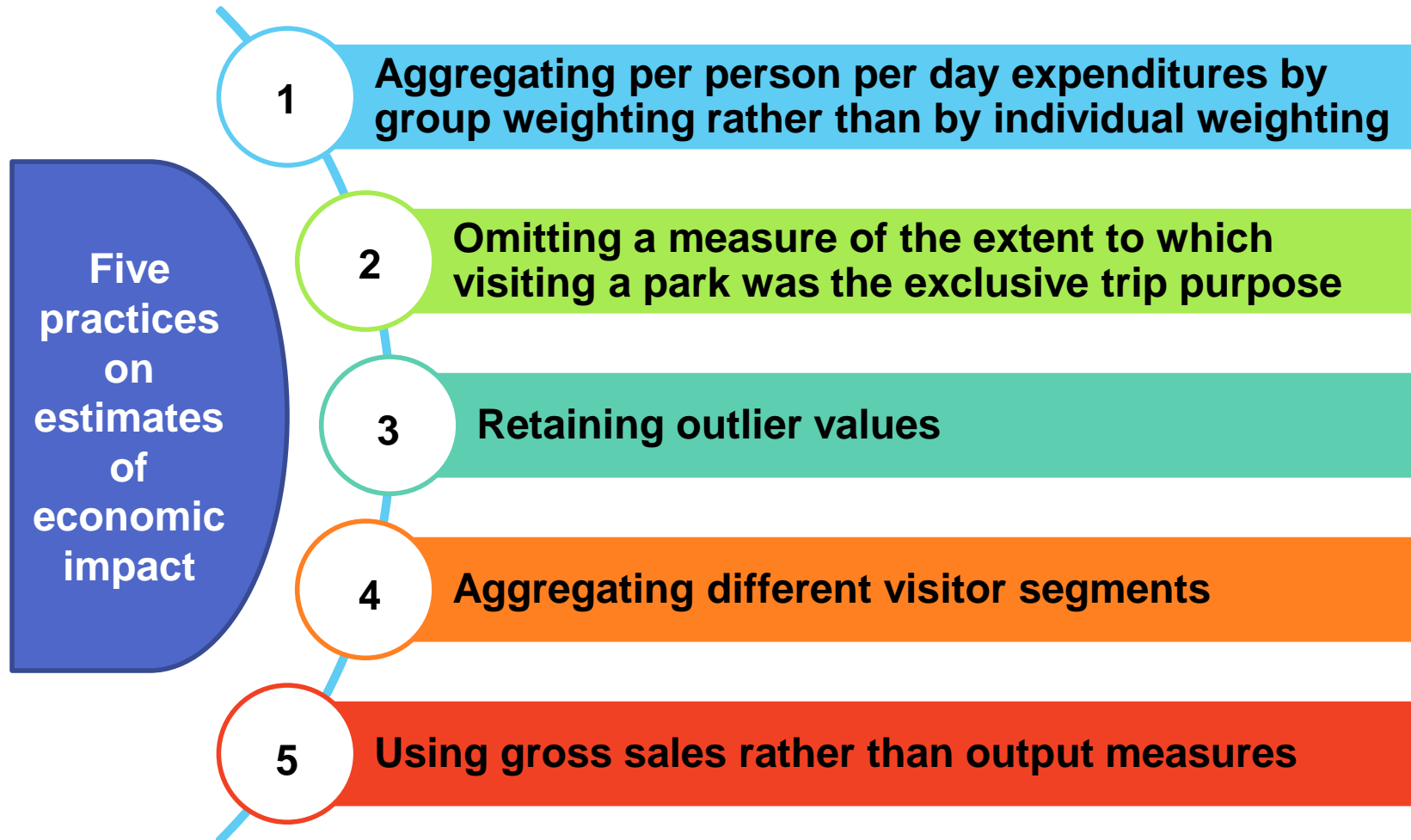| Table 7. Estimated Annual Expenditure of Visitors at Nine State Parks using Aggregated and Disaggregated Approaches			
Park Name	Disaggregated approach	Aggregated approach	% difference
Daingerfield	$332,750	$352,088	5.8%
Dinosaur Valley	$1,434,940	$1,360,772	-5.2%
Enchanted Rock	$6,215,438	$1,700,990	-72.6%
Garner	$13,339,963	$7,959,952	-40.3%
Goliad	$593,784	$587,634	-1.0%
Lake Corpus Christi	$1,344,096	$897,188	-33.2%
Lake Ray Roberts	$11,811,373	$9,354,029	-20.8%
Pedernales Falls	$2,954,198	$2,007,061	-32.1%
Tyler	$3,486,834	$1,665,341	-52.2%

The aggregation approach assumes the sample ratios reflect those of the population

Table 8. Ratios of Day and Overnight Visitors in the Samples and Populations at Nine Parks				
Park Name	Samples		Populations	
	Day visitors	Overnight visitors	Day visitors	Overnight visitors
Daingerfield	40.0%	60.0%	34.2%	65.8%
Dinosaur Valley	83.0%	17.0%	80.1%	19.9%
Enchanted Rock	64.7%	35.3%	91.1%	8.9%
Garner	15.0%	85.0%	39.5%	60.5%
Goliad	70.0%	30.0%	61.8%	38.2%
Lake Corpus Christi	20.3%	79.7%	43.1%	56.9%
Lake Ray Roberts	32.4%	67.6%	66.7%	33.3%
Pedernales Falls	22.6%	77.4%	63.5%	36.5%
Tyler	28.8%	71.2%	37.2%	62.8%

we cannot use the aggregate approach

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5. Using Gross Sales Rather than Output Measures

• The gross sales measure reports the effect of visitor spending on total economic activity.

• The output measure includes all sales in the service sector, but for wholesale and retail sales it includes only *gross margin* not gross sales.

Gross sales

Output

Value- added

Labor

Income
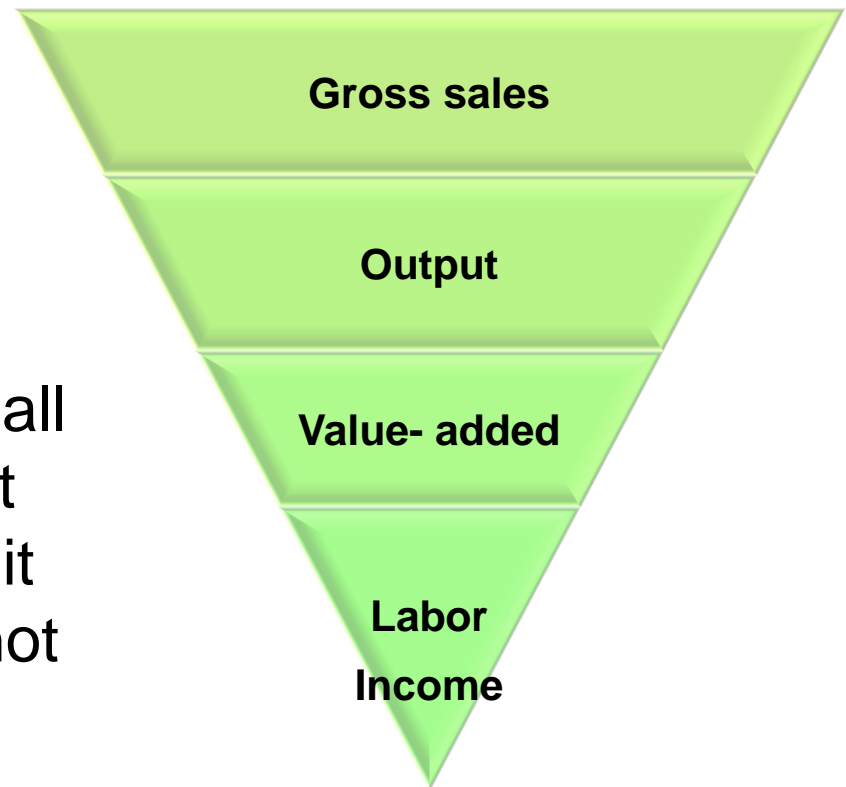
The output measure will always be smaller

Table 9. Measures of Economic Impact on the Host Counties of Nine Texas State Parks				
Park Name	Expenditures of visitors	Gross Sales	Output	% by which impact on gross sales exceed output
Daingerfield (N=382)	$332,753	$404,326	$166,079	143%
Dinosaur Valley (N=506)	$1,434,940	$1,763,378	$948,435	86%
Enchanted Rock (N=1,186)	$6,219,275	$8,297,416	$5,818,234	43%
Garner (N=1,286)	$13,339,963	$18,405,310	$9,730,725	89%
Goliad (N=444)	$593,784	$717,403	$425,180	69%
Lake Corpus Christi (N=390)	$1,344,096	$1,670,020	$775,411	115%
Lake Ray Roberts (N=499)	$11,811,373	$15,979,412	$7,062,781	126%
Pedernales Falls (N=494)	$2,954,196	$3,870,880	$1,926,812	101%
Tyler (N=447)	$3,486,834	$5,066,769	$2,480,398	104%

Concluding Comments

- Economic impact studies should be regarded as suggestive of the impacts of an attraction, rather than as being definitively accurate.

- In our view, the increasing skepticism with which economic impact studies are viewed can only be rebutted by avoidance of the mischievous practices described by Crompton (2006) and by embracing methodological transparency relating to the issues addressed in this paper.

- It is our hope this paper will stimulate others to address these issues.

Question?