

# The LRGV Active Plan Economic Study Technical Report

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*Photos courtesy Rails to Trails Conservancy — Mark Lehmann*

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## Study Supporters

Cities of Brownsville, Harlingen, Los Fresnos, Rancho Viejo, Rio Hondo, San Benito, and South Padre Island, Texas • Brownsville Community Improvement Corporation • Brownsville Economic Development Corporation • Friends of Laguna Atascosa Harlingen Wellness Coalition • National Parks Conservation Association • Palo Alto National Historical Park/Western National Parks Association • University of Texas Rio Grande Valley School of Medicine • University of Texas Rio Grande Valley Office of Research, Innovation and Economic Development • University of Texas School of Public Health Brownsville Regional Campus

## **Executive Summary**

In November 2016, ten Cameron County municipalities officially signed and adopted the *Lower Rio Grande Valley Active Transportation and Tourism Plan* (or “Active Plan”), an integrated plan for promoting active transportation and active tourism throughout the county, prepared by Halff Associates, Inc.

The plan proposes, in part, an integrated network of multi-use trails, on-road bicycle routes, and paddling trails. (See overview map of the Lower Rio Grande Valley [LRGV] active transportation network on the next page.) This economic study examines economic impacts and health care cost savings of a large share of this trail system.

Specifically, the study includes 291 miles of trails and routes:

- 1) The proposed U.S. Bicycle Route #55 — a network of 120 miles of designated bicycle routes following existing streets and highways;
- 2) The LRGV paddling trail system — 78 miles of paddling trail that includes the existing eight-mile South Bay Paddling Trail; and
- 3) The LRGV Multi-use “Legacy” Trail Network — 93 miles of dedicated trails for walking and bicycling that includes 18 miles of existing trail.

Economic impacts of construction, and out-of-town visitor spending, are estimated for all three categories of trails and routes identified above. In addition, health care cost savings due to increased physical activity are estimated for the proposed multi-use trails included in the study.

### **Key Findings**

- Construction costs for 263 miles of new bicycle route, paddling trail, and multi-use trail are estimated at \$113.3 million. During the course of construction, this investment will support an estimated 1,377 full-time jobs, \$44.3 million wages, and \$173 million in total economic impact within Cameron County.
- The completed system of trails and routes will attract more than 3 million walkers, hikers, bicyclists, and paddlers annually.
- Visitors from outside Cameron County will spend an estimated \$69.7 million per year related to use of the completed system. Each year, that visitor spending would support 958 full-time jobs in Cameron County, \$29.6 million in wages, and \$100.2

million in total economic impact within the county. Out-of-county visitor spending would put \$8.4 million tax revenues in local and state government coffers, and yield \$7.6 million in federal taxes.

- Annual health care cost savings from increased physical activity on new multi-use (walking and bicycling) trails is estimated at \$6 to \$12.5 million.



Map courtesy Half Associates, Inc.



## **Benefits of Partial Completion of the Trail Network**

Trail usage, and accompanying economic benefits, are expected to increase as parts of the trail and route network are completed.

For example, the Active Plan identifies six high-priority “catalyst projects” that comprise 57.5 miles of multi-use trails and on-road bicycle routes, and 18 miles of paddling trail.<sup>1</sup> These are strategically chosen to connect existing trails and recreation resources throughout the county. Completing these six high-priority segments would:

- Generate an estimated \$39.7 million in spending by visitors from outside Cameron County;
- Support 556 full-time jobs in Cameron County, \$16.9 million in wages, and \$57.5 million in total economic impact within the county; and
- Put \$4.8 million tax revenues in local and state government coffers, and yield \$4.3 million in federal taxes.

Finally, studies of other trail networks suggest that associated economic benefits should increase over time as the system becomes better known locally and among visitors and potential visitors, and as active outdoor recreation becomes increasingly popular.

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<sup>1</sup> Proposed “catalyst project” trail segments from the *Active Plan* included in this analysis: Arroyo-Resaca, Bahia Grande, Battlefield, and South Padre Island multi-use trails; Laguna Madre bicycle route segment; and Arroyo Colorado paddling trail.

## Economic Impact Analysis Methods

Impact studies typically utilize input-output modeling to connect industry sectors with each other and with outside demands, yielding estimates of the economic impact of spending. In the case of tourism-related facilities and activities like the proposed Active Plan trail system, these models estimate the impact of expenditures in several broad categories including capital investments and visitor spending.<sup>2</sup>

Most, though not all, of these expenditures will be made locally. The intent of this study is to quantify the expenditures made in each of the above categories for six new segments of the proposed Active Plan trail network, and to estimate the additional economic impacts of that spending within Cameron County

Economic impact studies measure both direct and secondary economic impacts. The direct impacts include the “first round” of expenditures made in trail construction, or by trail visitors. Secondary impacts are additional expenditures that result when the initial direct expenditures, taken in as sales receipts, wages, or payments for services, are then “re-spent” in the local economy.

In the case of the Active Plan, an economic impact is created when local, state, or federal government agencies or other organizations spend money to construct trails, and when trail users spend money for food and drinks, transportation, recreation, retail and lodging; the initial money spent is re-spent one or more times in the local economy, creating additional economic impact, also called the multiplier effect. Multipliers are related to three kinds of effects:

1. **Direct effects** are changes in the local economy caused by some economic change in the area. Examples include new trail construction, a new business, or tourist spending, all of which cause a change in the overall level of economic activity in the area.
2. **Indirect effects** are the changes in inter-industry purchases as they respond to the new demands of the directly affected industries. An example would be a

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<sup>2</sup> Facilities operation and maintenance is another common category of expenditure, which was not incorporated into this Phase 1 analysis, because annual maintenance costs, which typically average \$500-\$1,000 per multi-use trail mile without factoring in volunteer effort—and less for on-street bicycle routes—are expected to be relatively insignificant compared to other factors considered in this analysis.

restaurant or shop buying food or goods it sells from a wholesaler or manufacturer. This and the subsequent rounds of purchases are classified as indirect effects.

3. **Induced effects** reflect changes in inter-industry spending resulting from household spending. This spending comes from household income generated from the direct and indirect effects, for example of trail construction or visitor spending.

In performing an economic impact analysis, it is important to start with a focus on “new” dollars, or dollars that originated outside the study area, and which are spent locally because of the presence of the site being analyzed—in this case, the Active Plan trails and routes. The importance of this focus can be illustrated by looking at visitor spending. In this study, only out-of-town visitor expenditures are counted and spending by local visitors is excluded. Out-of-town visitor expenditures are clearly “new” dollars, which would not have been spent locally otherwise.

Some studies argue that the mere presence of an attraction such as a trail system has the effect of encouraging local visitor expenditures that might otherwise be spent in a similar destination outside the study area, and thus include local visitor expenditures in their impact analyses. There is, however, no guarantee that these visitors would have visited a similar attraction in another area, if the local attraction did not exist. Though an analysis could be made to identify locals’ propensity to visit a recreational site elsewhere, in the absence of such information we employ a more conservative estimate and look solely at the expenditures of out-of-area visitors.

The ratio of total impact to direct spending is often referred to as the multiplier and can be expressed in terms of dollars and jobs. This multiplier is applied to estimate the secondary impacts, as money spent locally recirculates in the local economy. Applying the multiplier, then, estimates the resulting effects or the changes in spending at the consumer level that result from the increases in expenditures related to the project or entity being analyzed.

Total secondary impacts<sup>3</sup> are calculated for each one of the direct economic impacts using the IMPLAN input/output economic modeling system. (IMPLAN stands for Impact Analysis for Planning.) The model utilizes benchmark tables provided by the Bureau of

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<sup>3</sup> Secondary impacts include both indirect and induced impacts, as described above.

Economic Analysis as well as other statistical data to model transactions occurring within a specific geographic area. IMPLAN is, in a sense, a general accounting system of the economic transactions taking place between industries, businesses, and consumers in an economy. It estimates the impacts on employment, value added, and total output for the local economy. By expanding its analysis to include the secondary effects as dollars spent locally recirculate in the local economy, IMPLAN provides an in-depth picture of the economic effects of transactions.

In addition, IMPLAN estimates local, state, and federal tax revenues from this business activity, across a range of types of taxes including social insurance taxes, sales and property taxes, personal and business income taxes, and other categories such as motor vehicle and hunting and fishing fees.

## Trail Construction Cost Estimates

Detailed project cost estimates provided by the Active Plan consulting team led by Half Associates, Inc. were used to estimate the future economic impact of construction of the six Active Plan catalyst project trail segments. An average of the low and high construction cost estimates for each trail segment was used in the impact analysis for the six catalyst projects described on page 5.

<b>Construction Cost by Trail Segment for Catalyst Projects</b>				
Trail Segment	Low Range Construction Cost	High Range Construction Cost	Average Construction Cost	Trail Length Miles
Arroyo-Resaca Segment	\$7,200,000	\$9,200,000	\$8,200,000	7.2
Bahia Grande Segment	\$11,400,000	\$15,500,000	\$13,450,000	21.5
Battlefield Extension Segment	\$4,300,000	\$5,300,000	\$4,800,000	4.2
South Padre Island Segment	\$4,700,000	\$5,900,000	\$5,300,000	4.2
Arroyo Colorado Segment	\$500,000	\$730,000	\$615,000	20.4
Laguna Madre Segment	\$3,900,000	\$4,100,000	\$4,000,000	18

Source: *Lower Rio Grande Valley Active Transportation and Tourism Plan*, Half Associates, Inc., September 2016.

Construction costs for the remaining trail and route segments included in this impact analysis were estimated as described in the table below.

<b>Construction Costs by Trail or Route Type</b>				
<b>Trail or Route Type</b>	<b>Construction cost per mile</b>	<b>Total construction cost</b>	<b>Trail Length Miles</b>	<b>Miles of New Trail</b>
<b>LRGV Multi-Use Trail Network</b> Employed the average construction cost for the four multi-use trail catalyst projects: Arroyo Resaca, Bahia Grande, Battlefield, and South Padre Island.	\$855,795	\$9,200,000	93	75
<b>United States Bicycle Route (USBR) - shoulder widening required (estimated 25% of 120 total route miles)</b> Used average cost estimates from the Active Plan, p. 3-17.	\$820,000	\$24,600,000	30	30
<b>United States Bicycle Route (USBR) - no shoulder widening required (estimated 75% of 120 total route miles)</b> Used average cost estimates from the Active Plan, p. 3-17.	\$250,000	\$22,500,000	90	90
<b>LRGV Paddling Trail System</b> Employed the estimated cost per mile for the Arroyo Colorado catalyst project segment.	\$30,147	\$2,050,000	78	68



For purposes of this analysis, construction for each trail segment was estimated to take 12 months, meaning that the jobs, wages, and total economic impacts supported would be of one-year duration. Construction of the six high-priority catalyst project trail segments was all attributed to 2018, while it was assumed that construction of the remainder of the trails and routes included in this analysis would be complete by 2028. While this is almost certainly not how construction will proceed, this approach allowed a consistent way to estimate impacts.

## Trail Use and Visitor Spending Estimates

Out-of-town visitor trail use and spending was estimated using information from a variety of sources, including visitor-use and economic impact studies of other multi-use, bicycle, and paddling trails and networks; trail use data for the Battlefield Historical Trail in Brownsville; and anecdotal information from area public-lands and trail managers. (See Appendix A for relevant data, calculations, and study references.)

<b>Multi-Use Trail Study</b>	<b>Study Used to Estimate</b>	
	<b>Trail Use</b>	<b>User Spending</b>
Brownsville Historic Battlefield Trail (trail counter data only)	X	
Central Ohio trails		X
Erie Canal Trail, New York		X
Great Allegheny Passage, Maryland & Pennsylvania		X
Heritage Trail, Pennsylvania	X	X
Northern Central Railroad Trail, Maryland	X	
New River Trail		X
Orange County trails, Florida	X	X
Outer Banks, North Carolina	X	
Silver Comet Trail, Georgia	X	X
Virginia Creeper Trail, Virginia		X
Outdoor Foundation West South Central Region trail user and bicyclist spending profile		X
<b>Paddling Trail Study</b>	<b>Study Used to Estimate</b>	
	<b>Trail Use</b>	<b>User Spending</b>
Huron River Water Trail, Michigan	X	
Kickapoo Water Trail, Wisconsin	X	X
Lake Superior Water Trail, Minnesota	X	X
Northern Forest Canoe Trail, New York, Vermont, Quebec, New Hampshire, and Maine	X	X
Roanoke Water Trail, North Carolina	X	X

Annual visitor spending estimates were broken down into expenditure categories (e.g., transportation, lodging, meals, etc.) using categories and proportions from the West South Central region spending profiles found in *The Economic Contribution of Active Outdoor Recreation—Technical Report on Methods and Findings*, produced by Southwick Associates for the Outdoor Industry Foundation, 2006. (See Appendix A for detail.)

### **Growth in trail use and visitor spending: 2019-2029**

In the first ten years following construction of the six high-priority catalyst project trail and route segments, overall trail use (local and non-local) is expected to grow from 976,000 to 1.7 million. Over that same time, non-local visitor spending is expected to grow from \$22.6 million to \$39.7 million.

### **Growth in trail use and visitor spending: 2029-2039**

In the ten years following completion of the 291 miles of paddling and multi-use trails and on-road bicycle routes, overall trail use (local and non-local) is expected to grow from 1.7 million to 3 million. Over that same time, non-local visitor spending is expected to grow from \$39.7 million to \$69.7 million.

## **Economic Impact Projections**

Impacts were estimated for the entire 291-mile network of trails and routes, as well as for the subset of high-priority “catalyst projects” described above.

### **Construction impacts for a subset of six catalyst projects**

The Active Plan identifies six high-priority “catalyst projects” that are a subset of the total network, comprising 57.5 miles of multi-use trails and on-road bicycle routes, and 18 miles of paddling trail.<sup>4</sup> These are strategically chosen to connect existing trails and

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<sup>4</sup> Proposed “catalyst project” trail segments from the *Active Plan* included in this analysis: Arroyo-Resaca, Bahia Grande, Battlefield, and South Padre Island multi-use trails; Laguna Madre bicycle route segment; and Arroyo Colorado paddling trail.

recreation resources throughout the county. Construction of these six high-priority segments is estimated to cost \$36.4 million, which would support 453 jobs, \$14.3 million in wages, and \$55.7 million in total economic impact. Construction would generate \$2.1 million in local and state tax revenues and \$3.2 million in federal taxes.

### **Construction impacts for the entire network of trails and routes**

Construction costs are estimated at \$113.3 million for the 263 miles of new trails and routes needed to complete the 291-mile network included in this analysis. This investment will support an estimated 1,377 full-time jobs in Cameron County, and \$44.3 million in labor income. The total economic impact will be \$173 million, generating \$6.7 million in local and state taxes and \$9.8 million in federal taxes. (See Appendix B for estimated construction costs and construction spending impacts for each of the six catalyst projects and Appendix C for the total construction impacts for each of the three trail and route types included in the LRGV regional active transportation network.)

Each dollar invested in trail construction will be more than offset by the economic impact of construction alone. Each dollar of construction investment is project to yield \$1.53 in economic activity within Cameron County.

### **Impacts of out-of-county visitor spending for the subset of six catalyst projects**

By the tenth year following construction of the six catalyst projects, 1.7 million users are expected on these trails and routes. Annual non-local visitor spending associated with trail use is projected to support 453 full-time Cameron County jobs and \$14.3 million in labor income. The total annual economic impact is estimated to be \$55.7 million, generating \$2.1 million in local and state taxes, and \$3.2 million in federal taxes.

In the first ten years, out-of-town visitors are projected to spend nearly \$367 million in Cameron County associated with using these trails. Their annual economic impact is expected to increase by 75 percent during that time from \$33 million in the first year to \$57 million in the tenth year.

Trail usage, and accompanying economic benefits, are expected to increase as other parts of the trail and route network are completed.

## **Impacts of out-of-county visitor spending for the entire network of trails and routes**

By the tenth year following completion of the entire 291-mile network of multi-use and paddling trails and on-road bicycle routes, 3 million users are expected on these trails and routes.

Visitors from outside Cameron County will spend an estimated \$69.7 million per year related to use of the completed system. Each year, that visitor spending would support 958 full-time jobs in Cameron County, \$29.6 million in wages, and \$100.2 million in total economic impact within the county. Out-of-county visitor spending would put \$8.4 million tax revenues in local and state government coffers, and yield \$7.6 million in federal taxes.

In the ten years following completion of the entire network, out-of-town visitors are projected to spend nearly \$877 million in Cameron County associated with using these trails. Their annual economic impact is expected to increase by more than 50 percent during that ten years.

## **Health Care Cost Savings Estimates**

Health care cost savings related to increased physical activity were projected as a further measure of the potential impact of the proposed Active Plan trail network on the Cameron County economy. (See Appendix D for additional detail about this analysis.)

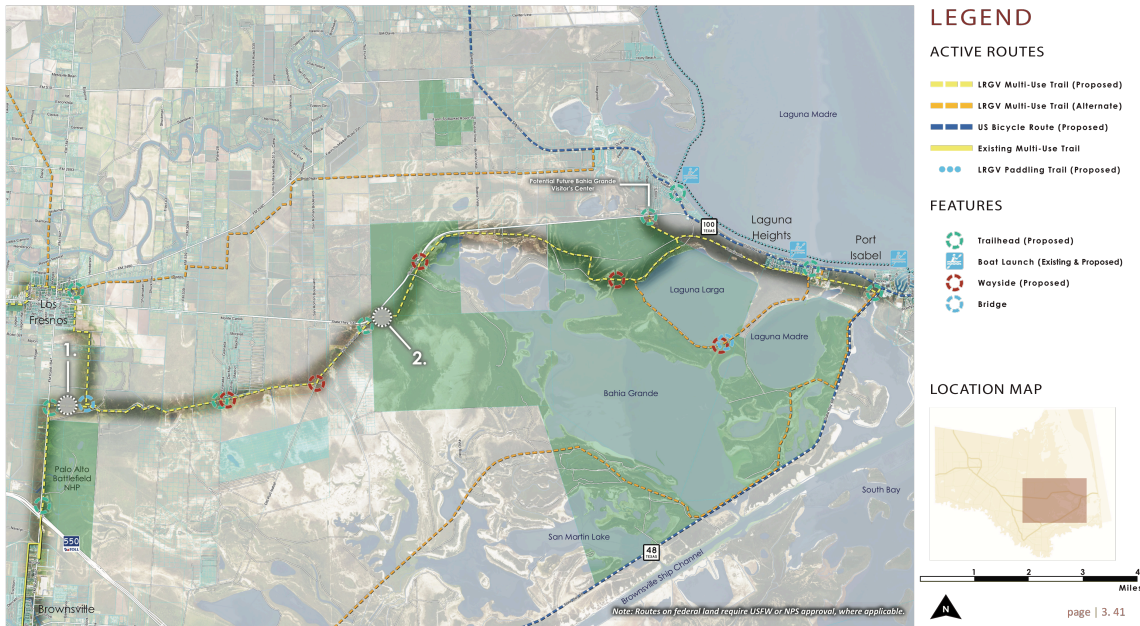
The effect of proximity to trails on physical activity was estimated using physical activity data collected selected Brownsville residents by the Tu Salud ¡Si Cuenta! study (University of Texas School of Public Health). This analysis revealed that, in Brownsville, people who live within ¼ mile of a multi-use trail get 22 percent more moderate physical activity than those who do not.

Using estimates of annual per-capita health care costs resulting from physical inactivity (\$228 to \$476.15), a 22 percent increase in physical activity for Cameron County residents living near the proposed Active Plan multi-use trail network, would result in annual health care cost savings ranging from \$5,890,238 to \$12,300,688.



# Case Study: Bahia Grande Multi-Use Trail

The proposed Bahia Grande segment of the Active Plan Multi-use Trail System connects Palo Alto Battlefield National Historical Park with the Bahia Grande Unit of the Laguna Atascosa National Wildlife Refuge. The proposed trail route also links the cities of Port Isabel, Laguna Heights, and Laguna Vista, and provides an important transportation connection to Port Isabel High School. Through an extension of the city of Brownsville's existing Historic Battlefield Trail, the Bahia Grande route also connects those bay-side communities to Brownsville and Los Fresnos.



Map courtesy Half Associates, Inc.

## Benefits and Opportunities of Connecting these Key Public Lands

Laguna Atascosa National Wildlife Refuge and Palo Alto Battlefield National Historical Park are significant public lands in Cameron County and the larger Lower Rio Grande

Valley area. Together, they protect more than 98,000 acres, and are responsible for maintaining historical sites from the Mexican-American War and Civil War, and wildlife habitat for threatened, endangered, migratory, and seasonal species, including over 415 bird species.

The refuge and the park welcome more than 220,000 visitors annually, and provide educational and interpretive programming for more than 12,000 students and adults. They maintain facilities such as trails, visitor centers, interpretive displays, and boat launches.

The proposed trail would establish a recreational linkage between these important historical and natural sites, and through the Bahia Grande unit of the refuge, which currently is not open to regular visitation.

Palo Alto Battlefield has benefited from increased visitation due to the existing City of Brownsville Historic Battlefield Trail, which connects downtown Brownsville with the park. Prior to installation of trail counters, observations by park staff suggested that the park receives about 100 additional visitors per week from trail usage, increasing annual park visitation by roughly ten percent of the park's annual visitation. Installation of trail counters in 2017 suggest that park visitation continues to grow, up an estimated 42 percent in 2017 alone.

Extending the trail would increase park visitation further simply by making the park accessible by trail from the north (Los Fresnos) and east (Port Isabel and other bay-side communities). In addition, a longer trail that connects to other communities and recreational sites would attract more users overall.

In 2015, approximately 25,000 refuge visitors hiked or bicycled along the refuge's trails. The trail through the Bahia Grande unit could work hand-in-hand with a proposed Bahia Grande visitor center not only to boost visitation to the refuge by creating access to this largely unvisited unit, but also to make more people aware of the recreational opportunities found on other parts of the refuge. The proposed visitor center—a partnership between the US Fish and Wildlife Service, Cameron County, and the City of Laguna Vista—would see more traffic if it were connected with this trail.

The trail would also encourage a flow of active tourists and recreating locals between the bay-side and inland communities within Cameron County, and familiarize many more people with Palo Alto and Laguna Atascosa who otherwise may not have found their way to either site.

### **Building a Constituency for Public Lands and Conservation**

The Bahia Grande trail would pass through open terrain, and planting shade trees to protect users from the heat and sun would not be feasible along much of the route. Wayside shelters placed at intervals along the route could also provide opportunities for installing educational and interpretive signage, stops for self-guided cell phone tours, and other means of helping people learn about the landscape through which they are passing.

In addition to the park and the refuge, the proposed trail route passes through undeveloped private lands, offering good opportunities to see threatened and endangered bird species and other wildlife that most potential users would not otherwise be likely to see. Collaborative programming such as guided bicycle tours or bird watching hikes along the Bahia Grande trail could start in the park or the refuge, and highlight the benefits of conserving land and creating greenways.

The trail could expanded opportunities for the Friends of Laguna Atascosa, National Parks Conservation Association, the Palo Alto Battlefield friends group, and other organizations to reach new potential supporters for the park and refuge. Organized trail and bicycle groups such as 2Run Crew would have extended possibilities for races and running events that could also highlight the refuge and the park.

### **Engaging Local Residents**

Staff at Palo Alto Battlefield have noted a long-standing challenge with attracting local residents to the park. Visitation statistics bear this out. In 2015, the official NPS estimates showed that only 16 percent of Palo Alto's visitors were local. Park staff believe this is an underestimate, and that about 40 percent of its visitors are local, including school groups supported by park-generated grant funding. At Laguna Atascosa, just over half of park visitors are local, likely due to the tremendous popularity of Adolph Thomae County Park with area residents. Outside the county park, non-hunting recreation visits to the refuge are probably comprised of mostly non-local visitors.

Park staff have noted the common complaint that "there is nothing to do" at Palo Alto. Building on the growing success of local efforts to use trails to increase physical activity and community engagement among residents, the park and refuge could use the trail extension to reach out to new kinds of visitors and innovative types of programming and experiences to connect with local residents. For example, at a recent Monarch butterfly summit in the region, one of the main concerns was lack of host habitat in this part of the

state. The trail would offer several miles of potential butterfly garden habitat to grow milkweed, seeded by groups of school children and adult trail users.

### **Transportation Connections and Local Usage**

Because the Bahia Grande trail would also connect several Cameron County communities—and could create a safe bicycle route to Port Isabel High School from nearby bay-side communities—it would likely attract both transportation and recreational usage from locals.

Studies show that new trails typically attract a significant share of new exercisers, increasing physical activity among local residents. In one study, 23 percent of users of a new 12-mile trail were new exercisers.

The health care cost savings analysis associated with this economic impact study found that construction of 57 miles of new multi-use trail would yield \$5.9 million to \$12.3 million in health care cost savings annually for Cameron County. Assuming these cost savings are relatively equal for different trail segments, the 25.7 miles of the Bahia Grande connector trail and the related Battlefield Connector trail to Los Fresnos would yield \$2.7 million to \$5.5 million in health care cost savings per year.

### **Economic Impacts of Trail Construction and Usage**

The Active Plan estimates the average construction cost for the 21.5-mile Bahia Grande connector trail at \$13.5 million. During the course of construction, this investment will support an estimated 167 full-time jobs in Cameron County, and \$5.3 million in labor income. The total economic impact will be \$20.6 million, generating \$795,000 in local and state taxes and \$1.2 million in federal taxes.

By itself, the trail would be a draw for active tourists. The attractiveness will be enhanced because of connections with—and easy access from—communities that offer facilities, restaurants, shopping, and accommodations.

By the tenth year following trail construction, non-local visitor spending associated with the Bahia Grande trail will support 158 full-time Cameron County jobs and \$4.8 million in labor income. The total economic impact will be \$16.3 million, generating \$1.4 million in local and state taxes, and \$1.2 million in federal taxes.

### **Special Considerations for Implementing this Trail Segment**

The proposed routing through Laguna Atascosa National Wildlife Refuge would require approval as part of the USFWS refuge visitor use plan. The planning process is expected to be completed in 2018.

A related Active Plan catalyst project—the Battlefield Extension trail—would connect Los Fresnos to the Bahia Grande trail and also to Palo Alto Battlefield and Brownsville via the existing Historical Battlefield Trail. Investing \$4.8 million into construction of that 4.2-mile trail segment would support an additional 60 local jobs and \$1.9 million in labor income, with a total additional economic impact of \$7.4 million.



## Appendix A: Trail Use and Visitor Spending Estimates Data

Data from visitor-use and economic impact studies of other hike-bike, bicycle, and paddling trails and networks, combined with the small amount of local trail-use data available, and informed by anecdotal information from area public-lands and trail managers, were the basis of estimating out-of-town visitor trail use and spending. Below are the primary calculations used to generate inputs for the economic impact analysis.

### 1) Expected trail users per mile: Calculations based on data from trail studies and counters

Trail	Length in Miles	Annual Users	Users/Mile	Notes
Outer Banks NC	56	680,000	12,143	Estimated bicyclists only
Orange County FL	36	1,700,000	47,222	
Heritage Trail PA	21.5	247,000	11,488	
Northern Central Railroad MD	20	365,000	18,250	
Silver Comet	61	1,900,000	31,148	
Brownsville Battlefield	8.5	247,000	29,059	Assumes 2/3 roundtrips of 369,000 trail counter hits
		<b>Average users/mile</b>	<b>24,885</b>	

**2) Estimated annual trail users for Active Plan multi-use trails**

Average annual users/mile based on studies and data	24,885
Miles of multi-use trails	<u>93</u>
Estimated annual users for multi-use trails	2,314,305

Note: We assumed that this number of trail users would be reached after three years of trail operations for the completed network, and increase at a conservative rate of three percent per year thereafter.

**3) Proportion of non-local hike/bike trail users**

Trail	% Non-local visitors	% of non-local visitors who stay overnight	Notes
Great Allegheny Passage	40%	40%	Percent non-local visitors estimated from total percent of overnight visitors
Erie Canal Trail	18%		
Silver Comet Trail	21%	3%	
Orange County FL trails	40%	40%	Percent non-local visitors estimated from total percent of overnight visitors
New River Trail	41%		
Virginia Creeper Trail	72%		
Average	39%		
Average without Virginia Creeper Trail	32%		

We used the more conservative 32 percent average of non-local trail users (disregarding the Virginia Creeper Trail, which attracts an unusually high proportion of out-of-town users), and reduced it further to an even more conservative estimate. The impact

analysis was conducted using a 28 percent out-of-town user estimate, with 40 percent of these logging an overnight stay in conjunction with trail use.

#### 4) Average daily hike/bike trail user spending

<b>Trail</b>	<b>Local visitor spending per day</b>	<b>Non-local day visitor spending</b>	<b>Non-local overnight visitor spending</b>
Great Allegheny Passage	\$13.00	\$13.00	\$98.00
Erie Canal Trail	\$26.00	\$26.00	\$265.00
Heritage Rail Trail	\$8.33	\$8.33	
Outdoor Foundation West South Central Region (weighted average 20% trail spending profile, 80% bicycle spending profile; \$254 overnight expenditures per trip reported, assumed 2-day trip length to estimate daily overnight visitor spending)		\$66.00	\$127.00
<b>Average daily spending</b>	<b>\$15.78</b>	<b>\$28.33</b>	<b>\$163.33</b>

While local expenditures associated with trail use were calculated, and their economic effects estimated as part of this analysis, these are not reported as part of the anticipated economic impact of these trails, for reasons noted on pp. 2-3 of this report.

**5) Expected paddle trail users per mile**

<b>Trail</b>	<b>Length in Miles</b>	<b>Annual Users</b>	<b>Users/Mile</b>
Kickapoo Water Trail	22	16,000	727
Northern Forest Canoe Trail	740	90,000	122
Lake Superior Water Trail	43	3,078	72
Roanoke Water Trail	75	2,220	30
Huron River Water Trail	104	103,006	990
		<b>Average users/mile</b>	<b>388</b>

**6) Estimated annual trail users for Active Plan paddling trail network**

Average annual users/mile based on studies and data	388
Miles of paddle trail	<u>78</u>
Estimated annual users for the paddling trail network	30,264

Note: We assumed that this number of paddling trail users would be reached after three years of trail operations, and increase at a conservative rate of three percent per year thereafter.

**7) Proportion of local/non-local paddling trail users**

Only two of the paddling trail studies used for this analysis included estimates of the proportion of non-local users. The Northern Forest Canoe Trail study estimated non-local usage at 80 percent, while the Kickapoo Water Trail study stated that “most” users

are non-local. Given the lack of data, we estimated the local/non-local split to be 50 percent local and 50 percent nonlocal.

### 8) Average daily paddling trail user spending

<b>Trail</b>	<b>Local visitor spending per day</b>	<b>Non-local day visitor spending</b>	<b>Non-local overnight visitor spending</b>
Northern Forest Canoe Trail	\$5	\$46	\$46
Kickapoo Water Trail	\$20	\$44	\$44
Outdoor Foundation West South Central Region (\$269 overnight expenditures per trip reported, assumed 2-day trip length to estimate daily overnight visitor spending)	\$98	\$98	\$135
<b>Average daily spending</b>	<b>\$41.00</b>	<b>\$62.67</b>	<b>\$75.00</b>

While local expenditures associated with trail use were calculated, and their economic effects estimated as part of this analysis, these are not reported as part of the anticipated economic impact of these trails, for reasons noted in the methods section of this report.

### 9) Estimates of non-local visitation for U.S. Bicycle Route #55

It is likely that the majority of use of U.S. Bicycle Route #55 will be by Cameron County residents. Visitor use of on-street and on-highway bicycle routes is difficult to gauge, and the background research for this analysis yielded no studies that could provide reliable comparable data to underpin estimates. Studies of bicycle tourism suggest three primary categories of road-going bicycle tourists: Self-guided, guided, and event participants.



Estimates of non-local visitor use of USBR #55 were generated for each of these three categories, as shown in the table below.

Visitor Type	Number of nonlocal visitors per year	Notes	Average spending per visitor
Self-guided bicycle tourist	18,000	750 nonlocal visitors per month, average stay of 2 days in Cameron County	\$90.57
Guided bicycle tourist	1,800	Three events at 1,000 participants each, 60% nonlocal	\$160.00
Bicycle event participant	2,400	Four local tour shops, 1,000 customers per year, 60% nonlocal	\$120.57

Note: We assumed that this number of out-of-county bicycle tourists would be reached after three years of route completion, and increase at a conservative rate of three percent per year thereafter.

**10) Breakdown of daily visitor spending into expenditure categories**

Annual visitor spending estimates were broken down into expenditure categories using categories and proportions from the West South Central region spending profiles found in *The Economic Contribution of Active Outdoor Recreation—Technical Report on Methods and Findings*, produced by Southwick Associates for the Outdoor Industry Foundation, 2006.

<b>Expenditure Type</b>	<b>Paddler Day</b>	<b>Paddler Overnight</b>	<b>Paddler Average Day &amp; Overnight</b>	<b>Bicycle &amp; Trails Day</b>	<b>Bicycle &amp; Trails Over-night</b>	<b>Bicycle &amp; Trails Avg. Day &amp; Over-night</b>
Food & drink	32%	26%	29%	33%	26%	33%
Transportation	23%	29%	26%	36%	19%	27%
Recreation, entertainment, activities	36%	17%	26%	18%	18%	18%
Souvenirs, gifts, other misc.	9%	7%	8%	13%	12%	12%
Lodging		21%	21%		25%	25%
<b>Total</b>	100%	100%	100%	100%	100%	100%

### **Data sources**

Alta Planning + Design, Econsult Solutions and Robert and Company. Silver Comet Trail Economic Impact Analysis and Planning Study. July 2013.

BBC Research and Consulting. Community and Economic Benefits of Bicycling in Michigan. Michigan Department of Transportation. June 2014.

Campos Inc. The Great Allegheny Passage Economic Impact Study (2007-2008). August 2009.

Cox, Stephen, et al. Building Connectivity Through Recreation Trails: A Closer Look at the New River Trail State Park and the Virginia Creeper Trail. Economic Development Studio at Virginia Tech. December 2011.

East Central Florida Regional Planning Council. Economic Impact Analysis of Orange County Trails. April 2011.

Lindsey, Greg, et al. The Impacts of Central Ohio Trails. Mid-Ohio Regional Planning Commission and Central Ohio Greenways and Trails Group. June 2015.

Johnson, Lindsay. Case Studies of Water Trail Impacts on Rural Communities. University of Oregon. September 2002.

Nickerson, Norma, et al. Analysis of Touring Cyclists: Impacts, Needs, and Opportunities for Montana. University of Montana. December 2013.

Pollock, Noah, et al. The Northern Forest Canoe Trail: Economic Impacts and Implications for Sustainable Community Development. University of Vermont. August 2007.

Scipione, Paul. The Economic Impact of the Erie Canalway Trail: An Assessment and User Profile of New York's Longest Multi-Use Trail. Parks & Trails New York. July 2014.

Southwick Associates, Inc. *The Economic Contribution of Active Outdoor Recreation—Technical Report on Methods and Findings*. Outdoor Industry Foundation. July 2006.

Trail Facts. Heritage Rail Trail County Park: 2001 User Survey and Economic Impact Analysis. York County Parks and Recreation. June 2002. (Also covers Northern Central Railroad trail usage.)

Washtenaw County Office of Community and Economic Development. Huron River Water Trail: Economic Impact Analysis. Huron River Watershed Council. December 2013.

Wilbur Smith Associates. Bicycle Tourism in Maine: Economic Impacts and Marketing Recommendations. Maine Department of Transportation. April 2001.

## Appendix B: Projected Economic Impacts of Trail Construction for Catalyst Project Trail Segments

<b>Arroyo-Resaca Segment--Construction Impacts, 2018</b>				
<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	64	\$1,996,602	\$2,518,069	\$8,200,000
Indirect Effect	22	\$676,220	\$1,253,466	\$2,524,018
Induced Effect	16	\$553,743	\$987,822	\$1,842,682
Total Effect	102	\$3,226,564	\$4,759,358	\$12,566,701
Total State & Local Tax				\$484,467
Total Federal Tax				\$713,591

<b>Bahia Grande Segment--Construction Impacts, 2018</b>				
<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	104	\$3,274,914	\$4,130,248	\$13,450,000
Indirect Effect	36	\$1,109,166	\$2,055,990	\$4,140,006
Induced Effect	26	\$908,273	\$1,620,270	\$3,022,448
Total Effect	167	\$5,292,353	\$7,806,507	\$20,612,454
Total State & Local Tax				\$794,646
Total Federal Tax				\$1,170,463

<b>Battlefield Extension Segment--Construction Impacts, 2018</b>				
<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	37	\$1,168,742	\$1,473,992	\$4,800,000
Indirect Effect	13	\$395,836	\$733,736	\$1,477,474
Induced Effect	9	\$324,142	\$578,237	\$1,078,643
Total Effect	60	\$1,888,721	\$2,785,965	\$7,356,117
Total State & Local Tax				\$283,590
Total Federal Tax				\$417,712

**South Padre Island Segment--Construction Impacts, 2018**

<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	41	\$1,290,486	\$1,627,533	\$5,300,000
Indirect Effect	14	\$437,069	\$810,167	\$1,631,378
Induced Effect	10	\$357,907	\$638,471	\$1,191,002
Total Effect	66	\$2,085,462	\$3,076,170	\$8,122,380
Total State & Local Tax				\$313,132
Total Federal Tax				\$461,225

**Arroyo Colorado Segment--Construction Impacts, 2018**

<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	5	\$149,745	\$188,855	\$615,000
Indirect Effect	2	\$50,717	\$94,010	\$189,301
Induced Effect	1	\$41,531	\$74,087	\$138,201
Total Effect	8	\$241,992	\$356,952	\$942,502
Total State & Local Tax				\$36,335
Total Federal Tax				\$53,520

**Laguna Madre Segment--Construction Impacts, 2018**

<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	5	\$149,745	\$188,855	\$615,000
Indirect Effect	2	\$50,717	\$94,010	\$189,301
Induced Effect	1	\$41,531	\$74,087	\$138,201
Total Effect	8	\$241,992	\$356,952	\$942,502
Total State & Local Tax				\$36,335
Total Federal Tax				\$53,520

**All Catalyst Project Segments--  
Construction Impacts, 2018**

<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	282	\$8,854,441	\$11,167,023	\$36,365,001
Indirect Effect	99	\$2,998,872	\$5,558,816	\$11,193,406
Induced Effect	72	\$2,455,713	\$4,380,751	\$8,171,846
Total Effect	453	\$14,309,026	\$21,106,590	\$55,730,253
Total State & Local Tax				\$2,148,496
Total Federal Tax				\$3,164,603

## Appendix C: Projected Economic Impacts of Trail Construction for Three Trail and Route Types

<b>LRGV Multi-Use Trail Network--Construction Impacts, 2019-2028</b>				
<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	486	\$15,546,041	\$19,606,318	\$64,184,639
Indirect Effect	170	\$5,265,220	\$9,759,800	\$19,597,754
Induced Effect	123	\$4,311,578	\$7,691,433	\$14,374,356
Total Effect	780	\$25,122,839	\$37,057,550	\$98,156,749
Total State & Local Tax				\$3,772,189
Total Federal Tax				\$5,556,200

<b>U.S. Bicycle Route #55--Construction Impacts, 2019-2028</b>				
<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	357	\$11,408,003	\$14,387,517	\$47,100,002
Indirect Effect	125	\$3,863,726	\$7,161,941	\$14,381,233
Induced Effect	91	\$3,163,924	\$5,644,131	\$10,548,197
Total Effect	572	\$18,435,654	\$27,193,589	\$72,029,432
Total State & Local Tax				\$2,768,109
Total Federal Tax				\$4,077,253

<b>LRGV Paddling Trail System--Construction Impacts, 2019-2028</b>				
<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	16	\$496,527	\$626,208	\$2,050,000
Indirect Effect	5	\$168,166	\$311,719	\$625,935
Induced Effect	4	\$137,708	\$245,657	\$459,104
Total Effect	25	\$802,401	\$1,183,585	\$3,135,039
Total State & Local Tax				\$120,480

Total Federal Tax

\$177,461

**All Trail and Route Segments--  
Construction Impacts, 2019-2028**

<b>Impact Type</b>	<b>Employment</b>	<b>Labor Income</b>	<b>Value Added</b>	<b>Output</b>
Direct Effect	859	\$27,450,570	\$34,620,043	113,334,641
Indirect Effect	300	\$9,297,113	\$17,233,460	\$34,604,922
Induced Effect	218	\$7,613,211	\$13,581,221	\$25,381,657
Total Effect	1,377	\$44,360,894	\$65,434,725	173,321,220
Total State & Local Tax				\$6,660,778
Total Federal Tax				\$9,810,914



## **Appendix D: Health Care Cost Savings Analysis Methods and Findings**

*Dr. H. Shelton Brown, University of Texas School of Public Health*

Lack of physical activity contributes to a variety of chronic and acute health problems, as well as to associated costs for health care. Estimates are that costs related to physical inactivity comprise between 2.4 and 5 percent of all health care costs annually. (Colditz 1999 and Roux et al. 2008). Access to trails has been shown to increase physical activity.

The economic benefits of the proposed trail system were estimated according to the method outlined in Wu et al. (2009). According to the Centers for Disease Control and Prevention (CDC), the 2014 per capita expenditure on health care was \$9,523 (Centers for Medicare and Medicaid Data). Adjusting Colditz et al. (1999) and Roux et al. (2008) to 2016 dollars, the contribution of physical inactivity to per capita health care costs were \$228 and \$476.15 respectively.

Current physical activity guidelines suggest 150 minutes of moderate to vigorous physical activity per week, or 75 minutes of vigorous activity per week.<sup>5</sup> If adjusted by standard metabolic equivalents (MET), then health guidelines require 600 MET-adjusted minutes of moderate activity per week. The prevalence of physical inactivity in Brownsville is low, with only about 21 percent of the population meeting physical activity guidelines (see cohort study description below).

In this analysis, we estimate health cost savings due to increased physical activity due to improved access to new multi-use trails proposed in the Active Plan. To do so, we first utilize a local cohort health study, which allows us to estimate the effect of trail access on physical activity for Brownsville residents. We then apply those estimates to the residents in proximity to the proposed new trails. Finally, we estimate the effects in terms of yearly cost savings due to increased physical activity.

### **Methods and Results**

Physical activity guidelines are binary. That is, an individual either meets them or does not. For those who do not meet these guidelines, we assumed that additional minutes of moderate-to-vigorous physical activity reduce health care costs proportionally to the proportion of the guidelines met. For example, a person walking for 200 MET-adjusted

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<sup>5</sup> See <http://health.gov/paguidelines/guidelines/adults.aspx>

minutes and engaging in no vigorous physical activity (like jogging or biking) will meet one-third of guidelines (200/600). If trail access is estimated to increase MET-adjusted moderate-to-vigorous physical activity, health care cost savings will rise proportionately to the increase in physical activity. We also assumed, conservatively, that there would be no additional health cost savings beyond meeting the physical activity guidelines, thus we excluded the proportion of the population already meeting guidelines from this analysis.

### ***Estimating Trail-Based Physical Activity in Brownsville***

In order to estimate the cost savings in health due to access new proposed trails, we applied trail-related physical activity estimates for existing trails from Tu Salud ¡Si Cuenta! (TSSC), is a cohort study in Brownsville, Texas. TSSC began in 2007 and continues to the present day. We used ArcGIS version 10.2.2 to identify the cohort participants inside and outside of the existing trail buffer, which we defined as being within one-quarter of a mile of the existing trail. This is the distance considered “walkable” in the literature (Demetsky and Lin 1982).

Some trails came into existence during the cohort study. However, we were not able to compare physical activity pre- and post-trail construction. Therefore, we simply compared average physical activity within the buffer to the average physical activity outside the buffer.

TSSC is an unbalanced cohort. In some years, a cohort member may appear twice. In those cases, we used the observation with the higher MET-adjusted moderate physical activity minutes per week. After removing missing observations, there were 159 observations within an existing trail buffer, and 2,478 observations outside of the buffers. The average MET-adjusted minutes per week was 473.68 inside of the trail buffer, and 339.46 minutes outside of the trail buffer, an increase of 134.22 for those within the trail buffer. We found that just over one in five people in TSSC (20.9%) met physical activity guidelines.

### ***Projecting Future Trail-Based Physical Activity***

We used ArcGIS version 10.2.2 to estimate the population within ¼ mile buffers around the new multi-use trails proposed in the Active Plan, using census block groups, which are the smallest geographical units with population estimates.

We included all people in block groups that geographically intersected one of the proposed trail buffers. This means that the census block group populations, which were

2014 estimates, will be larger than the populations that actually reside in the quarter mile buffer. There is no way to subdivide the population of census blocks accurately, so we accepted this analytical limitation.

In all, there were 148,644 persons in the census blocks surrounding the proposed trails. Applying the proportion of the population not meeting physical activity guidelines estimated in TSSC, we projected that there were 117,429 persons not meeting guidelines residing in the census blocks surrounding the proposed trails.

### ***Health Cost Savings***

Those living within the trail buffers are expected to have 134.22 additional MET-adjusted minutes per week. Using the proportionality assumption described above, those in the proposed trails will have 22 percent (134.22/600) more MET-adjusted minutes of physical activity per week.

Assuming the 22 percent gain is proportional in terms of health cost savings, we applied a 22 percent reduction to the estimated annual per-capita health care costs resulting from physical inactivity (\$228 to \$476.15, as noted above), resulting in annual per-capita cost savings of \$50.16 to \$104.75. Multiplying by the number of persons not meeting physical activity guidelines in these areas proximate to the proposed trails (117,429), the annual estimated health care cost savings ranges from \$5,890,238 to \$12,300,688.

### **References**

Centers for Medicare and Medicaid Services. National Health Expenditure Data. 2016.  
[http://www.cms.hhs.gov/NationalHealthExpendData/02\\_NationalHealthAccountsHistorical.asp](http://www.cms.hhs.gov/NationalHealthExpendData/02_NationalHealthAccountsHistorical.asp)

Colditz GA. Economic costs of obesity and inactivity. *Medicine and Science in Sports and Exercise*. 1999 Nov; 31(11 Suppl):S663-7.

Demetsky, M.J., Lin, B.: Bus stop location and design. *Transportation Engineering Journal of the American Society of Civil Engineers*. 108, 313–327 (1982)

Roux L, Pratt M, Tengs TO, Yore MM, Yanagawa TL, Van Den Bos J, et al. Cost effectiveness of community-based physical activity interventions. *American Journal of Preventive Medicine*. 2008;35(6):578–588.

Wu S, Cohen D, Shi Y, Pearson M, Sturm R. Economic analysis of physical activity interventions. *Am J Prev Med.* 2011;40(2):149-158.