



Colby College
Digital Commons @ Colby

CLAS: Colby Liberal Arts Symposium

May 1st, 10:00 AM - 11:00 AM

Weighing the Cost and Benefits of Ecotourism: A Quantitative Evaluation of Six Preserves around the World

Andrew Newcomb
Colby College

Tianyang Zhou
Colby College

Savannah Judge
Colby College

Follow this and additional works at: <https://digitalcommons.colby.edu/clas>

 Part of the [Environmental Sciences Commons](#)

Newcomb, Andrew; Zhou, Tianyang; and Judge, Savannah, "Weighing the Cost and Benefits of Ecotourism: A Quantitative Evaluation of Six Preserves around the World" (2014). *CLAS: Colby Liberal Arts Symposium*. 42.
<https://digitalcommons.colby.edu/clas/2014/program/42>

This Poster is brought to you for free and open access by Digital Commons @ Colby. It has been accepted for inclusion in CLAS: Colby Liberal Arts Symposium by an authorized administrator of Digital Commons @ Colby.

Weighing the Costs and Benefits of Ecotourism:

A quantitative evaluation of six preserves around the world

Savannah Judge, Andrew Newcomb, Vera Zhou

Department of
Environmental Studies,
Colby College



Abstract

Ecotourism is considered an effective way to preserve biodiversity, educate tourists, economically benefit local communities, and foster respect for different cultures. The ecotourism industry is booming, yet this growth may result in the degradation of local ecological systems while contributing little to local communities socioeconomically. We compare the negative effects of the operation on the environment and positive socioeconomic effects for local communities in three pairs of large and small parks in Canada, Chile and China. While the conservation benefits of ecotourism are important, we focus on the negative environmental impacts that may be brought by ecotourists. We predicted that relatively large ecotourism operations will have greater socioeconomic benefits for their community but greater environmental impacts. Results suggest that benefits and impacts are relatively balanced for very small and large parks, but the presence of confounding variables renders these results inconclusive.

Introduction

According to The International Ecotourism Society, ecotourism is defined as “responsible travel to natural areas that conserves the environment and improves the well-being of local people” (1990). This study focuses on the environmental impacts and socioeconomic benefits of ecotourism in three pairs of large and small national parks in Canada, Chile and China. We predict that relatively large ecotourism operations will have greater socioeconomic benefits but at greater environmental costs. The ultimate goal is to determine the “sweet spot” of annual visitation that creates socioeconomic benefits for local communities with minimal environmental impacts.

Methods

- Rationale for case selections:**
Three case study pairs cover a large geographic range
Individual pairs control for area and climate
- Independent variable:**
Average number of annual visitors, used to represent the level of ecotourism. Visitors provide revenue but also pose environmental threats.
- Dependent variables:**
 - Environmental impacts:*
 - Total length of roads (km)
 - Number of buildings
 - Area of tourist-caused fire damage (2013)
 - Percent of species present that are endangered
 - Socioeconomic benefits:*
 - Number of hotels and restaurants
 - Number of bus companies
- Data collected from a variety of sources, including: national databases, park management documents, news repots, ecological research, independent tourism operators, and personal experiences
- Each variable scored by ranking them according to value, and then summing the ranks in each variable of each case for socioeconomic benefit points and environmental impact points. Points for % Endangered Species, points were deducted.



Cases 5
Jasper
National Park



Cases 6
Banff
National Park



Cases 3
Torres del Paine
National Park



Cases 1
Huize Black-necked
Crane
National Nature
Reserve



Cases 2
Mt.Wuzhi
National Park



Cases 4
Future Patagonia
National Park



Cases Studies

Case 1: Huize Black-necked Crane National Nature Reserve

Location: Yunnan, China
Area (sq km): 129.1 Annual visitors: 30,000
Climate type: Tropical wet and dry or savanna
Managing organization: county government
How long it's been protected: Feb 2006
Description: To protect the threatened bird, Black-necked Crane (*Grus nigricollis*) and its natural habitat, Chinese government founded this national reserve since 2006 and started to promote ecotourism in this site recently.

Case 2: Mt.Wuzhi National Park

Location: Hainan, China
Area (sq km): 134.4 Annual visitors: 500,000
Climate type: Tropical rainforest
Managing organization: province government
How long it's been protected:2003
Description: Being one of the oldest national park, Mt. Wuzhi National park obtains high diversity of all kind of species: 2146 of plant species, more than 1700 insect species, 67 fish species and 289 vertebrate species, with 39 species are listed as endangered in CITES.

Case 3: Torres del Paine National Park

Location: Aysen, Chile
Area (sq km): 2670.93 Annual visitors: 4,751
Climate type: Patagonian Steppe, Glacier, Alpine, Temperate Forest
Managing organaization: Conservacion Patagonica , Chilean
How long it's been protected:2004
Description: Chile's newest protected area that will combine two existing national reserves and the Chacabuco Valley, which was purchased by American NGO Conservacion Patagonia in 2004.

Case 4: Future Patagonia National Park

Location: Magalanes, Chile
Area (sq km):2422.42 Annual visitors: 170,032
Climate type: Patagonian Steppe, Temperate Forest, Alpine, Glacier
Managing organization: Chilean National Forest Corporation
How long it's been protected:1959
Description: Most popular National Park in Chile, and a flagship for park tourism world wide. Dramatic terrain featuring high mountains and rock towers, the southern Patagonian ice field, surrounded by lakes, grasslands and temperate forests.

Case 5: Jasper National Park

Location: Alberta, Canada
Area (sq km): 6641 Annual visitors: 1,958,206
Climate type: Subarctic
Managing organization: Parks Canada
How long it's been protected: 1907
Description: The largest national park in the Canadian Rockies. Rugged terrain with varying altitude that is significantly drier than the western side of the Rockies.

Case 6: Banff National Park

Location: Alberta, Canada
Area (sq km): 564321 Annual visitors: 4,000,000
Climate type: Subarctic
Managing organization: Parks Canada
How long it's been protected: 1885
Description: The oldest national park in the Canadian Rockies. Covers a wide range of ecoregions and habitats, with a number of microclimates created by the varying terrain and altitude. The park is predominately subalpine, which consists of dense forests of spruce, fir, and pines.

Results

	National Nature Reserve (China)	(China)	National Park (Chile)	National Park (Chile)	(Canada)	(Canada)
Annual Visitors	30,000	500,000	170,032	4,751	1,958,206	4,000,000
Area (Km²)	129	134	2,422	2,671	10,878	6,641
Length of Roads (km)	40	120	210	120	280	230
Total Buildings	42	80	120	35	17	26
Fire Damage (Km²)	4	0	181	28	0	0
Total Species	634	356	160	160	406	405
Endangere d Species Richness	4	9	6	6	0	1
Tourism Businesses	211	295	77	16	189	156
Bus Company	4	8	6	3	2	7

Table 1. Data collected on the independent and dependent variables for each case.

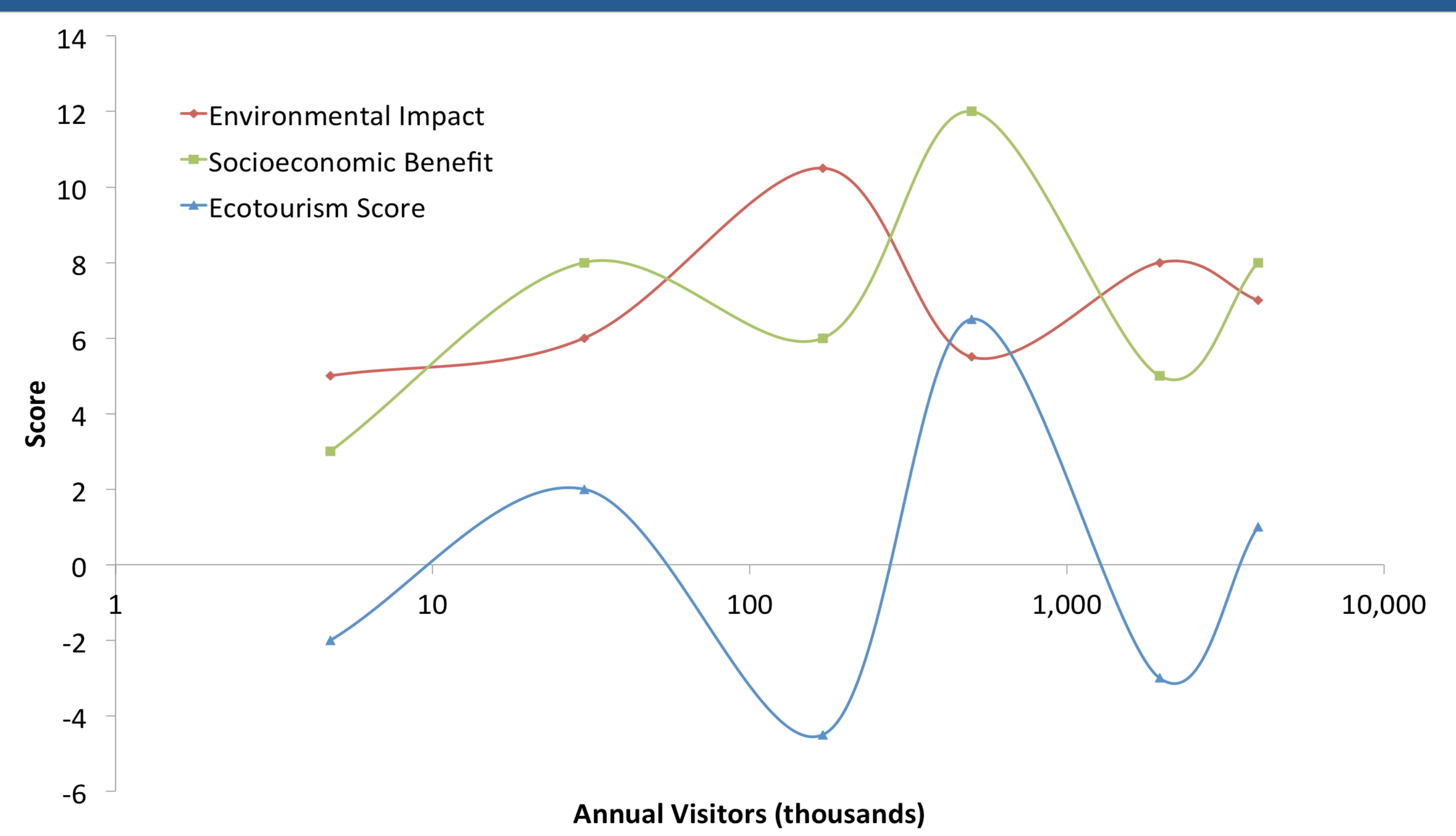


Figure 1. A rank-based analysis of level of ecotourism (blue line), displayed as the difference between socioeconomic benefits (green line) and environmental impacts (red line).

Discussion

- Ecotourism score (green line) represents the difference between socioeconomic benefits and environmental impacts
- Benefits and impacts appear relatively balanced at low and high levels of visitation, suggesting that the environmental impacts of mass tourism are “balanced” by the opportunities it creates for local businesses

Conclusion

- These results refute the hypothesis, however many confounding variables exist (e.g. age of park, type of management, etc.), making it impossible to estimate a “sweet spot” for visitation.
- Future studies may try to quantify other aspects of ecotourism such as the impacts of travel to and from national parks and the level of engagement that tourists have with each site.

Literature Cited

The International Ecotourism Society (1990). “What is ecotourism?” Accessed from <https://www.ecotourism.org/what-is-ecotourism>

Acknowledgements

We would like to thank Russ Cole for helping us through each stage of the research process, Abby Pearson for teaching us how to develop research posters, and Sahan Dissanayake for suggesting relevant literature on ecotourism.