

The Role of Economics in Fisheries Management Decisions:

Overview of Economic Analysis Methods

John Whitehead

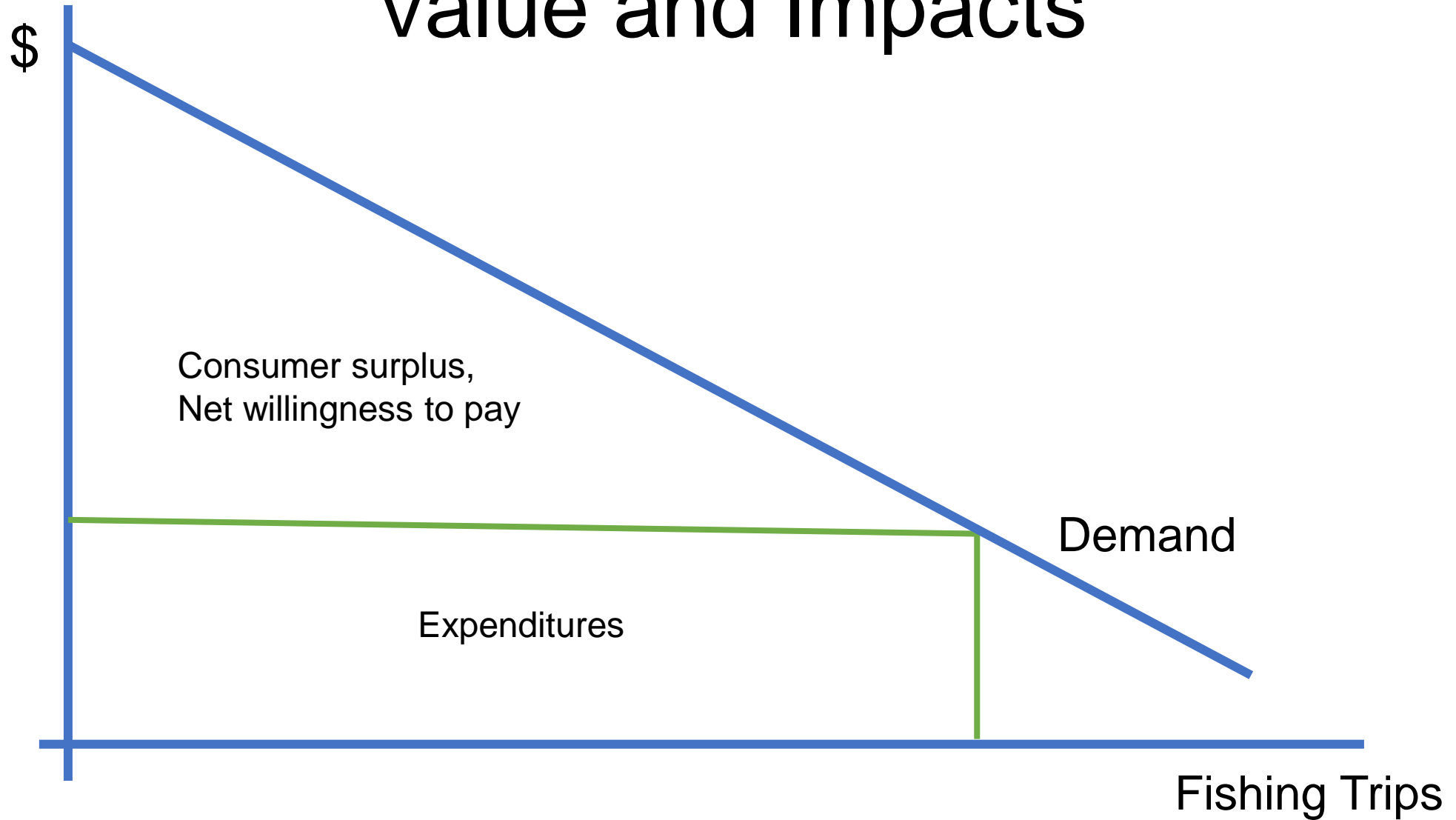
Appalachian State University & SAFMC Socioeconomic Panel

NMFS Recreational Economic Constituent Workshop

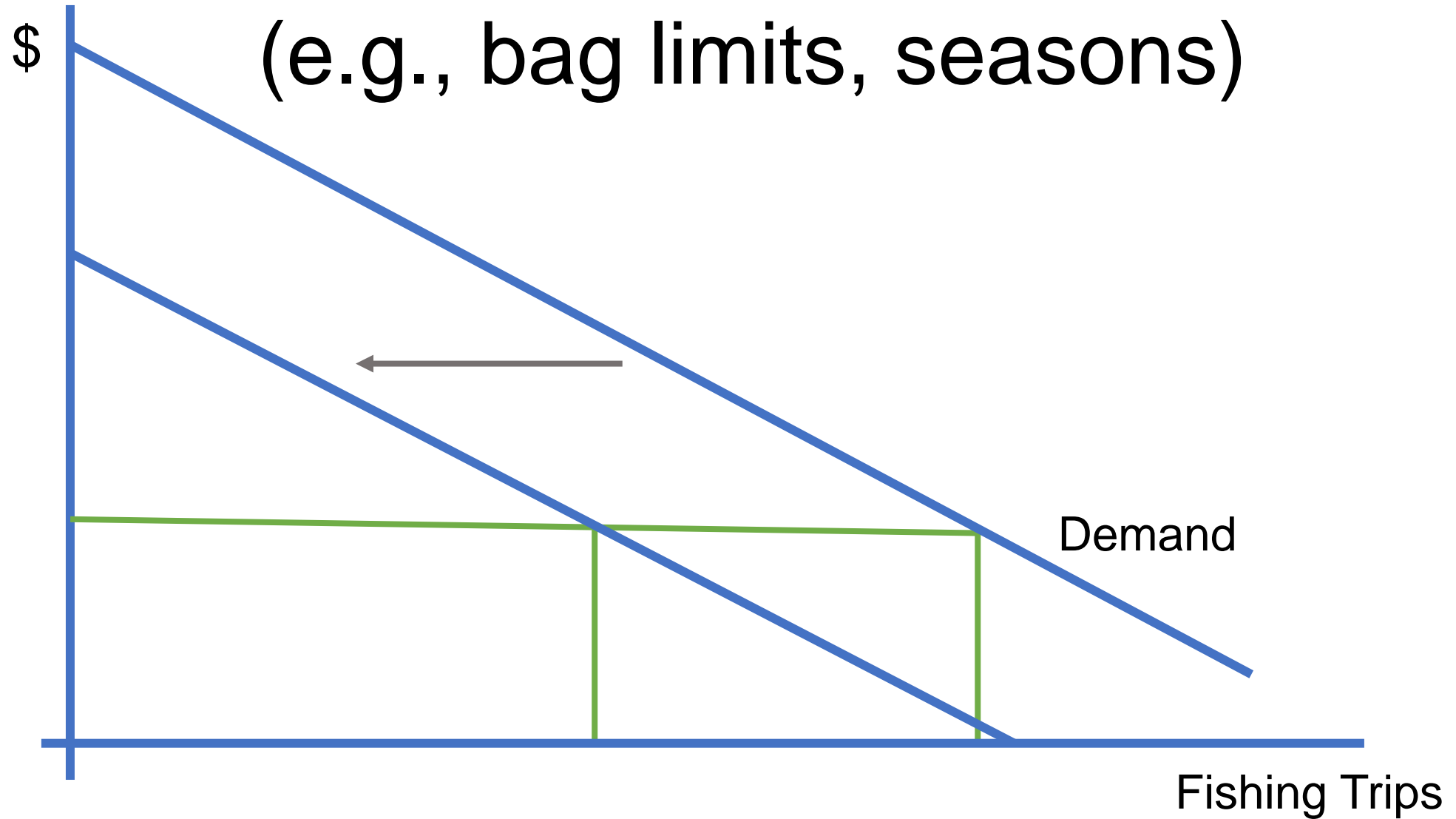
April 25-26, Tampa, FL

Type of Analysis	Purpose of the Analysis	Survey Data/Variables Needed
<p>Revealed Preference Valuation Methods</p> <ul style="list-style-type: none"> • Single-site travel cost method • Random Utility Model 	<p>Estimate the effect of management actions on the number of trips, location of trips, value of trips and catch</p>	<p>Actual:</p> <ul style="list-style-type: none"> • Number of trips • Location of trips • Income • Catch • Angler location
<p>Stated Preference Valuation Methods</p> <ul style="list-style-type: none"> • Contingent valuation • Contingent behavior • Discrete Choice Experiments 		<p>Hypothetical:</p> <ul style="list-style-type: none"> • Willingness to pay • Number of trips • Location of trips • Income • Choices among trip profiles
<p>Expenditure Methods</p> <ul style="list-style-type: none"> • Economic impact Analysis • Economic Contributions Analysis 	<p>Estimate the effect of management actions on expenditures and regional income, tax revenues and jobs</p>	<p>Actual or hypothetical</p> <ul style="list-style-type: none"> • Number of trips • Location of trips • Expenditures on the trip

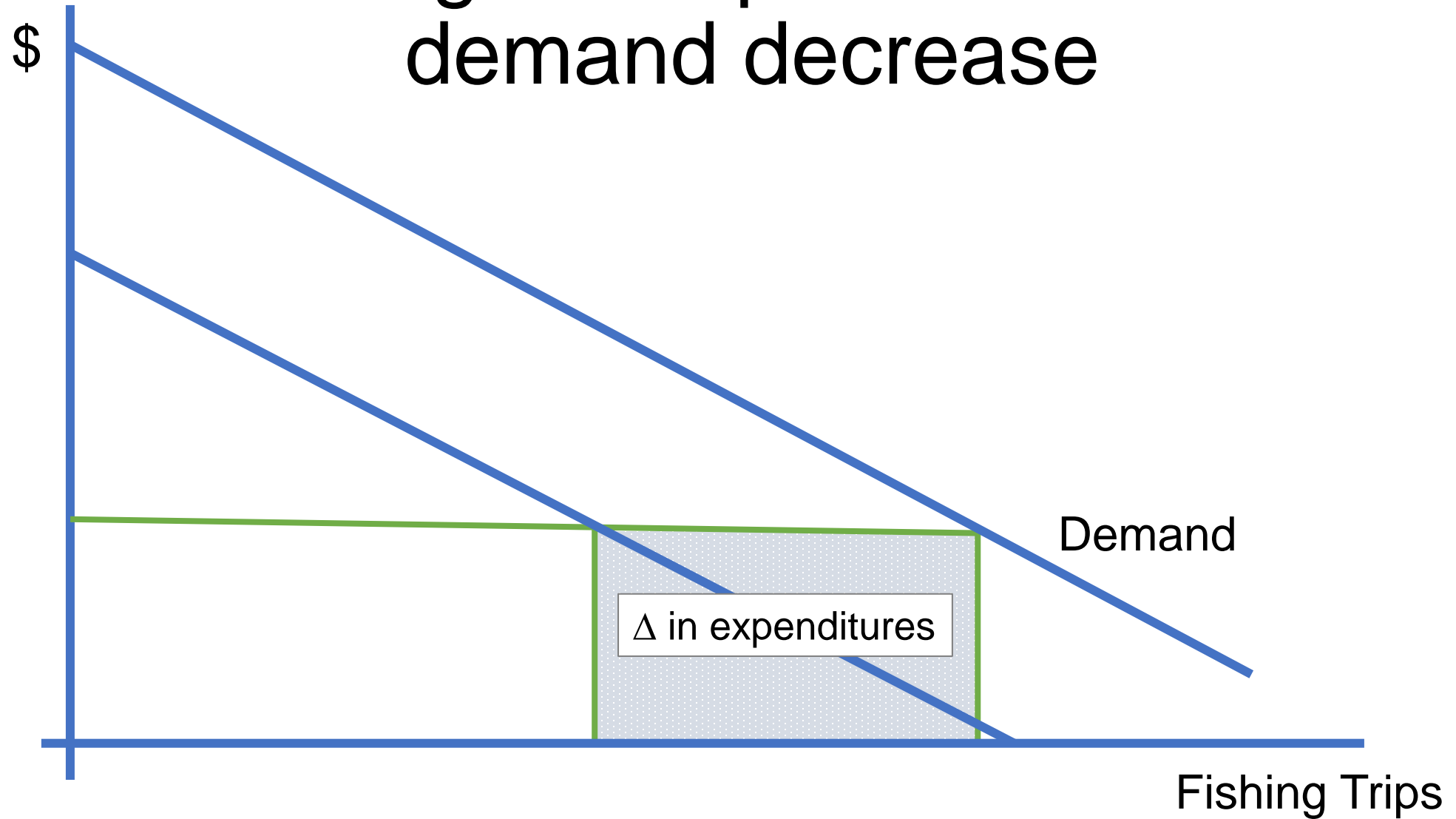
Value and Impacts



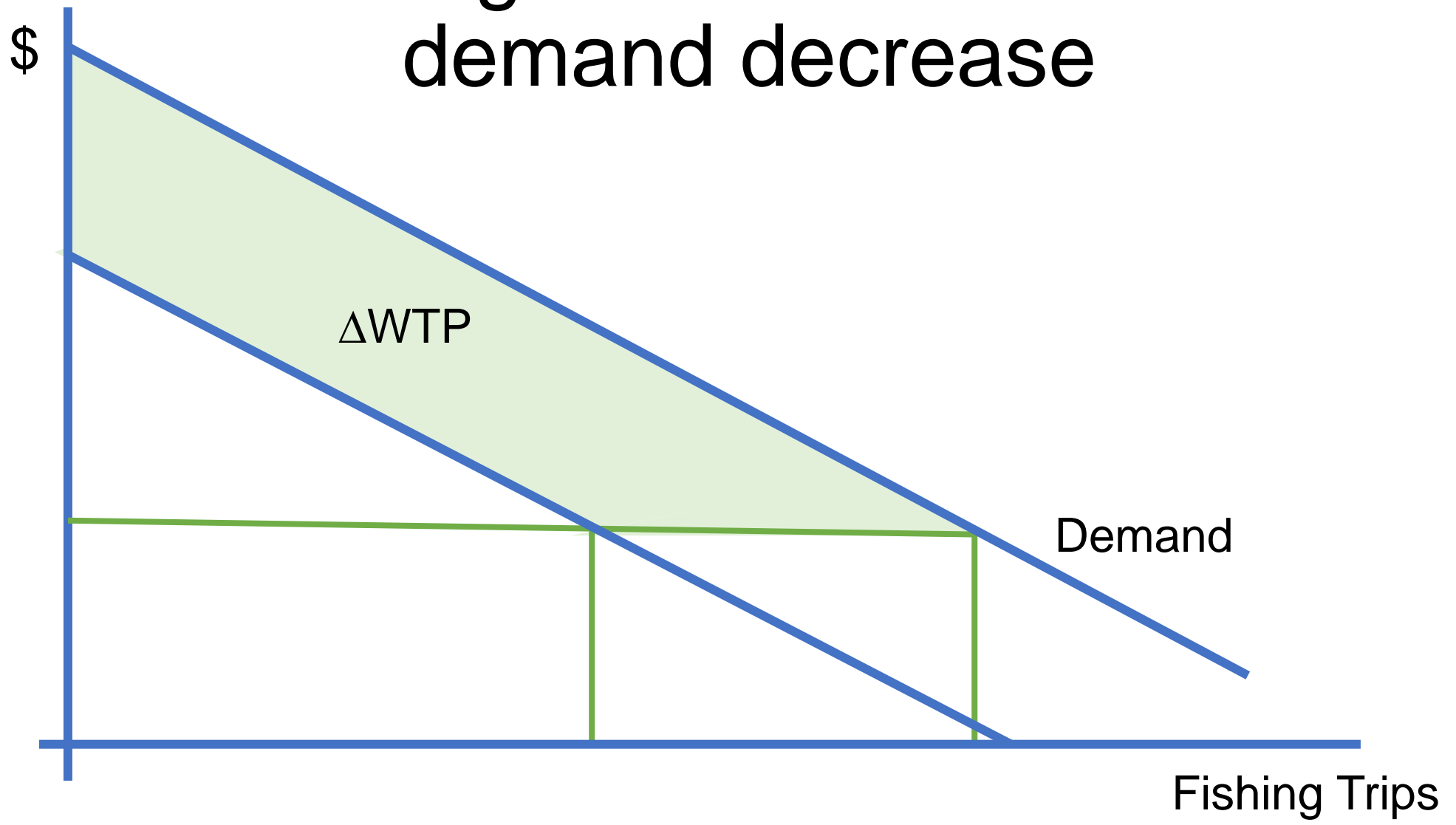
Demand decrease (e.g., bag limits, seasons)



Change in impacts due to a demand decrease



Change in value due to a demand decrease



Expenditures Methods

- Add up the regional spending due to an activity or a management action.
 - Economic Impact Analysis – estimates the net impact of an activity or management action
 - Economic Contribution Analysis – estimates the gross impact of an activity or management action

The Economic Contribution of Marine Angler Expenditures on Fishing Trips in the United States, 2017

Sabrina J. Lovell, James Hilger, Emily Rollins, Noelle A. Olsen,
and Scott Steinback



U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

NOAA Technical Memorandum NMFS-F/SPO-201
March 2020

Revealed Preference Valuation Methods

- The travel cost method (TCM) uses survey responses about **actual behavior** to estimate the benefits of recreational fishing.

*THE ECONOMIC VALUE OF
MID AND SOUTH ATLANTIC
SPORTFISHING*

Vol. 2

by

K. E. McConnell and I. E. Strand

with contributions by

S. Valdes and Q. R. Weninger

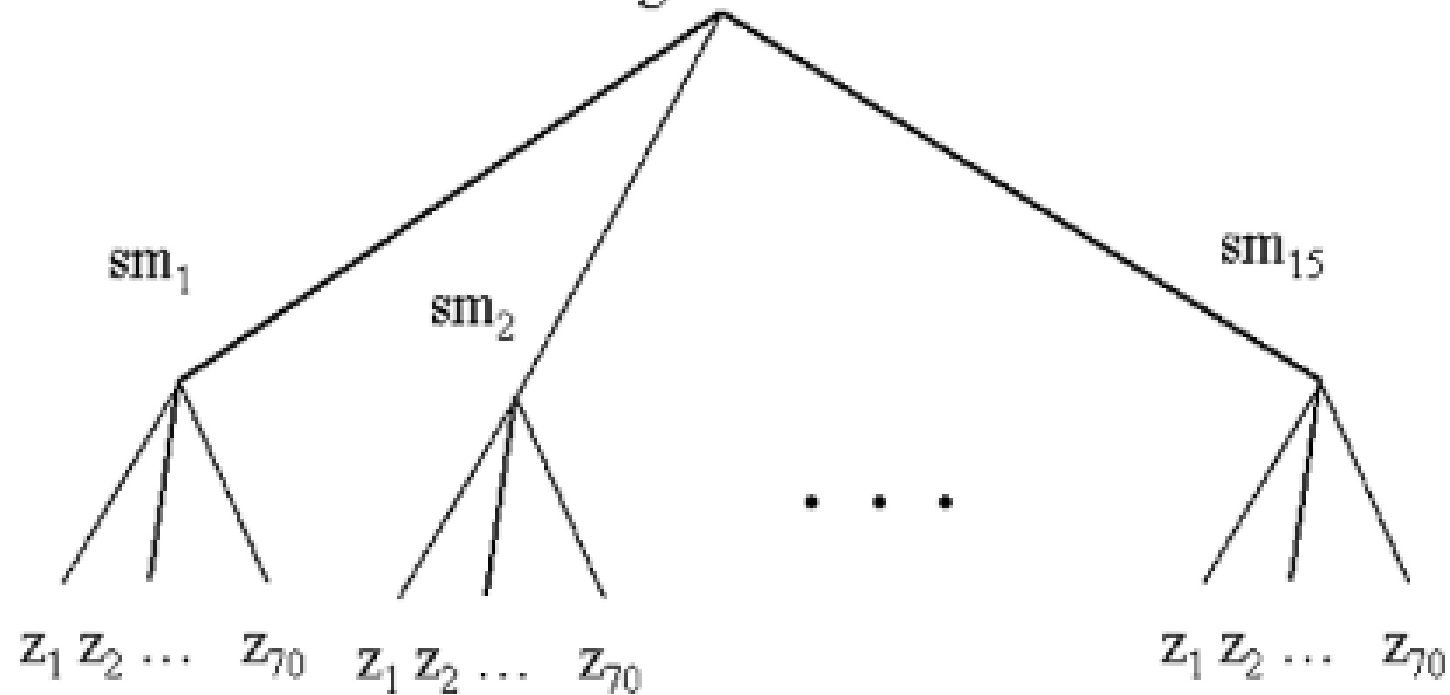
Report on Cooperative Agreement #CR-811043-01-0 (principal investigator Ivar Strand) between the University of Maryland, the Environmental Protection Agency, the National Marine Fisheries Service and the National Oceanic and Atmospheric Administration.

September 1994

University of Maryland at College Park

Figure 6-1. Nested Random Utility Model

Mode (m): Private/Rental Boat, charter/party boat, shore
Species (s): Big game, small game, bottom, flat, no
target/other



NMFS in-house and funded travel cost method (RUM) studies

Authors	Region	Purpose	Date
McConnell, Strand	Mid- and South Atlantic	Valuation	1994
Hicks, Steinbeck, Gautam, Thunberg	New England and Mid-Atlantic	Valuation	1999
Haab, Whitehead, McConnell	Southeast	Valuation	2000

Problem: Analysis of future / counterfactual management actions and regulations can be difficult with RP data.



Stated Preference (SP) Valuation Methods

- Contingent valuation method
- Contingent behavior method
- Discrete Choice experiments

Analysis of Contingent Valuation Data from the 1997-98 Southeast Economic Add-on Survey Data

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Final Report for Contract No. 40WCNA005806

SP Discrete Choice Experiments

Please compare the features of South Atlantic offshore fishing trips A and B and answer the questions below. Please keep in mind that:

- You can use your own boat, a friend's boat, or a rental, but **not a charter**
- **You might catch** various types of fish, but **catch is not guaranteed**
- Trips A and B are **exactly the same** except for differences shown

Trip Features		Trip A	Trip B
Hours on the water		8 hours	8 hours
Time of the week		Weekend	Weekday
Bottom type of area fished		Natural	Artificial
Trip cost (boat fuel, bait, and ice)		\$70	\$85
Regulations in effect at the place and time of trip	Dolphin fish	10 bag	5 bag
	Snappers / Red Snapper	10 bag / 2 bag	5 bag / 1 bag
	Groupers	6 bag	closed
	King Mackerel	closed	3 bag
	Other regulations	As in 2009	As in 2009

a) Which of these two trips do you **prefer**?

Trip A

Trip B

I don't know

At least 18 NMFS SP Discrete Choice Experiment Studies

Circa 2012

Stated Preference Survey Instruments

Region	Year
Northeast	2000, 2009, 2010
Southeast	2003/04, 2009, 2010
Caribbean	2003/04
West Coast	2006 (Washington, Oregon), 2009 (California)
Alaska	2002; 2007
Pacific Island	2006

Since 2012

- Northeast
 - 2014, 2016, 2019, 2022
- West Coast
 - 2017
- Southeast
 - 2013

	Advantages	Disadvantages
Revealed preference	Actual decisions	Constrained to historical management changes
	Data is readily available and straightforward to analyze	
Stated preference	Not constrained to historical management changes	Hypothetical decisions
		Data is expensive to collect and analyze (both time and money)



Joint estimation of angler revealed preference site selection and stated preference choice experiment recreation data considering attribute non-attendance

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ABSTRACT

We estimate angler demand models with revealed preference (RP) and stated preference (SP) site selection marine recreational fishing data. We combine RP data from the Marine Recreational Information Program (MRIP) creel survey with SP discrete choice experiment survey data from 2003/2004. There are eight SP trip decisions and one RP trip decision for each of 1928 anglers who provided enough information to be analysed. Joint RP-SP generalized multinomial logit models are estimated. We find that the SP travel cost coefficient is much lower than the RP travel cost coefficient in absolute value, suggesting hypothetical bias in the SP data. This difference is reflected in the willingness to pay estimates, where the SP estimates for improved catch are much higher than the RP estimates. We use inferred attribute non-attendance (ANA) methods to identify respondents who may be ignoring the SP cost variable. The SP cost coefficient accounting for ANA is much higher in absolute value than the SP coefficient from the model that does not account for ANA. The ANA model indicates much more consistency between the RP and SP data. The smaller difference in the travel cost coefficients is also reflected in the willingness to pay estimates.

ARTICLE HISTORY

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KEYWORDS

Revealed preference; stated preference; joint estimation; recreational fishing

JEL: Q51; Q22; Q26

Thanks for listening!

And Questions? (later)