Socioeconomics Research and Monitoring Update: Project 13.1 - Recreation

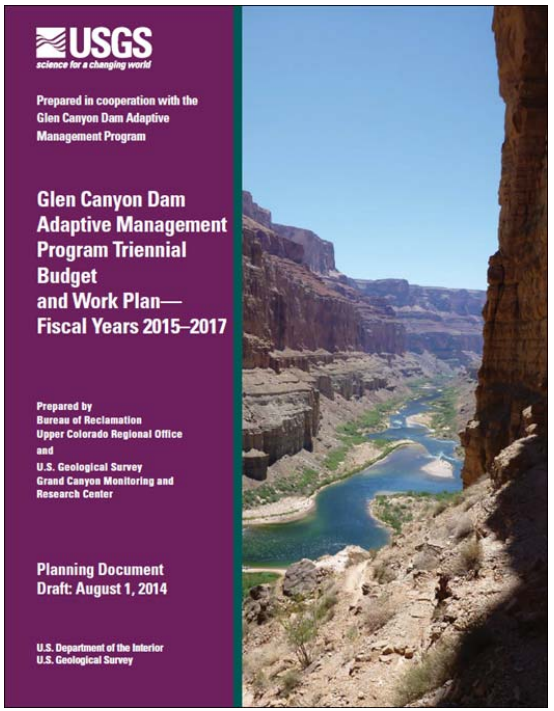
Lucas Bair, U.S. Geological Survey

October 2016 Technical Workgroup Meeting

U. S. Department of Interior
U.S. Geological Survey

Socioeconomic Monitoring and Research

- **Economic Values of Recreational Resources along the Colorado River – Grand Canyon Whitewater Floater and Glen Canyon Angler Values**
- Tribal Perspectives for Resources Downstream of Glen Canyon Dam
- Applied Scenario Analysis for the Glen Canyon Dam Adaptive Management Program



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2005 Protocol Evaluation Panel on the Recreation Monitoring Program

- Understand how flows influence trip attributes and associated preferences and economic benefits
- Develop a conceptual model to understand the relationship between dam operations and recreational conditions and trip attributes

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Estimating Economic Value

- Angling and whitewater floating on the Colorado are nonmarket goods
- Revealed or stated preference methods to gather and analyze information
- Recreational demand is a function of trip cost, recreational quality, socioeconomic characteristics (e.g., income, education, age)

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Economic value of angling on the Colorado River at Lees Ferry: Using secondary data to estimate the influence of seasonality

Lucas Bair, U.S. Geological Survey
David Rogowski, Arizona Game and Fish Department
Chris Neher, University of Montana

U. S. Department of Interior
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Study Overview

- Objective was to estimate the seasonal variation in economic value of angling at Lees Ferry and identify angler preferences that influence their demand for angling
- Data from AGFD creel in 2012 - 2014
- Used an individual travel cost model to estimate demand for angling

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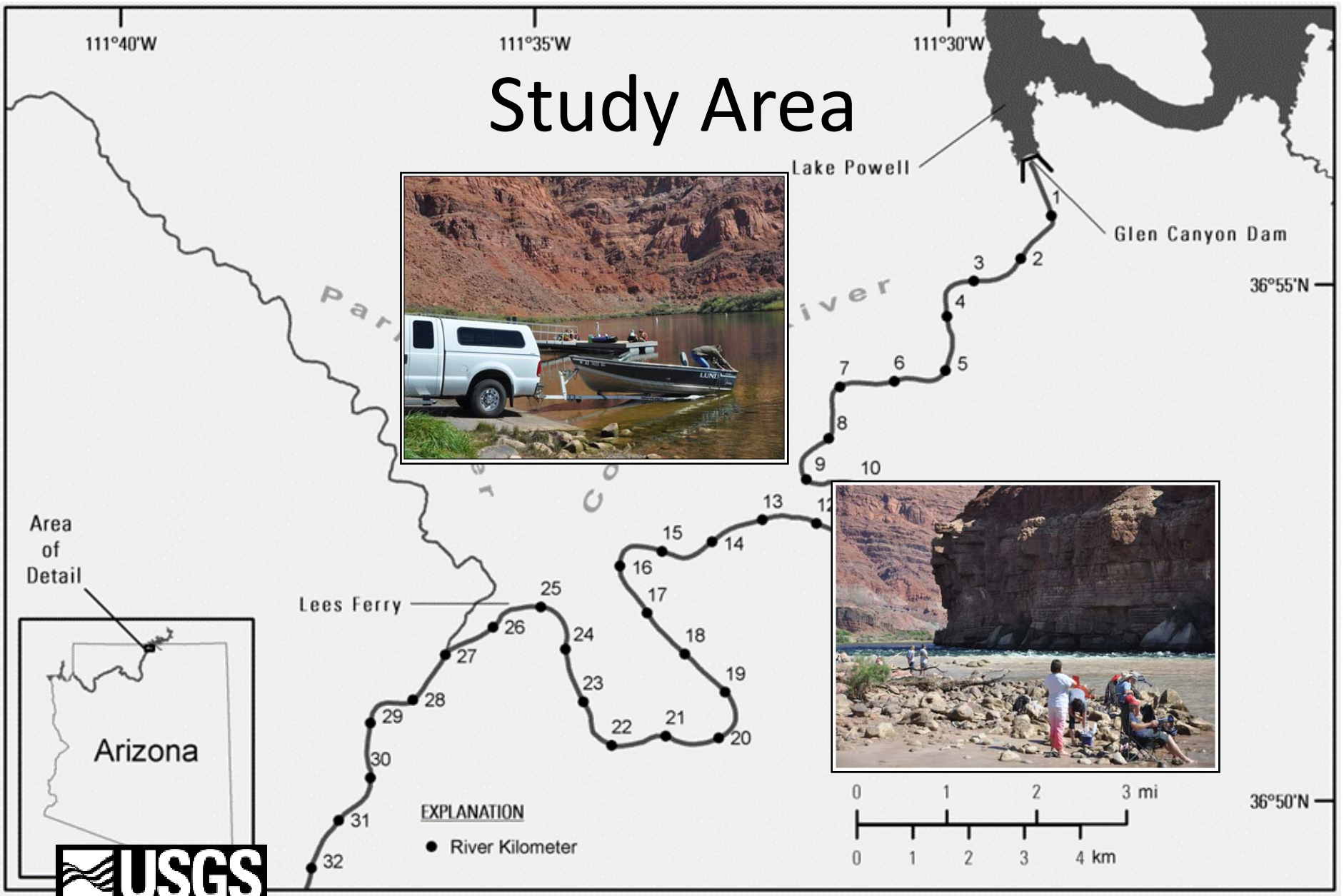
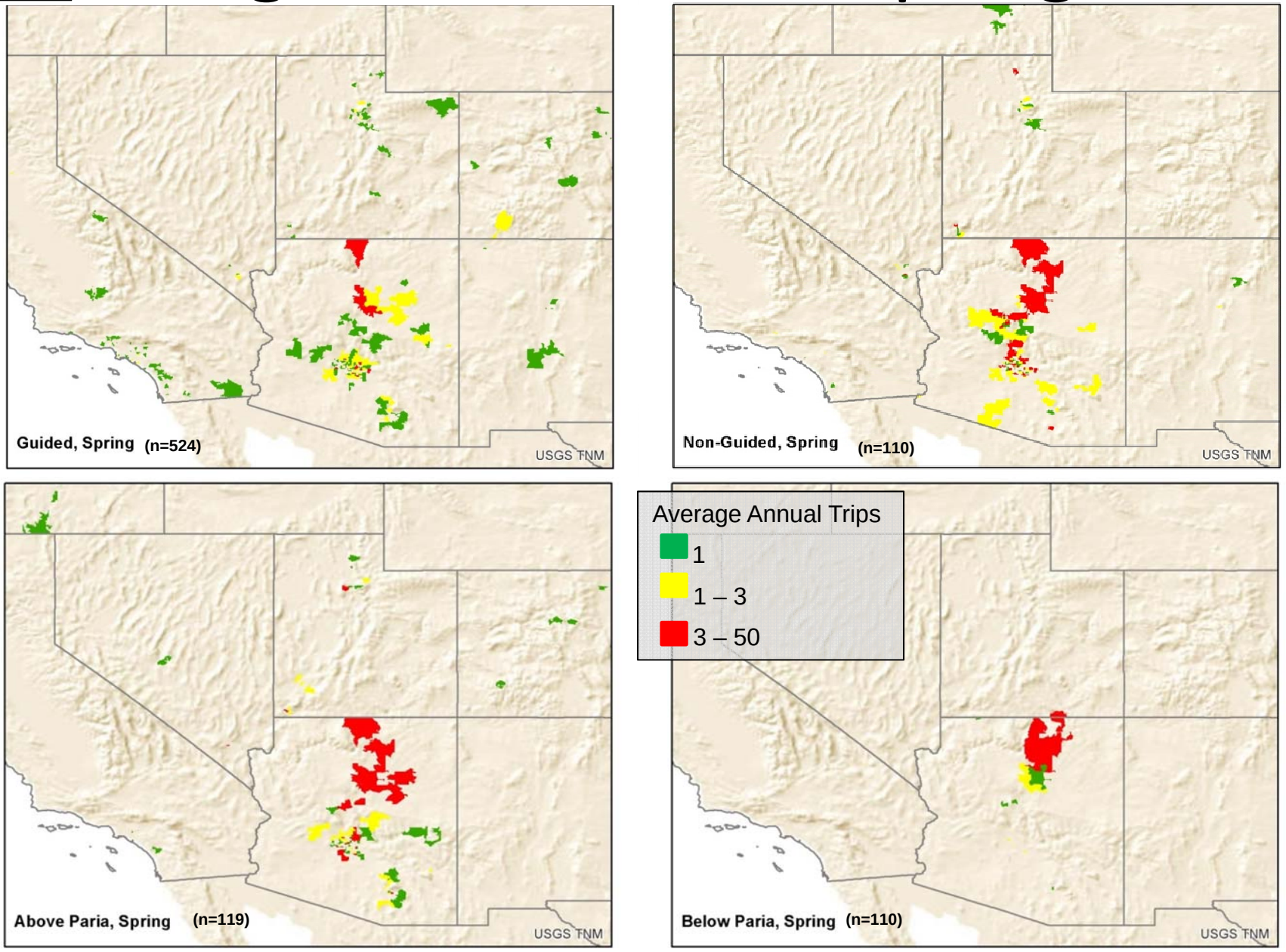
Study Area

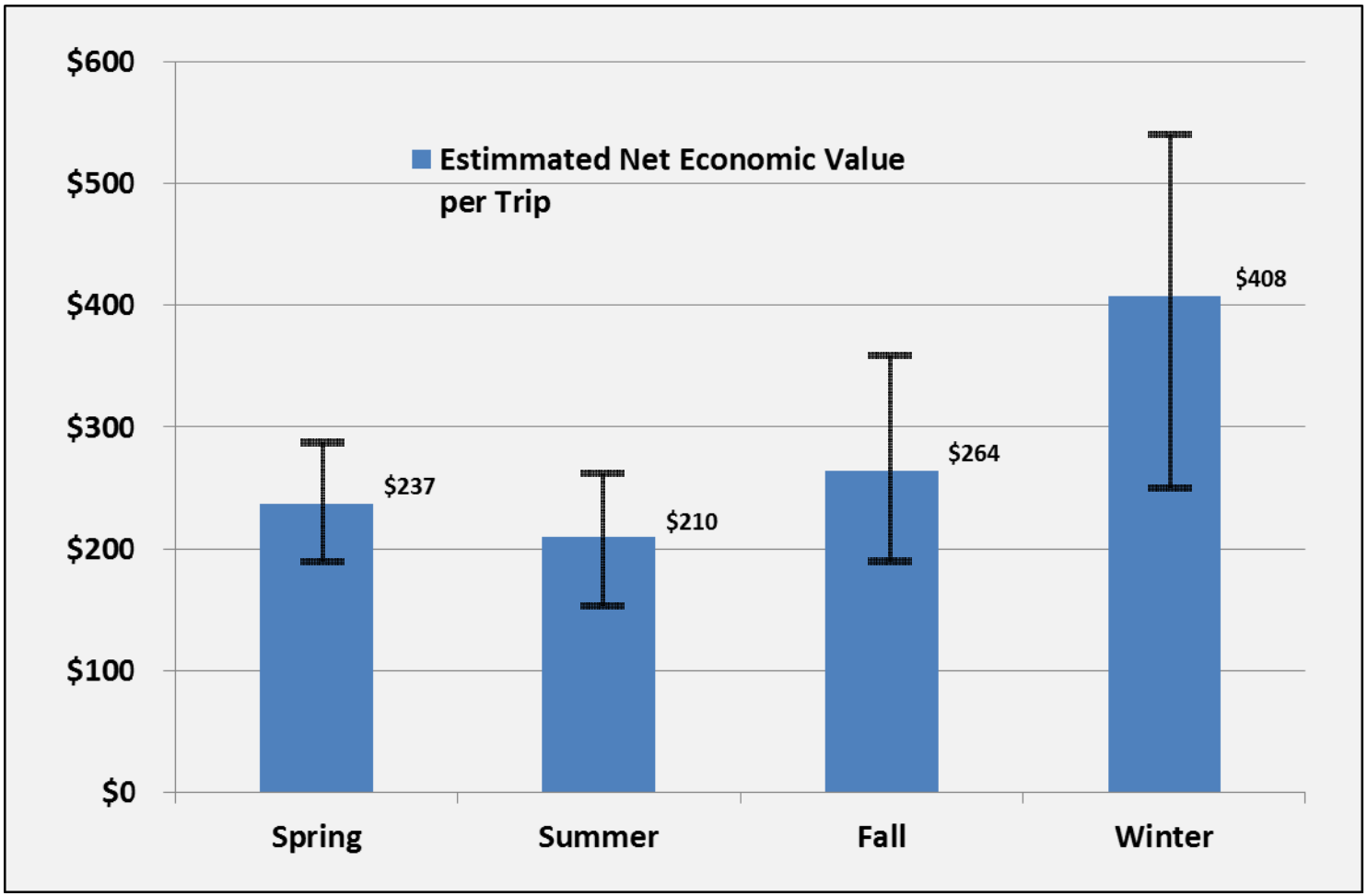

111°40'W
111°35'W
111°30'W
Lake Powell
Glen Canyon Dam
36°55'N
36°50'N
Area of Detail
Arizona
Lees Ferry
EXPLANATION
River Kilometer
0 1 2 3 mi
0 1 2 3 4 km

Angler Visitation in Spring



Lucas S. Bair, David L. Rogowski & Chris Neher (2016) Economic Value of Angling on the Colorado River at Lees Ferry: Using Secondary Data to Estimate the Influence of Seasonality, North American Journal of Fisheries Management, 36:6, 1229-1239, DOI: 10.1080/02755947.2016.1204388

Seasonal Economic Benefits



Bootstrapped aggregate model seasonal benefit estimates at Lees Ferry with confidence intervals at the 95% level (2014 dollars)

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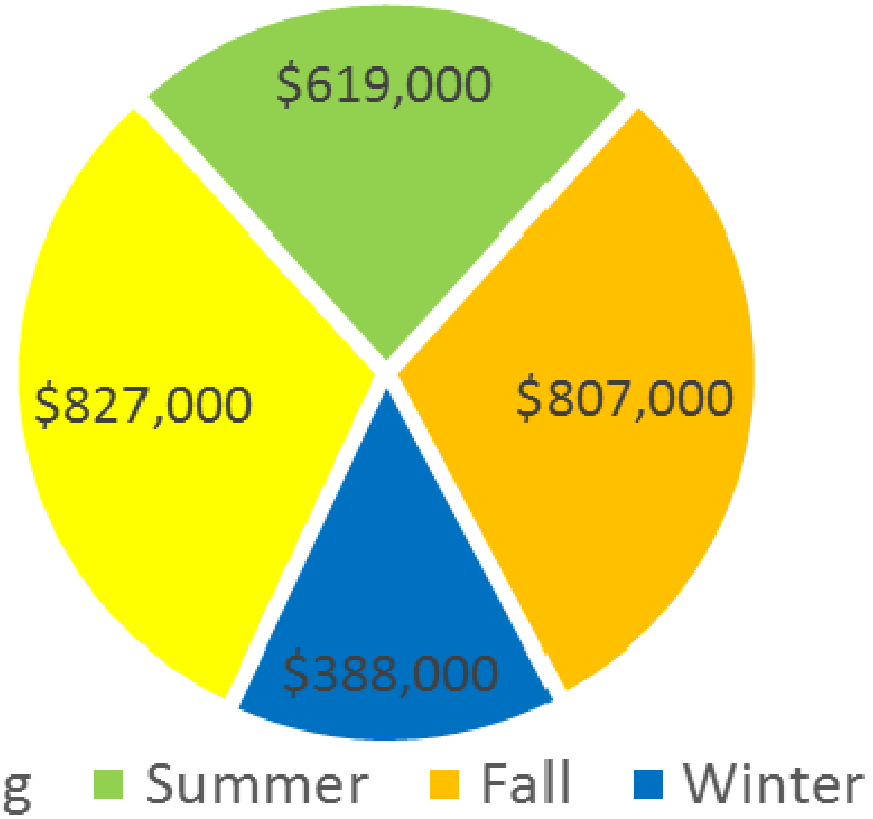
Scenario Analysis: Recreational Angling

Season	Anglers	Value
Spring	3,491	$237
Summer	2,952	$210
Winter	952	$408
Fall	3,059	$264



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Economic Analysis of Glen Canyon Angler and Grand Canyon Whitewater Visitor Surveys

Lucas Bair, U.S. Geological Survey
John Duffield, University of Montana
David Patterson, University f Montana
Chris Neher, University of Montana

U. S. Department of Interior
U.S. Geological Survey

Study Objective

- Estimate angler and whitewater visitor preferences and economic value for trip attributes by replicating and expanding the Bishop et al. (1987) study

1) Are the economic benefit estimates from the current study consistent with those estimated by Bishop et al. (1987)?

2) Do different methodological question formats lead to consistent economic benefit estimates?

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Survey*

- Office of Management and Budget
- Data

  Creel data + address in fall 2014 and spring 2015

  Private whitewater Sept. 1, 2014 – Aug 31, 2015
- Mail survey (Dillman method)

Sample	Mailed	Responded	Response Rate
Angler Fall	313	182	58%
Angler Spring	199	109	55%
Whitewater	1,293	832	64%

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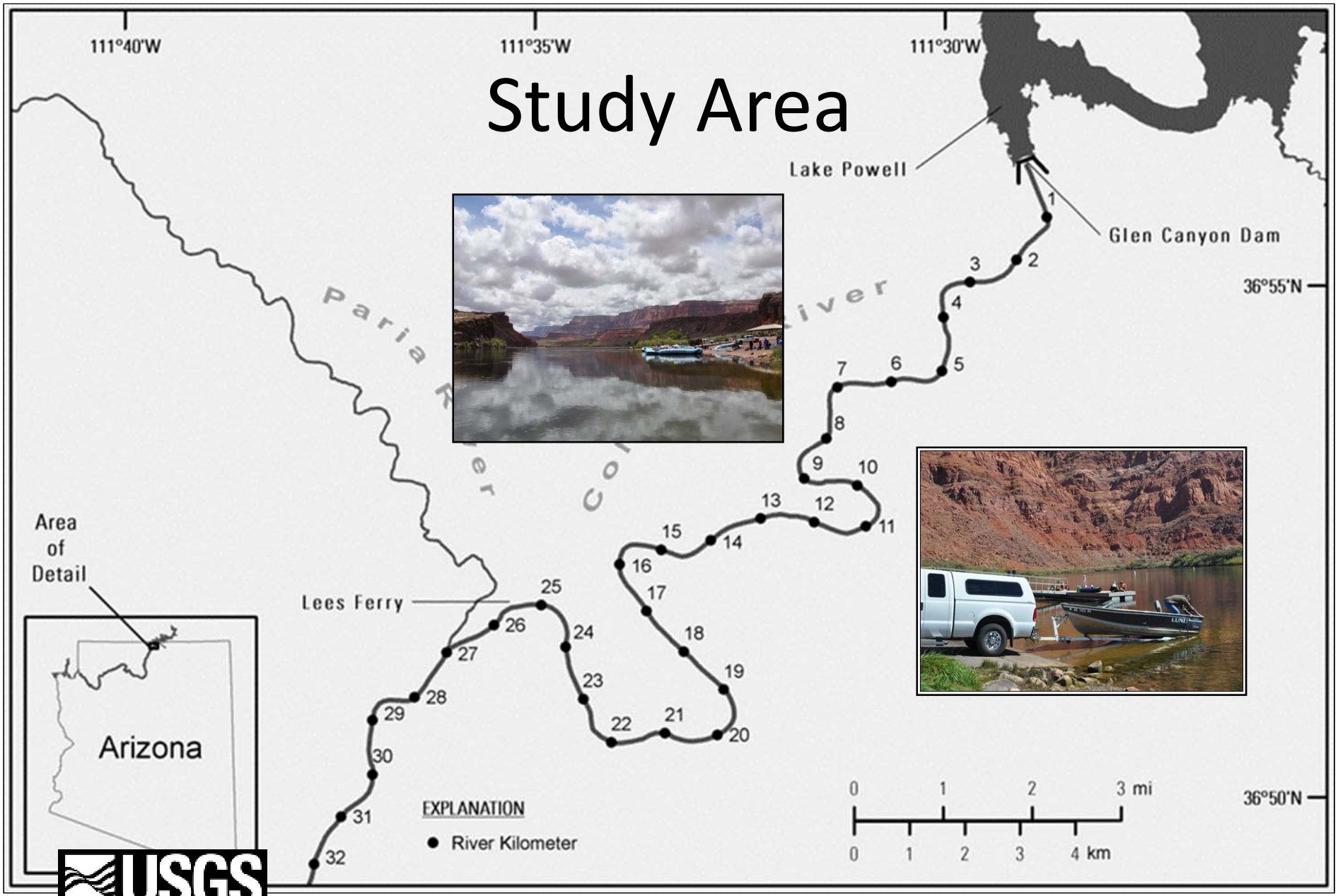
*Preliminary data, do not cite

Study Area



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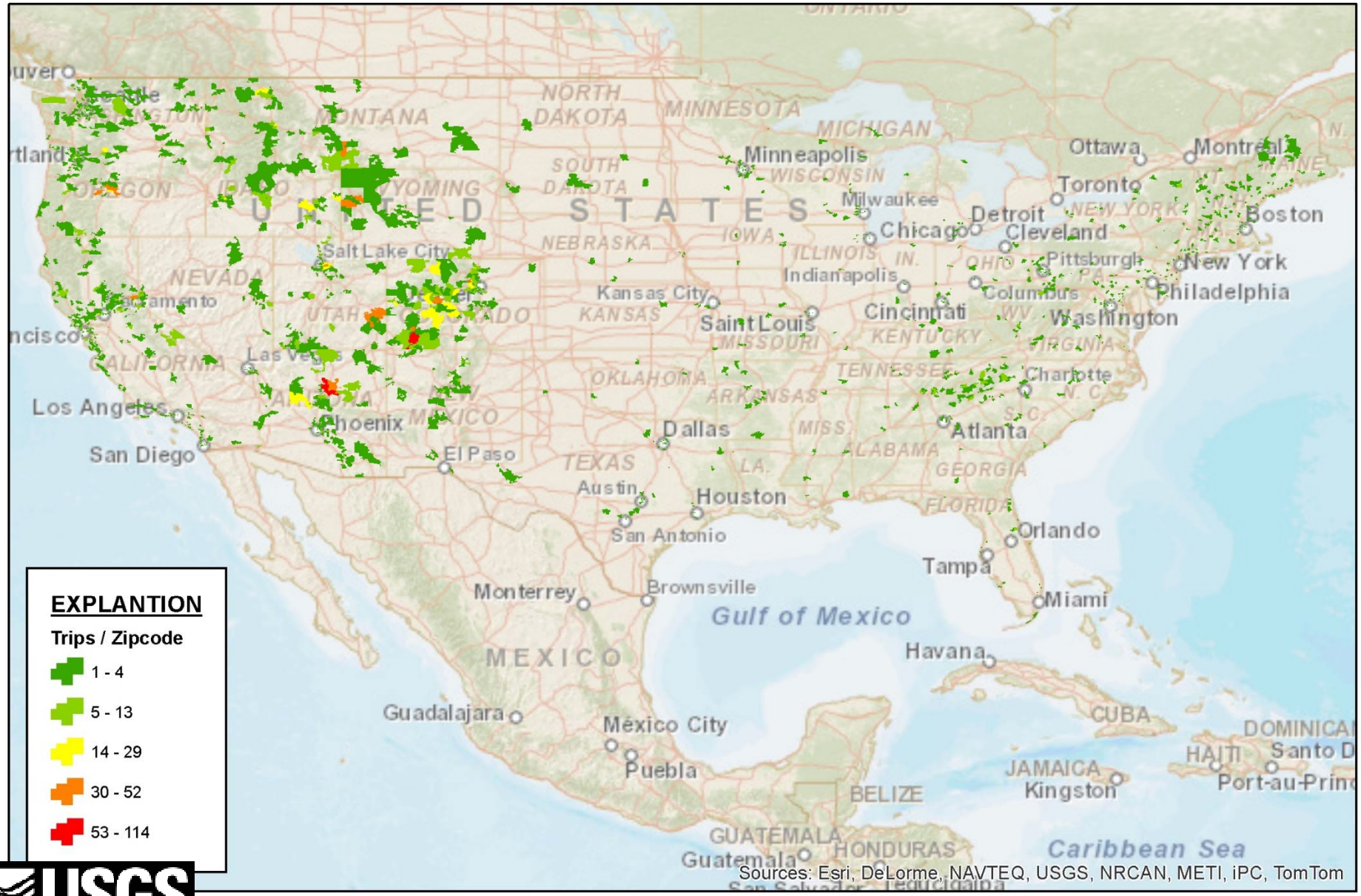
Private Whitewater Floaters*



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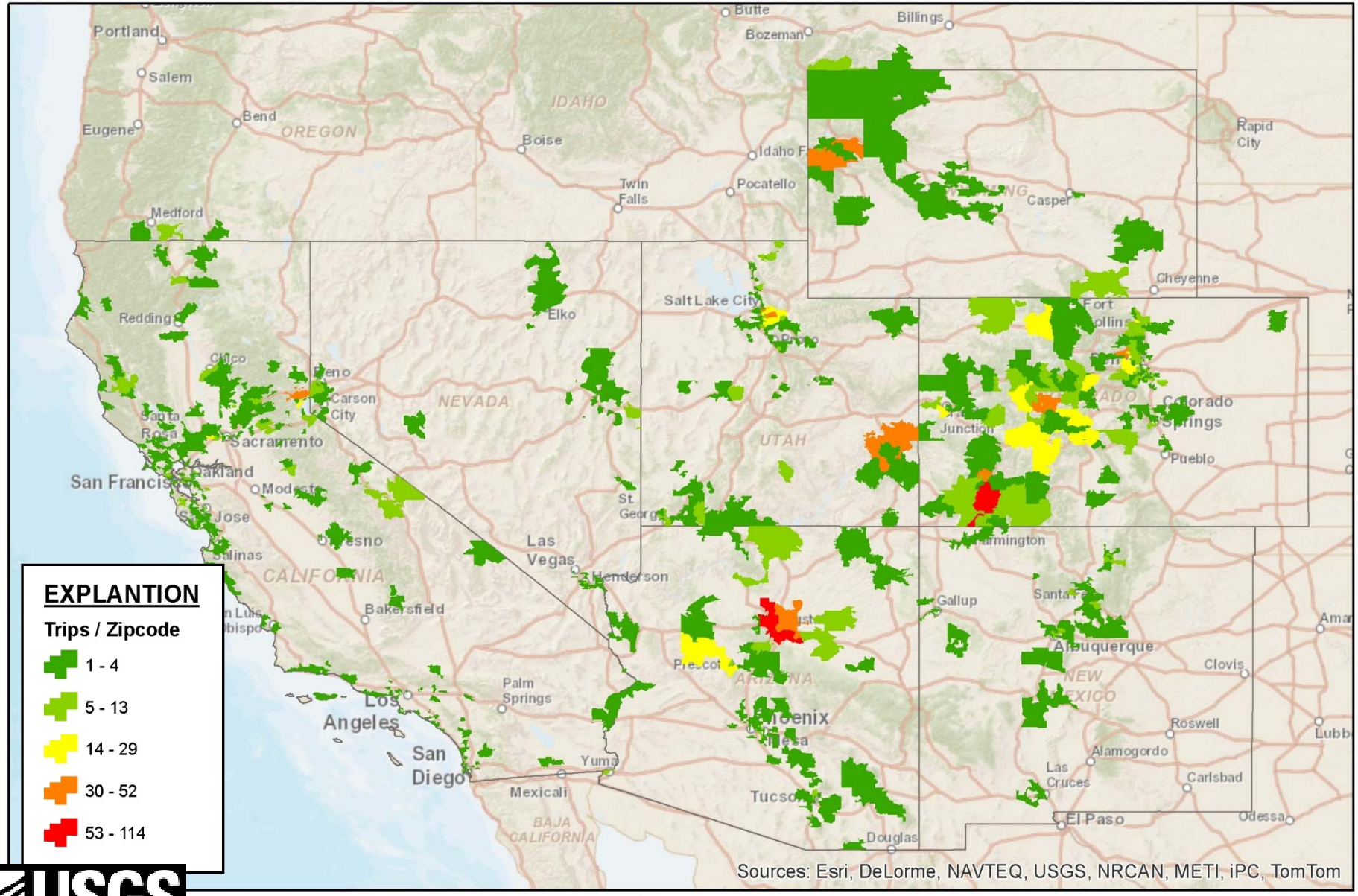

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Whitewater Perceptions of Flow*

- Average flow of 12,065 cfs current study

Scenario	Better		About the Same		Worse	
	Bishop 1987	**Current Study**	Bishop 1987	**Current Study**	Bishop 1987	**Current Study**
5,000 cfs	4%	1%	3%	4%	93%	**95%**
13,000 cfs	25%	17%	36%	**75%**	39%	7%
22,000 cfs	30%	**50%**	66%	40%	1%	10%
40,000 cfs	8%	24%	36%	13%	56%	**64%**

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Whitewater Perceptions of Flow*

- Average flow of 12,065 cfs current study
- Average flow of 29,200 cfs Bishop et al. (1987)

Scenario	Better		About the Same		Worse	
	Bishop 1987	Current Study	Bishop 1987	Current Study	Bishop 1987	Current Study
5,000 cfs	4%	1%	3%	4%	**93%**	**95%**
13,000 cfs	25%	17%	36%	**75%**	**39%**	7%
22,000 cfs	30%	**50%**	**66%**	40%	1%	10%
40,000 cfs	8%	24%	36%	13%	**56%**	**64%**

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Whitewater Economic Value*

Scenario	Current Study Mean Value	Bishop Mean Value	Ratio Current Mean Value to Bishop	Bishop Mean Value Indexed by CPI
5,000 cfs	$603	$233	2.59	$494
13,000 cfs	$1,169	$504	2.32	$1,068
22,000 cfs	**$1,237**	$525	2.36	**$1,113**
40,000 cfs	$962	$434	2.22	$920
Reduced Beaches	$822	$377	2.18	$799
Note: Scaling Bishop et al. (1987) by Consumer Price Index does not account for changes in real income.				

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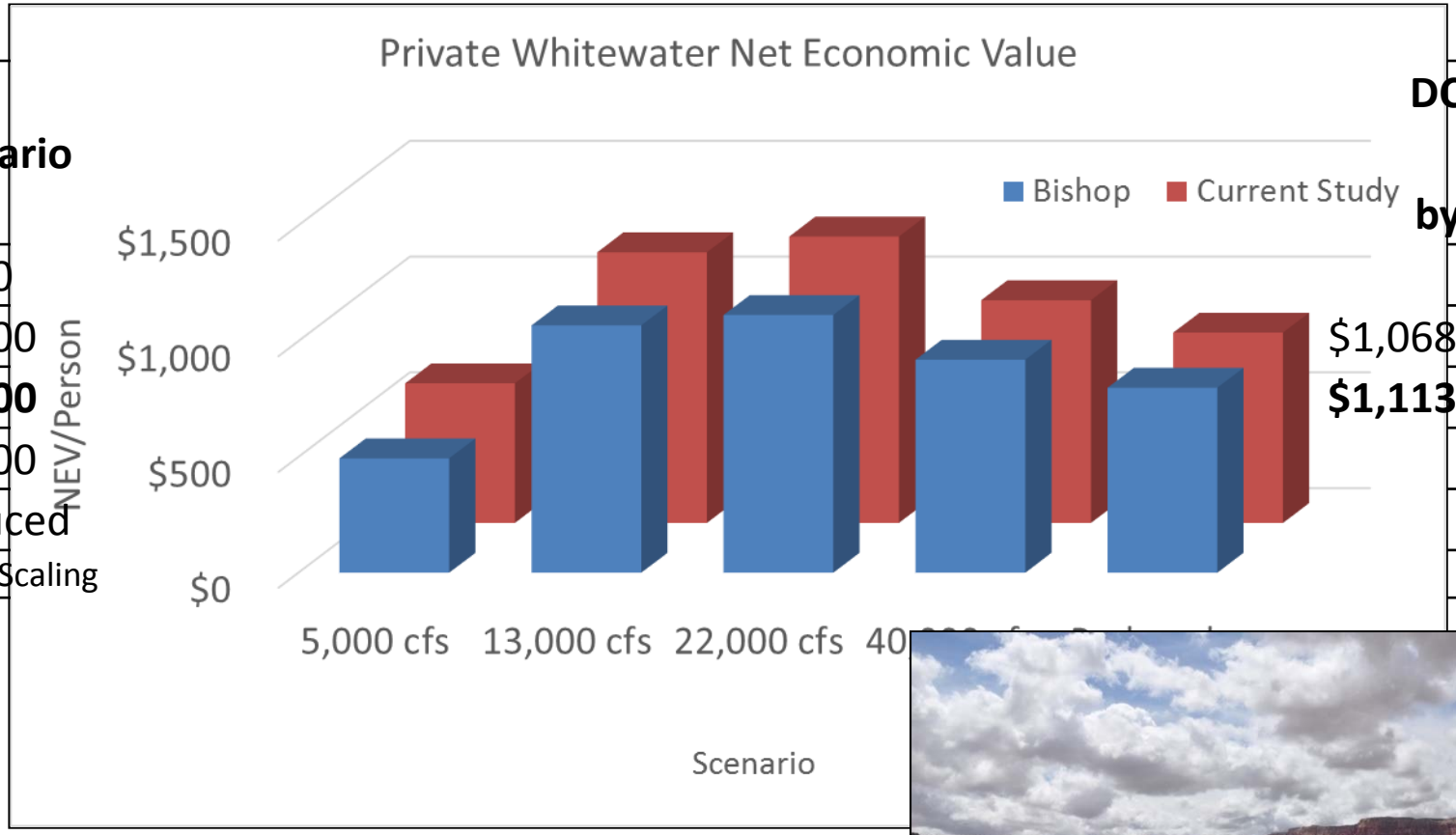
Whitewater Economic Value*

Scenario	DCCV
5,000	
13,000	$1,068
22,000	**$1,113**
40,000	
Reduced	
Note: Scaling	



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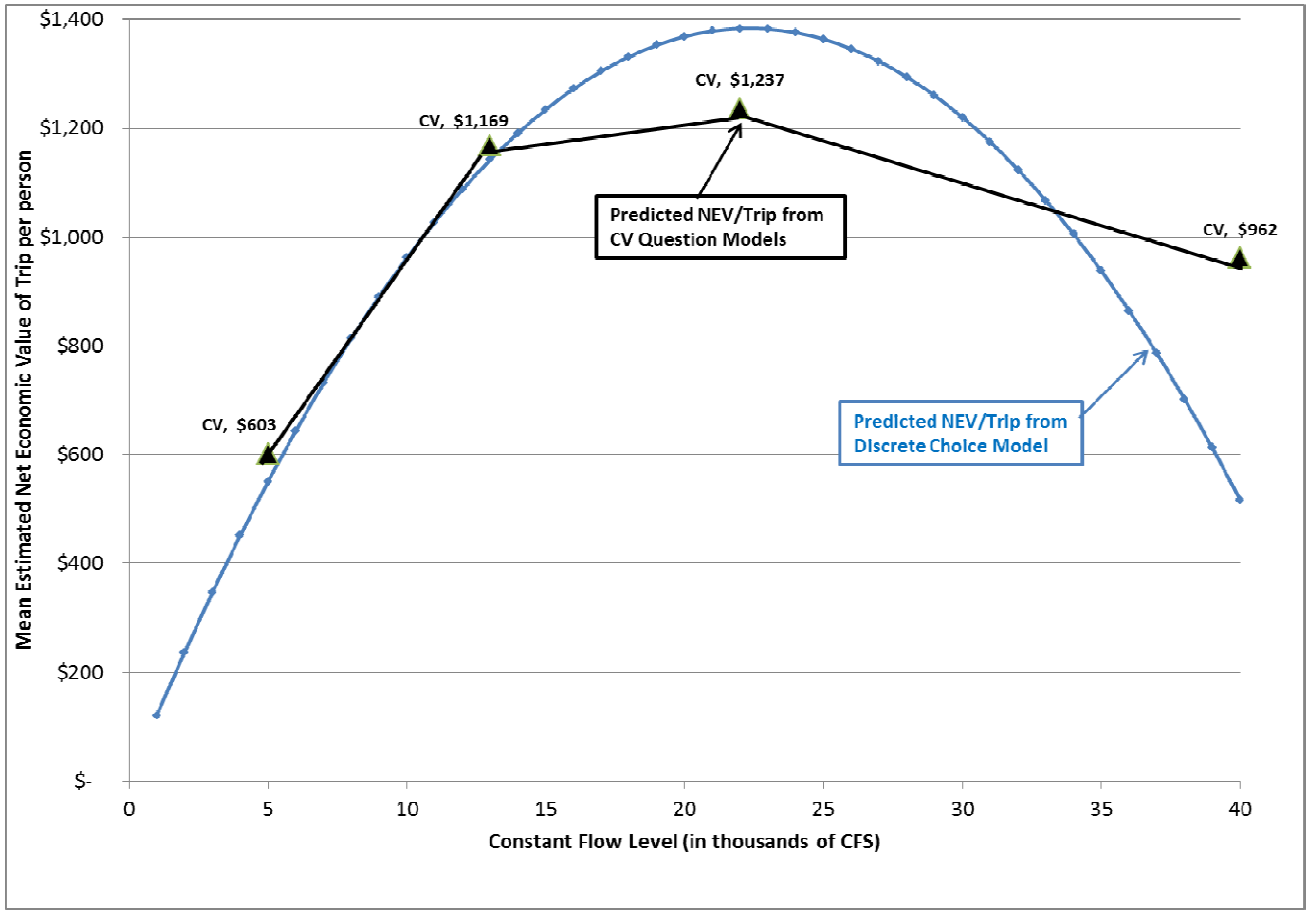
Whitewater Question Format*



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Regional Expenditures*

Private Whitewater Expenditure	Total		Local	
	Share	$	Share	$
Boat or river gear rented	27.6%	$451	36.5%	**$354**
Food and beverages	14.5%	$237	17.0%	**$165**
Lodging	5.8%	$95	9.0%	**$87**
Other	7.2%	$118	7.1%	$69
Vehicle shuttle	4.4%	$72	6.9%	$67
Restaurant	4.1%	$67	6.3%	$61
Gas and oil for vehicle	8.6%	$141	6.0%	$58
Take out at Diamond Creek	1.8%	$29	3.0%	$29
Personal gear	7.7%	$126	2.7%	$26
Boat gear purchases for trip	9.9%	$162	2.0%	$19
Camping fees	0.8%	$13	1.2%	$12
Airfare	6.5%	$106	0.8%	$8
Car rental	0.8%	$13	0.8%	$8
Native American art and craft	0.2%	$3	0.4%	$4
Tow across Lake Mead	0.1%	$2	0.3%	$3
		$1,634		**$969**

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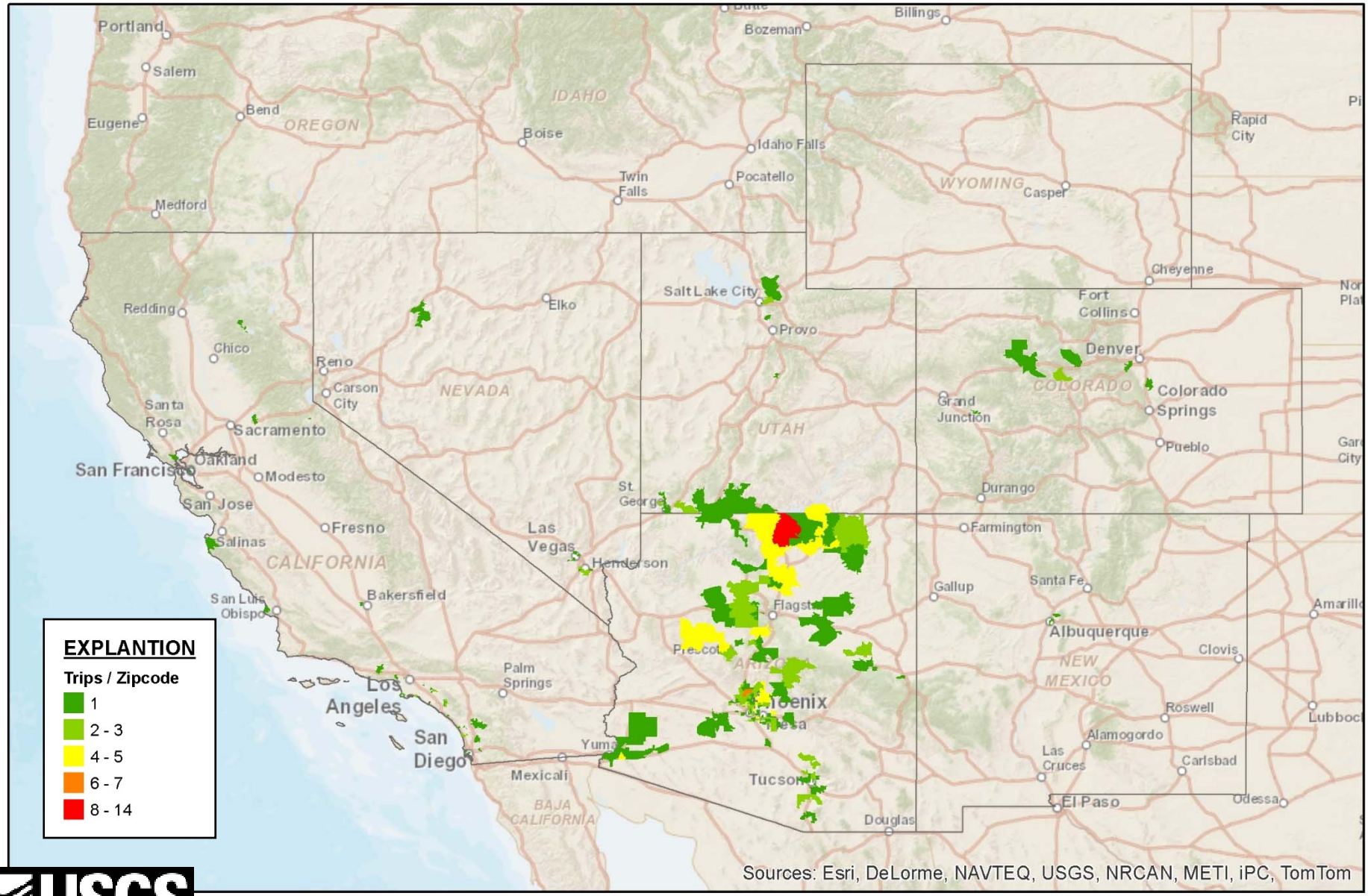
Lees Ferry Anglers*



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Angler Perceptions of Flow*

- Average flow of 10,800 cfs current study

Scenario	Better		About the Same		Worse	
	Bishop 1987	Current Study	Bishop 1987	Current Study	Bishop 1987	Current Study
3,000 cfs	23%	17%	13%	15%	64%	68%
10,000 cfs	56%	57%	31%	35%	13%	8%
25,000 cfs	23%	9%	44%	20%	33%	71%
40,000 cfs	5%	2%	16%	6%	79%	92%

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Angler Perceptions of Flow*

- Average flow of 10,800 cfs current study
- Average flow of 11,900 or 28,800 cfs Bishop et al. (1987)

Scenario	Better		About the Same		Worse	
	Bishop 1987	Current Study	Bishop 1987	Current Study	Bishop 1987	Current Study
3,000 cfs	23%	17%	13%	15%	64%	68%
10,000 cfs	56%	57%	31%	35%	13%	8%
25,000 cfs	23%	9%	44%	20%	33%	71%
40,000 cfs	5%	2%	16%	6%	79%	92%

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Angler Economic Value*

Scenario	Current Study Mean Value	Bishop Mean Value	Ratio Current Mean Value to Bishop	Bishop Mean Value Indexed by CPI
3,000 cfs	$348	$60	5.80	$127
10,000 cfs	**$432**	$126	3.43	**$267**
25,000 cfs	$359	$94	3.82	$199
40,000 cfs	$87	$52	1.67	$110
Note: Scaling Bishop et al. (1987) by Consumer Price Index does not account for changes in real income.				

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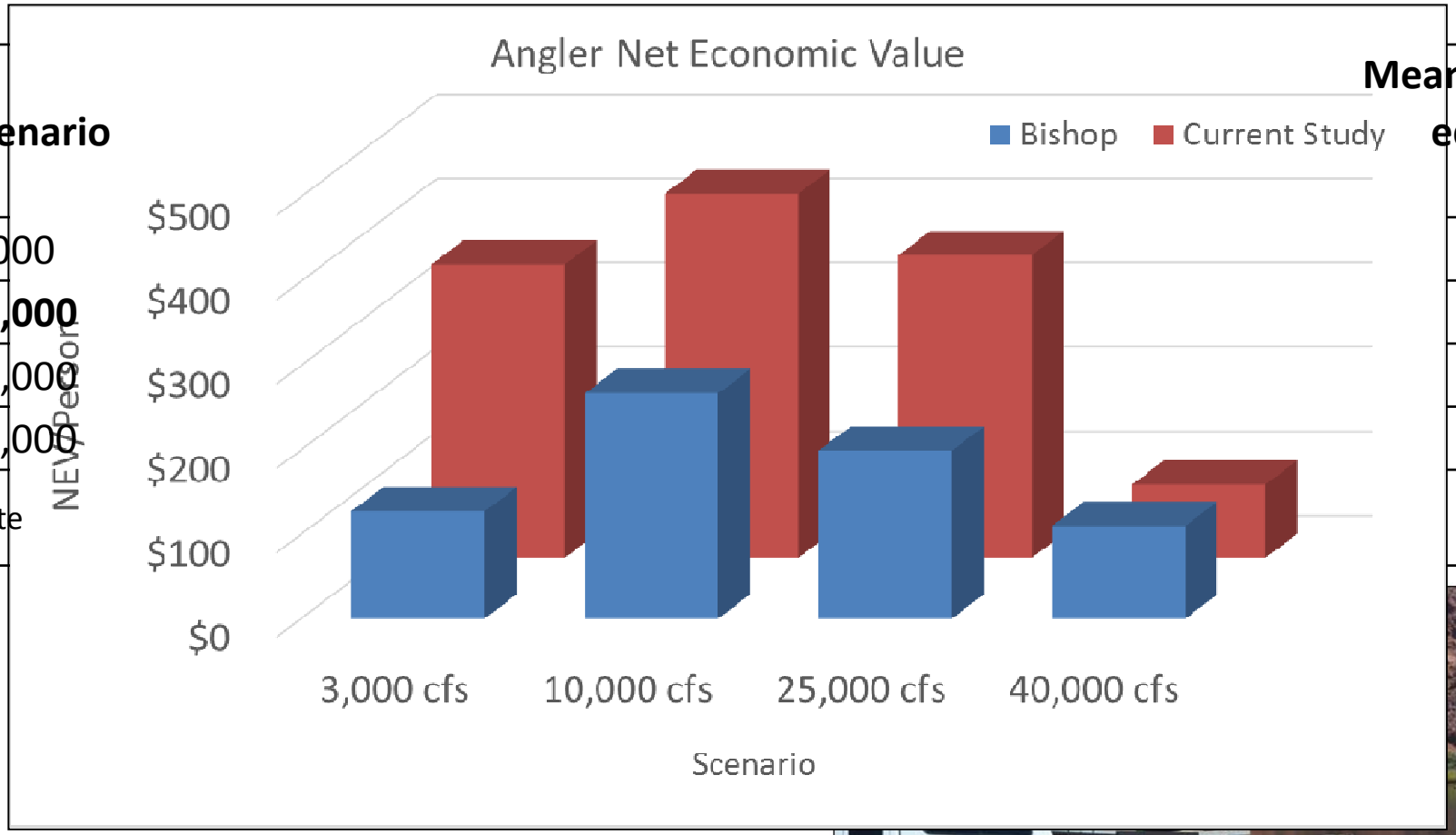
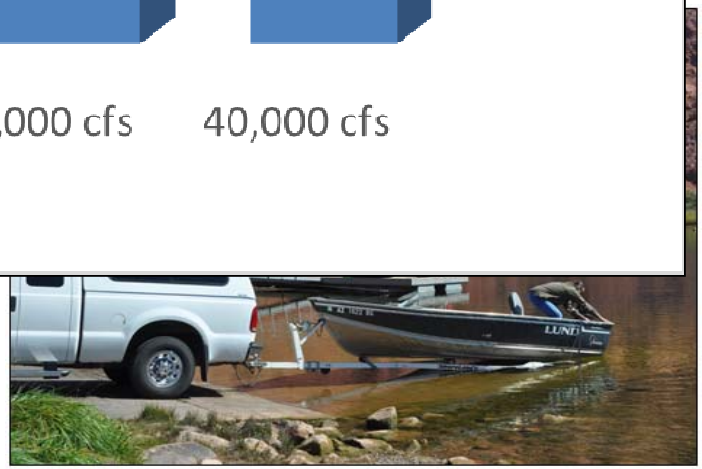
Angler Economic Value*

Scenario	Mean ed
3,000	
10,000	
25,000	
40,000	
Note	





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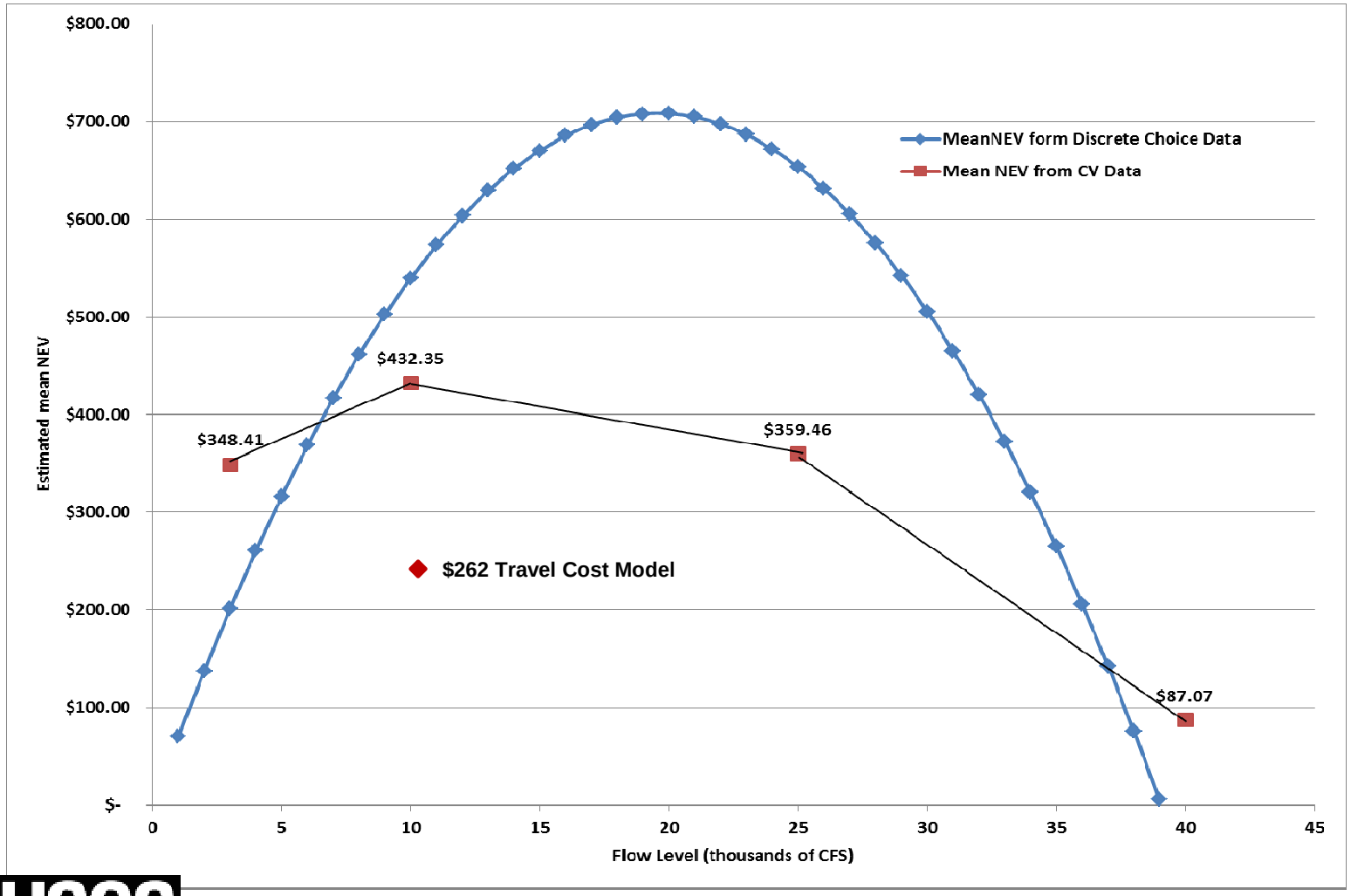
Angler Question Format*



*Preliminary data, do not cite

Regional Expenditures*

Angler Expenditure	Guided		Non-guided	
	Share	$	Share	$
Guide Fees	31.1%	**$342**	0.0%	$0
Food and beverages	20.4%	**$225**	13.8%	**$51**
Lodging	11.2%	**$123**	22.5%	**$83**
Other	10.3%	$113	13.6%	$50
Restaurant	6.9%	$76	10.9%	$40
Gas and oil	6.1%	$67	24.2%	**$89**
Personal gear	5.5%	$61	4.2%	$15
Boat gear	2.1%	$23	5.5%	$20
Camping fees	2.0%	$22	2.7%	$10
Airfare	1.7%	$19	1.5%	$6
Car rental	1.6%	$18	0.0%	$0
Native American art and craft	1.0%	$11	1.0%	$4
		$1,101		**$369**
	Local	**$861**		**$268**

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Nonmarket Values: Recreation

- Non-market values exist
  - Consistent over time (ranking and absolute value)
  - Consistent across methods
- How do we use them in improving management
  - Scenario analysis using varying spatial and temporal aspects of resource use and management

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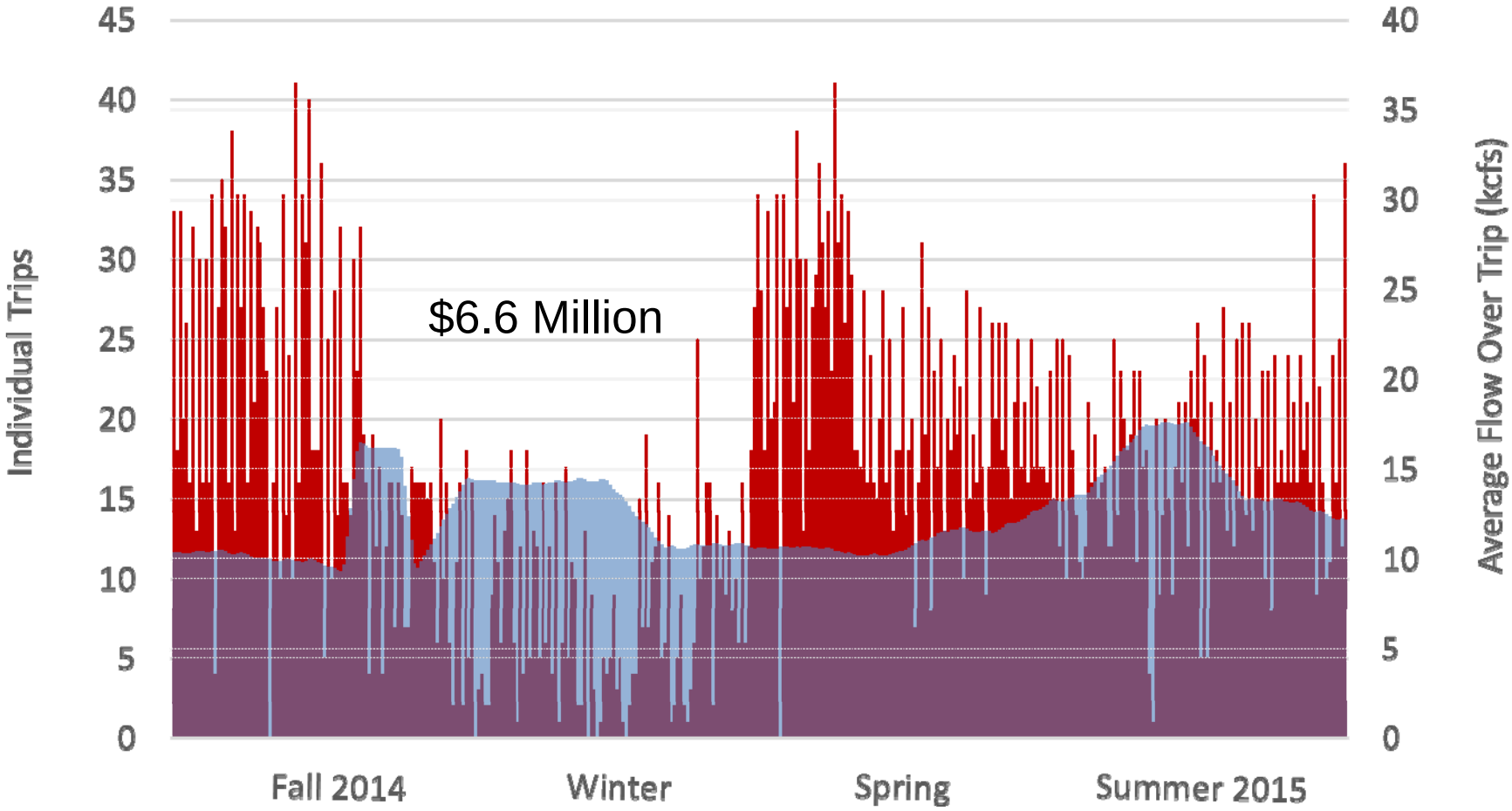
Scenario Analysis: Private Whitewater*



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2018-2020 Triennial Workplan

- Understand how flows influence trip attributes and associated preferences and economic benefits
  - Whitewater floating
  - Lees Ferry angling
  - Other user groups?
- Conceptual model
  - LTEMP EIS
- Revisit 2005 PEP

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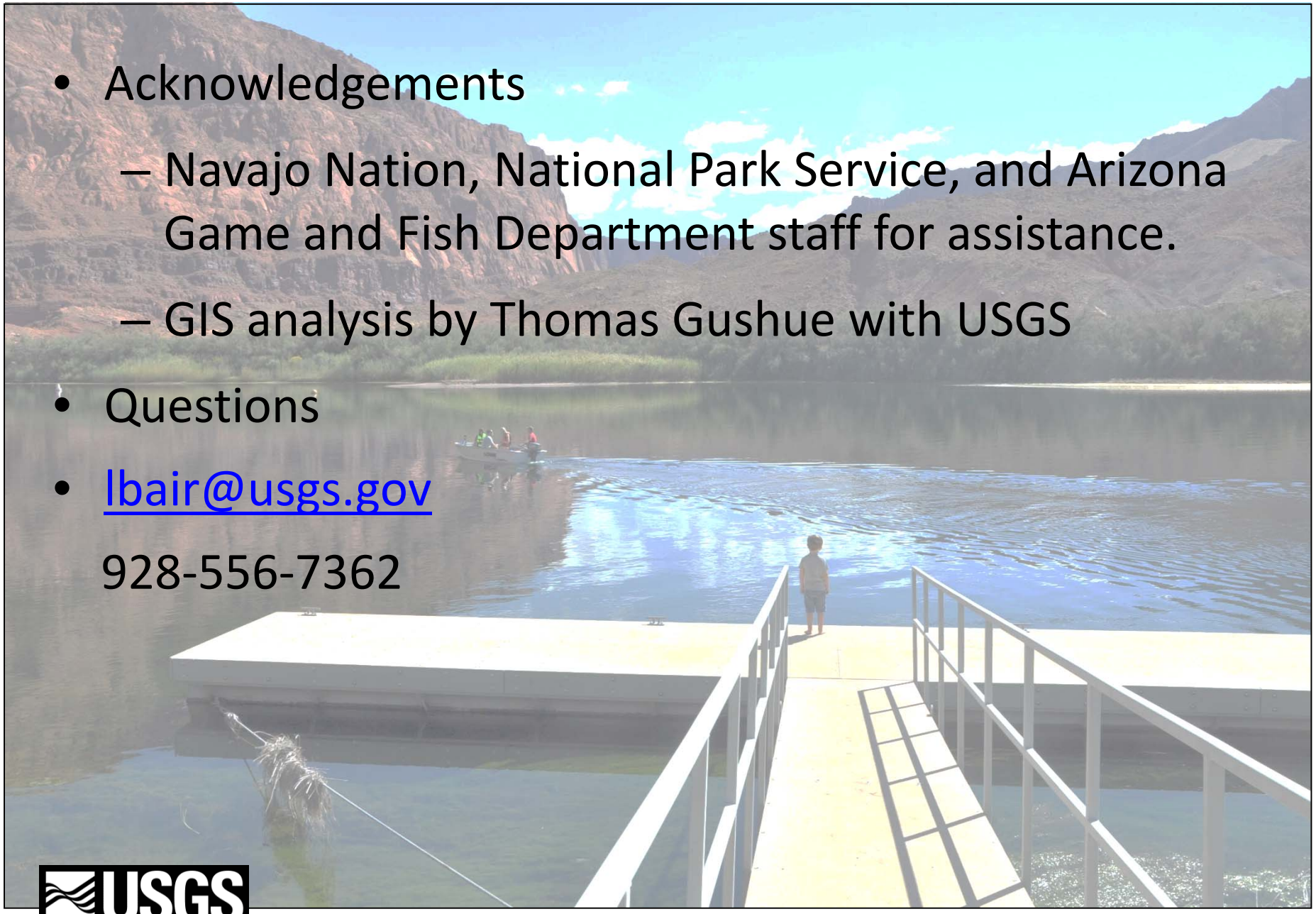

- Acknowledgements
  - Navajo Nation, National Park Service, and Arizona Game and Fish Department staff for assistance.
  - GIS analysis by Thomas Gushue with USGS

- Questions

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  928-556-7362

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