VALUING ECOSYSTEM SERVICES OF AN IMPACTED WATERWAY IN THE SOUTHWESTERN US




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Study Background

- Goals
  - Value impacted ecosystem services
  - Value "Final Ecosystem Services"
  - Target Total Economic Value
  - Provide info useful for river management
  - Develop in-house valuation capacity
- Funding sources:
  - US EPA ORD/Nat'l Science Foundation
- Partnerships:
  - USGS/University of Arizona/Arizona State University

Site Information

- Effluent-dominated waterway & urban resource
- Riparian ecosystem where surface water is scarce
- Uncertain future

What are the Final Ecosystem Services?

Tumacacori, AZ

North of Amado, AZ

Near W. St. Mary's Rd., Tucson, AZ

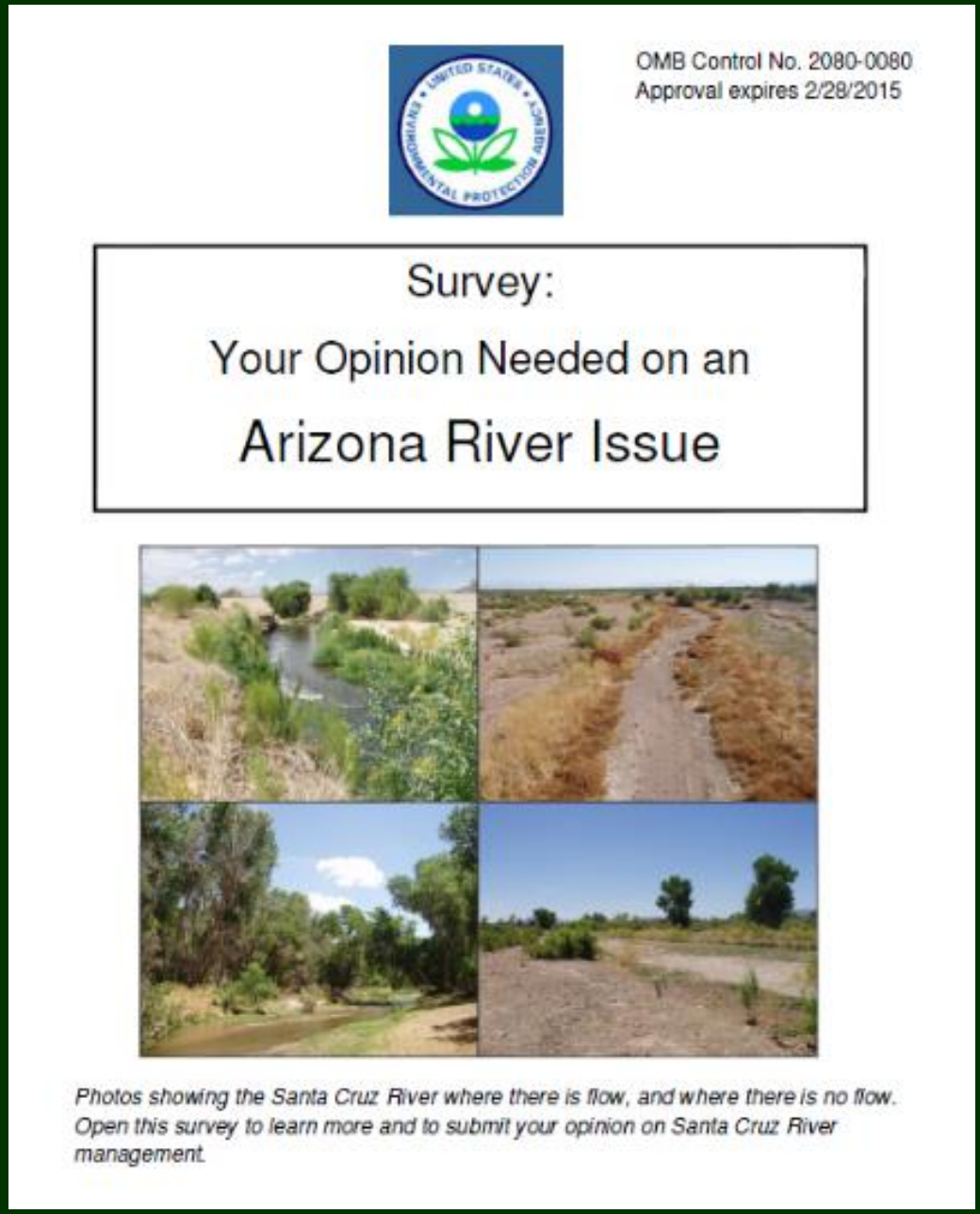
Near W. El Camino del Cerro, Tucson, AZ

14 Focus Groups & 46 Individual Interviews

- Results in: *Landscape & Urban Planning (2015) 133:37-52*
- Expect an recursive approach for pretesting
- Visible river flow & trees were top attributes & seen as linked
- Surface water is cognitively associated with water supply scarcity concerns
- Mixed feelings regarding rivers with treated wastewater

Survey Overview

- Stated Preference Survey
- Choice Experiment
- Up to 5 contacts by mail
- ~26% response rate overall



OMB Control No. 2080-0080
Approval expires 2/28/2015

Survey:

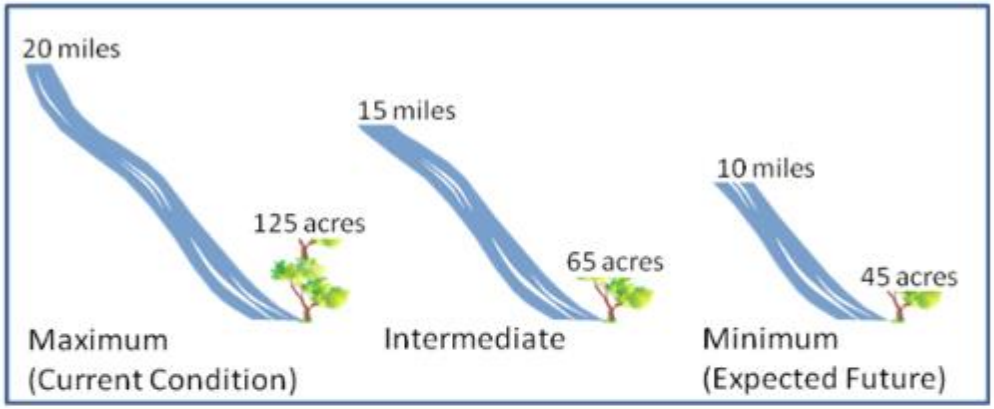
Your Opinion Needed on an

Arizona River Issue

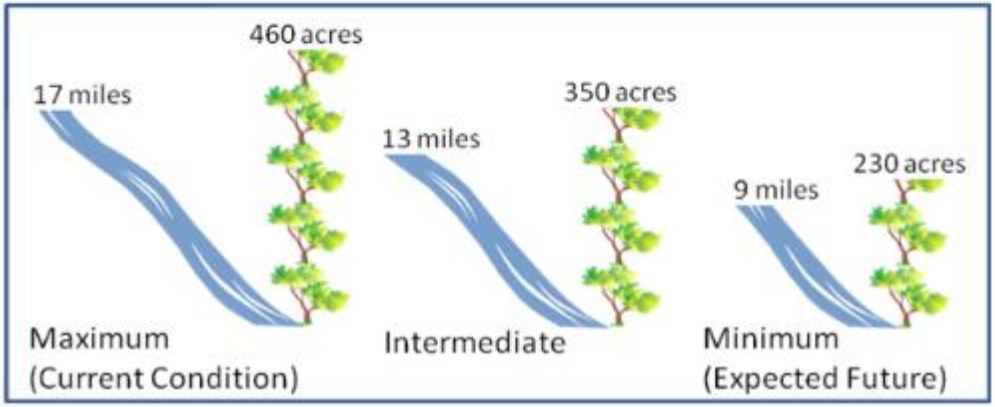
Photos showing the Santa Cruz River where there is flow, and where there is no flow. Open this survey to learn more and to submit your opinion on Santa Cruz River management.

Quantified Attributes

Summary of North Flow and Forest Possibilities



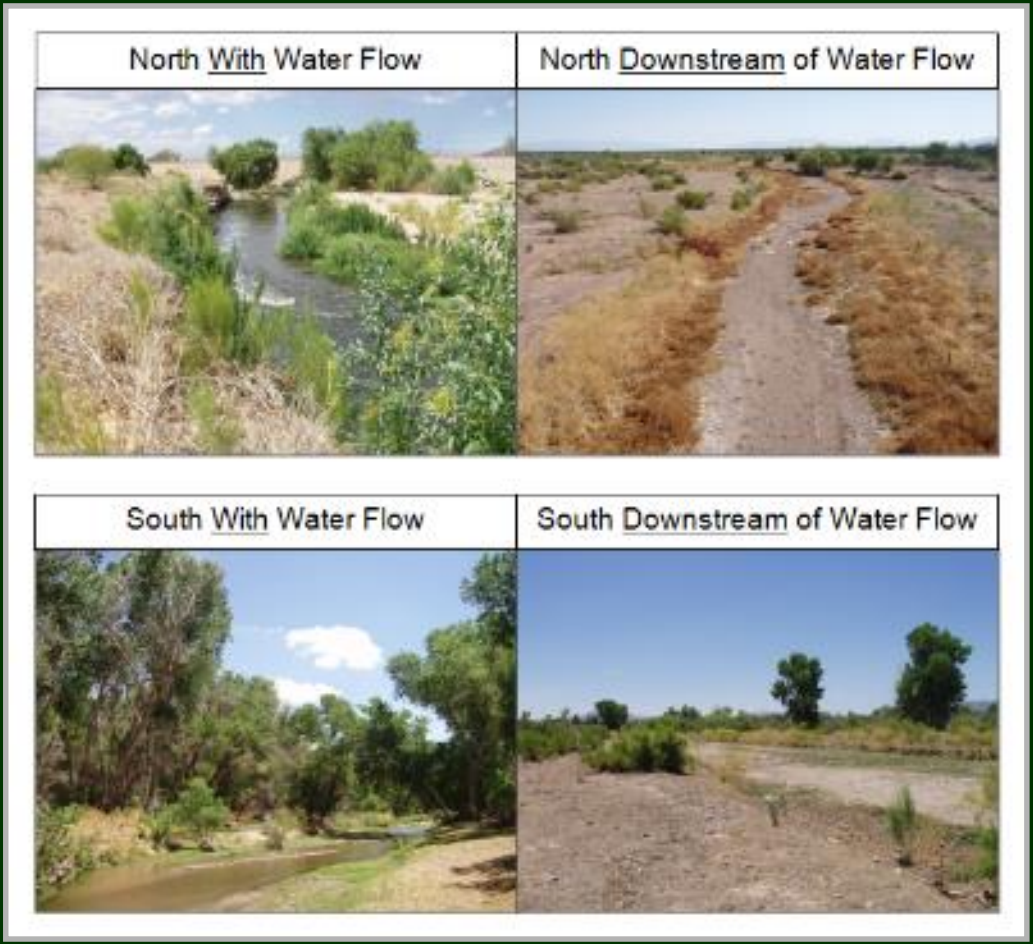
Summary of South Flow and Forest Possibilities



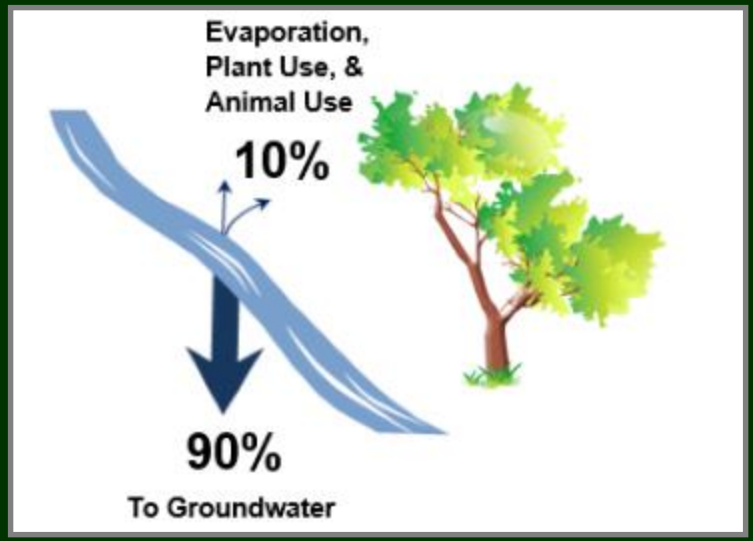
FULL BODY CONTACT:

During stormflows, the water quality is not considered safe for any type of human contact. However, during low-flow times the water in the North and South is currently considered safe for wading. Water quality could be improved to be considered safe for full body contact such as submersion during low-flow times. This would require further measures to control bacteria, which would mean an increase in taxes to pay for these measures.

Background Information



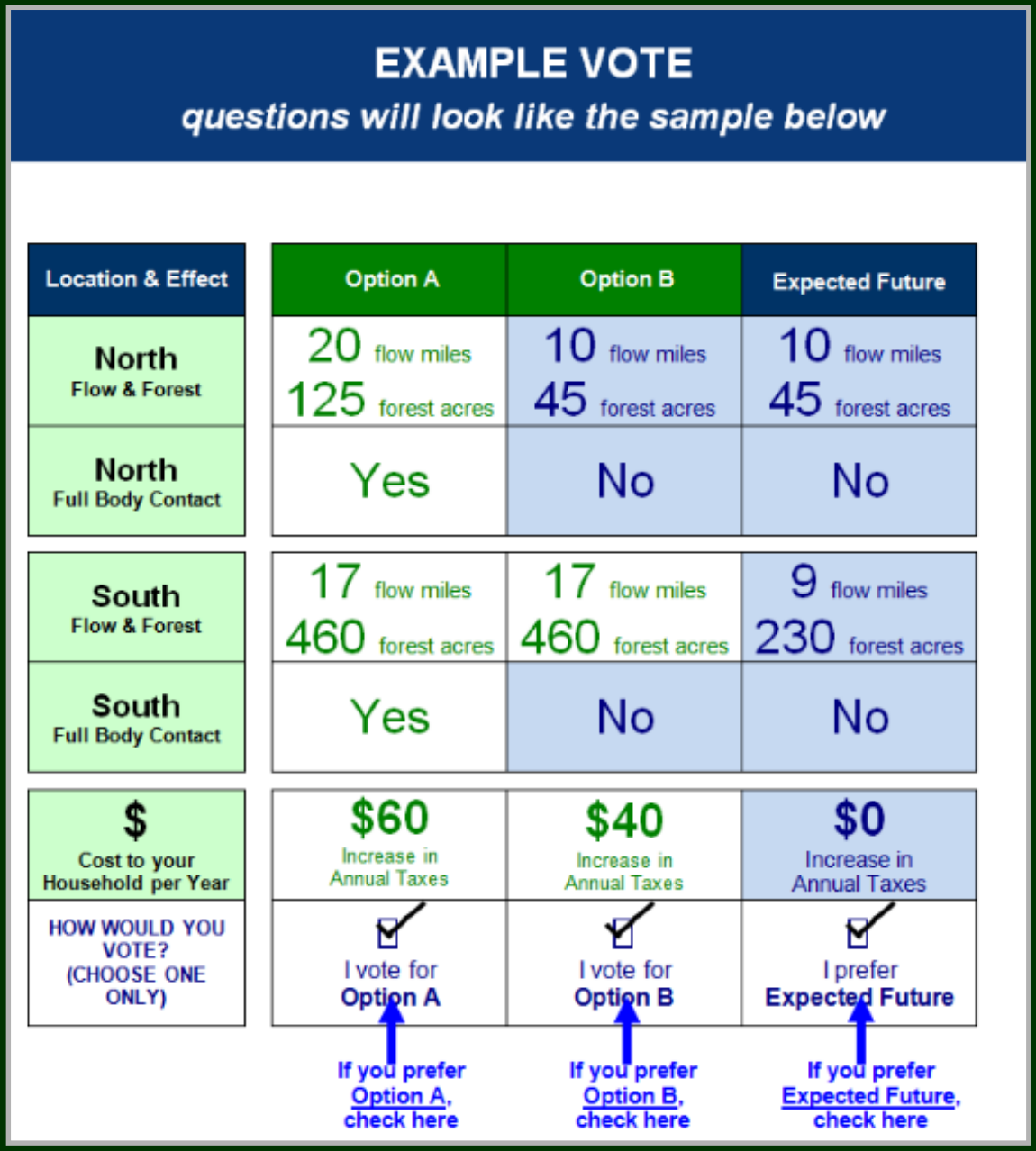
Photos as well as illustrations were used since many people were unaware of the perennial effluent dominated reaches.



The consumptive use of the riparian ecosystem, as well as the relationship of the perennial flow to groundwater was described.

Research Design

- Ecological Attribute vs. Recreational Attribute
- North Reach vs. South Reach
- Tucson Residents vs. Phoenix Residents



Analysis

- Choice Observations drive statistical model

$Utility_{household}$ =
f(Price, Resource Changes, SocioDemographics)

- Discrete Choice Modeling:
  Multinomial Logit Estimation

Preliminary Results

Parameter	Tucson n=260	p-value	Phoenix n=149	p-value
ASC: Chose Preservation	-26.70	0.011	-37.88	0.0018
Cost	-0.0153	0.000	-0.0254	0.000
North Intermediate	0.424	0.001	0.366	0.0134
North Maximum	0.709	0.000	1.121	0.000
North Body Contact	-0.139	0.223	0.236	0.0774
South Intermediate	0.509	0.003	0.944	0.000
South Maximum	0.744	0.000	1.18	0.000
South Body Contact	-0.122	0.190	0.0732	0.532
Year of Birth	*0.0134*	*0.0121*	*0.0189*	*0.0024*
Male	*-0.228*	*0.172*	*-0.343*	*0.0629*
Donated to Envi Org	*1.522*	*0.000*	*1.45*	*0.000*
Household Size	*-0.152*	*0.0311*	*-0.0304*	*0.644*
Aware of River Location	*0.220*	*0.249*	*0.0960*	*0.602*

Preliminary Results

Willingness To Pay per Household per year (2014$)	Tucson	95% CI	Phoenix	95% CI
North Intermediate	$ 27.71	+- $ 16.33	$ 14.45	+- $ 11.19
North Maximum	$ 46.39	+- $ 17.88	$ 44.22	+- $ 12.80
South Intermediate	$ 33.32	+- $ 18.72	$ 37.22	+- $ 13.50
South Maximum	$ 48.69	+- $ 18.11	$ 46.43	+- $ 13.19

Preliminary Results

Willingness To Pay per Household per year (2014$)	Tucson	Phoenix
North Intermediate	$ 5.54 / mi	$ 2.89 / mi
North Maximum	$ 4.64 / mi	$ 4.42 / mi
South Intermediate	$ 8.33 / mi	$ 9.31 / mi
South Maximum	$ 6.09 / mi	$ 5.80 / mi

Conclusions (based on preliminary results)

- Qualitative research provided the foundation
- Humble resources can be valuable
- Values respond to changes in scope
- Unusual results for "swimmable" water quality
- Support for non-use motivations, despite impacted resource status and urban proximity
- Similarities and differences between Tucson and Phoenix responses

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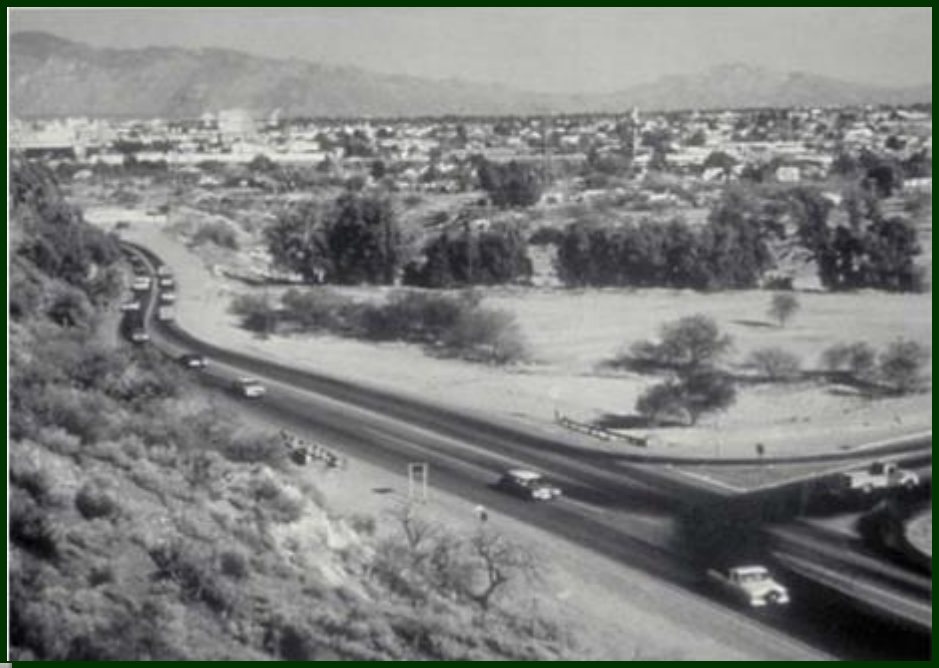
Repeat Photography: 1904 and 1981
West Branch of the Santa Cruz River
Photos by NOAA



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