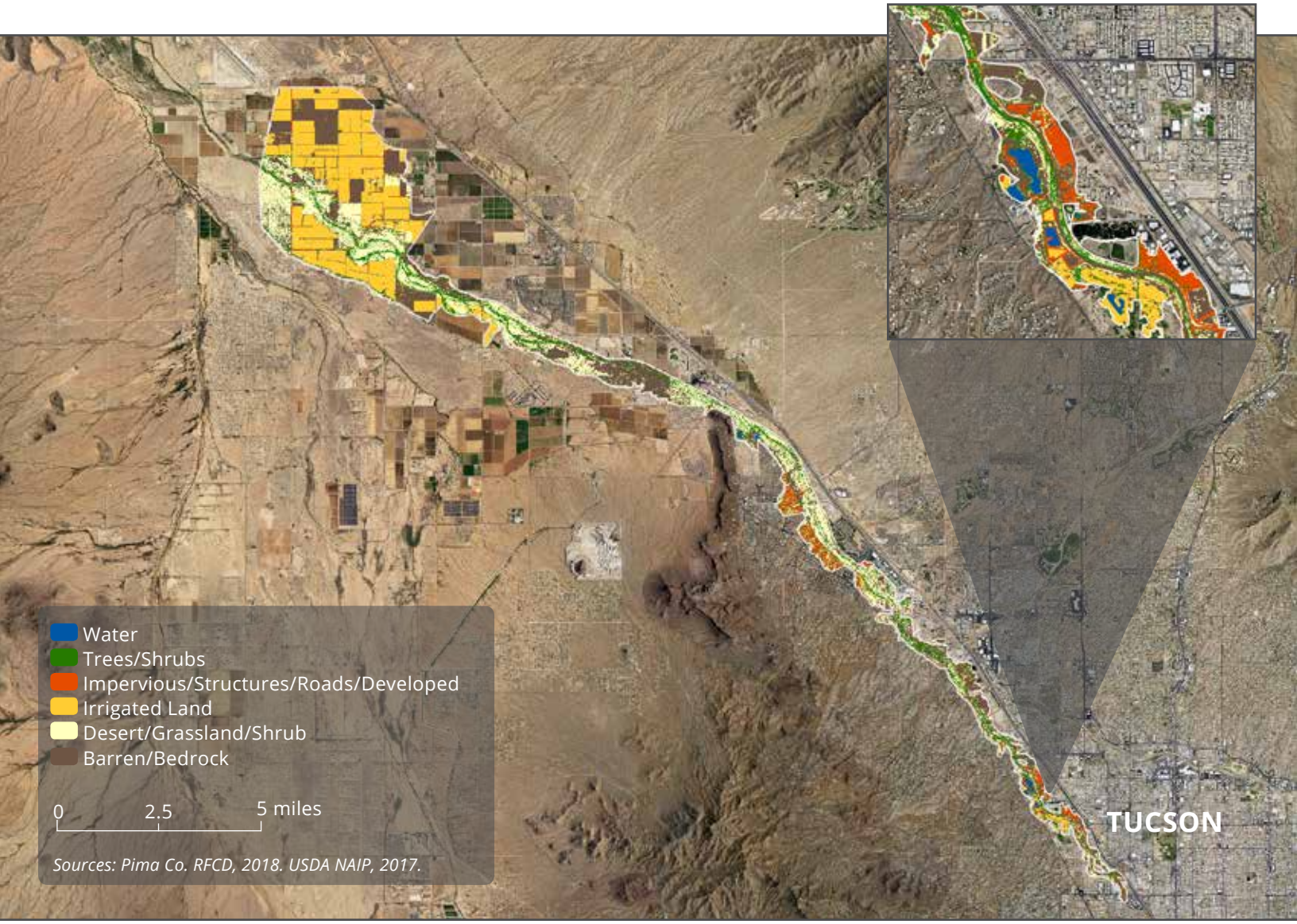
The economic value of

NATURAL CAPITAL IN THE SANTA CRUZ FLOODPLAIN

THE SANTA CRUZ FLOODPLAIN IS AN $800 MILLION ASSET

For thousands of years the Santa Cruz River and it's floodplains have served as a vital resource for surrounding communities, providing benefits from flood mitigation and water capture to birding and ecotourism. These are several examples of ecosystem services. **By conducting an Ecosystem Services Valuation (ESV) we work to assign value to ecosystem services - or the benefits people derive from nature, which have been traditionally overlooked when creating sustainable solutions.** This study values riparian ecosystems along a 23 mile stretch of the Santa Cruz River north of Tucson, Arizona.



The ecosystem services values in this document are preliminary estimates. They are intended for awareness-building, education, and making the case for a more comprehensive valuation. They should not be cited in litigation, official project evaluations, or policy development.

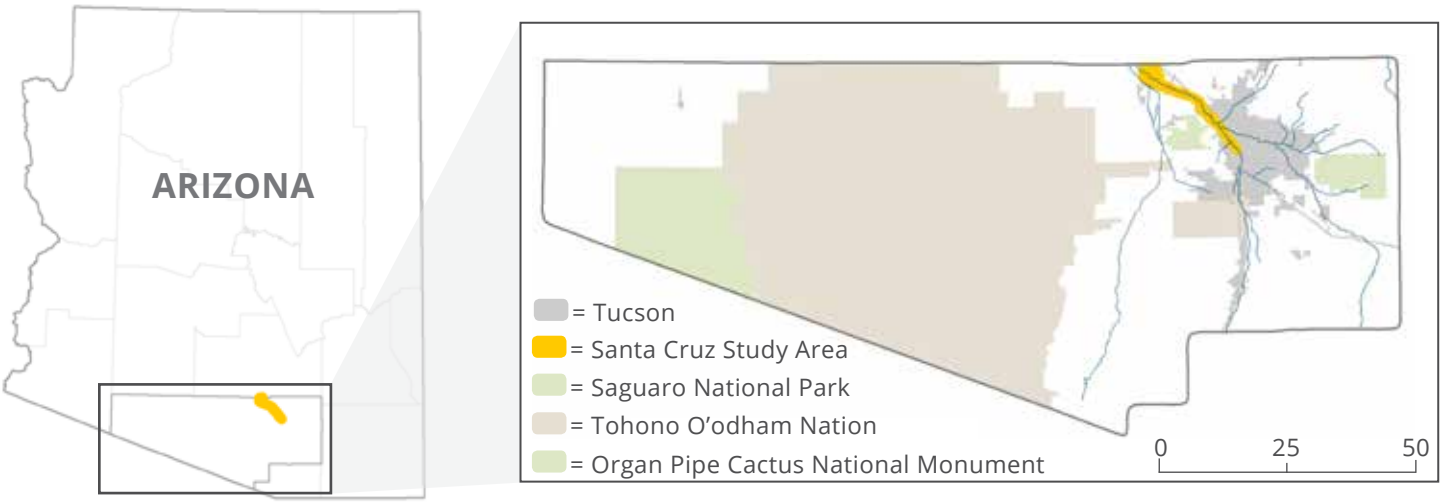
OUR APPROACH

to identify, value, aggregate, and calculate value for the Santa Cruz River.

1 IDENTIFY + VALUE
Ecosystem Services by Land Cover Type

2 AGGREGATE
Annual Ecosystem Service Values

3 CALCULATE
Asset Value



BENEFIT TRANSFER METHOD

enables us to effectively estimate the value of ecosystem services.

The Ecosystem Services Valuation (ESV) conducted for the Santa Cruz River study area is based on existing, comparable land cover data and applied to the study area through the Benefit Transfer Method (BTM). This is achieved by using the Earth Economics Ecosystem Valuation Toolkit™, a database comprised of thousands of values in published ecosystem valuation research. The values are categorized by geographic location and a variety of ecosystem characteristics. Applicable values are 'transferred' to the study area based on geographic, climatic, and ecosystem comparability - achieving an appropriate application of BTM for the study purpose, in this case education and awareness raising. The results provide us with a first analysis of natural capital assets and values in the Santa Cruz River study area using existing conditions derived from 2' resolution land use land cover data (2018; available from Pima County).

Source: USGS The National Map

BASELINE ANALYSIS

through the Benefit Transfer Method.

TOTAL ANNUAL VALUE

PRELIMINARY ANALYSIS INDICATES THAT THE STUDY AREA PROVIDES AN ESTIMATED **$32 MILLION ANNUALLY IN ECOSYSTEM SERVICE VALUE**.

The estimated annual value of the study area is captured by aggregating the identified ecosystem services for each land cover type.

Note: Impervious/Structure/Road land surfaced did not provide measurable ecosystem services value though the built environment represented by these classes clearly do provide other values to the community. Barren/Bedrock did not provide measurable ecosystem service values.

ANNUAL VALUES, BY LAND COVER TYPE

LAND COVER TYPE	ACRES (TOTAL)	TOTAL VALUE
Water	71	$306,000
Trees/Shrubs	1,334	$25,582,900
Irrigated Land	3,656	$2,859,400
Desert/Grassland/Shrub	3,432	$2,892,400
Barren/Bedrock	3,491	$0
Impervious/Structure/Road	667	$0

ASSET VALUE

WHEN A 2.75% DISCOUNT RATE* IS APPLIED, THE SERVICES PROVIDED BY **THE AREA IS ESTIMATED AT $814 MILLION** OVER THE NEXT 50 YEARS.

The ecosystems within this study area could potentially provide millions of dollars worth of services for future generations.

** "Annual Interest Rate Certification" (n.d.) TreasuryDirect. Retrieved from: https://www.treasurydirect.gov/govt/rates/tcir/tcir_fy2018_opdirannual.htm*

DISCOUNT RATES, BY 50-YEAR PERIOD

DISCOUNT RATE	HIGH VALUE
0%	$1,582M
2.75%	$854M
7%	$437M

GAP ANALYSIS

identification of baseline services valued and opportunities for further research.

This baseline analysis values 16 different ecosystem goods and services across ecosystem types within the Santa Cruz River floodplain. Additional site-specific data and more focused valuation studies would refine values by better accounting for functions and attributes unique to the study region, including recreation, habitat, and water capture.

ECOSYSTEM GOODS AND SERVICES	WATER	TREES/ SHRUBS	DESERT/ GRASSLAND/ SHRUB	IRRIGATED LAND	URBAN GREENSPACE
PROVISIONING					
Food	⚪	⚪	⚪	🟠	⚪
Medicinal Resources	⚪	⚪	⚪	⚪	⚪
Ornamental Resources		⚪		⚪	
Energy and Raw Materials	⚪	⚪	⚪	🟠	⚪
Water Storage	🟠	🔵	🟠	🔵	🔵
REGULATING					
Air Quality	⚪	🔵	🟠	🔵	🔵
Biological Control	⚪	🔵	🔵	🟠	⚪
Climate Stability	⚪	🟠	🟠	🟠	🔵
Disaster Risk Reduction	⚪	🟠	🟠	⚪	🔵
Genetic Transfer	⚪	🔵	🔵	🟠	⚪
Soil Formation	⚪	🔵	🔵	🟠	⚪
Soil Quality	⚪	🔵	🔵	🔵	⚪
Soil Retention	⚪	🔵	🟠	🟠	
Water Quality	⚪	🔵	🔵	🔵	🔵
Water Supply	⚪	🔵	🔵	🟠	🔵
Navigation	⚪				
SUPPORTING					
Habitat and Nursery	🟠	🟠	🔵	🔵	⚪
INFORMATION					
Aesthetic Information	🔵	🟠	🟠	🟠	🔵
Cultural Value	⚪	⚪	⚪	⚪	⚪
Recreation and Tourism	🟠	🟠	🟠	⚪	⚪
Science and Education	🔵	🔵	🟠	⚪	⚪

🟠 = VALUED IN PRELIMINARY ASSESSMENT 🔵 = COULD BE VALUED IN COMPREHENSIVE ASSESSMENT ⚪ = EXISTS, BUT NOT VALUED BLANK = UNKNOWN

RECOMMENDATIONS

Earth Economics has prepared detailed recommendations in the supplemental document, which include:

- Specific Ecosystem Services that were identified and valued.
- Building stakeholder awareness of the contribution of Santa Cruz River ecosystems to community wellbeing.
- Deepening and expanding the initial rapid valuation, by incorporating more local data and refined estimation methods.
- Evaluating Return on Investment of different possible future structural and non-structural improvements.
- Developing an implementation plan which considers more diverse funding mechanisms and financial accounting.