

# ***Natural Resource Plan***

Proposed Valuation of Natural Resource Programs

RRSC Meeting

January 19-20, 2011





# *Proposed Benefits Valuation:* **Discussion Topics**

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- ◆ Cardno ENTRIX Overview
- ◆ Purpose of Analysis
- ◆ Framework and Methodology
- ◆ Example Findings
- ◆ Questions



# Cardno ENTRIX Overview: Our Firm and Economics Group

## ◆ Cardno ENTRIX

- Natural resource management and environmental consultancy with 48 offices nationwide and 900 employees
- Subsidiary of Cardno Limited, a global provider of physical and social infrastructure services with more than 150 worldwide offices and over 3,700 employees



**Down to Earth. Down to Business.™**

## ◆ Economics Group of ENTRIX

- 27 Natural resource and environmental economists
- Expertise in diverse resource areas (e.g., water resources, energy, species and habitat, agriculture, recreation, land use, cultural resources)
- Expertise with diverse methods (e.g., non-market valuation, cost benefit analysis, regional economic impact analysis, natural resource damage assessment, financial feasibility analysis, economic development, econometric/mathematical/statistical modeling)

# *Purpose of the Analysis:* Objectives and Advantages of Economic Valuation



- ◆ Objective:
  - Assess, analyze, and report on the potential or expected benefits resulting from the biological, cultural, recreation, and water resource management programs being considered in the NRP
  
- ◆ Use of information:
  - TVA is using benefits information to help prioritize NRP programs and identify the preferred alternative for the EIS
  
- ◆ Advantages of economic valuation:
  - Clarify objectives and positive outcomes of NRP programs
  - Identify relevancy of NRP programs to people (i.e., who benefits, what number of people benefit, and how they benefit)
  - Transparency in decision-making process
  - Identify best use of funds



# Framework and Methodology: Scale of the Analysis

- ◆ Geographic scope:
  - 293,000 acres of TVA-managed lands
  - Water resources in entire Tennessee River watershed
- ◆ Breadth and depth of NRP analyzed:
  - A benefits analysis was performed on each program option for each resource area
  - 179 program activities/goals across four program options (see example table below)
  - 716 total combinations of activities/goals and program options to value
- ◆ Example program option table (Cultural Resources):

Program Category	Program	Goals and Activities	Program Options			
			Current	Custodial	Enhanced	Flagship
Cultural Resource Management	ARPA	Conduct ARPA Inspections with ___ security checks per year	1000	by reported incident	2500	5000
Cultural Resource Management	ARPA	Train and outfit new officers and train ARPA specialists			•	•
Cultural Resource Management	Archaeological Monitoring and Protection	Protect archaeological site of ___ tributary shoreline miles (TSM) OR ___ main stem shoreline miles (MSM) per year	2 TSM OR MSM	0.3 - 0.4 TSM OR 0.4 - 0.6 MSM	0.4 - 0.6 TSM OR 0.9 to 1.1 MSM	1.1 - 1.3 TSM OR 1.9 to 2.1 MSM
Cultural Resource Management	Archaeological Monitoring and Protection	Monitor archaeological site along ___ miles of shoreline per year	mitigation projects only	150 miles	250 miles	500 miles
Cultural Resource Management	Native American Consultation	Coordinate Consultation with federally recognized Indian tribes	•	•	•	•
Cultural Resource Management	Native American Consultation	Conduct formal consultation workshops with federally recognized tribes every ___ years	5 years	5 years	3 years	2 years
Cultural Resource Management	NAGPRA	Ensure NAGPRA compliance	•	•	•	•



# Framework and Methodology: Benefit Categories

◆ Framework:

- Define types of positive outcomes (“Benefit Category”)
- Identify potential or expected benefits from each NRP program option
- Develop unit estimates of benefits that are scalable for different program options

Benefit Category	Definition
— Recreation / Visitor Use Benefit	— Benefits to recreationists/visitors of experiences on TVA-managed lands
— Water Resource Benefit	— Direct benefits of water resource management related to the provisioning of water supplies and stabilization of shoreline areas
— Species / Habitat Conservation and Abundance	— Biological resource benefit of enhancing or preventing degradation of biological resources
— Cultural Resource Preservation	— Cultural resource benefit of preventing degradation of cultural resources
— Management Data and Scientific Knowledge / Reduce Compliance Costs	— Benefits related to increased knowledge or data availability to TVA resource managers and benefit to TVA associated with reduced compliance or resource management costs
— Public Perception, Partnerships, Outreach	— Benefit of increased public knowledge; benefits associated with developing partnerships with local and regional entities; and benefits related to enhanced public perception

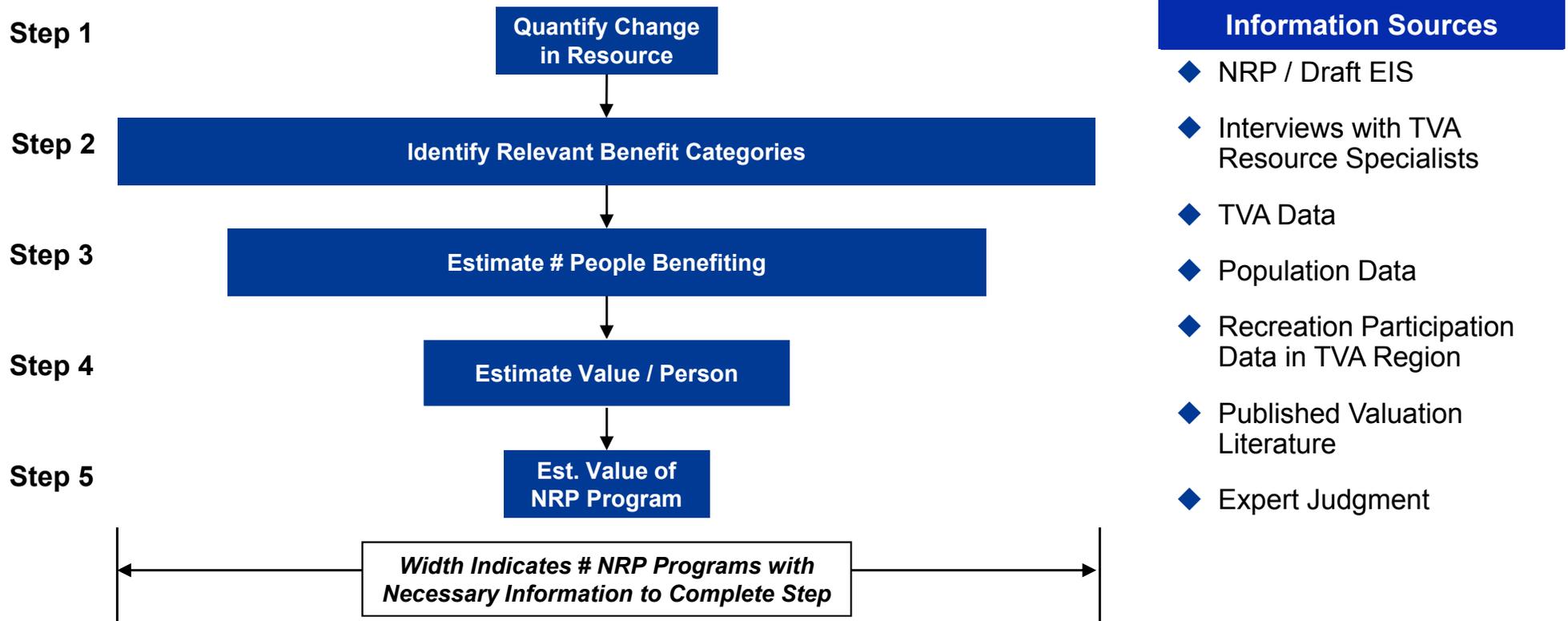


# Framework and Methodology: Valuation Process and Data Sources

- ◆ In general, economic valuation of the NRP requires defining the benefits to people of changes in the quantity and quality of resources:

$$\text{Economic Value} = \text{Number of People Benefiting} \times \text{Average Value Per Person of Change}$$

- ◆ TVA requested that the analysis use published literature or existing values/data as a means to determine quantitative values and professional expertise to determine qualitative values
- ◆ Below is the 5-step process used to evaluate each program option's potential benefit:





# Framework and Methodology: Achievable Steps by Benefit Category

Valuation Steps <i>(shown on previous slide)</i>		Benefit Category					
		Recreation/ Visitor Use	Water	Species / Habitat	Cultural Preservation	Knowledge/ Cost Savings	Perception/ Partnerships
1	Identify/Quantify Change	✓	✓		~	~	
2	Identify Relevant Benefit Categories	✓	✓	✓	✓	✓	✓
3	Estimate # People Potentially Benefitting	✓	✓	✓	✓	✓	~
4	Estimate Value / Person of Change	✓	✓	~			
5	Estimate Total Value of NRP Program	✓	✓		~		

✓ Information Typically Available for Benefit Category

~ Limited Information Available Benefit Category



## Example Findings:

# Biological Resource Management Benefits

- ◆ Benefits were captured in a benefits table for each program by program option (example, Biological Resource Management, Enhanced Program Option):

Program	Benefit Category					
	Recreation/ Visitor Use	Water	Species / Habitat	Cultural Preservation	Knowledge/ Cost Savings	Perception/ Partnerships
Land Condition Assessment and Land Stewardship Maintenance	Value to recreationists of habitat improvement estimated at \$3 to \$30 per acre	Knowledge of resource conditions can enhance prioritization of resource enhancement activities	Knowledge of resource conditions can enhance resource protection of resource enhancement activities	Knowledge of resource conditions can enhance prioritization of resource enhancement activities	Together with Endangered and Threatened Species, Natural Heritage Database and Wetland Database, current management cost savings to TVA of an estimated \$18.5 million annually	Positive perception of stewardship activities
Boundary Maintenance	Preventing encroachment and unlawful uses provide potential benefit to recreationists. Value to recreationists of habitat improvement estimated at \$3 to \$30 per acre	Potential increased protection of resources	Potential increased protection of resources	Potential increased protection of resources		Public perception benefit of ensuring no encroachment and appropriate uses



# Example Findings: Summary of Usage Findings

◆ Key usage findings (on an annual basis) of the TVA-service area:

Benefit Category					
Recreation/ Visitor Use	Water	Species / Habitat	Cultural Preservation	Knowledge/ Cost Savings	Perception/ Partnerships
<ul style="list-style-type: none"> <li>— 735,000 TVA Day Use Area Visits/Year (\$10 - \$40 per person per day)</li> <li>— 78,000 Campsite Nights Occupied/Year (\$9 - \$30 per person per day)</li> <li>— 6.5 million Dispersed Recreation Visits/Year (\$10 - \$40 per person per day)</li> </ul>	<ul style="list-style-type: none"> <li>— 2.9 million participate in water-resource based outdoor recreation activities</li> <li>— \$10 to \$30 / year / household of improving 1% of region's water bodies to 'good' water quality</li> </ul>	<ul style="list-style-type: none"> <li>— 4.8 million people in TVA region participate in outdoor recreation activities</li> <li>— 3.2 million people in TVA region view wildlife</li> </ul>	<ul style="list-style-type: none"> <li>— 450,000 people in 18 federally recognized tribes consulted with by TVA</li> <li>— 2.3 million people in the TVA region visit historic sites and 1 million people visit archaeological sites</li> <li>— 7,000 people visited TVA Cultural Resources web pages</li> <li>— \$1-\$5 million potential benefit per shoreline mile stabilized</li> </ul>	<ul style="list-style-type: none"> <li>— Benefits to rate payers and residents in TVA-service area</li> </ul>	<ul style="list-style-type: none"> <li>— Benefits to rate payers and residents in TVA-service area</li> </ul>