



Phase One Report:

Development of Methodologies to Value the Natural Capital
within the Canandaigua Lake Watershed

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October 17, 2011

Background

- Where we came from
 - Original RFP from Association
- What we found
 - Three proposals
- **Bergmann**
 - Would Only Complete Task One
 - \$28,560
- **EDR**
 - Would Complete Tasks One-Two-Three
 - \$29,000
- **Ecologic**
 - Would Complete all four tasks
 - Would also Complete objective one
 - \$38,500
- **Partnership Agreement**
 - Completed all four tasks
 - Largely completed objective four
 - Total cost: \$9,000
 - CLWA share \$4,500

Introduction

- The focus of this project is to rank and value the natural capital within the Canandaigua Lake watershed, and the substantial ecosystem services that it provides.
- The second goal of this project is to identify ways that municipalities, land trusts, county agencies, watershed organizations and other entities could actually use this study to assist them with the identification and prioritization of lands for protection, restoration, and appropriate land use planning techniques.

Defining Our Natural Capital

Natural Capital is:

- “Natural Capital consists of those components of the natural environment that provide a long-term stream of benefits and services to individual people and to society as a whole”

- Costanza et. al (2010) pg. 1

“Natural Capital” provides the following services:

- Higher quality water
- Reduced flooding,
- Reduced filtration costs,
- Increased biodiversity
- Increased habitat quality
- Increased recreational value,
- Increased tourism
- Increased assessed value,
- Increased aesthetic value

Project Objectives

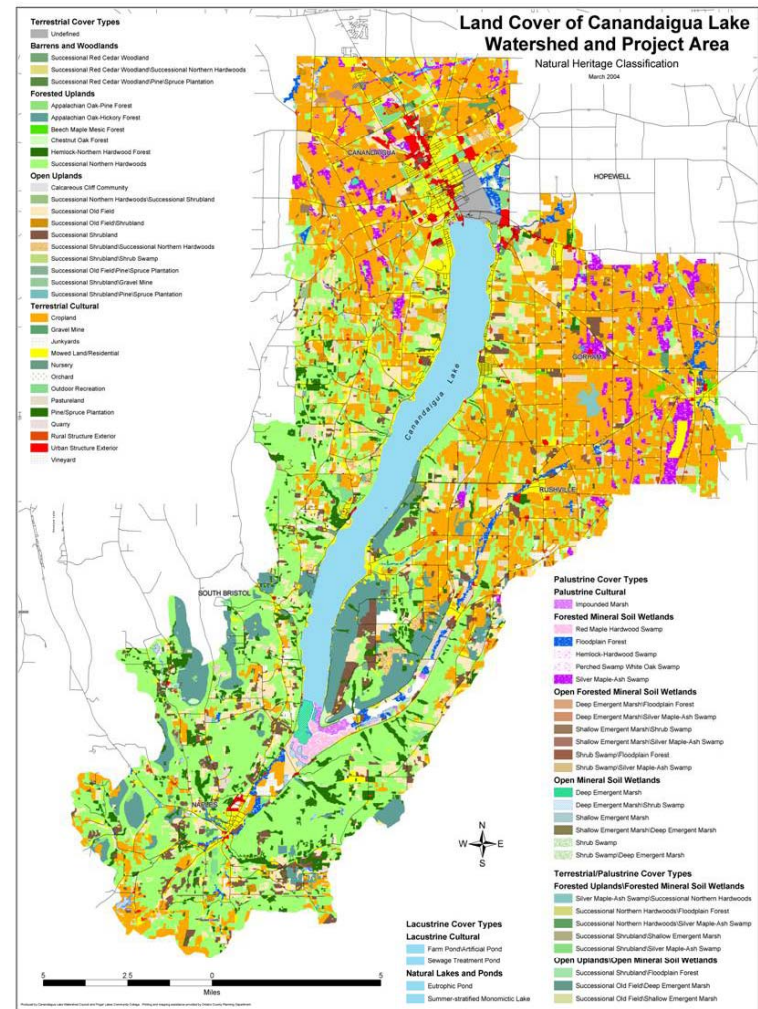
- 1. Assign an **ecologic value** to the natural lands within the Canandaigua Lake Watershed with a specific focus on **habitat value**.
- 2. Assign an **ecological value** to the natural lands within the Canandaigua Lake watershed with a specific focus on protecting **water quality**.
- 3. Assign an **ecological value** to **near shore areas** of Canandaigua Lake.
- 4. Assign an **economic value** to **natural lands** within the Canandaigua Lake Watershed.

Phase One Tasks

- 1. Develop an inventory of all existing local data sets and resources for the Canandaigua Lake watershed.
- 2. Complete a Literature Review and develop an annotated bibliography for 20 reports that provides some level of research and methodology that ranks and/or develops an economic value of natural lands.
- 3. Select 10 reports and complete a more thorough review on the specific ranking of lands from a habitat and water quality perspective. Thoroughly review approaches and methods of completing a land-dollar or natural capital dollar valuation of watershed lands.
- 4. Obtain consensus on specific methodologies to be utilized for each of the objectives listed.

Task One: Inventory

- The Ontario County Planning Department is the watershed's clearinghouse on all Geographic Information System (GIS) layers and datasets that could potentially be used for this project.
- The Canandaigua Lake Watershed Council also is one of the main clearinghouses and report generator for documents and written resources for Canandaigua Lake watershed.



Task Two: Annotated Bibliography

- In total, 52 reports were reviewed and identified in the annotated bibliography.
- The 32 additional reports were reviewed based on the amount of research that has been completed in the field of prioritizing and valuing the “Natural Capital” of land.
- Annotated bibliography was sent to the stakeholder committee for their review and to determine what reports merited further review in Task Three.
- Comments were provided and those reports cited as requiring further review were included in the Task Three review.

Task Three: Analysis of selected Methodologies

- The seven reports and categories of methodology were as follows:
- A. **Ecological Ranking Methodology**
 1. Genesee Land Trust Conservation Plan (2007)
 2. Town of Gorham Farmland Open Space and Resource Conservation Plan (2005)
 3. Maryland's Green Infrastructure Assessment: A Comprehensive Strategy for Land Conservation and Restoration
- B. **Water Protection Methodology**
 1. TPL's Source Water Assessment Project
 2. Raritan Water Resources Protection Open Space Criteria
- C. **Economic Valuation Methodology**
 1. Valuing of New Jersey's Ecosystem Services and Natural Capital (2006)
 2. Valuing the Puget Sound Basin: Revealing Our Best Investments (2010)

Task Four:

- **Obtain consensus on specific methodologies to be utilized for each of the four objectives listed.**

Objectives One & Two

Ecological Value of Habitat and Water Quality

- A consensus was reached to combine objectives one and two into a single methodology that considers both habitat and water quality.
- The model for this methodology will be GIS based and will produce maps with lands ranked from high to low priority.

Two Model Projects :

1. *Genesee Land Trust Conservation Plan*
2. *Trust for Public Land as part of the Source Water Assessment Project*

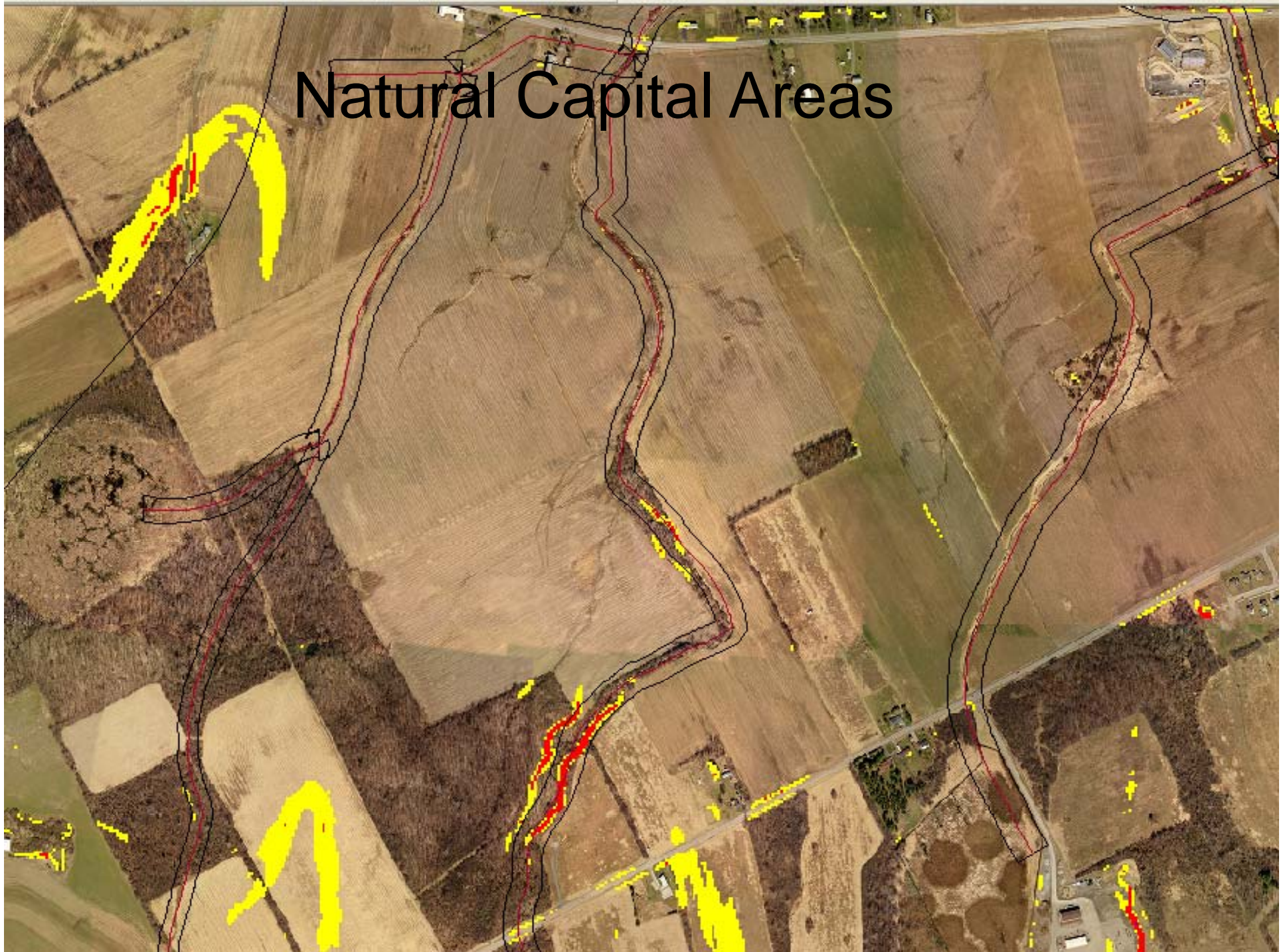
Criteria

- Land Cover
- Distance to Water & Wetlands
- Slope Percentage
- Soil Erodibility
- Soil Permeability
- Land Capability

Ecological Value of Habitat and Water Quality Table

GIS Layer			Score			
Criteria	5	4	3	2	1	0
<i>Land cover (habitat focus)</i>	Wetlands, specific forest types (Bruce will choose)	Successional Northern Hardwoods	Shrublands	SOF		Residential Urban structures Agriculture
<i>Land cover (water quality focus)</i>	Wetlands, All forest types	Mixed forest/ shrubland	Shrubland SOF			Residential Urban structures Agriculture
<i>Distance to water and wetlands (feet)</i>	0-200 feet	200-300	300-500	500-750	750-1,000	>1,000
<i>Slope %</i>	> 50	25-50	15-25	10-15	5-10	0-5
<i>Soil Erodibility</i>	Very High/	High	Medium		Low	
<i>Soil permeability profile</i>	HSG- A soils to be ranked highest	B		C		D
<i>Land Capability classification</i>	2w or greater and hydric soils Floodplains			All others		

Natural Capital Areas



Objective Three: Near Shore Habitat Ranking



- The goal will be to determine where there is high quality littoral zone habitat for the variety of fish species that inhabit this lake.
- Major fish species considered include: bluegills, largemouth bass, smallmouth bass and yellow perch
- The methodology for Objective 3 will consist of evaluating:
 - the substrate of the lake bottom
 - types of macrophytes
 - percent cover of macrophytes
 - Shoreline development
- Gravel substrate is best for bluegills, largemouth bass, and smallmouth bass to spawn while yellow perch prefer inundated vegetation for spawning
- Percent cover is important for all life stages for all four fish species- 20-60% seems optimum
- Need to determine scale in order to measure the specific level of detail we are looking for (ex. Every 100 ft. 500 ft. 1000 ft.) Every 1,000 feet would require 190 segments.
- Specific method will be a combination of the Habitat Suitability Index and EPA method

Objective Four: Economic Valuation

- The economic values for two of the methodologies have been completed for the Canandaigua Lake watershed.
 - (a) Costanza report on *New Jersey's Ecosystem Services* and
 - (b) *Valuing the Puget Sound Basin*.
- Mapping will need to be completed in order to visually display the monetary valuation utilizing these methodologies.
 - (a) NJ Valuation:
 - 1.) \$103,368,906
 - Discount rate of 0.03
 - Total long term value: \$3,445,630,200
 - (b) Puget Sound Valuation
 - Min: \$81,345,071
 - Max: \$342,813,244
 - (c) Hedonic Analysis
 - Compare shoreline land values on Canandaigua Lake vs. Owasco Lake and Conesus Lake

Adapting the Costanza Methodology

Ecosystem Service	Forest	Grass/Rangelands	Freshwater wetlands	Open fresh water	Riparian buffer	Total Canandaigua Lake
Disturbance Regulation			\$3,657		\$88	
Water Regulation		\$2	\$2,986			
Water Supply	\$163		\$1,544	\$409	\$1,921	
Soil Formation	\$5	\$3				
Nutrient Cycling						
Waste Treatment	\$44	\$44	\$838			
Habitat	\$923		\$113			
TOTAL/ ACRE	\$1,135	\$49	\$9,138	\$409	\$2,009	
Area (acres)	45,114	17,739	5,584	657	?	
TOTAL Canandaigua Lake watershed	\$51,204,390	\$869,211	\$51,026,592	\$268,713	\$0	\$103,368,906

Adapting the Puget Sound Method

	Grasslands		Wetlands		Lakes/Rivers		Forests		Riparian		TOTAL	
Ecosystem Services	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Disturbance Regulation									\$8	\$251		
Water Regulation			\$6,765	\$6,765			\$10	\$10	\$10	\$10		
Water Supply			\$194	\$33,419	\$59	\$843			\$2,240	\$13,850		
Soil Formation	\$1	\$1										
Nutrient Cycling			\$7,347	\$7,347								
Waste Treatment	\$51	\$51										
Habitat/Refugia			\$6	\$13,341	\$17	\$1,480			\$278	\$532		
TOTAL/ACRE	\$52	\$52	\$14,312	\$60,872	\$76	\$2,323	\$10	\$10	\$2,536	\$14,643		
Area (acres)	17,739	17,739	5,584	5,584	657	657	45,114	45,114				
TOTAL Canandaigua Lake Watershed	\$913,559	\$914,800	\$79,920,051	\$339,910,532	\$49,945	\$1,526,395	\$461,516	\$461,516	0	0	\$81,345,071	342,813,244

Conclusions

- Each of the Four Tasks within the Partnership Proposal has been completed
- We have developed methodologies for each of the four objectives and have substantially completed two of the methodologies identified in Objective Four.
- We have stayed within or below the Watershed Association share of the agreement.

Needs

- Landcover Data Needs to be Updated
- Riparian Buffer areas need to be further delineated in order to support completing objectives 1/2 & 4
- Objective 3 also needs to be scoped out more specifically in order to better understand the appropriate level budget to satisfy the various stakeholders' needs.
- The partnership needs to determine if they want to send out an RFP to various consulting firms to complete these four objectives or if they want to continue to work with the in-house resources that are available.

Phase II

Preliminary Budget- \$45,000

- updates to the landcover map with a specific focus on the riparian areas **(\$7,000)**
- additional field research on the near shore littoral zone habitat quality **(\$5,000** or more depending on scale)
- GIS mapping of the methodology to complete Objectives One and Two **(\$5,000)**
- Final mapping of Objective 3 after research is completed and we have refined the scope and scale of this research **(\$2,000)**
- Mapping of the work that has been completed for Objective Four **(\$4,000)**
- Complete Hedonic analysis of comparing shoreline values on different Finger Lakes and compare to the FLI water quality research on these lakes **(\$7,000)**
- Report compiling each of these components **(\$15,000)**