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SD-1 Central Boone County Conveyance Project

Presented By: Ben Thompson

SD-1 Central Boone County Conveyance Project

Purpose:

- Sanitation District-1 (SD-1) is a public utility
- The Northern Kentucky experiencing growth
- Growth has put strain on current infrastructure.
- New sewer line design required access to public and private lands

Problems

Landowners:

Had concerns about the sewer line design on their property

Impact Concerns Included:

- Location
- Tree Loss
- Multiple stream crossings

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CEC Conflict Resolution

- Property owner reached out to CEC.
- CEC agreed we could do the work but SD-1 is a client of ours.
- Reached out to SD-1 to negotiate scope of work.

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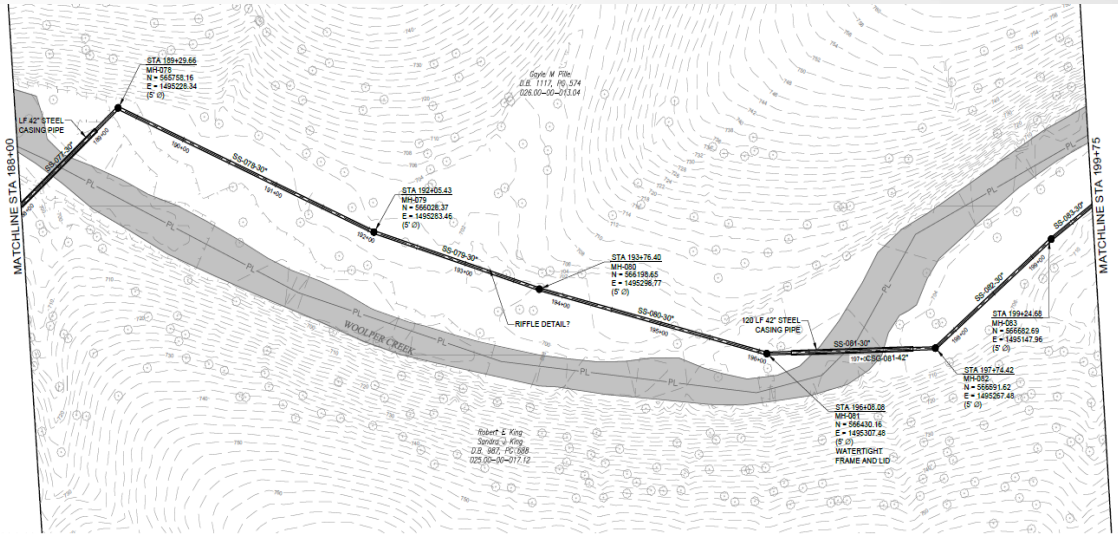
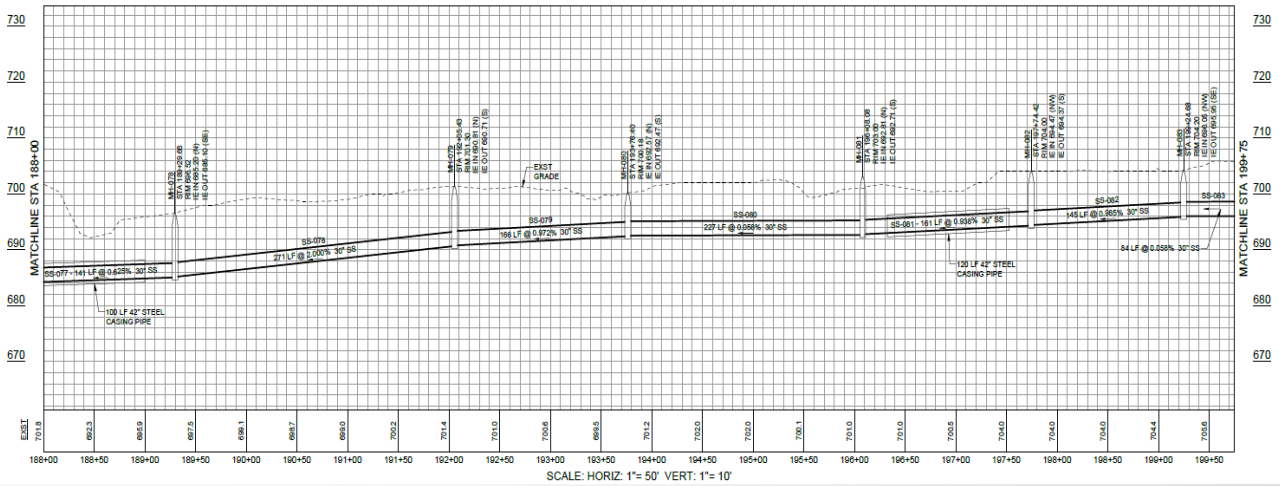
Office Preparation

Process:

- We don’t often do tree valuation inventories
- Experience as an arborist
    - Included:
        - Tree Health
        - Tree diameter
        - Location
- Determine how to collect data and how to present data
- Lack of design details from clients





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Field Work

- Performed our normal Wetland and Waterbody Delineation.
  - Captured all streams and drainages
- Performed the Tree Inventory
  - Included a brief assessment to determine if PRT or not.

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Post Field Work Activities

- Download Data from Arc Enterprise to ArcPro
- All collected data is downloaded
- Data is then QC'd and organized
- Tree Inventory Data
- I-Tree is an app developed by tree care industry leaders.
- Uses collected Tree Data and uses industry valuation standards to develop valuations
- Has a variety of calculations to monetize tree benefits.

Health Classes are used for REPORTING

ID	Description	Condition % >=
1	Excellent	100
2	Good	90
3	Fair	75
4	Poor	50
5	Critical	25
6	Dying	1
7	Dead	0

Data > Inventory Data > Trees

ID	User Tree ID	Crew	Survey Date	Species	Photo ID	DBH 1 (in)	Crown: Condition	Comments
1	{E873F42F-94BF-4CD2-8C20-67F87E4511FE}			Honeylocust (Gleditsia triacanthos)		13.0	60	
2	{0CCD9E99-AECB-402F-B600-1E285AB94DAB}			Bitternut hickory (Carya cordiformis)		17.0	70	
3	{5F6E2389-4171-4D85-910C-F0128D468C4C}			American elm (Ulmus americana)		17.0	70	
4	{8EC363EA-ED5F-4552-81CE-482AEF7CE9ED}			Northern red oak (Quercus rubra)		37.0	70	
7	{A7BB27B0-E70C-481C-BF2A-ED724BCA0FA8}			Sugar maple (Acer saccharum)		7.0	70	
12	{EAC6FE6B-DA4B-47F8-AA85-401E14EB0077}			White oak (Quercus alba)		24.0	80	
16	{BE097122-A73B-4C43-BCC1-F23B1D9565C0}			Northern red oak (Quercus rubra)		35.0	40	
19	{8A0F1459-E1C1-49B7-8F7D-80B873E4DF1F}			Black cherry (Prunus serotina)		7.0	80	
21	{A04A25DA-72A2-4530-9D2F-FC8AA81537FF}			Ohio buckeye (Aesculus glabra)		6.0	80	
24	{E868D7C6-FBED-4AB1-88C7-D267BF59A9C0}			Sugar maple (Acer saccharum)		15.0	20	
25	{15C8F895-EBAC-4F13-8107-9A47681582E9}			Sugar maple (Acer saccharum)		12.0	65	
26	{1A47A044-A615-43FF-A955-B28DBD6A7E62}			Sugar maple (Acer saccharum)		33.0	45	Multistem
27	{74A2E4BB-F090-4A46-868F-D059DC1D0B49}			Black cherry (Prunus serotina)		8.0	60	
30	{36856D35-0356-4817-8F06-F22A4DA652D1}			Northern red oak (Quercus rubra)		35.0	60	
31	{A57F36DE-E776-4849-A044-03318B7DD61F}			Ohio buckeye (Aesculus glabra)		6.0	70	
32	{B1365B18-8C94-4158-A4A2-70E96CAFE028}			Ohio buckeye (Aesculus glabra)		8.0	60	Multistem
33	{9F456A87-2E55-437D-B97E-D07A5AD4771E}			Shagbark hickory (Carya ovata)		22.0	80	
34	{BC13F06D-EDB9-4931-B7B4-BD6EACC37186}			Northern red oak (Quercus rubra)		30.0	60	
35	{E0081670-6C90-4E47-89D1-B7E15F6956DB}			Sugar maple (Acer saccharum)		10.0	80	
36	{3ACB53B4-D2F4-4FC6-BB96-3F6B9D4BF037}			Sugar maple (Acer saccharum)		10.0	80	
37	{5196CB85-E775-41A8-A89F-68E3502FA015}			Sugar maple (Acer saccharum)		8.0	50	
38	{24C9D14E-144D-4F4B-8A9A-A3CF18A8CB24}			Sugar maple (Acer saccharum)		14.0	50	
39	{9041D7C7-BDF3-4451-B4E6-5E3F0D195421}			Sugar maple (Acer saccharum)		12.0	70	
40	{4C2DB386-D39A-4430-AC87-7417A10A18F1}			Sugar maple (Acer saccharum)		9.0	60	
41	{7E65A8A2-8200-45CE-8736-5B926C49D6E8}			Ohio buckeye (Aesculus glabra)		6.0	80	
42	{3DAAF403-FCC0-4DCE-9CE1-4574F7C15952}			Northern red oak (Quercus rubra)		39.0	80	
43	{9EA4EE6F-F1BB-4D7D-93E8-66589ED627E8}			Sugar maple (Acer saccharum)		10.0	80	
44	{58CD8F0E-04CF-4C87-BA1E-2254FF4DD11E}			Sugar maple (Acer saccharum)		8.0	80	
45	{B0217EDA-35D2-41C5-87D3-63486A6DDD76}			Shagbark hickory (Carya ovata)		11.0	60	
46	{593D8A78-67D4-49F0-B03F-BC1CD91366F5}			Sugar maple (Acer saccharum)		9.0	80	
47	{10373148-1FFC-479E-9CE6-B05F94247BAF}			Sugar maple (Acer saccharum)		9.0	80	
48	{01E3C76B-0C2A-4899-A906-27A9D9A66B55}			Black walnut (Juglans nigra)		12.0	90	
51	{09F3AB3B-DF5C-4845-9ED2-B2E29B32DF4C}			Honeylocust (Gleditsia triacanthos)		17.0	75	
55	{11EC234A-155D-4FD7-B750-59E4D8185ABE}			Northern hackberry (Celtis occidentalis)		6.0	80	

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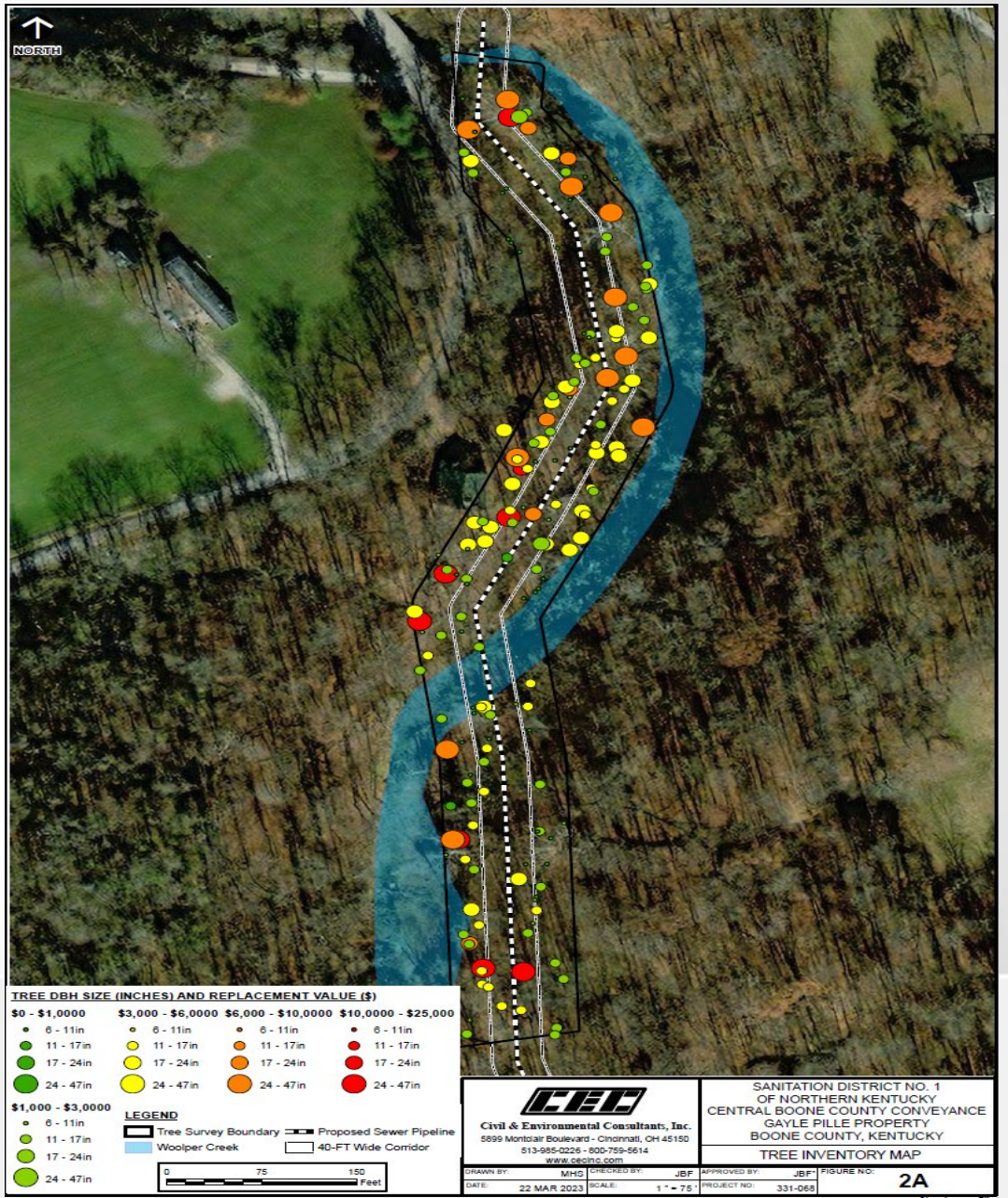
Post Field Work Activities Continued

- Tree Inventory Figures
  - Based on I-Tree Valuations, all inventoried trees were mapped in GIS
  - The smaller the tree, the smaller the dot.
  - The least valuable trees are a dark green, while the most valuable trees are red.
  - Important to depict this way so SD-1 and the property owner have a way to negotiate.



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Benefits and Costs Summary of Individual Trees

Location: Burlington, Boone, Kentucky, United States of America
Project: 331-068: Central Boone County Conveyance, Series: Tree Inventory, Year: 2023
Generated: 3/15/2023

Tree ID	Species Name	DBH (in)	Replacement Value ($)	Carbon Storage (lb)	Carbon Storage ($)	Annual benefits: Gross Carbon Sequestration (lb/yr)	Gross Carbon Sequestration ($/yr)	Avoided Runoff (gal/yr)	Avoided Runoff ($/yr)	Carbon Avoided (lb/yr)	Carbon Avoided ($/yr)	Pollution Removal (oz/yr)	Pollution Removal ($/yr)	Energy Savings ($/yr)	Total Annual Benefits ($/yr)
1	Honeylocust	13.0	2,227.98	641.9	54.74	24.2	2.06	80.3	0.72	N/A	N/A	4.6	0.72	N/A	3.50
2	Bitternut hickory	17.0	2,471.65	942.2	80.35	16.9	1.44	243.4	2.18	N/A	N/A	13.8	2.18	N/A	5.80
3	American elm	17.0	2,955.69	1,024.4	87.35	33.9	2.89	222.6	1.99	N/A	N/A	12.6	2.00	N/A	6.87
4	Northern red oak	37.0	19,595.80	8,941.6	762.50	99.7	8.51	344.5	3.08	N/A	N/A	19.5	3.09	N/A	14.67
7	Sugar maple	7.0	703.05	194.2	16.56	8.2	0.70	60.3	0.54	N/A	N/A	3.4	0.54	N/A	1.78
12	White oak	24.0	11,115.46	3,286.5	280.26	48.7	4.15	590.5	5.28	N/A	N/A	33.5	5.30	N/A	14.73
16	Northern red oak	35.0	10,206.80	7,812.3	666.20	55.3	4.72	219.8	1.96	N/A	N/A	12.5	1.97	N/A	8.65
19	Black cherry	7.0	569.44	173.3	14.78	16.5	1.41	63.6	0.57	N/A	N/A	3.6	0.57	N/A	2.55
21	Ohio buckeye	6.0	558.30	229.9	19.61	24.4	2.08	74.7	0.67	N/A	N/A	4.2	0.67	N/A	3.42
24	Sugar maple	15.0	824.98	1,168.2	99.62	6.5	0.56	8.9	0.08	N/A	N/A	0.5	0.08	N/A	0.72
25	Sugar maple	12.0	1,747.68	690.4	58.87	15.7	1.34	116.8	1.04	N/A	N/A	6.6	1.05	N/A	3.43
26	Sugar maple	33.0	8,544.42	7,341.7	626.07	40.4	3.44	178.3	1.59	N/A	N/A	10.1	1.60	N/A	6.64
27	Black cherry	8.0	506.87	240.3	20.49	14.9	1.27	42.7	0.38	N/A	N/A	2.4	0.38	N/A	2.03
30	Northern red oak	35.0	15,310.20	7,812.3	666.20	83.1	7.08	273.9	2.45	N/A	N/A	15.5	2.46	N/A	11.99
31	Ohio buckeye	6.0	488.51	229.9	19.61	21.3	1.81	54.0	0.48	N/A	N/A	3.1	0.48	N/A	2.78
32	Ohio buckeye	8.0	652.76	459.7	39.20	27.4	2.33	63.4	0.57	N/A	N/A	3.6	0.57	N/A	3.47
33	Shagbark hickory	22.0	7,447.81	1,888.1	161.01	29.9	2.55	478.8	4.28	N/A	N/A	27.1	4.30	N/A	11.12
34	Northern red oak	30.0	11,670.92	5,372.0	458.10	66.7	5.68	308.6	2.76	N/A	N/A	17.5	2.77	N/A	11.21
35	Sugar maple	10.0	1,526.88	449.3	38.31	15.2	1.29	148.6	1.33	N/A	N/A	8.4	1.33	N/A	3.95
36	Sugar maple	10.0	1,526.88	449.3	38.31	15.2	1.29	148.6	1.33	N/A	N/A	8.4	1.33	N/A	3.95
37	Sugar maple	8.0	635.15	265.8	22.67	7.0	0.59	32.5	0.29	N/A	N/A	1.8	0.29	N/A	1.18
38	Sugar maple	14.0	1,805.36	992.9	84.67	14.9	1.27	76.1	0.68	N/A	N/A	4.3	0.68	N/A	2.63
39	Sugar maple	12.0	1,882.12	690.4	58.87	17.0	1.45	140.2	1.25	N/A	N/A	7.9	1.26	N/A	3.96
40	Sugar maple	9.0	943.03	350.6	29.90	9.8	0.84	61.6	0.55	N/A	N/A	3.5	0.55	N/A	1.94
41	Ohio buckeye	6.0	558.30	229.9	19.61	24.4	2.08	74.7	0.67	N/A	N/A	4.2	0.67	N/A	3.42
42	Northern red oak	39.0	24,318.02	10,161.5	866.53	110.1	9.39	499.6	4.46	N/A	N/A	28.3	4.48	N/A	18.34
43	Sugar maple	10.0	1,526.88	449.3	38.31	15.2	1.29	148.6	1.33	N/A	N/A	8.4	1.33	N/A	3.95
44	Sugar maple	8.0	1,016.25	265.8	22.67	11.2	0.96	104.8	0.94	N/A	N/A	5.9	0.94	N/A	2.83
45	Shagbark hickory	11.0	1,448.35	346.3	29.53	8.2	0.70	58.2	0.52	N/A	N/A	3.3	0.52	N/A	1.75
46	Sugar maple	9.0	1,257.38	350.6	29.90	13.1	1.12	126.4	1.13	N/A	N/A	7.2	1.13	N/A	3.39
47	Sugar maple	9.0	1,257.38	350.6	29.90	13.1	1.12	126.4	1.13	N/A	N/A	7.2	1.13	N/A	3.39
48	Black walnut	12.0	1,982.18	341.4	29.11	21.1	1.80	237.1	2.12	N/A	N/A	13.4	2.13	N/A	6.05
51	Honeylocust	17.0	4,722.65	1,237.9	105.56	45.0	3.84	210.0	1.88	N/A	N/A	11.9	1.88	N/A	7.60
55	Northern hackberry	6.0	598.82	35.3	3.01	2.7	0.23	49.4	0.44	N/A	N/A	2.8	0.44	N/A	1.12
57	Ohio buckeye	9.0	927.34	611.2	52.12	37.9	3.23	114.3	1.02	N/A	N/A	6.5	1.03	N/A	5.28
58	American elm	16.0	2,633.88	885.7	75.53	31.1	2.65	203.9	1.82	N/A	N/A	11.6	1.83	N/A	6.31
59	Sugar maple	20.0	5,782.17	2,298.6	196.02	38.4	3.28	368.5	3.29	N/A	N/A	20.9	3.31	N/A	9.88
65	Osage orange	7.0	539.92	137.7	11.74	7.4	0.63	25.1	0.22	N/A	N/A	1.4	0.23	N/A	1.08
66	American sycamore	9.0	580.06	148.3	12.64	6.8	0.58	37.7	0.34	N/A	N/A	2.1	0.34	N/A	1.25

Monetized Tree Benefits

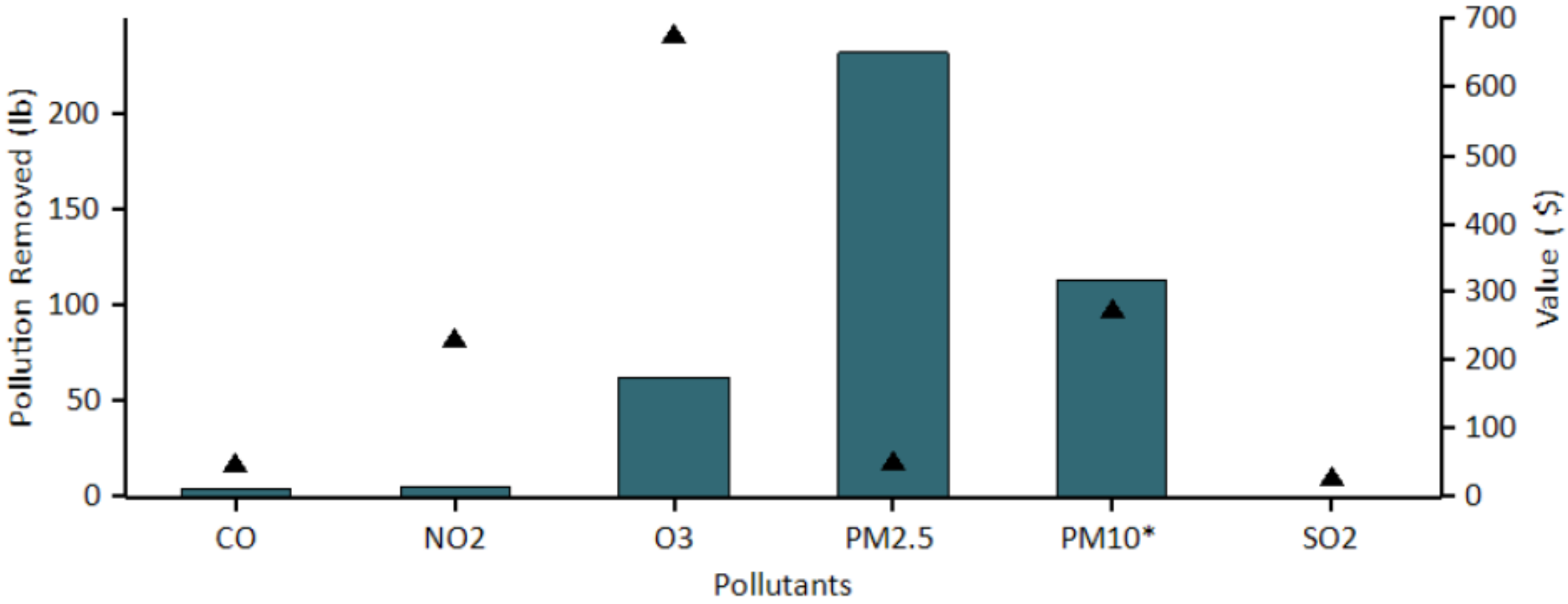

Figure 7. Annual pollution removal (points) and value (bars) by urban trees, 331-068: Central Boone County Conveyance

Monetized Tree Benefits

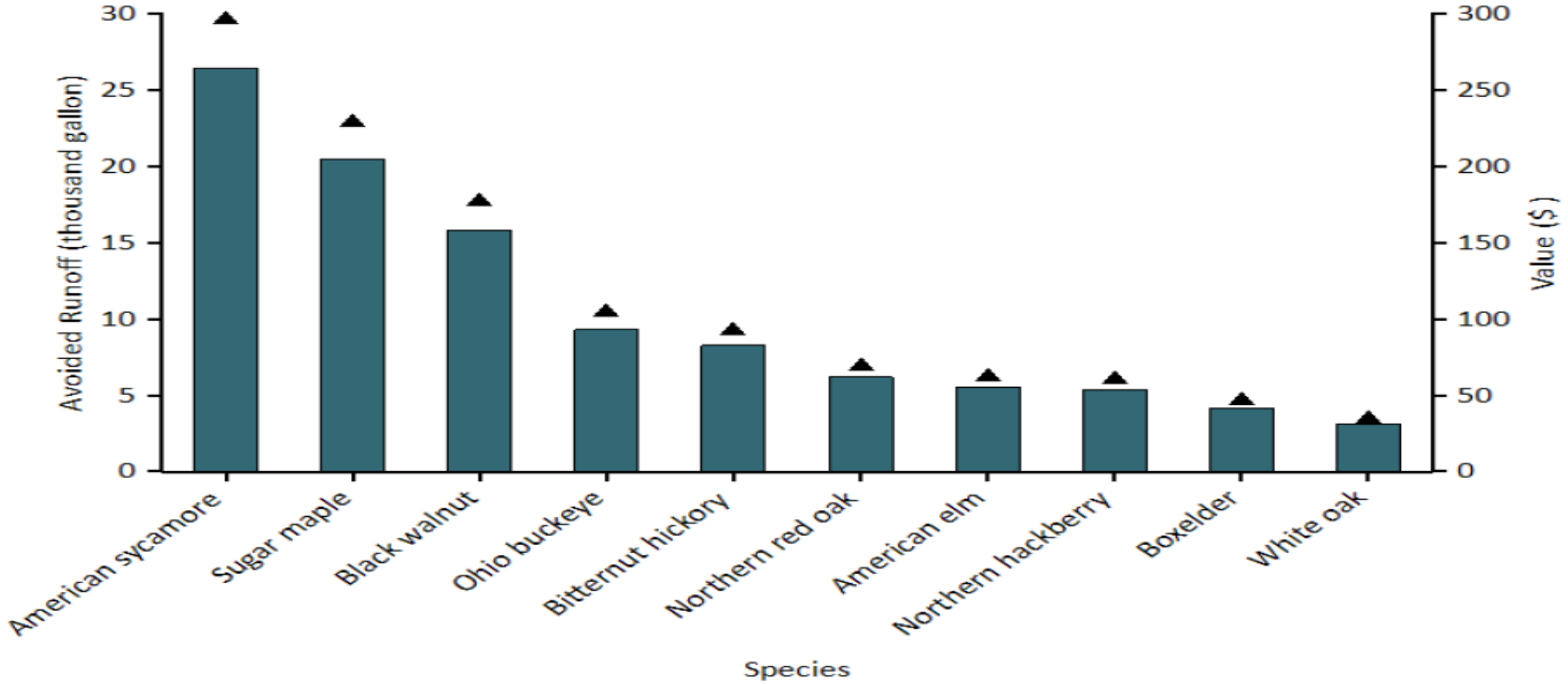

Figure 10. Avoided runoff (points) and value (bars) for species with greatest overall impact on runoff, 331-068: Central Boone County Conveyance

Accomplishments

- Created a process for future tree inventories/tree valuations
- Helped property owner receive appropriate compensation.
- Used GIS in a new way.

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QUESTIONS?