Taryn Davidson
6/11/2021

City of Seaford
High priority and Underserved Communities

What is a high priority urban community?? Every five years the Delaware Forest Service assesses the tree canopy for the state of Delaware using updated imagery. Each community is assessed and ranked by their total canopy percent (canopy acres/total acres). Communities are then prioritized based on their total acres, total canopy acres, and population density. Higher ranking indicates higher priority. All 57 of Delaware's communities were assessed and scored. The scores ranged from 70.9 to 21.5 with the first 15 being a reasonable threshold for high priority areas. Of those 15 communities four are within the Chesapeake Bay watershed, one of those being Seaford. Seaford has 3,212 total acres, 789 canopy acres and 32 roadside canopy acres yielding a total canopy percent of 25.6. Seaford's priority score is 55.7, the sixth highest priority community. It is also one of Delaware's many communities that are experiencing growth and expansion. As communities grow it is important to increase tree canopy and consider water quality and air quality issues. Using i-Tree tools I have assessed Seaford's' landscape, canopy, and designed planting projects to take place over the next five years to show the benefits of trees and the impact they can have on the Cities overall health.

To accurately assess Seaford's current landscape for a future planting project I reached out to the City of Seaford Parks and Recreation Department. There are several underserved areas throughout Seaford. Underserved areas have a high poverty level and low tree canopy. Low tree canopy in areas where there is a lot of impervious surface can result in heat island effects. Individuals in these areas tend to walk to their destination. Walking in areas where there is no tree canopy can be detrimental for your health, as there is no protection against the environment. The population would benefit greatly by increasing tree canopy in these areas. The first report in i-Tree landscape shows some census data for the City of Seaford. Seaford has a total area of 3,376 acres. Of that, there are 813 canopy acres, 850 impervious acres and 1,650 acres of plantable space. The tree canopy in Seaford consists of Red maple, American holly, Pine species, Sweetgum, Tulip poplar, Blackgum, Oak Species, Sassafras, and more. Based on the number of trees currently in Seaford the carbon storage is approximately 15,863 tons and the carbon sequestration is approximately 594 tons per year. The map shows Seaford's boundary. The second i-Tree landscape report shows census information of the block groups within Seaford. The block groups overlap Seaford's boundary, so I was unable to collect accurate data for the block groups within Seaford. However, I was able to show which areas of Seaford are underserved, have high walkability and low tree canopy. I also attached another map showing these areas with Seaford's boundary outlined. The pink portion of Seaford shows the high priority range that would benefit from an increase in tree canopy.

The next step was to determine the tree benefits Seaford currently has. Using i-Tree canopy and its random point system, I was able to determine tree benefits for carbon, air pollution, and hydrology. Based off the cover assessment I was able to determine the following information. The estimated amount of carbon sequestered is 1,220 tons per year. Annually, there is approximately 807 pounds of carbon monoxide removed, 4,405 pounds of nitrogen dioxide removed, and 43,875 pounds of ozone removed. Annual hydrological estimates are as follows: 463 gallons of avoided runoff, 38,253 gallons of evaporation, 38,467 gallons of interception, and 51,762 gallons of transpiration. Seaford's current benefits are satisfactory, but by increasing the tree canopy these benefits can be exceptional.

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Creating a planting project requires a lot of planning. I have created a planting project for every year for the next six years for the City of Seaford. With this data we are able to predict how increasing Seaford's tree canopy can benefit the community in the next 15 years.

The first planting project takes place at Nutter Park off Collins Avenue. Twenty-seven trees consisting of White oak, Washington Hawthorne, Redbud, Black gum, and Silver maple will be planted at this park. These trees will provide shade for those who play or sit at the park. After reviewing the i-Tree Design report, the total project benefits within the first year and over the next 15 years based on this planting yields the following:

2021	**1st year**	**15 years**
Avoided runoff	292 gallons	12,538 gallons
Intercepting rainfall	2,451 gallons	105,108 gallons
Carbon dioxide reduction through CO2 sequestration	$6.49 in savings	$239 in savings and 10,263 pounds (5.13 tons)
Air quality improvement	$1.24	$65

The second planting project takes place off E King Street in 2022. Nine trees consisting of Redbuds and Serviceberries will be planted as street trees. These trees will help in reducing heat island affects, as this is a high walkability area. The total project benefits within the first year and over the next 14 years based on this planting yields the following:

2022	**1st year**	**14 years**
Avoided runoff	131 gallons	3,583 gallons
Intercepting rainfall	1,096 gallons	30,042 gallons
Carbon dioxide reduction through CO2 sequestration	$2.52 in savings	$25 in savings and 1,073 pounds (.5 tons)
Air quality improvement	$0.49	$17

The third planting project takes place on 4th Street and N Pine Street in 2023. Twenty-six trees consisting of Redbuds and Serviceberries will be planted as street trees. These trees will help in reducing heat island affects, as this is a high walkability area. The total project benefits within the first year and over the next 13 years based on this planting yields the following:

2023	**1st year**	**13 years**
Avoided runoff	320 gallons	9,224 gallons
Intercepting rainfall	2,684 gallons	77, 326 gallons
Carbon dioxide reduction through CO2 sequestration	$6.47 in savings	$120 in savings and 5,153 pounds (2.57 tons)
Air quality improvement	$1.12	$42

The fourth planting project takes place on Pine Street from Rt20 to Maple Street in 2024. Twenty-two trees consisting of White Oak, Black gum, American Holly, Flowering dogwood, and Serviceberries will be planted in the open space and as street tress. The total project benefits within the first year and over the next 12 years based on this planting yields the following:

2024	1st year	12 years
Avoided runoff	292 gallons	7,705 gallons
Intercepting rainfall	2,541 gallons	64,595 gallons
Carbon dioxide reduction through CO2 sequestration	$8.21 in savings	$178 in savings and 7,644 pounds (3.822 tons)
Air quality improvement	$1.17	$42

The fifth planting project takes place in front of the Seaford Parks and Rec building and the Police Station off Virginia Avenue in 2025. Twenty-four trees consisting of Redbud, Silver maple, Washington Hawthorne, Serviceberry, Black gum, and Flowering dogwood will be planted in the open space and as street tress. There is a school located across the street from this location. These trees will aid in providing shade for students who walk to and from school. The total project benefits within the first year and over the next 11 years based on this planting yields the following:

2025	1st year	11 years
Avoided runoff	313 gallons	7,510 gallons
Intercepting rainfall	2,620 gallons	62,960 gallons
Carbon dioxide reduction through CO2 sequestration	$7.94 in savings	$188 in savings and 8,065 pounds (4 tons)
Air quality improvement	$1.05	$36

The sixth and final planting project takes place at the Seaford Sports Complex in 2026. Fourteen trees consisting of Willow Oak, Fringe tree, Serviceberry, White Oak, Redbud, Hackberry, Red maple, and American Holly will be planted in the open space as you enter the complex and as street tress. These trees will create a beautiful view as you enter the complex. They will also provide shade to those that like to walk the complex. Future planting in this area is recommended. The total project benefits within the first year and over the next 10 years based on this planting yields the following:

2026	1st year	10 years
Avoided runoff	179 gallons	3,891 gallons
Intercepting rainfall	1,497 gallons	32,620 gallons
Carbon dioxide reduction through CO2 sequestration	$4.63 in savings	$106 in savings and 4,574 pounds (2.3 tons)
Air quality improvement	$0.88	$27

The total benefits these six tree planting projects will yield over the next 15 years are:

2021 - 2036	122 Trees in 6 years over the next 15 years
Avoided runoff	44,451 gallons
Intercepting rainfall	372,651 gallons
Carbon dioxide reduction through CO2 sequestration	$8.56 in savings and 36,772 pounds (18.386 tons)
Air quality improvement	$229

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Here is a look at the current benefits in Seaford compared to adding the above six planting sites.

	Current annually	**In 15 yrs by adding 122 trees**
Avoided runoff	463 gallons	44,541 gallons
Intercepting rainfall	38,467 gallons	372,651 gallons
Carbon dioxide reduction through CO2 sequestration	1220 tons	18.4 tons
Air quality improvement savings	$1.12	$42
Air Pollution Benefits Savings	$11,793	$229

As you can see, increasing the tree canopy in the City of Seaford increases the benefits drastically. Can you imagine if even more trees were added after the first six planting sites!? Trees are essential in providing shade, reducing heat island effects, reducing air pollutants, and have positive effects on our hydrologic cycle. My goal is to present this information to the City of Seaford and provide technical assistance in hopes to encourage them to increase their urban tree canopy. I will use these i-tree tools to create more planting scenarios to present to other high priority urban communities throughout Delaware.

City of Seaford

Census Data

Date: 06/02/2021

landscape.itreetools.org

Version: 4.3.1

Location Information

Canopy & Impervious (High Resolution UTC)

Dataset	Type	Name	ID	Area		Canopy		Impervious		Plantable Space	
				acre	% of all	acre	%	acre	%	acre	%
HiRes	Place	Seaford	1064320	3,376.1	100.00	813.3	24.41	850.2	25.52	1,650.3	49.53
	Selection Total:			3,376.1	100.00	813.3	24.41	850.2	25.52	1,650.3	49.53

Forest Details (High Resolution UTC)

Dataset	Type	Name	ID	Forest Type Groups	Basal Area by Species (Top 10)	Total Basal Area (ft^2 (square feet))
HiRes	Place	Seaford	1064320	• Loblolly/Shortleaf Pine (19.05%) • Oak/Gum/Cypress (4.76%) • Oak/Hickory (66.67%) • Oak/Pine (9.52%)	• Acer spp., maple spp. (6747 ft²) • Acer rubrum, red maple (6747 ft²) • Ilex opaca, American holly (4597 ft²) • Pinus spp., pine spp. (4313 ft²) • Pinus taeda, loblolly pine (4071 ft²) • Liquidambar styraciflua, sweetgum (3829 ft²) • Nyssa spp., tupelo spp. (2861 ft²) • Nyssa sylvatica, blackgum (2861 ft²) • Quercus spp., oak spp. (1893 ft²) • Sassafras albidum, sassafras (1295 ft²) • ...	41,692.0
	Selection Total:			• Loblolly/Shortleaf Pine (19.05%) • Oak/Gum/Cypress (4.76%) • Oak/Hickory (66.67%) • Oak/Pine (9.52%)	• Acer spp., maple spp. (6747 ft²) • Acer rubrum, red maple (6747 ft²) • Ilex opaca, American holly (4597 ft²) • Pinus spp., pine spp. (4313 ft²) • Pinus taeda, loblolly pine (4071 ft²) • Liquidambar styraciflua, sweetgum (3829 ft²) • Nyssa spp., tupelo spp. (2861 ft²) • Nyssa sylvatica, blackgum (2861 ft²) • Quercus spp., oak spp. (1893 ft²) • Sassafras albidum, sassafras (1295 ft²) • ...	41,692.0

Hardiness Zones (High Resolution UTC)

Dataset	Type	Name	ID	Plant Hardiness Zone
HiRes	Place	Seaford	1064320	7a: 0 to 5 F
	Selection Total:			N/A

Tree Benefits

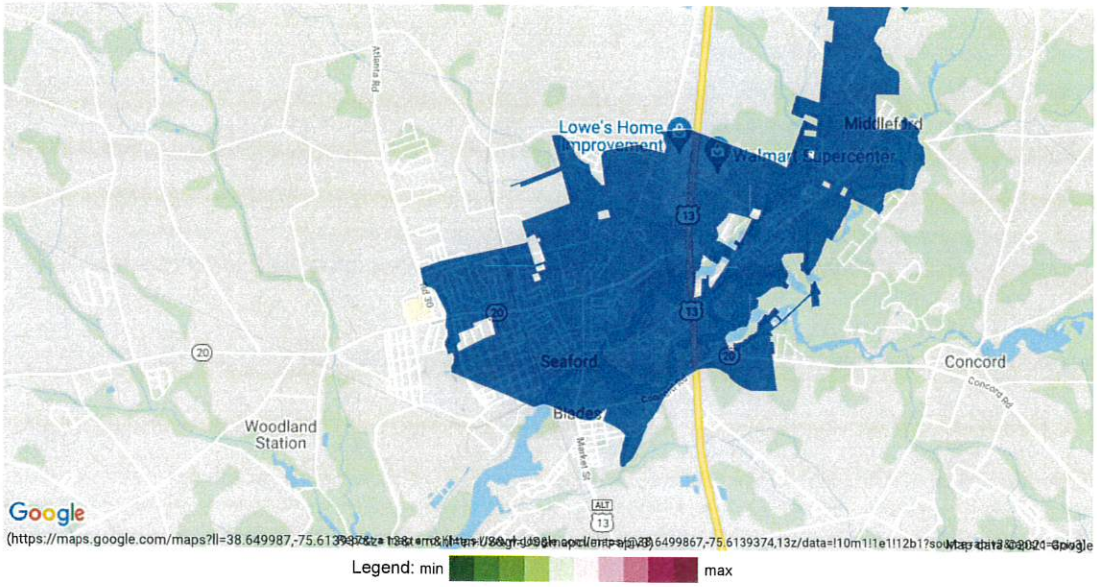
Carbon and CO_2 (High Resolution UTC)

Dataset	Type	Name	ID	Carbon Storage		Carbon Sequestration		CO_2 Equivalent Storage		CO_2 Equivalent Sequestration	
				$	Short Ton	$/yr (year)	t/yr (Short Tons per year)	$	Short Ton	$/yr (year)	t/yr (Short Tons per year)
	Selection Total:			2,705,576	15,863.8	101,317	594.0	2,705,576	58,167.1	101,317	2,178.2

Dataset	Type	Name	ID	Carbon Storage $	Carbon Storage Short Ton	Carbon Sequestration $/yr (year)	Carbon Sequestration t/yr (Short Tons per year)	CO_2 Equivalent Storage $	CO_2 Equivalent Storage Short Ton	CO_2 Equivalent Sequestration $/yr (year)	CO_2 Equivalent Sequestration t/yr (Short Tons per year)
HiRes	Place	Seaford	1064320	2,705,576	15,863.8	101,317	594.0	2,705,576	58,167.1	101,317	2,178.2
	Selection Total:			2,705,576	15,863.8	101,317	594.0	2,705,576	58,167.1	101,317	2,178.2

Prioritization

Population (High Resolution UTC)



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Visit the i-Tree Tools (https://www.itreetools.org/) website to learn more about the benefits that trees provide.

City of Seaford

Underserved Areas

Date: 06/02/2021

landscape.itreetools.org

Version: 4.3.1

Share

Location Information

Canopy & Impervious (High Resolution UTC)

Dataset	Type	Name	ID	Area		Canopy		Impervious		Plantable Space	
				acre	% of all	acre	%	acre	%	acre	%
HiRes	Place	Seaford	1064320	3,376.1	13.01	813.3	24.41	850.2	25.52	1,650.3	49.53
HiRes	Block Group	N/A	100050504011	12,542.2	48.35	2,771.9	22.10	419.4	3.34	9,336.8	74.44
HiRes	Block Group	N/A	100050504051	2,170.9	8.37	514.5	23.70	200.8	9.25	1,452.9	66.93
HiRes	Block Group	N/A	100050504062	958.3	3.69	173.0	18.06	251.0	26.20	529.3	55.23
HiRes	Block Group	N/A	100050504071	3,575.6	13.78	960.1	27.11	263.4	7.44	2,316.3	65.40
HiRes	Block Group	N/A	100050504063	507.5	1.96	138.2	30.19	178.4	38.98	134.5	29.38
HiRes	Block Group	N/A	100050504052	592.6	2.28	151.6	25.58	197.3	33.30	242.3	40.89
HiRes	Block Group	N/A	100050504061	2,218.5	8.55	327.3	15.18	230.8	10.71	1,606.3	74.53
	Selection Total:			25,941.6	100.00	5,849.8	22.72	2,591.4	10.06	17,268.8	67.06

Income Overview (Census/Other)

Dataset	Type	Name	ID	Median Income $	Per Capita Income $	Poverty %
census	Place	Seaford	1064320	36,250.0	17,302.0	24.8
census	Block Group	N/A	100050504011	48,017.0	19,693.0	7.5
census	Block Group	N/A	100050504051	66,550.0	27,974.0	6.3
census	Block Group	N/A	100050504062	16,328.0	11,189.0	33.0
census	Block Group	N/A	100050504071	41,932.0	22,128.0	24.0
census	Block Group	N/A	100050504063	22,400.0	13,269.0	33.0
census	Block Group	N/A	100050504052	39,682.0	22,247.0	6.3
census	Block Group	N/A	100050504061	55,164.0	20,340.0	33.0
	Selection Total:			N/A	N/A	N/A

Tree Benefits

Carbon and CO_2 (High Resolution UTC)

Dataset	Type	Name	ID	Carbon Storage		Carbon Sequestration		CO_2 Equivalent Storage		CO_2 Equivalent Sequestration	
				$	Short Ton	$/yr (year)	t/yr (Short Tons per year)	$	Short Ton	$/yr (year)	t/yr (Short Tons per year)
HiRes	Place	Seaford	1064320	2,705,576	15,863.8	101,317	594.0	2,705,576	58,167.1	101,317	2,178.2
HiRes	Block Group	N/A	100050504011	11,833,355	69,383.2	450,050	2,638.8	11,833,355	254,405.1	450,050	9,675.6
HiRes	Block Group	N/A	100050504051	1,805,752	10,587.8	68,834	403.6	1,805,752	38,821.9	68,834	1,479.9
HiRes	Block Group	N/A	100050504062	562,809	3,300.0	21,702	127.2	562,809	12,099.9	21,702	466.6
HiRes	Block Group	N/A	100050504071	4,002,664	23,469.1	135,224	792.9	4,002,664	86,053.1	135,224	2,907.1
	Selection Total:			22,620,628	132,632.9	845,580	4,958.0	22,620,628	486,320.5	845,580	18,179.1

Dataset	Type	Name	ID	Carbon Storage		Carbon Sequestration		CO_2 Equivalent Storage		CO_2 Equivalent Sequestration	
				$	Short Ton	$/yr (year)	t/yr (Short Tons per year)	$	Short Ton	$/yr (year)	t/yr (Short Tons per year)
HiRes	Block Group	N/A	100050504063	380,634	2,231.7	16,150	94.7	380,634	8,183.2	16,150	347.2
HiRes	Block Group	N/A	100050504052	239,777	1,405.9	10,398	61.0	239,777	5,155.0	10,398	223.5
HiRes	Block Group	N/A	100050504061	1,090,062	6,391.4	41,904	245.7	1,090,062	23,435.2	41,904	900.9
Selection Total:				22,620,628	132,632.9	845,580	4,958.0	22,620,628	486,320.5	845,580	18,179.1

Prioritization

Povery_Walkability_Canopy (High Resolution UTC)

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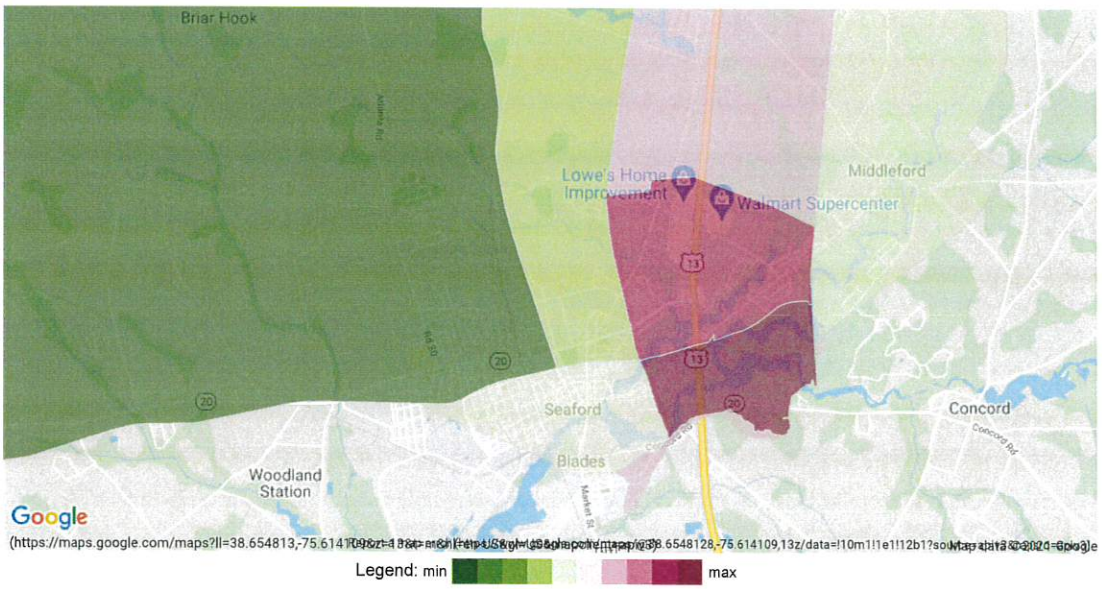

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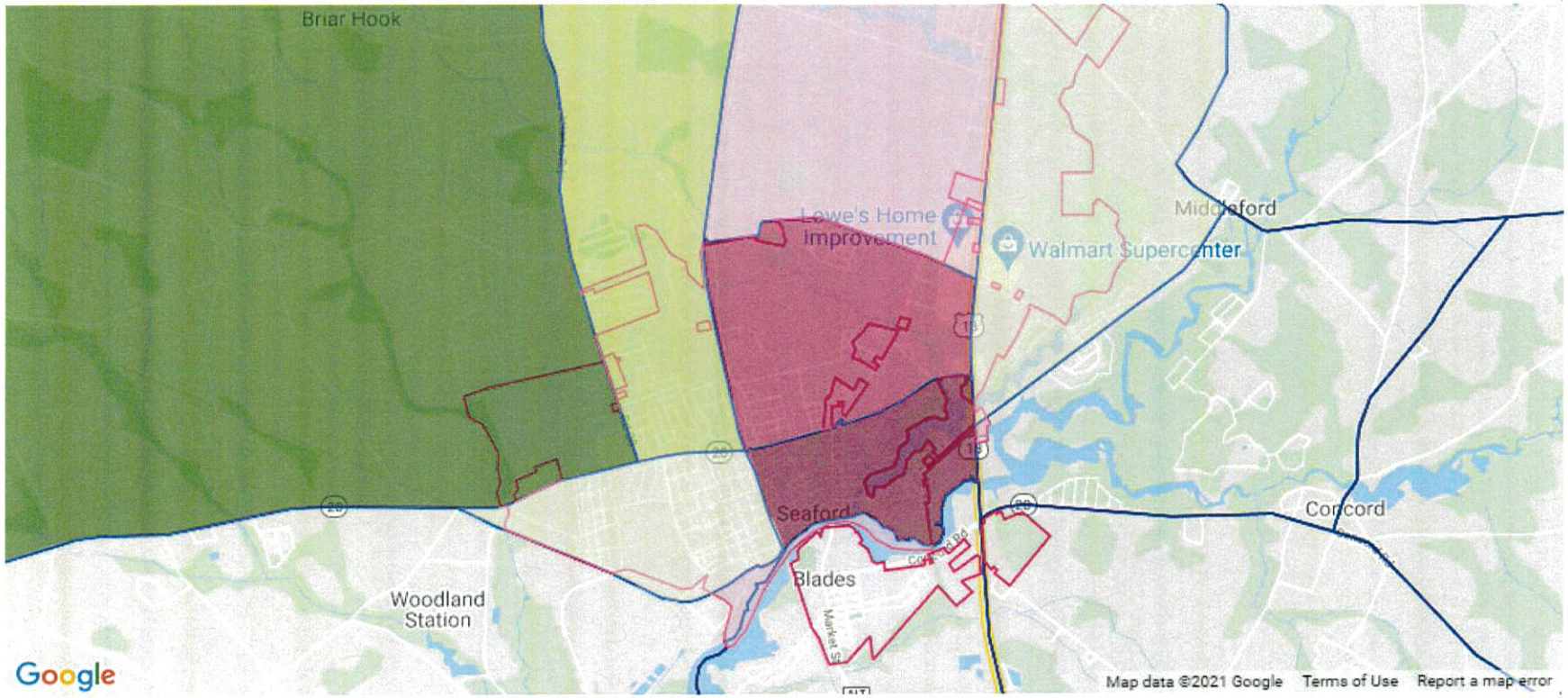
Prioritization

Povery_Walkability_Canopy (High Resolution UTC)



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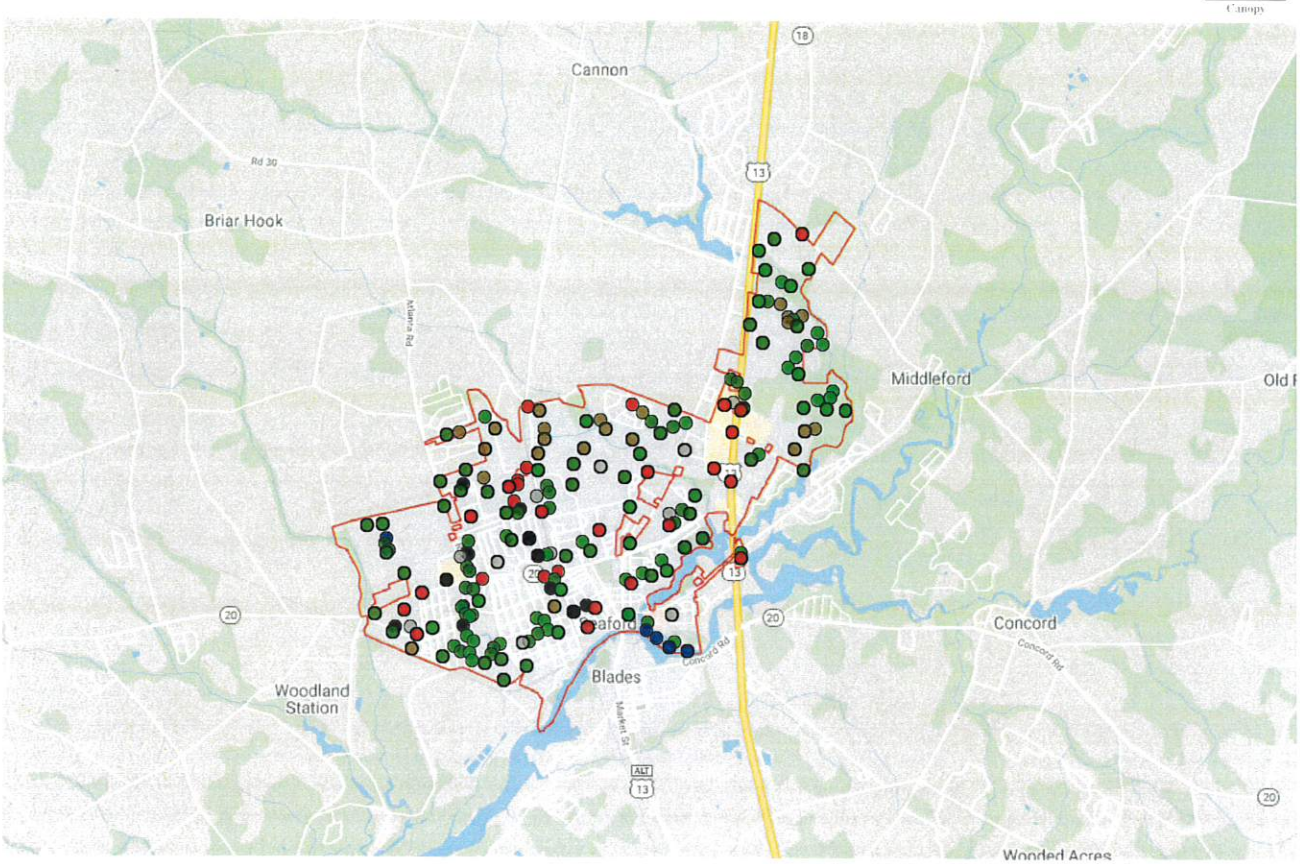
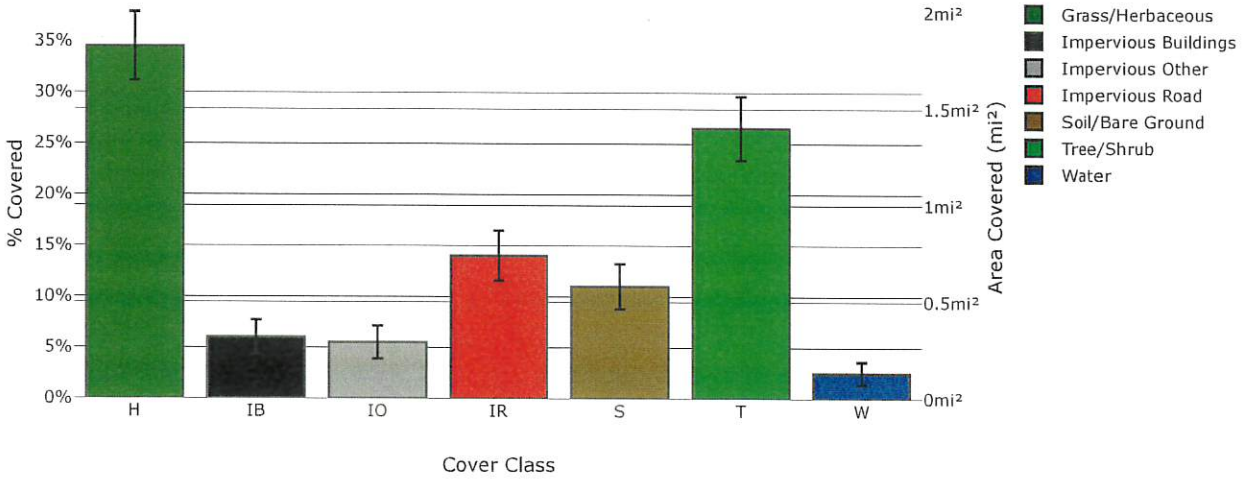
i-Tree Canopy v7.1

Cover Assessment and Tree Benefits Report

Estimated using random sampling statistics on 5/26/2021



Land Cover



Abbr.	Cover Class	Description	Points	% Cover ± SE	Area (mi²) ± SE
H	Grass/Herbaceous		69	34.50 ± 3.36	1.82 ± 0.18
IB	Impervious Buildings		12	6.00 ± 1.68	0.32 ± 0.09
IO	Impervious Other		11	5.50 ± 1.61	0.29 ± 0.09
IR	Impervious Road		28	14.00 ± 2.45	0.74 ± 0.13
S	Soil/Bare Ground		22	11.00 ± 2.21	0.58 ± 0.12
T	Tree/Shrub		53	26.50 ± 3.12	1.40 ± 0.16
W	Water		5	2.50 ± 1.12	0.13 ± 0.06
Total			**200**	**100.00**	**5.28**

Tree Benefit Estimates: Carbon (English units)

Description	Carbon (kT)	±SE	CO_2 Equiv. (kT)	±SE	Value (USD)	±SE
Sequestered annually in trees	1.22	±0.14	4.48	±0.53	$208,595	±24,565
Stored in trees (Note: this benefit is not an annual rate)	30.72	±3.62	112.62	±13.26	$5,238,615	±616,911

Currency is in USD and rounded. Standard errors of removal and benefit amounts are based on standard errors of sampled and classified points. Amount sequestered is based on 0.874 kT of Carbon, or 3.203 kT of CO_2, per mi²/yr and rounded. Amount stored is based on 21.940 kT of Carbon, or 80.446 kT of CO_2, per mi² and rounded. Value (USD) is based on $170,550.73/kT of Carbon, or $46,513.84/kT of CO_2 and rounded. (English units: kT = kilotons (1,000 tons), mi² = square miles)

Tree Benefit Estimates: Air Pollution (English units)

Abbr.	Description	Amount (lb)	±SE	Value (USD)	±SE
CO	Carbon Monoxide removed annually	807.92	±95.14	$34	±4
NO2	Nitrogen Dioxide removed annually	4,405.38	±518.79	$59	±7
O3	Ozone removed annually	43,875.60	±5,166.88	$3,082	±363
SO2	Sulfur Dioxide removed annually	2,776.16	±326.93	$10	±1
PM2.5	Particulate Matter less than 2.5 microns removed annually	2,131.99	±251.07	$6,370	±750
PM10*	Particulate Matter greater than 2.5 microns and less than 10 microns removed annually	14,696.69	±1,730.71	$2,237	±263
Total		**68,693.73**	**±8,089.52**	**$11,793**	**±1,389**

Currency is in USD and rounded. Standard errors of removal and benefit amounts are based on standard errors of sampled and classified points. Air Pollution Estimates are based on these values in lb/mi²/yr @ $/lb/yr and rounded:
CO 577.084 @ $0.04 | NO2 3,146.698 @ $0.01 | O3 31,339.728 @ $0.07 | SO2 1,982.970 @ $0.00 | PM2.5 1,522.851 @ $2.99 | PM10* 10,497.643 @ $0.15 (English units: lb = pounds, mi² = square miles)

Tree Benefit Estimates: Hydrological (English units)

Abbr.	Benefit	Amount (gal)	±SE	Value (USD)	±SE
AVRO	Avoided Runoff	463.33	±54.56	$4	±0
E	Evaporation	38,253.54	±4,504.82	N/A	N/A
I	Interception	38,467.62	±4,530.03	N/A	N/A
T	Transpiration	51,762.94	±6,095.72	N/A	N/A
PE	Potential Evaporation	289,863.88	±34,134.99	N/A	N/A
PET	Potential Evapotranspiration	236,504.68	±27,851.30	N/A	N/A

Currency is in USD and rounded. Standard errors of removal and benefit amounts are based on standard errors of sampled and classified points. Hydrological Estimates are based on these values in gal/mi²/yr @ $/gal/yr and rounded:
AVRO 330.949 @ $0.01 | E 27,323.972 @ N/A | I 27,476.886 @ N/A | T 36,973.547 @ N/A | PE 207,045.729 @ N/A | PET 168,931.995 @ N/A (English units: gal = gallons, mi² = square miles)

About i-Tree Canopy

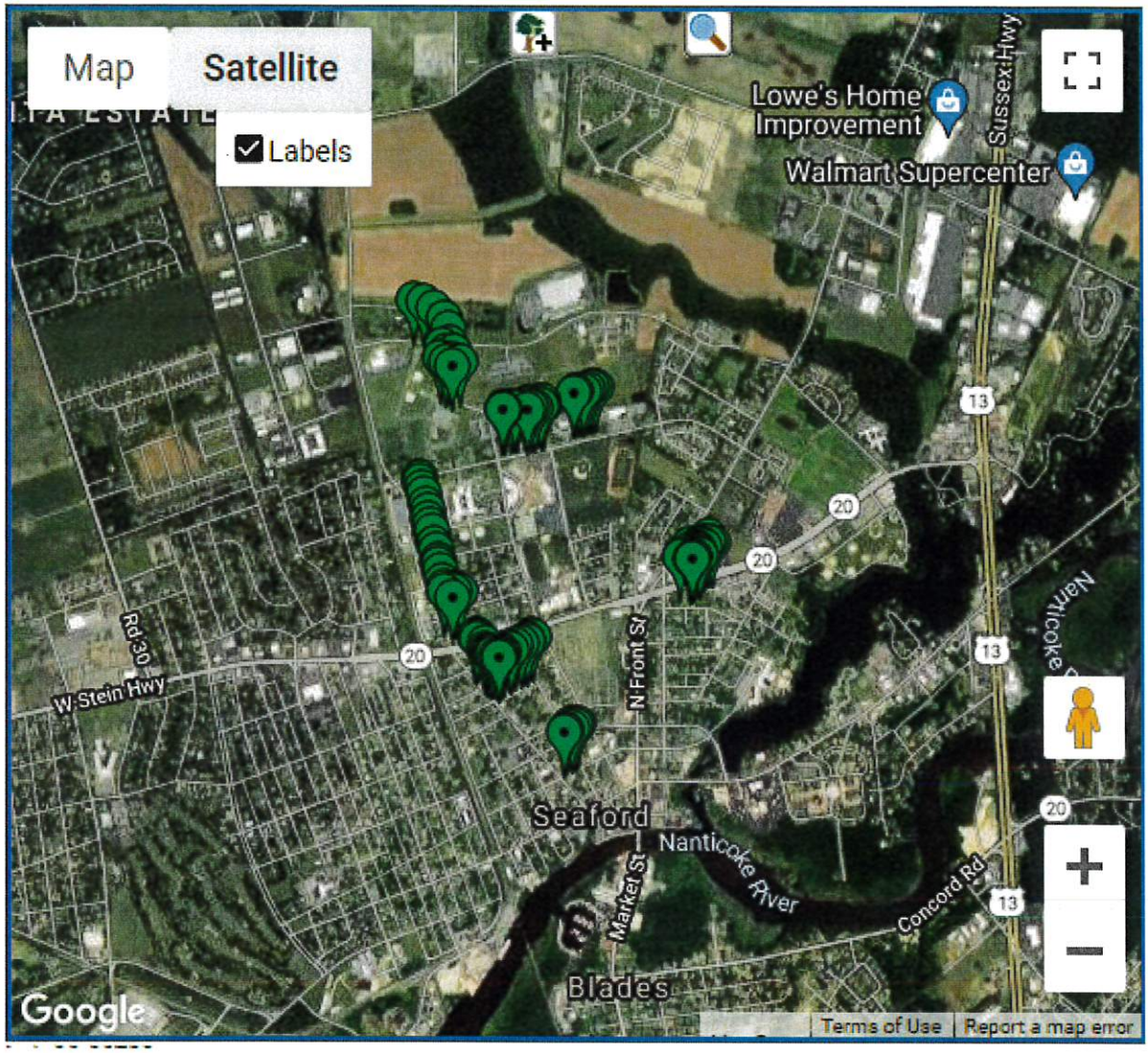
The concept and prototype of this program were developed by David J. Nowak, Jeffery T. Walton, and Eric J. Greenfield (USDA Forest Service). The current version of this program was developed and adapted to i-Tree by David Ellingsworth, Mike Binkley, and Scott Maco (The Davey Tree Expert Company)

Limitations of i-Tree Canopy

The accuracy of the analysis depends upon the ability of the user to correctly classify each point into its correct class. As the number of points increase, the precision of the estimate will increase as the standard error of the estimate will decrease. If too few points are classified, the standard error will be too high to have any real certainty of the estimate.

Additional support provided by:

Use of this tool indicates acceptance of the EULA.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Dover Pools
Party Corner
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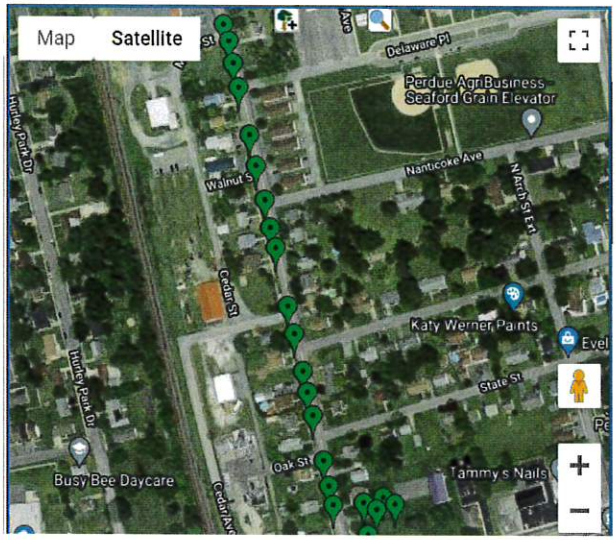
Map
Satellite
Delaware Pl
Perdue AgriBusiness Seaford Grain Elevator
Nanticoke Ave
Walnut St
Hurley Park Dr
Cedar St
Katy Werner Paints
State St
Busy Bee Daycare
Oak St
Tammy's Nails

Map
Satellite
Labels
State Service Center
Seaford City Parks & Rec Department
Seaford Police Department
Virginia Ave
N Market St Ext
Seaford HS Baseball Home of the Bluejays
Seaford Senior High School
School Ln
Google
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Map
Satellite
N Market St
Venture Dr
Seaford District Library
Lifestar Response Seaford, DE
Seaford Sports Complex
Jay Nest park
Boys & Girl
N Market St Ext
Seaford House
Google
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