# EXAMPLE OF URBAN TREE CANOPY ASSET NET BENEFIT (RETURN ON INVESTMENT) AGGREGATION

Supplemental Resource to the Natural Capital Investment: Urban Forest Canopy Benefits Guide.

UNIVERSITY OF MARYLAND ENVIRONMENTAL FINANCE CENTER 2022

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#### Why aggregate net benefits?

Most reports for urban tree canopy (canopy) benefits discuss total benefits only. The importance of reporting net benefits is the accounting for costs and benefits of trees. The lack of funding in urban canopy programs is informed by the tracking and documentation of both costs and benefits. When net benefits (benefit minus cost) are tracked and reported, gaps in funding are more evident as the net benefit value may be negative, meaning there are few benefits for the cost (or budget) provided for tree canopy and care.

The net benefit calculation shows return on investment per capita in a simple way. Compared to the benefit, the budget expenditures or allocations show how the estimated benefits accrue per capita across a particular municipal or urban area (herein, benefit estimates are reported using i-Tree Landscape). The resulting net benefit may be positive or negative. The negative result may support the need for more investment in the canopy to provide canopy benefits to a particular urban area.

The steps below show a "benchmark area" of a municipal boundary. Benchmark and smaller canopy asset net benefit per capita examples are in the "Natural Capital Investment: Urban Forest Canopy Benefits" guidance document. This document provides an example of how net benefits can be summed (aggregated) across municipal or urban areas. Summing one benefit category separate from other benefit categories within the urban boundaries allows comparing that benefit across cities. It also provides a picture of the per capita positive and negative net benefits, nationally. The recommendation to add only one benefit category for comparison attempts to avoid the idea that the cost per capita is - in reality - distributed among all the canopy benefits. This makes the cost difficult to partition among the benefits. The summing within one benefit category for comparison also attempts to avoid the fact that some benefits overlap; that is how humans experience the benefit. For example, particulate matter less than 2.5 microns.(PM 2.5) reduction provides airquality benefits of health care cost reduction. However the health care cost reduction may also be attributed to decrease of multiple pollutants (e.g., ozone, PM 10) that the canopy helps reduce.

The steps below follow the steps within "Natural Capital Investment: Urban Forest Canopy Benefits" guidance document. The detailed data for each municipal area are in Appendix A. The examples below demonstratemonetizing benefits per-capita of stormwater runoff reduction and air quality improvement. A description of potential benefits to track is in Appendix B.

#### Step 1 Collect information on current costs, funding sources, and amounts for urban canopy

The University of Maryland Environmental Finance Center scoured budget reports and collected budget (cost) data from municipalities to provide a synopsis of the urban canopy management budget. The data was collected from varied parts of the country with diverse populations. Multiple departments such as public works, planning, and either the capital budget and/or the executive budget for each city was retrieved for the cities from the web. Key word search within the budget included the words: urban forest/forest/tree/tree canopy. The line item and total budgets were attempted to be categorized and totaled. For eight cities the urban forest budget data appeared relatively complete. The summary of the budget scan is below. The budget lines for each city are in Appendix A.

Table 1 Community comparison of per capita investment

Tuble I Commi		son of per our		
Municipality	Municipal Population (2019)	Total Budget (2019)	Per Capita Budget (2019)	Per Capita Budget (2021)*
City of Atlanta, GA (2019)	488,000	\$4,158,341	\$8.94	\$10.10
City of Baltimore, MD	586,000	\$8,477,863	\$13.68	\$15.46
City of Denver, CO	727,000	\$475,596	\$0.70	\$0.79
City of Detroit, MI	670,052	\$6,940,910	\$10.21	\$11.54
City of Frederick, MD	67,421	\$87,475	\$1.26	\$1.42
City of Lancaster, PA	59,344	\$286,102	\$4.80	\$5.42
City of Philadelphia, PA	1,584,064	\$5,474,649	\$3.49	\$3.94
City of Portland, OR	645,291	\$6,257,872	\$9.93	\$11.22

<sup>\*</sup>Consumer Price Index 2019 to 2021

Step 2
Create an assessment area(s) (Benchmark Example: Municipal Boundary)
Table 2 Atlanta Benchmark

Tuble 2 Allul	Tuble 2 Attanta Denchmark								
Census Place									
Atlanta population (2019)	Canopy Acres (2011 i-Tree Landscape)	Persons per canopy acre							
488,000	42,117		12						

<sup>\*</sup>Persons per canopy indicates "intensity of use" by each canopy acre - that is the more people the higher the use value of each acre of canopy. This metric provides comparative acre use across urban forest areas.

<sup>1.13</sup> 

#### Step #3

Estimate benefits and benefits per capita using i-Tree Landscape) benchmark area and 2) asset area benefits(Example below: Municipal Boundary). Use consumer and producer price indexes to correct the dollar value.

Table 3 Atlanta Benchmark Area Benefits

Tree Benefit	\$/year (i-Tree Landscape)		\$ Bene (2011)	fit/Capita	\$ Benefit/Capita (2021)		
PM2.5	\$	4,816,398	\$	9.87	\$	11.74	
Avoided Runoff	\$	6,366,574	\$	13.05	\$	15.79	

CPI 2011 (2021) for Avoided Runoff

1.21

PPI 2011 (2021) for Air Quality PM 2.5

1.19

#### Step #4

Net Benefits and Return on Investment Estimates for Canopy Assets (Subtract the budget (cost) \$per capita in the Table 1 from the benefit \$per capita above)

Table 4 Atlanta Benchmark Net Benefits per Capita

	Net B	enefit
	\$/Cap	ita
Tree Benefit	(2021	)
PM2.5	\$	1.64
Avoided		
Runoff	\$	5.68

#### Step #5

#### Tracking benefits and costs of canopy services for return on investment (Example for select cities)

- Persons per canopy indicates "intensity of use" by each canopy acre that is the more people the higher the use value of each acre of canopy.
- Negative net benefits displayed for the cities profiled indicates the net benefit (benefit minus cost per capita) of focus is not positive, that is more spending to increase benefits, and tracking of the benefit is may be indicated.
- Positive net benefits indicates spending is producing benefits greater than costs per capita for that particular benefit.
- The aggregate benefit per capita indicates overall net benefits per capita for stormwater is negative and positive for PM 2.5.
- Benefit and cost tracking helps determine benefit gaps (i.e. potential equity concerns) and where spending to increase benefit may be indicated.

Table 5 Aggregate Net Benefits (Return on Investment) for Urban Tree Canopy: Summary for Select Cities and Two Benefits, PM 2.5 and Avoided Runoff

	Atlanta, GA	Baltimore, MD	Denver,	Detroit, MI	Frederick, MD	Lancaster, PA	Philadelphia, PA	Portland, OR	Aggregate Net Benefit per capita
Persons per									Return on
canopy acre*	12	40	135	91	26	51	70	37	Investment
	\$	\$	\$	\$		\$		\$	\$
PM2.5	1.64	(1.47)	(0.60)	(8.39)	\$ 1.30	(3.88)	\$ 6.43	15.96	10.99
Avoided	\$	\$	\$	\$		\$		\$	\$
Runoff	5.68	(8.62)	0.13	(7.62)	\$ 1.80	(2.91)	\$ 0.39	7.91	(3.24)

## **Appendix A Data for Cities Summarized in Table 5**

Community comparison of per capita investment

Municipality	Municipal Population (2019)	Total Budget (2019)	Per Capita Budget (2019)	Per Capita Budget (2021)*
City of Atlanta, GA (2019)	488,000	\$4,158,341	\$8.94	\$10.10
City of Baltimore, MD	586,000	\$8,477,863	\$13.68	\$15.46
City of Denver, CO	727,000	\$475,596	\$0.70	\$0.79
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City of Frederick, MD	67,421	\$87,475	\$1.26	\$1.42
City of Lancaster, PA	59,344	\$286,102	\$4.80	\$5.42
City of Philadelphia, PA	1,584,064	\$5,474,649	\$3.49	\$3.94
City of Portland, OR	645,291	\$6,257,872	\$9.93	\$11.22

<sup>\*</sup>Consumer Price Index 2019 to 2021

### Aggregate Net Benefits (Return on Investment) for Urban Tree Canopy: Summary for Select Cities and Two Benefits, PM 2.5 and Avoided Runoff

Summary for Select	Atla GA		Bal MC	timore,	Den CO	,	Det MI	-	Fred MD	-	Lan PA	-	Phil PA	adelphia,	Por OR	-	net	regate benefit capita
Persons per canopy																		
acre*		12		40		135		91		26		51		70		37		
PM2.5	\$	1.64	\$	(1.47)	\$	(0.60)	\$	(8.39)	\$	1.30	\$	(3.88)	\$	6.43	\$	15.96	\$	10.99
Avoided Runoff	\$	5.68	\$	(8.62)	\$	0.13	\$	(7.62)	\$	1.80	\$	(2.91)	\$	0.39	\$	7.91	\$	(3.24)

<sup>\*</sup>Persons per canopy indicates "intensity of use" by each canopy acre - that is the more people the higher the use value of each acre of canopy.

Negative net benefits displayed for the cities profiled indicates the net benefit (benefit minus cost per capita) of focus is not positive, that is more spending to increase benefits, and tracking of the benefit is may be indicated.

Positive net benefits indicates spending is producing benefits greater than costs per capita for that particular benefit.

The aggregate benefit per capita indicates overall net benefits per capita for stormwater is negative and positive for PM 2.5. Benefit and cost tracking helps determine benefit gaps (i.e. potential equity concerns) and where spending to increase benefit may be indicated.

#### Atlanta GA

Census Place								
Atlanta Pop.	Canopy Acres	Persons per						
(2019)	(2010 i-Tree	canopy acre						
	Landscape)							
488,000	42,117		12					

Tree Benefit	\$/year (i-Tree Landscape )		\$ Benefit/Capita (2011)		\$ Benefit/Capita (2021)		Net Benefit \$/Capita (2021)	
PM2.5	\$	4,816,398	\$	9.87	\$	11.74	\$	1.64
Avoided								
Runoff	\$	6,366,574	\$	13.05	\$	15.79	\$	5.68

CPI 2011 (2021 1.21 PPI 2011 (2021 1.19

#### Baltimore, MD

Census Place									
Baltimore	Canopy Acres	Persons per							
Pop. (2020)	(2010 i-Tree	canopy acre							
	Landscape)								
586,000	14,750	40							

			\$ Benef	it/Capita	\$ Bene	fit/Capita		: Benefit :apita
Tree Benefit		ear (i-Tree dscape )	(2011	)	(2021	L)	(20	21)
PM2.5	\$	\$ 6,885,999		11.75	\$	13.98	\$	(1.47)
Avoided								
Runoff	\$	3,311,449	\$	5.65	\$	6.84	\$	(8.62)

CPI 2011

(2021) 1.21 PPI 2011 (2021 1.19

#### Denver, CO

Census Place								
Denver Pop.	Canopy Acres	Persons per						
(2020)	(2010 i-Tree	canopy acre						
	Landscape)							
727,000	4,475	135						

	.,			fit/Capita		-	\$/0	t Benefit Capita
Tree Benefit		ear (i-Tree indscape )	(2011)		(202	1)	(20	21)
PM2.5	\$	118,458	\$	0.16	\$	0.19	\$	(0.60)
Avoided								
Runoff	\$	554,218	\$	0.76	\$	0.92	\$	0.13

CPI 2011

(2021) 1.21

PPI 2011

(2021) 1.19

#### Detroit, MI

	Census Place		
Detroit Pop.	Canopy Acres	Persons per	
(2019)	Canopy Acres (2010 i-Tree	canopy acre	
	Landscape)		
670,052	7,339	!	91

Tree Benefit	ear (i-Tree dscape)	\$ Benefit (2011)	/Capita	\$ Bene (2021)	fit/Capita	Net \$/Ca (202	•
PM2.5	\$ 1,022,376	\$	1.53	\$	1.82	\$	(8.39)
Avoided Runoff	\$ 1,432,992	\$	2.14	\$	2.59	\$	(7.62)

CPI 2011 (2021) 1.21 PPI 2011 (2021) 1.19

#### Frederick, MD

Census Place (2010)							
		Persons per					
Pop. (2019)	Acres (i-Tree	canopy acre					
	Landscape)						
67,421	2,619	26					

			\$		\$		Net Ben	efit	
	\$/year(i-Tree		Benefit/C	Capita	Benefit/0	Capit	\$/Capita	(2021)	
Tree Benefit	Landscape)		(2011)		a(2021)				
PM2.5		144,967	\$	2.15	\$	2.56	\$	1.30	
Avoided									
Runoff		170,319	\$	2.53	\$	3.06	\$	1.80	

CPI 2011 (2021) 1.21 PPI 2011 (2021) 1.19

#### Lancaster, PA

	Census Place							
		Persons per						
Pop. (2015)	Acres (i-Tree	canopy acre						
	Landscape)							
59,344	1,171.40	51						

Tree Benefit	, ,	\$ Benefit/ (2011)	'Capita	\$ Benefit/C	Capita(2021)	Net Bener \$/Capita (2021)	fit
PM2.5	45,995	\$	0.78	\$	0.92	\$	(3.88)
Avoided							
Runoff	92,672	\$	1.56	\$	1.89	\$	(2.91)

CPI 2011

(2021) 1.21

PPI 2011

(2021) 1.19

Philadelphia, PA

Census Place					
Philadelphia	Canopy	Persons per			
Pop. (2019)	Acres (i-Tree	canopy acre			
	Landscape)				
1,584,064	22,615	70			

Tree Benefit	\$/year(i-Tree Landscape)	\$ Benefit/Cap	oita(2011)	\$ Bene	efit/Capita(2021)	Benefit pita(2021)
PM2.5	13,210,822	\$	8.34	\$	9.92	\$ 6.43
Avoided						
Runoff	5,077,481	\$	3.21	\$	3.88	\$ 0.39

CPI 2011

(2021) 1.21

PPI 2011

(2021) 1.19

#### Portland, OR

Census Place						
		Persons per				
Portland Pop.	Acres (i-Tree	canopy acre				
	Landscape)					
645,291	17,389		37			

Tree Benefit	\$/year (i-Tree Landscape)	\$ Benefit/0 (2011)	Capita	\$ Benefit/( (2021)	Capita	Net Bo \$/Cap (2021	ita
PM2.5	14,036,645	\$	21.75	\$	25.89	\$	15.96
Avoided Runoff	9,516,433	\$	14.75	\$	17.84	\$	7.91

CPI 2011 (2021) 1.21 PPI 2011 (2021) 1.19

Proceedings   Process	Community	Department	Project Type ("Buckets")	Project/Task	Funding	Annual Budget
Part			Project Implementation	Urban Food Forest at Browns Mill (Nation's largest municipal "food forest park")	secured \$4,800 from Cherokee Garden	\$124,800
Part			Project Implementation	Urban Food Forest at Bowns Mill	Intergrovernmental Grant Fund	\$11,256
Section of the content of the conten			Tree Assessment	support of philanthropic partners to draft a tree assessment along the corridor and	Philantrhopic Parners	Unknown
Part	City of Atlanta, GA FY 2019 Budget  City of Phildelphia, PA FY 2019 Budget (Book 1)  City of Phildelphia, PA FY 2019 Budget (Book 1)  City of Phildelphia, PA FY 2019 Budget (Book 1)  City of Phildelphia, PA FY 2019 Budget (Book 2)  City of Phildelphia, PA FY PO DO DO DO CITY CITY of Baltimore, MD FY 2019 [Volume II]  City of Baltimore, MD FY 2019 [Volume II]  Tr R R A A A CITY of Baltimore MD FY CITY of Baltimo		Tree Removal/Maintenance	Park arborists and forestry crews are responsible for street trees on 1,724 linear milesofright-of-way.		
Processing of the process of the p	City of Atlanta GA		Tree Planting	Plantedbver 1,500 community-based, small tree plantings within the City of ☐ Atlanta. The Department also utilized ruminants to clear invasive species from park	General Fund	\$39,087,190
Part			Education & Outreach	including pruning classes, educational tours alon Atlanta's Beltline linear arboretum		
Part		Planning/Office of Commissioner		aspects of nature in Atlanta should be protected, restored, and enhanced as well as provide a framework that protects greenspace alongside development in the City. The project also includes an update to the Tree Ordinance that helps to preserve and enhance the tree canopy.	General Fund	\$23,617,717
Part		Planning/Office of Buildings	-	property.	0.240.4.7.4	40.750.057
Company   Comp		Recreation Assume Department of Parks &				
Management of process of proces		Recreation	Education & Outreactly free Removal	Lut. Outreacily free Removal - 000307		
Management of process of proces	City of Phildelphia, PA FY 2019 Budget (Book 1)	Department of Public Property	Tree Removal		General Fund	\$89,000
Part		Office/Community Life	Tree Maintenance		General Fund	\$2,000
Processing of the Security Annual Processing Control Annual Processi		Office/Community Life	Tree Maintenance	Lanscaping services, Jimmy's Tree & Landscaping	General Fund	\$30,000
Secretary Management		Recreation/Infrastructure & Property Management	Tree Removal	Contract with Jimmy's Tree & Landscaping for tree/trunk/stump removal	General Fund	\$70,000
Secondary Continuation   Secondary Continuat		Recreation/Infrastructure & Property Management	Tree Maintenance	Cpntract with The Davey Tree Expert for stree tree pruning	General Fund	\$200,000
Reconstantificationaries   Procession of Parks & Montement   Mon		Recreation/Infrastructure & Property Management	Tree Plantings	adjacent upland areas, headwaters, and green SW basins	Grant	\$50,000
Secretary Management of Planting and Programs And Programs (Planting and Organization of Planting Planting and Organization of Planting and Organization of Planting and Organization of Planting Planti	2019 Budget (BOOK 2)	Recreation/Infrastructure &	Tree Maintenance	Operator, Park Projects Technician, Tree Maintenance Crew Chief, Tree Maintenance Worker	General Fund	\$1,350,029
Development (FILE) Contract  (File Indingenous)  Development of Water/Piporation  Department of Water/Piporation  The Maintenance Water  Department of Water Piporation  The Maintenance Water  Department of Pipis and  Recreation Control  The Maintenance Water  Department of Pipis and  Recreation Control  The Maintenance Water Piporation  The Maintenance Water Piporation		Recreation/Infrastructure & Property Management	Urban Forestry	Greenhouse/nursery attendant, Park manager, Park Projects Tech, Parks & Rec Grounds Maintenance, Parks & Rec Operations Manager, Parks Operations Director, Service Representative	General Fund	\$1,147,564
Agriculture of Water (Dispations)  (Agriculture of Water (Pulsent)  (Agriculture of Water (Pulsent)		Development/DHCD Contract	Plantings/Education & Outreach	that include tree maintenance, tree plantings, and education and technical	General Fund	\$2,390,000
Speciment of Water (Prisoning 4) Speciment of Prison and Prisoning 4 Speciment of Prison and Speciment of Prison and Speciment of Prison and Speciment of Prison and Speciment of			Maintenance Worker			
City of Baltimore, MDT (Comprodies Agency) fixed factors (Comprodies Agenc		Department of Water/Planning &		Contract with The Davey Tree Expert Company for tree pruning and cutting to care		
Recreation and Parks Against New York Parks  Recreation and Parks  Recreation and Parks Against New York Parks  Recreation and P					City of Philadelphia Total	\$5,474,649
Ministenance  Fire Intiminer  **Extra positions**  **Extra positions**  **Fire Intiminer  **Extra positions**  Free Intiminer  **Extra positions**  **Fire Maintenance  **Fire M		Acquisition & Management	Tree Removal (hazardous)	Increase funding for hazardous tree removal on City-owned properties	General Fund	\$20,000
Tree   Baltimore, MD PR   Receivation and Parks   Agency/Urban Description   Agency/Urban Descriptio			Tree Trimmer	6 staff positions	General Fund	\$235,564
Regrestion and Parks Agreey/Foreity Division Pow/Forsion Control Tree Planting Recreation and Parks Agreey/Foreity Division Pow/Forsion Control Tree Militagation Tree Maintenance Downtown Parnership of Baltimore Baltimore Six Year Capital Program P72019 Planting Department/Forest Conservation Program Tree Maintenance Tree Maintenance Tree Maintenance Downtown Parnership of Baltimore Recreation Tree Maintenance Tree Maintenance Tree Maintenance Tree Maintenance Downtown Parnership of Baltimore Six Year Capital Program P72019 Tree Maintenance Tree Maintenance Tree Maintenance Downtown Parnership of Baltimore Tree Maintenance Tree Planting/Maintenance Tree Planting/Maintenance Tree Planting/Maintenance Tree Planting/Maintenance Tree Spatian der Under Tree Canopy Fund removes and replaces trees lost or damaged during Conservation Program Tree Planting/Maintenance Tree Planting/Maintenance Tree Spatian der Verweiruse Tree Equipment Tree Equipment Tree Equipment Tree Equipment Tree Equipment Tree Equipment Tree Planting/Maintenance Tree Planting/Ma				street and park trees, including inspecting, planting, removing, pruning, watering and mulching. This service manages trees on public property and rights of way, and	General Fund	\$4,429,451
Agency Forest Division on Parks Agency Forest Provision   Tree Planting   Document Copy   Document of Parks and Recreation   Parks and Re		Rights-of-Way Landscape	Tree Maintenance		General Fund	\$3,790,941
City of Baltimore Six Year Capital Program PY 2019  Monthown Parnership of Saltimore Six Year Capital Program PY 2019  Palaning Department/Forest Conservation Program  Department of Parks and Recreation  Department of Parks and Recreation  Program PY 2019 Budget (Volume I)  Department of Parks and Recreation  Tree Equipment  Tree Equipment  Tree Equipment  Tree Equipment  Tree Equipment  Department of Parks and Recreation  Tree Equipment  Tree Planting/Maintenance  Department of Parks and Recreation includes Parks Forestry equipment in the Capital Planned Fleet Fund. Funding for fleet replacement on an annual cycle, and Recreation includes Parks Forestry equipment in the Capital Planned Fleet Fund. Funding for fleet replacement on an annual cycle, and Recreation includes Parks Forestry equipment in the Capital Planned Fleet Fund funding for fleet replacement on an annual cycle, and Department of Parks and Recreation includes Parks Forestry equipment in the Capital Planned Fleet Fund funding for fleet replacement on an annual cycle, and Department of Parks and Recreation includes Parks Forestry equipment in the Capital Planned Fleet Fund funding for Emeral Ath Bore			Tree Planting	locations for trees. In FY2019 also complete the renovation fo the TreeBaltimore		\$500
Tree Maintenance   Tree Planting/Maintenance   Tree Planting/Maintenance   Tree Planting/Maintenance   Tree Planting/Maintenance   Tree Equipment   Tree Maintenance   Tree Inting/Maintenance   Tree Inting/Maintenance   Tree Inting/Maintenance   Tree Inting/Maintenance   Tree Equipment   Tree Equipm		DPW/Erosion Control	Tree Mitigation			\$1,107
Implement the Forest Conservation Program across the City. Support the reforestation, afforestation, and forest management in the city including forest management includes private donations, project incomes, and reimbursements.    City of Denver, COFY	City of Baltimore Six Year Capital Program FY 2019		Tree Maintenance	tree pits, and provide additional landscaping to improve and enhance the pedestrian	Capital Budget: General Obligation Bonds	\$200
Department of Parks and Recreation  Tree Removal/Planting  Tree Planting/Maintenance  Tree Equipment  Tree Maintenance  Charges for tree trimming mentioned in the "Charges for Services" section explaining the city revenues explaining the city revenues  Explaining the			Forest Management	Implement the Forest Conservation Program across the City. Support the reforestation, afforestation, and forest management in the city including forest inventories or assessments, site identification, acquisition, preparation,	Capital Budget: Forest Conservation Funds	\$100
Pepartment of Parks and Recreation  Tree Removal/Planting  City and private construct exhibits of a management control of Parks and Recreation  Tree Planting/Maintenance  Tree Planting/Maintenance  Tree Equipment  Tree Planting/Maintenance  Charges for tree trimming mentioned in the "Charges for Services" section  explaining the city revenues  Pepartment of Parks and  Recreation  Recreation  Tree Planting/Maintenance  Tree					City of Baltimore Total	\$8,477,863
Parks and Recreation  Tree Planting/Maintenance  maintain and refurbish Denver's tree canopy and to meet the sustainability program objectives of the City.  2019 Budget (Volume I)  Department of Parks and Recreation  Tree Equipment  Tree Maintenance  Charges for tree trimming mentioned in the "Charges for Services" section explaining the city revenues  Parks and Recreation  Tree Planting/Maintenance  Charges for tree trimming mentioned in the "Charges for Services" section  Recreation  Tree Planting/Maintenance  City of Denver, CO FX  2019 Budget (Volume II)  Department of Parks and Recreation  Recreation  Tree Planting/Maintenance  Tree Planting/Maint			Tree Removal/Planting	City and private construction projects on street rights-of-way.	incomes, and reimbursements.	\$275,596
2019 Budget (Volume II) Department of Parks and Recreation includes Parks Forestry equipment in the Capital Planned Fleet Detail by Fund and Department for the replacement of 1 or 2 of each: Parks Recreation  Tree Equipment Tree Equipment Tree Equipment Tree Equipment Tree Equipment Tree Haintenance Tree Maintenance Tree Planting/Maintenance Tree Planting mentioned in the "Charges for Services" section Tree trimming services Tree trimming services N/A  Unknown Lays this out to say no charges in expenditures, the proposition of forestry operations in parks. The positions were limited through the end of 2023. No increase in FTE count or dollars in 2019.			Tree Planting/Maintenance	maintain and refurbish Denver's tree canopy and to meet the sustainability		\$200,000
Pepartment of Parks and Recreation  Tree Planting/Maintenance  Explaining the city revenues  Trees planting the city revenues  Trees planting for Entry for Entry revenues  Trees planting for Entry and treated are increasing with the funding for Emerald Ash Borer Founds  Unknown  Extension of 11 limited positions, consisting of four Arborist Technician I's, three  Poerstry inspectors, two Operations Assistants, one Accounting Technician II, and  One Operations Supervisor for forestry operations in parks. The positions were  Recreation  Staffing  Staffing  Staffing  Staffing  General Fund  General Fund  General Fund  General Fund  General Fund  Staffing  Staffing  General Fund  Staffing  General Fund  Staffing  Staffing  General Fund  Staffing  Staffing			Tree Equipment	Fleet Detail by Fund and Department for the replacement of 1 or 2 of each: Parks Forestry Pickup Truck, Loader , Dump Truck , Overhead Service, Stump Grinder, Chipper, Tree Spader	replacement on an annual cycle, and new/expansion vehicles are budgeted here as well. Revenues to this fund come from a General Fund transfer and interest	individual
Department of Yarks and Recreation  Tree Planting/Maintenance parks can stay abled of this natural disaster and maintain Denver's valued tree  City of Denver, CO FY  2019 Budget (Volume II)  Department of Parks and Recreation  Staffing  Staffing  Tree Planting/Maintenance  Extension of 11 limited positions, consisting of four Aborist Technician II, and one Operations Assistants, one Accounting Technician II, and one Operations Department of Parks and Recreation  Staffing			Tree Maintenance	explaining the city revenues	Tree trimming services	N/A
Department of Parks and Recreation  Staffing  Staffing  Forestry Inspectors, two Operations Assistants, one Accounting Technician II, and One Operations Staffing in Expenditures; one Operations Staffing in Expenditures; One Operations In parks. The positions were limited through the end of 2019 and have been extended to the end of 2023. No increase in FTE count or dollars in 2019.  Staffing  Forestry Inspectors, two Operations Assistants, one Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing in Expenditures; One Accounting Technician II, and Operations Staffing III, and Oper			Tree Planting/Maintenance	parks can stay ahead of this natural disaster and maintain Denver's valued tree canopy.	Emerald Ash Borer Funds	
			Staffing	Forestry Inspectors, two Operations Assistants, one Accounting Technician II, and one Operations Supervisor for forestry operations in parks. The positions were limited through the end of 2019 and have been extended to the end of 2023. No	General Fund	change in expenditures; does not breakdown personnel costs only
			•		City of Denver Total	

City of Portland FY 18/19  Budget (Volume I)  City of Portland FY 18/19  Budget (Volume II)  Department of Public Wo  program costs  Portland Parks and Rec //Urban Forestry Div  Bureau of Environm Services/Public Utilities Area  Bureau of Finning & Suc Community Developmer Area  Proportation, Yarang Budget (Volume II)  Bureau of Public Wo Community Developmer Area  Proportation, Yarang Budget (Volume II)  Department of Public Wo Community Developmer Area  Proportation, Yarang Budget (Volume II)  Department of Public Wo Departmen	orks	Tree Funding			
City of Portland FY 18/19  Budget (Volume I)  Department of Public Woods of Portland FY 18/19  Budget (Volume I)  Department of Public Woods of Portland FY 18/19  Bureau of Planning & Sus Community Development Area  Portland Bureau Transportation, Transport Area  Bureau of Planning & Sus Community Development Area  Portland Bureau Transportation, T	orks		Stree Tree Fee - only had appropriations in FY 15/16	Street Tree Fee	\$0
City of Portland FY 18/19  Budget (Volume I)  Department of Public Woods of Portland FY 18/19  Budget (Volume I)  Department of Public Woods of Portland FY 18/19  Bureau of Planning & Sus Community Development Area  Portland Bureau Transportation, Transport Area  Bureau of Planning & Sus Community Development Area  Portland Bureau Transportation, T	orks	Tree Planting	Tree Planting Replacement identified in capital funding by funding source	Capital Funds: Tree Planting & Replacement Fund	\$120,000
Department of Public Wood		Tree Maintenance	DPW responsible for: maintenance of roads and bridges, sidewalks, curbs, gutters, and streetscapes, tree health and maintenance, and right-of-way coordination.		\$22,998,971
an estimate, does not breakdown hunders threakdown	orks	Tree Planning/Maintenance/Planting	Advance City tree canopy and urban forestry guidelines to maintain, expand, and enhance the City's urban forest.		
City of Portland FY 18/19  Bureau of Planning & Sus Community Developmer Area  Bureau of Planning & Sus Community Developmer Area  Portland Bureau Transportation, Transp and Parking Service  City of Portland FY 18/19  Budget (Volume I)  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Parks Dwission  City of Frederick, MD FY 19/20 Budget Details Street Maintenance Dept Parks Dwission Parks Dwission Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission		Tree Policy/Ordinance	Implementation of City's new Tree Ordinance, creating transparency for tree removal permits and new mitigation requirements.		
DPW/Maintenance Servi Owision/ Urban Forestry Resolution Approving Op Capital Budget  Portland Parks and Rec //Urban Forestry Div  Budget (Volume I)  Bureau of Environm Services/Public Utilities Area  Bureau of Planning & Suc Community Developmer Area  Portland Bureau Transportation, Transp and Parking Service City of Portland FY 18/19 Budget (Volume II)  Department of Public Works/Bureau of Operation Works/Bureau of Operation DPW/Park Admin Expens DPW/Park Expenses DPW/Park Trees DPW/Park Trees DPW/Stormwater Manag  City of Asheville, NC FY 18/19 Budget Department of Public Wo Sustainability General St Sustainability Sustainability Sustainability Sustainability Tenderick, MD FY 19/20 Budget Details Street Maintenance Dept Parks Division	orks	Staffing	4 Senior Tree Maintenance Workers, 4 Senior Tree Pruners, 1 Tree Maintenance Supervisor, 6 Tree Maintenance Workers, 10 Tree Pruner Ils, 2 Tree Pruner	General Fund	
Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Department of Public Wo Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Parks Division Parks Division City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Parks Division Parks Division City of Perderick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Parks Division City of Perderick, MD FY Department of Public Wo Sustainability General St Division Parks Division City of Perderick, MD FY Department of Public Wo Sustainability General St Department of Public Wo Sustain			Supervisors Urban Forestry Program maintains, sustains, and enhances City's tree canopy		
City of Portland FY 18/19  Bureau of Environm Services/Public Utilities Area  Bureau of Panning & Sus Community Developmer Area  Portland Bureau Transportation, Transp and Parking Service  Portland Bureau Transportation, Transp and Parking Service  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Department of Publi		Tree Canopy	through variety of program; city staff prune 890 trees monthly average - targeting 95% of tree inventory pruner per annual cycle As part of resolution, Adjust the Public Works Department revenue budget	Performance tracking	
City of Portland FY 18/19 Budget (Volume I)  Bureau of Environm Services/Public Utilities Area  Bureau of Panning & Sus Community Developmer Area Portland Bureau Transportation, Transp Budget (Volume II)  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division City of Frederick, MD FY 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division City of Frederick, MD FY 20-25 Capital Improvements Program  City of Prederick, MD FY 20-25 Capital Improvements Program	perating &		(15001811) and the expenditure budget in the Tree Planting and Replacement (R15188500) project based on actual revenues received in the Tree Planting and Replacement Fund (Fund 2035).		
City of Portland FY 18/19  Budget (Volume I)  Bureau of Environm Services/Public Utilities Area  Bureau of Panning & Sus Community Developmer Area  Portland Bureau Transportation, Transp Budget (Volume II)  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability Department of Public Wo Sustainability City of Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Community Parks Division  City of Frederick, MD FY Department of Public Wo Department o				City of Sacramento Total	\$23,118,971
City of Portland FY 18/19 Budget (Volume I)  Bureau of Environm Services/Public Utilities Area  Bureau of Panning & Sus Community Developmer Area Portland Bureau Transportation, Transp Budget (Volume II)  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division City of Frederick, MD FY 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division City of Frederick, MD FY 20-25 Capital Improvements Program  City of Prederick, MD FY 20-25 Capital Improvements Program		Tree Funding	Increased fees in Urban Forestry Program, emergency tree removal	Fees	
City of Portland FY 18/19 Budget (Volume I)  Bureau of Environm Services/Public Utilities Area  Bureau of Panning & Sus Community Developmer Area Portland Bureau Transportation, Transp Budget (Volume I)  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Department of Public Wo Sustainability Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division		Tree Planting/Maintenance/Outreach	Responsible for all things tree related	General Fund	
City of Portland FY 18/19 Budget (Volume I)  Bureau of Environm Services/Public Utilities Area  Bureau of Panning & Sus Community Developmer Area Portland Bureau Transportation, Transp Budget (Volume II)  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Parks Division Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division Parks Division Parks Division City of Frederick, MD FY 20.25 Capital Improvements Program City of Detroit, MIFY19- 22.20verview (Sec A) Capital Program		and Education/etc. Tree Maintenance Facility	Urban Forestry Maintenance facility included in capital program	Capital Fund	\$3,000,000
City of Portland FY 18/19 Budget (Volume I) Bureau of Environm Services/Public Utilities Area  Bureau of Panning & Sus Community Developmer Area Portland Bureau Transportation, Transp Budget (Volume II)  Department of Public Wo Department of Publ	(0000)	Philathropy Staffing	Urban Forestry Maintenance Facility dedicated dollars for art  Fee increases to support new staff (4 arborists, senior admin specialist)	Donation Fees	\$33,736 \$770,000
Bureau of Environm Services/Public Utilities Area  Bureau of Pianning & Sus Community Developmer Area  Portland Bureau Transportation, Transp and Parking Service City of Portland FY 38/19 Budget (Volume II)  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY13- 22. Overview (Sec A).  Capital Program		Staffing Staffing	Tree Inspector (10.5 positions) Urban Forestry Supervisor (3 positions)	General Fund General Fund	\$726,810 \$272,376
Bureau of Environm Services/Public Utilities Area  Bureau of Pianning & Sus Community Developmer Area  Portland Bureau Transportation, Transp and Parking Service  City of Portland FY 18/19 Budget (Volume II)  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Parks Dwission  City of Frederick, MD FY 19/20 Budget Details Street Maintenance Dept Parks Dwission Parks Dwission  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Frederick, MI FYI 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability City of Department of Public Wo Sustainability City of Prederick, MI FYI 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability City of Department of Public Wo Sustainability City of Prederick, MI FYI 20-25 Capital City of Prederick MI FYI 20-20-20 Capital City of Prederick MI FYI 20-20 Capi		Strategic Planning	PP&R Strategic Plan: Long-term vision plan ensures legacy access to park, rec, and	General Fund	\$300,000
Bureau of Environm Services/Public Utilities Area  Bureau of Pianning & Sus Community Developmer Area  Portland Bureau Transportation, Transp and Parking Service  City of Portland FY 18/19 Budget (Volume II)  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Parks Dwission  City of Frederick, MD FY 19/20 Budget Details Street Maintenance Dept Parks Dwission Parks Dwission  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Frederick, MI FYI 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability City of Department of Public Wo Sustainability City of Prederick, MI FYI 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability City of Department of Public Wo Sustainability City of Prederick, MI FYI 20-25 Capital City of Prederick MI FYI 20-20-20 Capital City of Prederick MI FYI 20-20 Capi			tree elated services for future generations  City has a goal to increase tree canopy cover to 33% (went from 27 to 31% over last		***************************************
Bureau of Environm Services/Public Utilities Area  Bureau of Pianning & Sus Community Developmer Area  Portland Bureau Transportation, Transp and Parking Service  City of Portland FY 18/19 Budget (Volume II)  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Dwission Parks Dwission  City of Frederick, MD FY 19/20 Budget Details Street Maintenance Dept Parks Dwission Parks Dwission  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Frederick, MI FYI 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability City of Department of Public Wo Sustainability City of Prederick, MI FYI 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability City of Department of Public Wo Sustainability City of Prederick, MI FYI 20-25 Capital City of Prederick MI FYI 20-20-20 Capital City of Prederick MI FYI 20-20 Capi		Tree canopy	15 years)  New General Fund resources included to address backlog of major maintenance	Performance tracking	
Bureau of Environm Services/Public Utilities Area  Bureau of Planning & Sus Community Developmer Area Portland Bureau Transportation, Transp and Parking Service PP&R Capital Improveme  Department of Public Works/Bureau of Operation Works/Bureau of Operation DPW/Traffic Expenses DPW/Park Admin Expens DPW/Park Admin Expens DPW/Park Expenses DPW/Park Expenses DPW/Park Expenses DPW/Park Department of Public Works/Bureau of Operation DPW/Traffic Expenses DPW/Park Expenses DPW/Park Expenses DPW/Park Department of Public Works/Bureau of Operation DPW/Stormwater Manag  City of Asheville, NC FY 19/20 Budget Department of Public Works/Bureau of Operation DPW/Parks Expenses DPW/Pa		Tree maintenance	(page 238)	General Fund	
Bureau of Planning & Suc Community Development Area Protriand Bureau Transportation, Transport		Tree Planting	Tree planting in Stephens Creek watersehed	Utilities	\$30,600
Bureau of Planning & Sus Community Developmer Area Portland Bureau Transportation, Transp and Parking Service  City of Portland FY 18/19 Budget Wolume II)  Department of Public Wo Department of Public Wo Department of Public Works/Bureau of Operation DPW/Park Admin Expens DPW/Park Admin Expens DPW/Park Admin Expens DPW/Parks Trees  DPW/Parks Tr		Tree planting	One time increase for the Neighborhood to the River Program to improve tree canopy and vegetation conditions	Utilities	\$106,000
Community Developmer Area Portland Bureau Transportation, Transp and Parking Service Department of Public Wo Sustainability General St Sustainability General St Street Maintenance Dept Parks Swission Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Swission Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Swission Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY Department of Public Wo Department of Public		Tree planting Urban Forest Canopy	Anticipate planting 9.250 in FY 17/18 and target of 12,000 for FY 18/19 The Watershed Revegetation program is reflected in both budgets for Wastewater Group and Watershed Services. The progra reforests city natual areas and adjacet lands, plants and maintains city green streets, SW management facilities, and bureau capital projects to improve the urban forest canopy	Utilities Utilities	
Transportation, Transportation		Planning/Performance Measures	Central City Planning: Central City 2035 targets for the Central City related to transportation, jobs and housing, riverbank enhancement, <b>tree canopy</b> , and public space		\$718,350
City of Frederick, MD FY 19/20 Budget Department of Public Wo Department of Public Wo Department of Public Wo Department of Public Wo Mork/Bureau of Operation DPW/Fark Admin Expens DPW/Park Admin Expens DPW/Park Expenses DPW/Park Expenses DPW/Park Expenses DPW/Park Expenses DPW/Park Expenses DPW/Park Expenses DPW/Park Department of Public Wo Sustainability General St. 19/20 Budget Details. Street Maintenance Dept Parks Division Parks Division Department of Public Wo Sustainability General St. 19/20 Budget Details. Street Maintenance Dept Parks Division Department of Public Wo Sustainability Mission Department of Public Wo Mission Department o	portation	Interagency Agreement Balancing	Adopted budget includes \$200,468 net increase in interagency costs; primarily driven by emergency tree removal cost recovery charges to Parks Bureau (\$382,800) (page 488)	Ineragency Budget Balancing	
Department of Public Works/Bureau of Operation DPW/Iraffic Expenses DPW/Park Admin Expens DPW/Park Admin Expens DPW/Park Sexpenses DPW/Parks Expenses DPW/Parks Expenses DPW/Parks Trees DPW/Stormwater Manage DPW/Stormwate		Capital project	Ventura Park Playground: Repair pavement buckled by tree roots; remove four problematic trees and protect remaining trees (this is part of the entire project)	2014 General Obligation Bonds	\$300,000
Department of Public Works/Bureau of Operation of Public Works/Bureau of Operation DPW/Iraffic Expenses DPW/Park Admin Expens DPW/Park Admin Expenses DPW/Parks Expenses DPW/Parks Trees DPW/Stormwater Manage  City of Asheville, NC FY 18/19 Budget Department of Public Wo Department of Public Wo Department of Public Wo Department of Public Wo Sustainability Street Maintenance Dept Parks Division Parks Division City of Frederick, MD FY 19/20 Budget Details. Street Maintenance Dept Parks Division Parks Division Department of Public Wo Sustainability General Street Maintenance Dept Parks Division Department of Public Wo Sustainability City of Frederick, MD FY Department of Public Wo Sustainability City of Detroit, MI FY19- 22 Overview (Sec A). Capital Program				City of Portland Total	\$6,257,872
City of Frederick, MD FY 19/20 Budget Department of Public Wo Sustainability General Street Maintenance Dept Parks Division Parks Division Parks Division City of Frederick, MD FY 20-25 Capital Improvements Program  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Proderick, MD FY 20-25 Capital Program  City of Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Proderick, MD FY 20-25 Capital Program  City of Proderick, MD FY 20-25 Capital Program  City of Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Proderick, MD FY 20-25 Capital Program  City of Proderick MD FY 20-25 Capital Program  City of Proderick MD FY 20-25 Capital Program	orks		Shade Tree Commission	N/A	N/A
City of Asheville, NC FY 18/19 Budget  City of Asheville, NC FY 18/19 Budget  City of Asheville, NC FY 18/19 Budget  City of Frederick, MD FY 19/20 Budget  City of Frederick, MD FY 19/20 Budget Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  Funds Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  Department of Public Wo Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Department of Public Wo Sustainability General St Sustainability General St City of Department of Public Wo City of Department of Public Wo City of Prederick, MD FY 20-25 Capital City of Department of Public Wo City of Prederick, MD FY 20-25 Capital City of Department of Public Wo City of Prederick, MD FY 20-25 Capital City of Prederick, MD FY 20-25 Capital City of Department of Public Wo City of Prederick, MD FY 20-25 Capital City of Prederick MD FY 20-25 Capital City of Prederick MD FY 20-25 Capital City of Prederick MD FY 20-25 Capi	tions	Tree Planting/Maintenance/Ordinance Implementation	The Bureau's Tree Crew administers the City's Shade Tree Ordinance and street tree planting program	N/A	N/A
City of Frederick, MD FY 19/20 Budget Department of Public Wo Sustainability General Street Maintenance Dep Parks Division Parks Division  City of Frederick, MD FY 19/20 Budget Department of Public Wo Sustainability General Street Maintenance Dept Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Frederick, MD FY 20-25 Capital Company Sustainability Company Parks Division  City of Frederick, MD FY 20-25 Capital Company Sustainability Company Parks Division  City of Company Sustainability Company		Tree Trimming	Contract services listed under general fund include tree trimming  Advertising the annual Arbor Day Celebrations, the Tree Revitalize	General Fund	\$30,000
2018 Budget  DPW/Parks Expenses  DPW/Parks Expenses  DPW/Parks Trees  DPW/Stormwater Manage  City of Asheville, NC FY 18/19 Budget  Department of Public Wo Department of Public Wo Department of Public Wo Sustainability  Funds Street Maintenance Dept Street Maintenance Dept Parks Division Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec A).  Capital Program	ses	Tree Program Advertising	Program from DCNR and tree inventory.	General Fund	\$400
DPW/Parks Trees  DPW/Stornwater Manag  City of Asheville, NC FY 18/19 Budget Department of Public Wo  City of Frederick, MD FY 19/20 Budget Funds Sustainability Sustainability General St. Sustainability General St. Street Maintenance Dept Parks Division Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec A).  Capital Program	ses	Tree Program Postage	All Bureau mailings, including street tree notices and pavilion rental permits.	General Fund	\$298
City of Asheville, NC FY 18/19 Budget Department of Public Wo 18/19 Budget Department of Public Wo 18/19 Budget Department of Public Wo 19/20 Budget, Funds Sustainability Sustainability General St Street Maintenance Dept Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Frederick, MI FY 20-22 Capital City of Department of Public Wo Sustainability Department of Public Wo Sustainability City of Frederick, MD FY 20-25 Capital City of Frederick, MD FY 20-25 Capital City of Department of Public Wo Sustainability City of Detroit, MI FY19- 22 Overview (Sec A)  Capital Program		Tree Planting	Overtime to perform services after regular hours for seasonal cleanup; spring mowing, tree planting; storm damage and snow removal; timedefinite project completion; and all City special events and activities.	General Fund	\$5,248
City of Asheville, NC FY 18/19 Budget Department of Public Wo Sustainability Funds Sustainability General St Street Maintenance Dept Parks Division Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec A). Capital Program		Tree Department	Includes total budget for: salaried personnel, overtime, maint equipment, dues & subscription, contract services, training & school, operating supplies, special events, minor equipment; seems that the Parks Trees are a department within DPW	General Fund	\$233,870
18/19 Budget  Department of Public Wo  City of Frederick, MD FY 19/20 Budget  Funds Sustainability Sustainability General St. Sustainability General St. Street Maintenance Dept Parks Division Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec A).  Capital Program	gement	Tree Landscaping	This code is the expense to purchase landscape plants for the maintenance of rain gardens throughout the City.	General Fund	\$16,286
18/19 Budget  Department of Public Wo  City of Frederick, MD FY 19/20 Budget  Funds Sustainability Sustainability General St. 39/20 Budget Details Street Maintenance Dept Parks Division Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec A).  Capital Program				City of Lancaster Total	\$286,102
18/19 Budget  Department of Public Wo  City of Frederick, MD FY 19/20 Budget  Funds Sustainability Sustainability General St. Sustainability General St. Street Maintenance Dept Parks Division Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec A).  Capital Program		Tree Recognition	Recognized as Tree City USA for decades, streets, greenways, and parks embody an urban forest		-
City of Frederick, MD FY 19/20 Budget  Funds  Street Maintenance Dept Street Maintenance Dept Street Maintenance Dept Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec A).  Capital Program		Tree Canopy Study	Budget includes tree canopy study	General Fund	\$20,000 Does not break down
19/20 Budget  Funds Sustainability City of Frederick, MD FY 19/20 Budget Details Street Maintenance Dept Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec A).  Capital Program	orks	Tree Department	"Trees & Trimming" within Streets in DPW	General Fund	DOES NOT Break down DPW budget enough
Sustainability  Sustainability  19/20 Budget Details  Street Maintenance Dept Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec A).  Capital Program	orks	Tree Planting	In Mayor's Budget Message: 7,500 additional tree plantings as part of sustainable urban growth effort		
City of Frederick, MD FY 19/20 Budget Details Street Maintenance Dept Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec A)  Capital Program		Tree Program Revenue	Tree City Dues in the amount of "25" dollars?	Revenue	-\$25
19/20 Budget Details Street Maintenance Dept Street Maintenance Dept Street Maintenance Dept Parks Division Parks Division City of Frederick, MD FY 20-25 Capital Improvements Program City of Detoit, MI FY19-22 Overview (Sec A). Capital Program	Supplier	Tree Program Revenue Tree Canopy	Tree Canopy Program Fee Tree Canopy Program	Revenue General Fund	-\$7,500 \$15,000
Parks Division Parks Division Parks Division Parks Division Department of Public Wo Sustainability City of Detroit, MI PY19- 22 Overview (Sec A). Capital Program	ot.	Tree Maintenance	Tree Removal (sidewalk related)	General Fund	\$25,000
Parks Division  City of Frederick, MD FY 20-25 Capital Improvements Program  City of Detroit, MI FY19- 22 Overview (Sec Al.  Capital Program	t.	Tree Maintenance Tree Planting	Downtown tree well maintenance HOATree Planting Program	General Fund General Fund	\$10,000 \$10,000
20-25 Capital Improvements Program Sustainability  City of Detroit, MI FY19-22 Overview (Sec A).		Tree Planting and Maintenance	Street tree replacement	General Fund	\$35,000
22 Overview (Sec A) Capital Program	orks/	Tree Canopy	As part of larger sustainibility initiatives, increase urban tree canopy listed	Grants	
22 Overview (Sec A)				City of Frederick Total	\$87,475
		Tree Removal	Identifies large capital grants that the City receives for tree removal, of many other items		
(Detroit Parks and Rec De		Tree maintenance and removal	The Grounds Maintenance Division is responsible for tree trimming, tree and stumpremoval, and all things tree-related. This Division oversees Street Fund Forestry	,	
City of Detroit, MI FY19- 22 Departments (Sec B) merged here effective FY	ept. was		staff  1 Tree Artisan Helper, recommended 12 Tree Artisans, 6 Senior Tree Artisans, 2		
General Services Departm	ept. was		Forestry and Landscape Foreman, 2 Assistant Foresters, 1 recommended Associate	Non Park Forestry Street Fund	\$6,940,910
City of Detroit, MI FY19- 22 Legal Budget (Sec C) General Services Departn	ept. was Y 19)	Staffing	Forester, 1 Senior Associate Forester, and others; a total of 26 staff members identified within Non Park Forestry Street Fund		

#### Appendix B

#### Tracking benefits and costs of canopy services for return on investment 1

The purpose of tracking costs and benefits of specific urban canopy services (not services in aggregate) is to identify, justify and communicate with potential new funding sources. Governments and non-profits have traditionally relied on municipal, state, or federal dollars to develop and implement many projects and initiatives, including urban and community forestry projects. In this approach, funding for the entirety of the project and all related aspects are allocated and appropriated upfront. Although this approach has its advantages, funding is spent on projects before the expected outcomes being delivered. Therefore, this financing structure usually means that riskier projects, i.e. those with untested approaches or uncertain outcomes, may be less likely to receive funding.

Outcomes-based financing is a relatively new financing model that takes an innovative approach to mitigate this risk. In this structure, investors are providing the upfront capital needed to fund these projects, and the repayment of this funding is tied to the achievement of project outcomes and deliverables. Shifting the financial risk of funding innovative projects onto investors allows governments, non-profits, and other similar entities – who typically have less financial capital – to access. New funding from non-traditional sources based on the multiple benefits projects may create, allows more innovative projects to be implemented. In outcomes-based financing, there are usually several parties involved. Figure 1 maps the responsibilities of each party and the relationships between them.

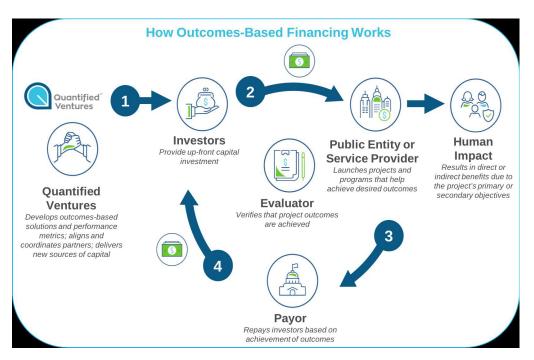


Figure 1 Outcomes-based financing model (Quantified Ventures)

Central to the development of any outcomes-based financing approach is the identification of the various stakeholders that would participate, and stand to benefit from an assessment and accounting

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<sup>&</sup>lt;sup>1</sup> This section written with project partner Quantified Ventures.

of the varied outcomes generated by the projects that are being financed. In the context of urban and community forestry projects, the following types of entities to be the most significant and important types of "users" the accounting framework should target:

- 1. **Outcomes Payor:** An entity that benefits from the value of urban tree canopies, and thus may be compelled to be a "payor" in an outcomes-based financing entity, or contribute to financing of these projects. For example, based recent project team conversations and the link between urban trees and health, this could potentially be a health plan based in a city like Louisville where urban heat island effects and the ability of tree cover to mitigate them are strong. It could also potentially be a municipality itself.
- 2. **Service Provider:** An organization that plants trees in urban settings and implements urban and community forestry projects, such as Casey Trees in Washington, DC. This is the target entity for scaling from capital provided by outcomes payors. If the service provider is also one that incorporates social and economic goals in their operations, such as workforce development training, a broader set of payors may be incentivized to participate to help pay for projects.
- 3. **Lobbyist:** Scaling from the local to the national level, an accounting framework that values the benefits of an urban tree canopy could better equip for organizations that lobby for urban trees around the country, such as American Forests. By ensuring buy-in of, and providing tools for, a lobbyist as a "user" of the framework, it would enable easier replication of urban and community forestry projects across the country.

There are different categories used for accounting for urban forest costs and benefits. The costs can fall into direct costs (similar to the costs described above in budgets across departments) in addition to cost savings. These are estimates provided by the benefits, for example, stormwater runoff reduction reducing treatment costs. Revenue can fall into the following categories further described in Table 1.

Table 1 Urban forest accounting system tracking

Contr. Divert	Costs associated with creating and maintaining
Costs - Direct	urban/community forest resources.
	Costs that are impacted by urban/community forest
	resources. These costs could be reduced or avoided through
Costs - Indirect	an investment.
	Revenue generated directly or indirectly from
Revenue	urban/community forest resources.
	Non-revenue benefits are generated directly or indirectly
	from urban/community forest resources. <i>In italics below are</i>
	benefits that may be difficult to quantify, so proxies may
Non-Revenue Benefits	have to be developed on a city-by-city basis.

Table 2 Benefit and Cost connections

Category	BENEFITS Types of data that can be tracked related to investments in urban/community forestry projects Data Types Relevant to Urban/Community Forestry	COST DIRECT/INDIRECT POTENTIAL Specific illustrative data and metrics that can be tracked to assess value in a pay for success or impact investment transaction  Data Examples
Costs - Indirect	Improved water treatment	Avoided water/stormwater treatment through reduced run-off into waterways
Costs - Indirect	Reduced local flood damage and nuisance Reduced urban heat	Volume capture of (storm)water, as flow or stock/capacity removal from the floodplain  Ambient temperatures before and after installation
Costs - Indirect	island effect Reduced health impacts from urban environment Reduced health	of urban forestry resources  Recreation-obesity surrounding parks/urban forests Air quality-EMS Calls for cardiac and respiratory
Costs - Indirect	impacts from urban environment	distress during high heat index days (>103 degrees F)
Revenue	Tax revenues Productive reuse of	Taxes associated with tourism, visitation, neighborhood improvement, etc.
Revenue Revenue	fresh cut hardwoods, tree trimmings Carbon	Revenue from sales of hardwoods, wood trimming material  Carbon credits
Non- Revenue Benefits	Property values	Changes in property value (assessed tax value) before & after park creation
Non- Revenue Benefits	Job creation	# park / maintenance employees over time, # employees of contractors engaged
Non- Revenue Benefits	Crime reduction in neighborhoods	Neighborhood crime rates
Non- Revenue Benefits	Stormwater volume captured	Quantity of volume captured
Non- Revenue Benefits	Reduced urban heat island effect	Ambient temperatures before and after installation of urban forestry resources

Non-	Reduced health	
Revenue	impacts from urban	Asthma rates, obesity surrounding parks/urban
Benefits	environment	forests
Non-	Reduced health	
Revenue	impacts from urban	EMS Calls for cardiac and respiratory distress
Benefits	environment	during high heat index days (>103 degrees F)
Non-		
Revenue	Neighborhood	[To be developed on a city-by-city basis:
Benefits	social cohesion	appropriate proxies]
Non-		
Revenue	Improved mental	[To be developed on a city-by-city basis:
Benefits	health	appropriate proxies]
Non-	Social and	
Revenue	environmental	[To be developed on a city-by-city basis:
Benefits	equity improvement	appropriate proxies]
Non-	Ecosystem services	
Revenue	(pollination,	[To be developed on a city-by-city basis:
Benefits	biodiversity)	appropriate proxies]

Table 2 shows examples of data types and metrics that urban and community forest managers can collect to value their investments. This data could be used in justifying and structuring new financing sources for urban forestry programs.