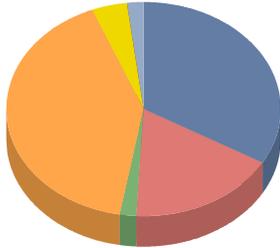


Analysis Report for Washoe County

Land cover in acres and percentages



■ Arid & Semi-Arid Rangeland: Sagebrush: Ground cover 30% - 70%	19,268.7	33.3%
■ Impervious Surfaces: Paved: Drain to sewer	10,103.7	17.5%
■ Impervious Surfaces: Unpaved: Dirt	1,125.7	1.9%
■ Open Space - Grass/Scattered Trees: Grass cover > 75%	23,801.8	41.2%
■ Trees: Grass/turf understory: Ground cover > 75%	2,421.9	4.2%
■ Trees: Impervious understory	18.7	0.0%
■ Water Area	1,051.5	1.8%
Total:	57,791.9	100.0%

Tree Canopy: 2,440.7 acres (4.2%)

Air Pollution Removal

By absorbing and filtering out nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone (O₃), carbon monoxide (CO), and particulate matter less than 10 microns (PM₁₀), trees perform a vital air cleaning service that directly affects the well-being of urban dwellers. CITYgreen estimates the annual air pollution removal rate of trees within a defined study area for these five pollutants based on research conducted by David Nowak, PhD, of the U.S. Forest Service. Economists use “externality” costs, or indirect costs borne by society such as rising health care expenditures and reduced tourism revenue to determine the dollar value of air pollutant removal. The externality costs used in CITYgreen are set by each state’s Public Services Commission.

Nearest Air Quality Reference City: **Salt Lake City**

	<u>Lbs. Removed/yr</u>	<u>Dollar Value/yr</u>
Carbon Monoxide:	6,527	3,203
Ozone:	65,269	\$230,599
Nitrogen Dioxide:	34,810	\$122,986
Particulate Matter:	113,133	\$266,864
Sulfur Dioxide:	10,878	\$9,388
<u>Totals:</u>	230,618	633,041

Dollar values are based on 2009 dollars

Carbon Storage and Sequestration

Trees remove carbon dioxide from the air through their leaves and store carbon in their biomass. Approximately half of a tree’s dry weight is carbon. For this reason, large-scale tree planting projects are recognized as a legitimate tool in many national carbon-reduction programs. CITYgreen estimates the carbon storage capacity and sequestration rates of trees within a defined study area. The carbon storage and sequestration model was developed using research conducted by David Nowak, E. Gregory McPherson, and Rowan Rowntree of the U.S. Forest Service.

Tons Stored (Total):	105,026
Tons Sequestered (Annually):	818

Analysis Report for Washoe County

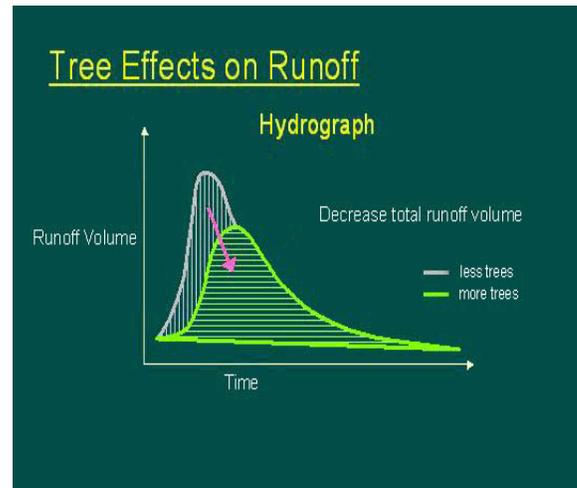
Stormwater Management

Water Quantity (Runoff Volume)

Trees decrease total runoff volume, helping cities to decrease their stormwater management costs. CITYgreen calculates the volume of runoff in a 2-year 24-hour storm event that would need to be contained if all trees were removed. To do this, CITYgreen uses a model developed by the Natural Resources Conservation Service (NRCS) called TR-55, based on a system of curve numbers. Curve numbers are an index of potential runoff within a specified drainage area. Curve numbers range from 30 to 100, with a higher number indicating greater runoff potential.

CITYgreen calculates two curve numbers for the stormwater analysis: one reflecting existing land cover conditions and the other reflecting the replacement of tree canopy in the study area by a user-defined replacement land cover (specified in the CITYgreen Preferences.) The difference in curve numbers and local rainfall determine the change in storage volume between the two different land cover scenarios (with and without trees). To determine the dollar amount of stormwater-related savings resulting from tree canopy, this calculated volume is then multiplied by the user-specified local construction cost.

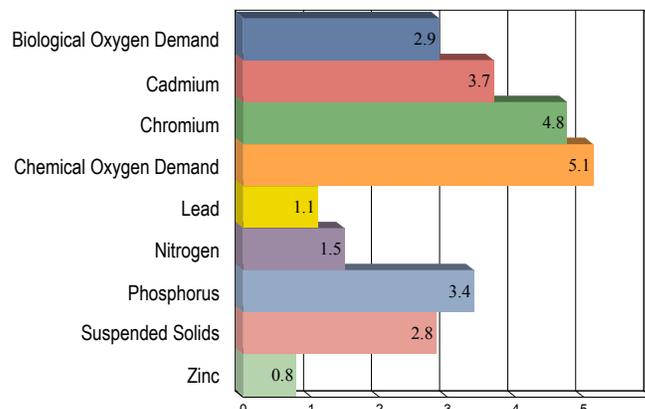
2-yr, 24-hr Rainfall in inches:	2.50
Curve Number reflecting existing conditions:	75
Curve Number of replacement land cover:	76
Dominant soil type:	C
Replacement land cover type: (existing condition)	
Urban: Western Desert: Natural Landscaping	
Additional cu. ft. storage needed:	4,998,986
Construction cost per cu. ft.:	\$3.00
Total Stormwater Value:	\$14,996,958
Annual Stormwater Value:	\$1,307,503
(based on 20-year financing at 6% interest)	



Water Quality (Contaminant Loading)

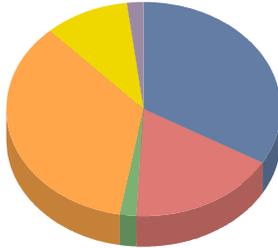
Trees filter surface water and prevent erosion, both of which maintain or improve water quality. American Forests developed the CITYgreen water quality model using data from the US Environmental Protection Agency (EPA) and Purdue University's L-Thia spreadsheet water quality model. The water quality model estimates the change in the concentration of pollutants in runoff during a typical storm event, by replacing the tree canopy in a specified study area with the user-defined replacement land cover (specified in the CITYgreen Preferences) and comparing the results. The model estimates the event mean concentrations of nitrogen, phosphorus, suspended solids, zinc, lead, cadmium, chromium, chemical oxygen demand (COD), and biological oxygen demand (BOD).

Percent change in contaminant loadings



Washoe County: Increase to 10% Canopy

Land cover in acres and percentages



■ Arid & Semi-Arid Rangeland: Sagebrush: Ground cover 30% - 70%	19,244.7	33.3%
■ Impervious Surfaces: Paved: Drain to sewer	10,113.6	17.5%
■ Impervious Surfaces: Unpaved: Dirt	1,098.0	1.9%
■ Open Space - Grass/Scattered Trees: Grass cover > 75%	20,458.4	35.4%
■ Trees: Grass/turf understory: Ground cover > 75%	5,779.2	10.0%
■ Water Area	1,098.0	1.9%
Total:	57,791.9	100.0%

Tree Canopy: 5,779.2 acres (10.0%)

Air Pollution Removal

By absorbing and filtering out nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone (O₃), carbon monoxide (CO), and particulate matter less than 10 microns (PM₁₀), trees perform a vital air cleaning service that directly affects the well-being of urban dwellers. CITYgreen estimates the annual air pollution removal rate of trees within a defined study area for these five pollutants based on research conducted by David Nowak, PhD, of the U.S. Forest Service. Economists use "externality" costs, or indirect costs borne by society such as rising health care expenditures and reduced tourism revenue to determine the dollar value of air pollutant removal. The externality costs used in CITYgreen are set by each state's Public Services Commission.

Nearest Air Quality Reference City: **Salt Lake City**

	<u>Lbs. Removed/yr</u>	<u>Dollar Value/yr</u>
Carbon Monoxide:	15,455	7,585
Ozone:	154,549	\$546,029
Nitrogen Dioxide:	82,426	\$291,216
Particulate Matter:	267,885	\$631,899
Sulfur Dioxide:	25,758	\$22,230
Totals:	546,073	1,498,959

Dollar values are based on 2009 dollars

Carbon Storage and Sequestration

Trees remove carbon dioxide from the air through their leaves and store carbon in their biomass. Approximately half of a tree's dry weight is carbon. For this reason, large-scale tree planting projects are recognized as a legitimate tool in many national carbon-reduction programs. CITYgreen estimates the carbon storage capacity and sequestration rates of trees within a defined study area. The carbon storage and sequestration model was developed using research conducted by David Nowak, E. Gregory McPherson, and Rowan Rowntree of the U.S. Forest Service.

Tons Stored (Total):	248,687
Tons Sequestered (Annually):	1,936

Washoe County: Increase to 10% Canopy

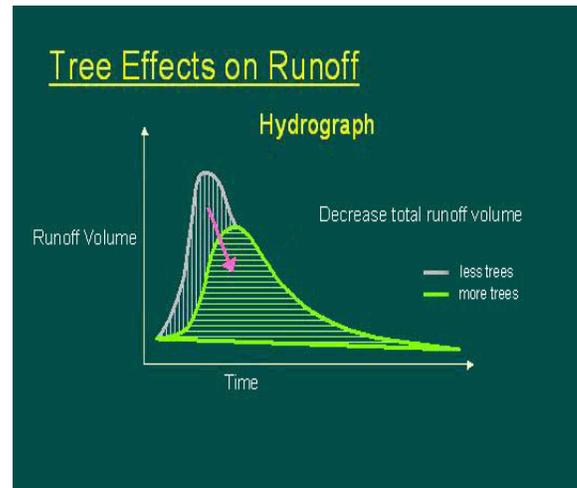
Stormwater Management

Water Quantity (Runoff Volume)

Trees decrease total runoff volume, helping cities to decrease their stormwater management costs. CITYgreen calculates the volume of runoff in a 2-year 24-hour storm event that would need to be contained if all trees were removed. To do this, CITYgreen uses a model developed by the Natural Resources Conservation Service (NRCS) called TR-55, based on a system of curve numbers. Curve numbers are an index of potential runoff within a specified drainage area. Curve numbers range from 30 to 100, with a higher number indicating greater runoff potential.

CITYgreen calculates two curve numbers for the stormwater analysis: one reflecting existing land cover conditions and the other reflecting the replacement of tree canopy in the study area by a user-defined replacement land cover (specified in the CITYgreen Preferences.) The difference in curve numbers and local rainfall determine the change in storage volume between the two different land cover scenarios (with and without trees). To determine the dollar amount of stormwater-related savings resulting from tree canopy, this calculated volume is then multiplied by the user-specified local construction cost.

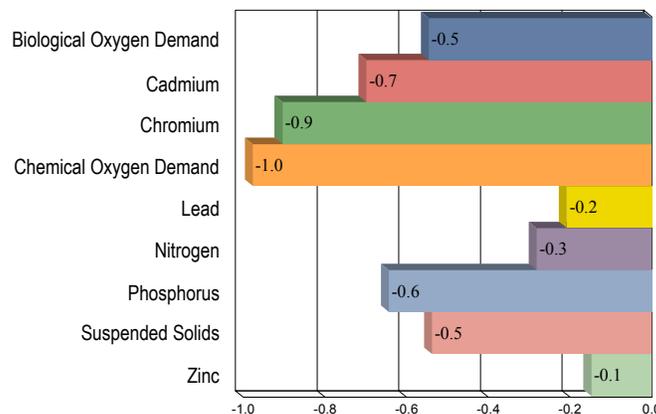
2-yr, 24-hr Rainfall in inches:	2.50
Curve Number reflecting existing conditions:	75
Curve Number of replacement land cover:	75
Dominant soil type:	C
Replacement land cover type: (existing condition)	
Urban: Western Desert: Natural Landscaping	
Additional cu. ft. storage needed:	-938,357
Construction cost per cu. ft.:	\$3.00
Total Stormwater Value:	-\$2,815,070
Annual Stormwater Value:	\$245,431
<small>(based on 20-year financing at 6% interest)</small>	



Water Quality (Contaminant Loading)

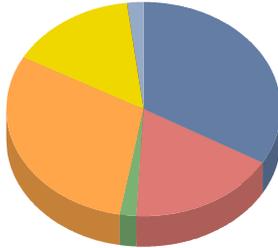
Trees filter surface water and prevent erosion, both of which maintain or improve water quality. American Forests developed the CITYgreen water quality model using data from the US Environmental Protection Agency (EPA) and Purdue University's L-Thia spreadsheet water quality model. The water quality model estimates the change in the concentration of pollutants in runoff during a typical storm event, by replacing the tree canopy in a specified study area with the user-defined replacement land cover (specified in the CITYgreen Preferences) and comparing the results. The model estimates the event mean concentrations of nitrogen, phosphorus, suspended solids, zinc, lead, cadmium, chromium, chemical oxygen demand (COD), and biological oxygen demand (BOD).

Percent change in contaminant loadings



Washoe County: Increase to 15% Canopy

Land cover in acres and percentages



■ Arid & Semi-Arid Rangeland: Sagebrush: Ground cover 30% - 70%	19,244.7	33.3%
■ Impervious Surfaces: Paved: Drain to sewer	10,113.6	17.5%
■ Impervious Surfaces: Unpaved: Dirt	1,098.0	1.9%
■ Open Space - Grass/Scattered Trees: Grass cover > 75%	17,568.8	30.4%
■ Trees: Grass/turf understory: Ground cover > 75%	8,668.8	15.0%
■ Urban: Western Desert: Natural Landscaping	0.0	0.0%
■ Water Area	1,098.0	1.9%
Total:	57,791.9	100.0%

Tree Canopy: 8,668.8 acres (15.0%)

Air Pollution Removal

By absorbing and filtering out nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone (O₃), carbon monoxide (CO), and particulate matter less than 10 microns (PM₁₀), trees perform a vital air cleaning service that directly affects the well-being of urban dwellers. CITYgreen estimates the annual air pollution removal rate of trees within a defined study area for these five pollutants based on research conducted by David Nowak, PhD, of the U.S. Forest Service. Economists use "externality" costs, or indirect costs borne by society such as rising health care expenditures and reduced tourism revenue to determine the dollar value of air pollutant removal. The externality costs used in CITYgreen are set by each state's Public Services Commission.

Nearest Air Quality Reference City: **Salt Lake City**

	<u>Lbs. Removed/yr</u>	<u>Dollar Value/yr</u>
Carbon Monoxide:	23,182	11,377
Ozone:	231,823	\$819,044
Nitrogen Dioxide:	123,639	\$436,823
Particulate Matter:	401,827	\$947,849
Sulfur Dioxide:	38,637	\$33,345
Totals:	819,109	2,248,438

Dollar values are based on 2009 dollars

Carbon Storage and Sequestration

Trees remove carbon dioxide from the air through their leaves and store carbon in their biomass. Approximately half of a tree's dry weight is carbon. For this reason, large-scale tree planting projects are recognized as a legitimate tool in many national carbon-reduction programs. CITYgreen estimates the carbon storage capacity and sequestration rates of trees within a defined study area. The carbon storage and sequestration model was developed using research conducted by David Nowak, E. Gregory McPherson, and Rowan Rowntree of the U.S. Forest Service.

Tons Stored (Total):	373,031
Tons Sequestered (Annually):	2,904

Washoe County: Increase to 15% Canopy

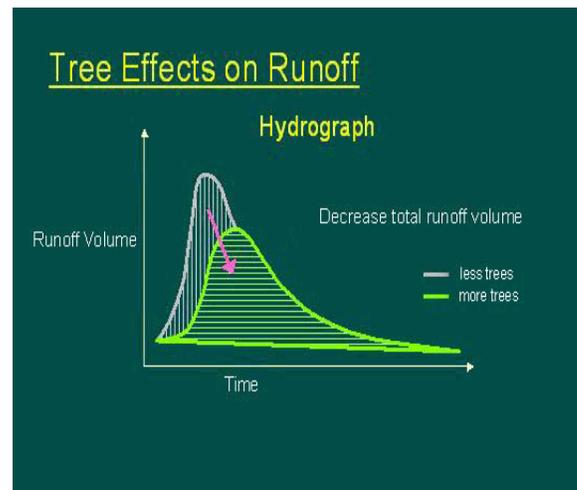
Stormwater Management

Water Quantity (Runoff Volume)

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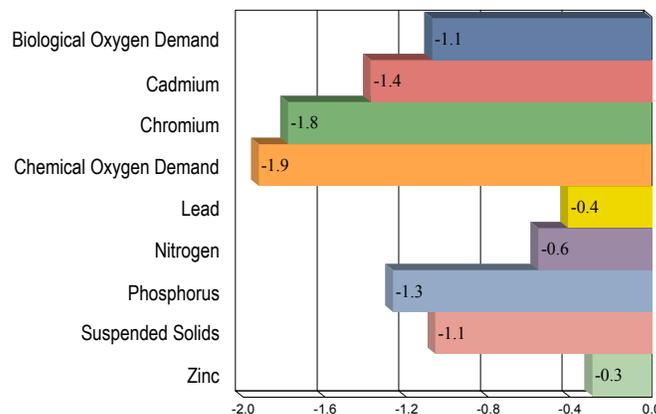
2-yr, 24-hr Rainfall in inches:	2.50
Curve Number reflecting existing conditions:	75
Curve Number of replacement land cover:	75
Dominant soil type:	C
Replacement land cover type: (existing condition)	
Urban: Western Desert: Natural Landscaping	
Additional cu. ft. storage needed:	-1,844,385
Construction cost per cu. ft.:	\$3.00
Total Stormwater Value:	\$-5,533,154
Annual Stormwater Value:	\$482,406
<small>(based on 20-year financing at 6% interest)</small>	



Water Quality (Contaminant Loading)

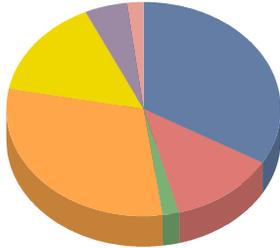
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Percent change in contaminant loadings



Washoe County: Increase to 20% Canopy

Land cover in acres and percentages



■ Arid & Semi-Arid Rangeland: Sagebrush: Ground cover 30% - 70%	19,244.7	33.3%
■ Impervious Surfaces: Paved: Drain to sewer	7,224.0	12.5%
■ Impervious Surfaces: Unpaved: Dirt	1,098.0	1.9%
■ Open Space - Grass/Scattered Trees: Grass cover > 75%	17,568.8	30.4%
■ Trees: Grass/turf understory: Ground cover > 75%	8,668.8	15.0%
■ Trees: Impervious understory	2,889.6	5.0%
■ Urban: Western Desert: Natural Landscaping	0.0	0.0%
■ Water Area	1,098.0	1.9%
Total:	57,791.9	100.0%

Tree Canopy: 11,558.4 acres (20.0%)

Air Pollution Removal

By absorbing and filtering out nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone (O₃), carbon monoxide (CO), and particulate matter less than 10 microns (PM₁₀), trees perform a vital air cleaning service that directly affects the well-being of urban dwellers. CITYgreen estimates the annual air pollution removal rate of trees within a defined study area for these five pollutants based on research conducted by David Nowak, PhD, of the U.S. Forest Service. Economists use "externality" costs, or indirect costs borne by society such as rising health care expenditures and reduced tourism revenue to determine the dollar value of air pollutant removal. The externality costs used in CITYgreen are set by each state's Public Services Commission.

Nearest Air Quality Reference City: **Salt Lake City**

	<u>Lbs. Removed/yr</u>	<u>Dollar Value/yr</u>
Carbon Monoxide:	30,910	15,170
Ozone:	309,098	\$1,092,058
Nitrogen Dioxide:	164,852	\$582,431
Particulate Matter:	535,770	\$1,263,799
Sulfur Dioxide:	51,516	\$44,460
Totals:	1,092,146	2,997,918

Dollar values are based on 2009 dollars

Carbon Storage and Sequestration

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Tons Stored (Total):	497,375
Tons Sequestered (Annually):	3,872

Washoe County: Increase to 20% Canopy

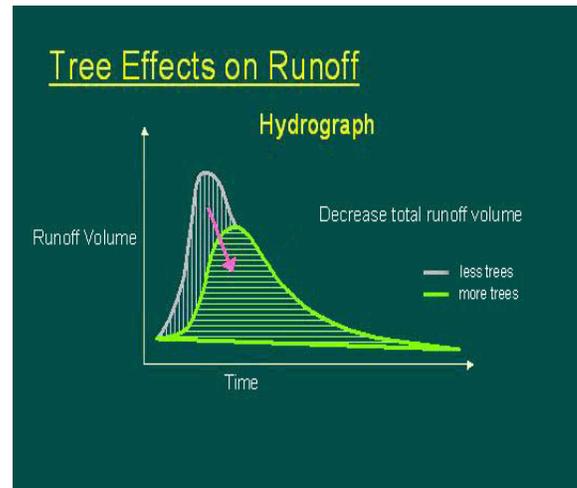
Stormwater Management

Water Quantity (Runoff Volume)

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2-yr, 24-hr Rainfall in inches:	2.50
Curve Number reflecting existing conditions:	75
Curve Number of replacement land cover:	75
Dominant soil type:	C
Replacement land cover type: (existing condition)	
Urban: Western Desert: Natural Landscaping	
Additional cu. ft. storage needed:	-4,987,246
Construction cost per cu. ft.:	\$3.00
Total Stormwater Value:	\$-14,961,739
Annual Stormwater Value:	\$1,304,433
<small>(based on 20-year financing at 6% interest)</small>	



Water Quality (Contaminant Loading)

Trees filter surface water and prevent erosion, both of which maintain or improve water quality. American Forests developed the CITYgreen water quality model using data from the US Environmental Protection Agency (EPA) and Purdue University's L-Thia spreadsheet water quality model. The water quality model estimates the change in the concentration of pollutants in runoff during a typical storm event, by replacing the tree canopy in a specified study area with the user-defined replacement land cover (specified in the CITYgreen Preferences) and comparing the results. The model estimates the event mean concentrations of nitrogen, phosphorus, suspended solids, zinc, lead, cadmium, chromium, chemical oxygen demand (COD), and biological oxygen demand (BOD).

Percent change in contaminant loadings

