(Technology) Tools for Making Use/ Sense of Your Urban Forest Inventory

Urban Ecos

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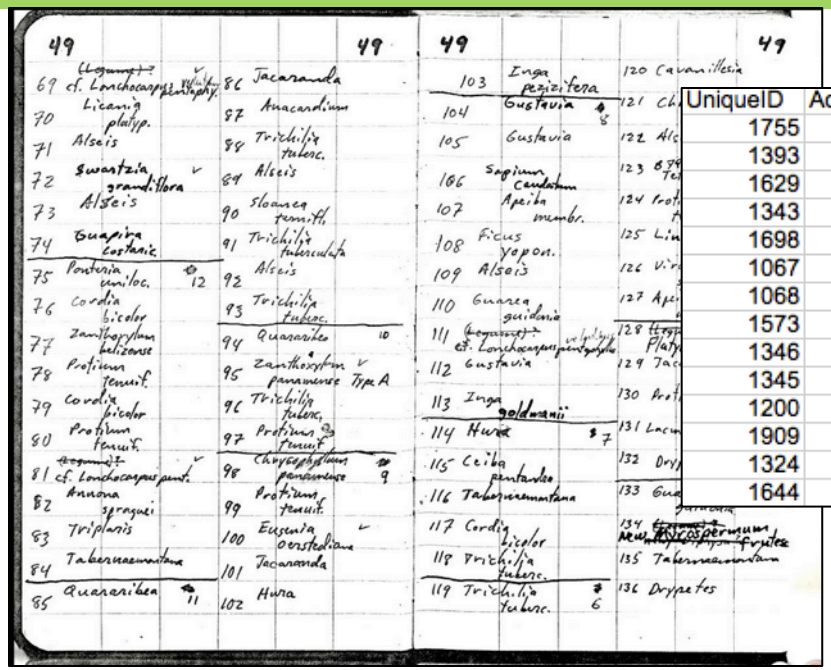
Making use (sense) of an inventory



UniqueID	Address	Street	SpCode	DBHInv	DBH1	TreeHt	Cond
1755	720	OLOHENA ST	TAAR	12-18	11.2	8.0	3
1393	7091	KAMILO ST	COER_A	18-24	23	12.0	3
1629	7481	MAKAA ST	COER_A	6-12	8.7	4.0	3
1343	1877	KALAKAUA AV	CAEQ	18-24	22.3	27.0	3
1698	2801	MONSARRAT AV	FIBE	24-30	30.9	23.0	3
1067	2115	ALA WAI BL	CONU	12-18	12	21.0	3
1068	2115	ALA WAI BL	CONU	12-18	12.7	17.5	3
1573	438	LAUNIU ST	CONU	6-12	14.4	24.0	3
1346	2270	KALAKAUA AV	LASP	3-6	3.6	6.0	3
1345	2186	KALAKAUA AV	LASP	3-6	6.5	10.5	3
1200	2444	HIHIWAI ST	VEME	6-12	7.3	5.0	4
1909	1106	YOUNG ST	ELOR2	0-3	3.8	3.5	4
1324	1500	KALAKAUA AV	SWMA	6-12	15.8	12.0	3
1644	1305	MAKIKI ST	BABL	3-6	13.8	10.0	3

For yourself as an urban forest manager

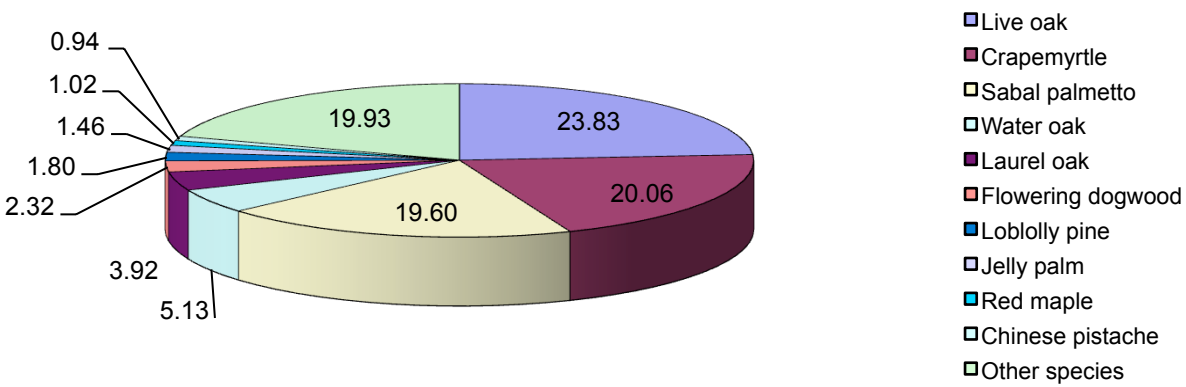
- Understand the data in the aggregate
- Visualize it geographically
- Plan for the future

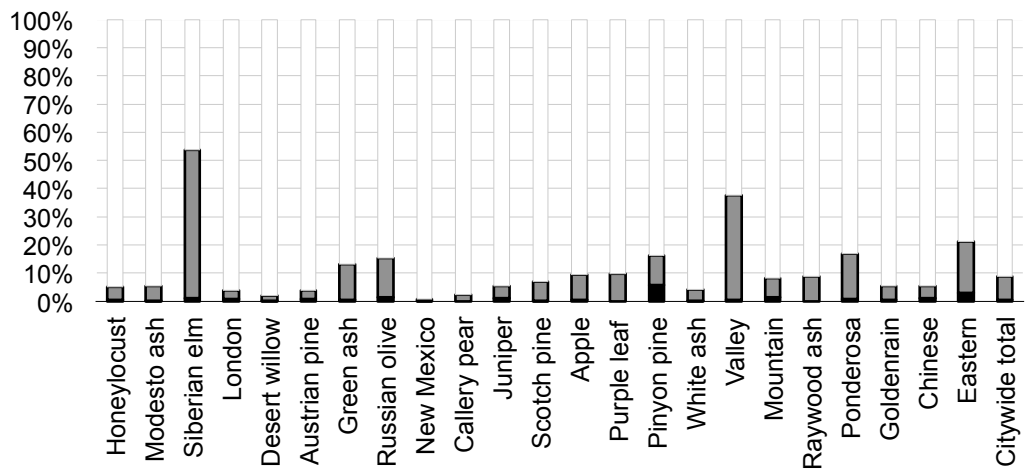
For your constituents (public, politicians, grant-givers)

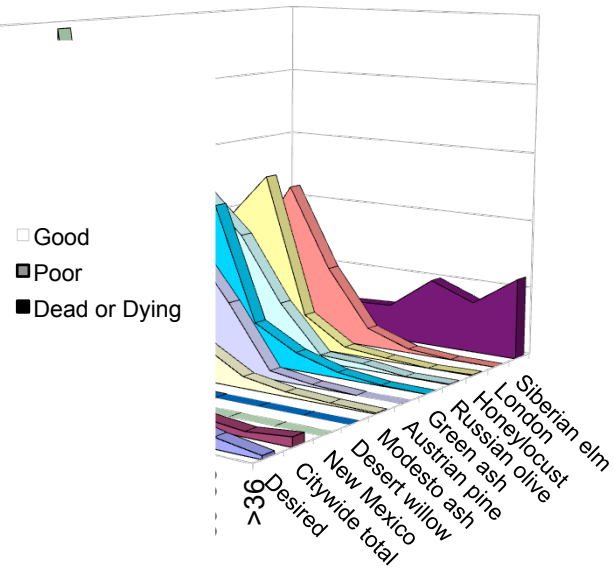
- Share the data
- Translate into more understandable terms
- Justify funding/grant requests

Understand data as a whole

	A	B	
1	RECNO	COMMON_NAM	CONDI
2	1	Other	Good
3	2	Other	Good
4	3	Other	Good
5	4	Other	Good
6	5	Flowering Pear	Good
7	6	Mountain Cottonwood	Fair
8	7	Mountain Cottonwood	Fair
9	8	Mountain Cottonwood	Fair
10	9	Mountain Cottonwood	Fair
11	10	Modesto Ash	Good
12	11	Modesto Ash	Good
13	12	Modesto Ash	Good
14	13	Modesto Ash	Good
15	14	Austrian Pine	Good
16	15	Austrian Pine	Good
17	16	Austrian Pine	Good
18	17	Austrian Pine	Good
19	18	Austrian Pine	Good
20	19	Austrian Pine	Good
21	20	Crabapple spp	Good



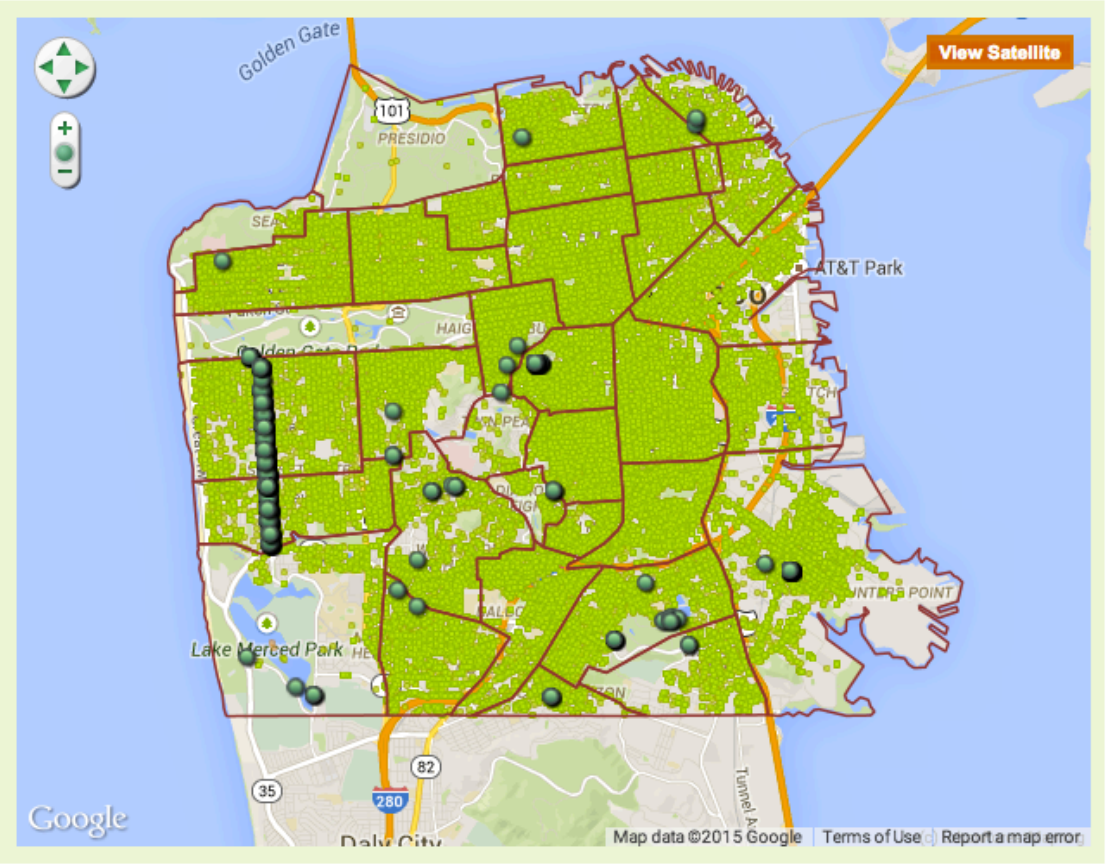




Visualize data geographically

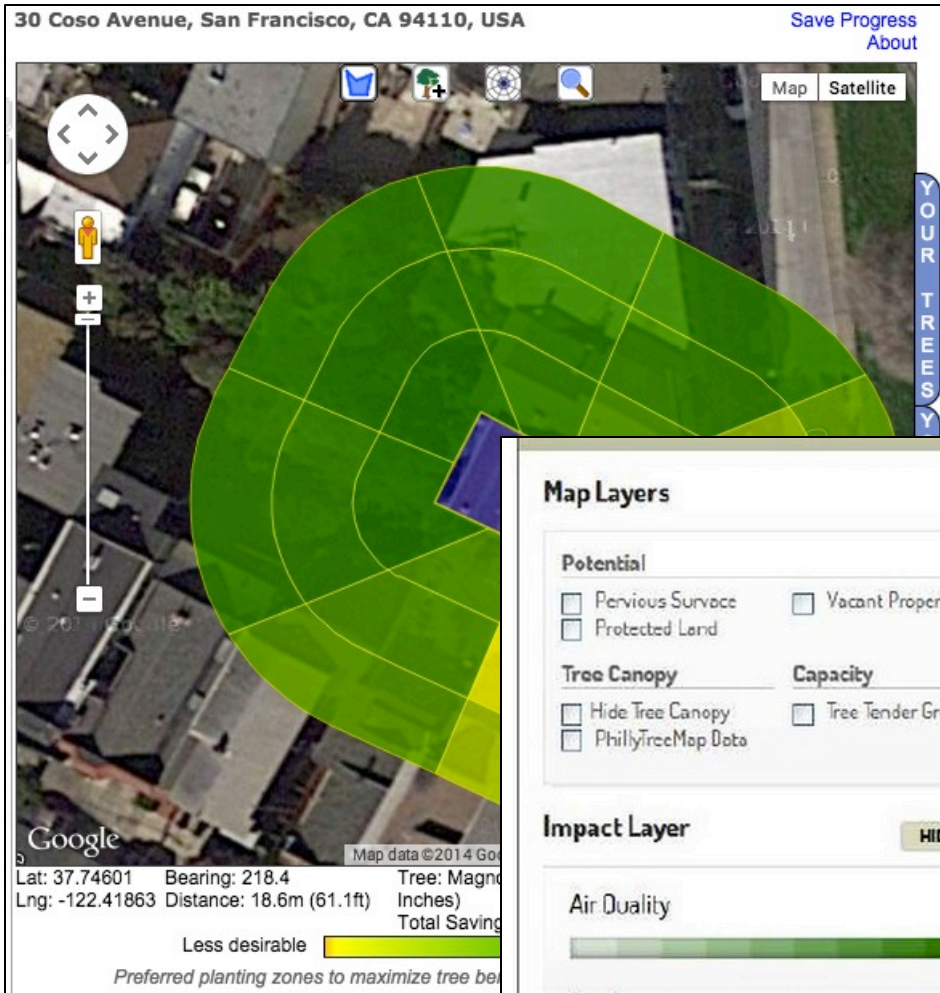
Citywide

Species	DBH Class (in) 0-3	3-6	6-12	12-18	18-24	24-30	>30	Total
Lg. Broadleaf Evergreen								
ACME	159	235	885	1,188	653	192	116	3,429
BEL OTHER	149	273	385	473	298	183	331	2,091
EUFI	185	127	390	1,700	833	38	235	3,508
TRCO	253	888	1,891	298	36	0	0	3,366
Total	746	1,523	3,551	3,660	1,819	413	681	12,394
Med. Broadleaf Evergreen								
AGFL	34	658	733	220	0	0	0	1,645
BEM OTHER	869	1,157	2,414	455	205	77	0	5,177
FIMI	747	254	3,396	1,515	130	0	0	6,042
LILU	99	405	571	183	0	0	0	1,258
MABO	428	1,038	1,173	183	68	0	0	2,890
MAGR	469	935	509	0	0	0	0	1,914
MEEX	158	714	2,730	1,155	115	0	0	4,873
MEQU	429	1,012	108	0	0	0	0	1,549
MYLA	122	131	851	709	142	37	0	1,992
OLEU	360	361	462	78	124	39	0	1,423
PICR	234	147	517	115	76	117	0	1,206
PIUN	1,132	1,888	4,191	1,133	74	84	0	8,500
Total	5,082	8,701	17,654	5,746	934	354	0	38,470
Sm. Broadleaf Evergreen								
ARMA	2,327	328	75	0	0	0	0	2,731
BES OTHER	2,598	1,416	1,039	647	156	75	80	6,013
CACI	113	575	1,361	108	0	0	0	2,157
PYKA	398	493	1,039	185	36	0	0	2,151
RHAP	1,415	0	0	0	0	0	0	1,415
TRLA	1,715	883	66	113	0	38	38	2,852
Total	8,567	3,696	3,581	1,053	192	113	117	17,320
Lg. Conifer								
CL OTHER	34	145	145	112	113	0	36	585
CUMA	36	108	391	197	36	0	524	1,292
PIRA	34	76	476	414	322	138	575	2,035
Total	103	329	1,012	723	471	138	1,135	3,911
Med. Conifer								
CM OTHER	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0
Sm. Conifer								
CS OTHER	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0
Lg. Deciduous								
DL OTHER	310	216	231	250	221	264	190	1,683
GIBI	1,311	592	195	43	0	0	0	2,140
PLAC	315	1,099	3,583	1,077	346	47	47	6,514
Total	1,935	1,907	4,009	1,371	567	310	237	10,337
Med. Deciduous								
DM OTHER	927	966	643	0	67	0	47	2,650
ULPA	69	43	790	1,102	36	0	0	2,040
Total	997	1,009	1,433	1,102	103	0	47	4,691
Sm. Deciduous								
DS OTHER	704	740	288	0	0	0	0	1,732
PRCE	2,315	1,435	720	67	0	0	0	4,537
PRSE	1,491	993	813	116	0	0	0	3,413
Total	4,510	3,168	1,821	184	0	0	0	9,682
Lg. Palm								
PL OTHER	0	0	0	0	0	67	40	107
Total	0	0	0	0	0	67	40	107
Med. Palm								
PM OTHER	69	116	75	70	106	72	36	543
Total	69	116	75	70	106	72	36	543
Sm. Palm								
PS OTHER	36	284	431	217	71	0	40	1,079

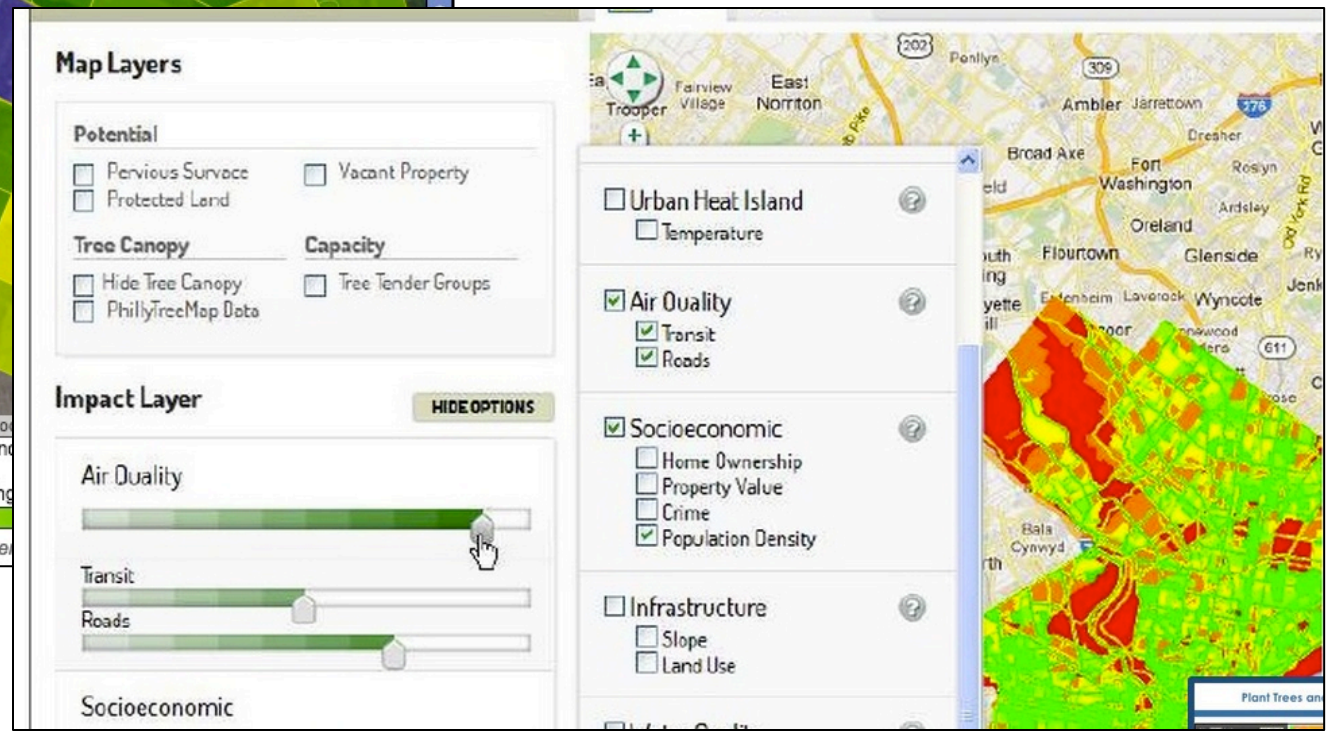


Plan for the future

Saved Energy Report



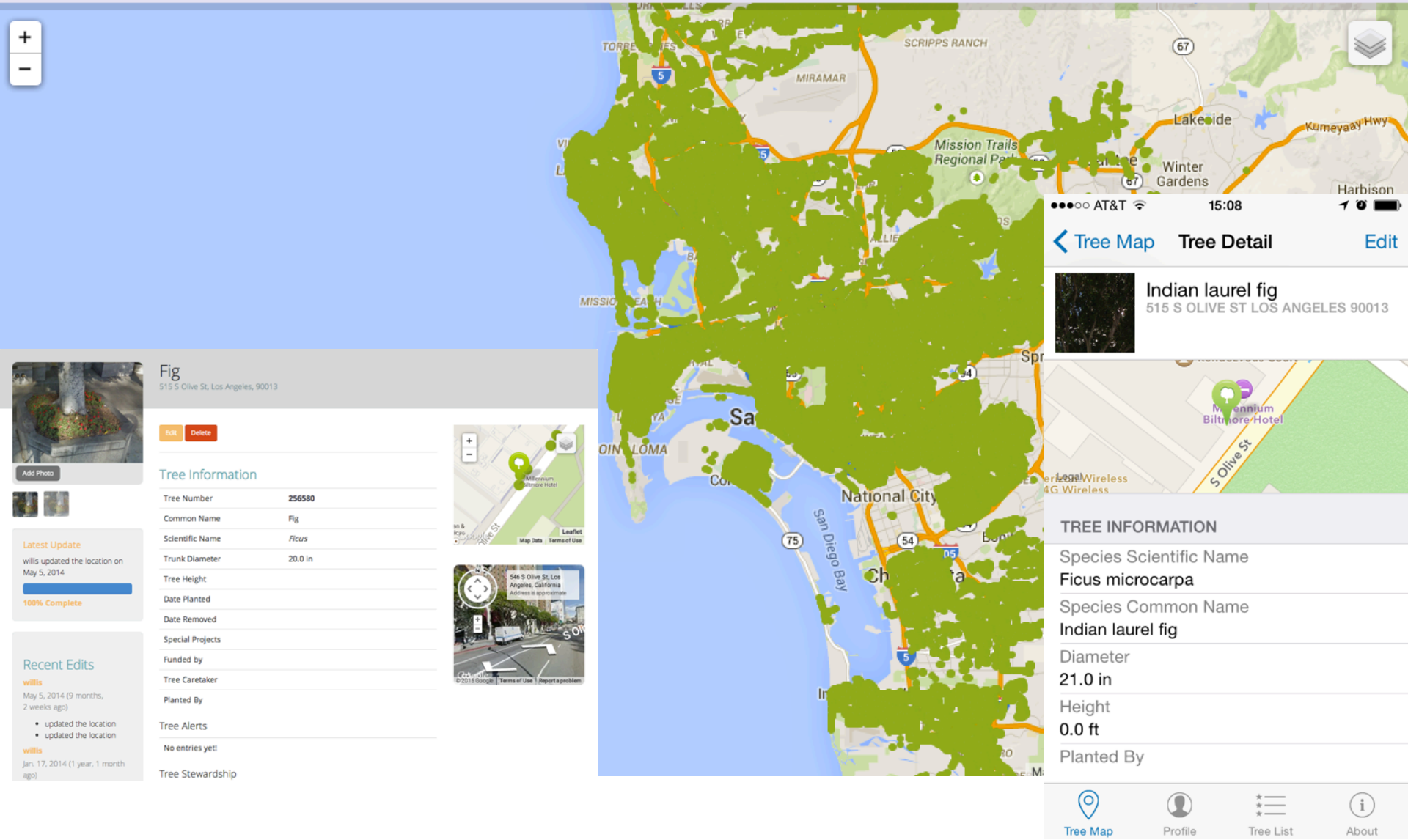
Energy (kwh) to cool this house without any trees	Energy (kwh) to cool this house with the trees listed	Percent change in energy use for cooling. Savings (+)
4236	4030	4.86
4236	4002	5.52
4236	3963	6.44
4236	3927	7.29
4236	3922	7.41
4236	3919	7.48
4236	3929	7.25
4236	3927	7.29
4236	3927	7.29
4236	3953	6.68
4236	3956	6.61



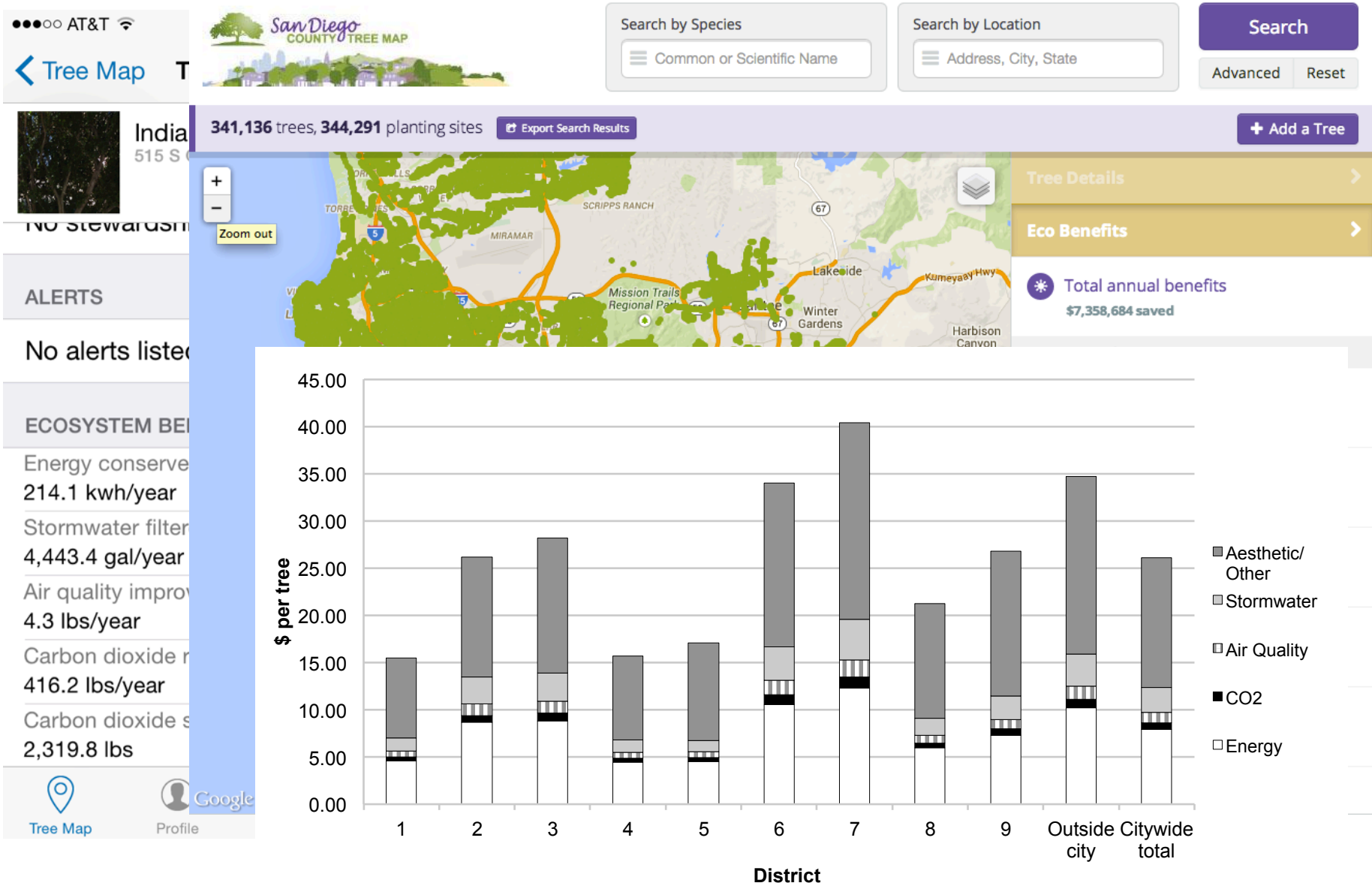
Share the data

341,136 trees, **344,291** planting sites

Export Search Results



Translate the data

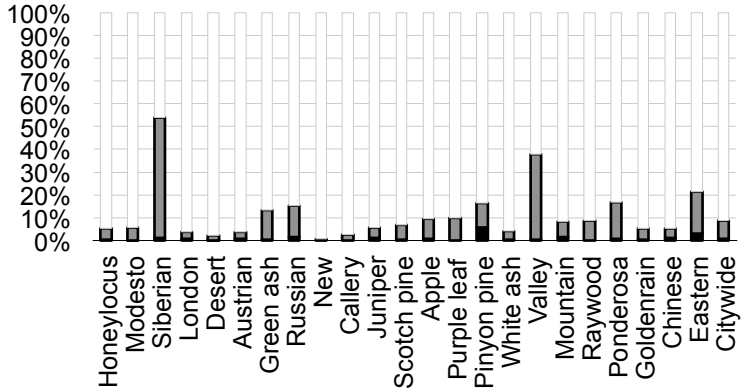


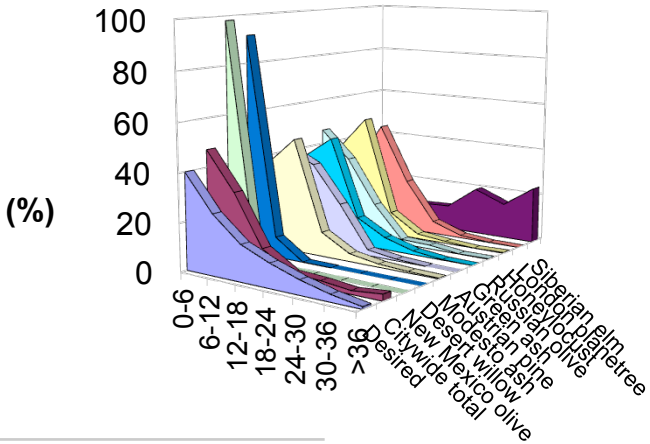
Justify funding requests

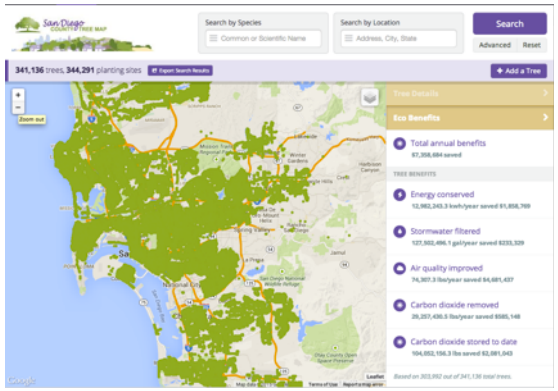
Species	Energy	CO2	Air Quality	Stormwater	Aesthetic/	Total
Silver maple	36.65	- 0.23	0.74	10.25	42.92	90.34
American sycamore	36.16	0.65	0.33	14.18	35.65	86.97
English elm	34.75	1.35	0.75	15.47	32.26	84.59
Siberian elm	21.21	0.83	0.42	8.52	40.62	71.60
Elm	23.73	0.91	0.50	10.25	36.12	71.51
Black walnut	25.67	0.58	0.47	5.96	28.60	61.28
London planetree	12.98	0.20	0.14	4.21	42.18	59.71
Northern red oak	17.28	0.36	0.22	4.15	30.52	52.53
Ash	20.18	0.33	0.63	4.76	24.82	50.71
Cottonwood	22.50	0.17	0.80	6.22	19.26	48.95
Maple	12.79	0.17	0.20	2.63	32.58	48.38
Honeylocust	11.38	0.23	0.21	3.44	30.14	45.40
Northern catalpa	16.94	0.27	0.28	3.98	16.88	38.35
Norway maple	11.57	0.41	0.19	2.66	21.12	35.94
Black locust	16.70	0.76	0.38	0.98	16.04	34.86
American basswood	10.52	0.19	0.29	3.05	20.49	34.54
Green ash	10.32	0.17	0.30	2.29	21.00	34.08
White ash	4.70	0.10	0.13	0.94	25.15	31.02
Austrian pine	5.61	0.13	0.03	4.67	20.17	30.61
Blue spruce	5.85	0.11	0.07	5.42	15.92	27.36
Littleleaf linden	2.24	0.09	0.06	0.58	23.09	26.05
Sweetgum	6.10	0.10	- 0.01	1.14	17.79	25.13
Plum	6.76	0.22	0.11	0.38	14.77	22.22
Sugar maple	5.65	0.15	0.09	0.75	15.03	21.68
Hawthorn	8.24	0.21	0.13	1.66	9.14	19.37
Callery pear	3.09	0.14	0.05	0.78	14.95	19.01
Crabapple	4.69	0.15	0.07	0.26	11.53	16.70
Scotch pine	0.00	0.06	0.01	1.90	13.17	15.15
Other street trees	9.36	0.26	0.21	3.50	19.52	32.85

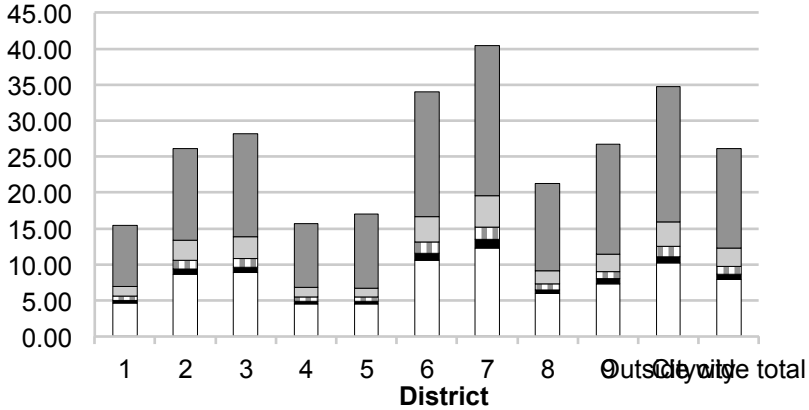
Species Name	Dead	Critical	Poor	Fair	Good	Very Good	Excellent
Black locust	2.33	1.66	71.38	19.63	3.49	0.00	1.50
Siberian elm	0.00	0.00	55.37	34.53	6.51	0.00	3.58
English elm	0.00	0.99	49.50	38.94	10.56	0.00	0.00
Silver maple	0.83	0.94	42.57	42.63	12.51	0.05	0.47
Elm	1.40	0.40	37.60	37.00	23.00	0.00	0.60
Cottonwood	4.06	0.00	35.06	32.10	28.41	0.00	0.37
Black walnut	1.96	1.47	28.12	46.94	21.03	0.00	0.49
American sycamore	0.28	0.42	21.24	45.43	23.35	0.42	8.86
Ash	0.32	0.00	19.32	35.75	41.22	0.00	3.38
Northern catalpa	0.00	0.29	15.07	47.83	34.78	0.58	1.45
Plum	1.38	0.69	14.83	26.21	34.83	0.00	22.07
Norway maple	0.62	0.70	9.39	24.96	56.92	0.45	6.96
Maple	1.43	0.39	7.55	21.48	48.57	0.00	20.57
American basswood	0.45	0.15	6.99	22.32	45.09	0.00	25.00
Crabapple	0.21	0.32	5.41	23.46	50.85	0.96	18.79
Hawthorn	0.51	0.77	5.38	39.74	40.26	0.00	13.33
Sugar maple	0.28	0.85	5.11	9.09	71.88	6.25	6.53
Honeylocust	0.31	0.19	4.48	20.47	60.80	1.31	12.45
Green ash	0.57	0.48	4.40	21.82	54.74	0.96	17.03
Sweetgum	0.65	0.33	3.42	18.57	66.12	0.16	10.75
Callery pear	0.54	0.27	3.23	13.46	62.45	1.62	18.44
Northern red oak	0.65	0.00	3.23	9.46	70.97	1.08	14.62
Littleleaf linden	0.00	0.34	3.05	25.42	62.71	5.08	3.39
White ash	0.34	0.46	2.74	17.14	52.46	2.17	24.69
London planetree	0.00	0.00	2.62	13.12	65.31	0.87	18.08
Austrian pine	0.00	0.00	1.94	12.74	83.93	0.00	1.39
Blue spruce	0.44	0.00	1.77	21.06	73.84	0.00	2.88
Scotch pine	0.00	0.00	0.21	17.38	82.40	0.00	0.00
Citywide total	0.64	0.49	15.20	26.72	47.32	0.65	8.98

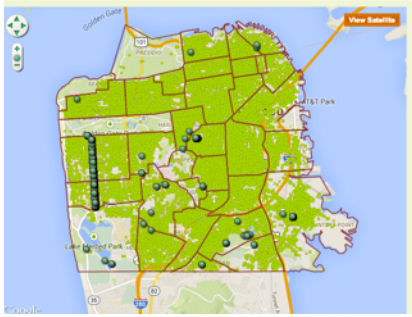
Justify funding/apply for grants

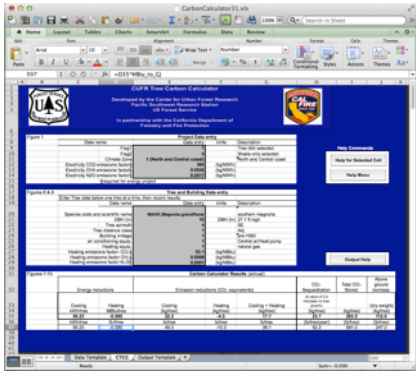












Tree Status	Year	Baseline energy (kBtu) to heat this house	Energy (kBtu) to heat this house with the trees listed	Percent change in energy use for heating. Savings (+)	Energy (kwh) to cool this house without any trees	Energy (kwh) to cool this house with the trees listed
All Trees	2014	79012	79412	-0.51	4236	4030
All Trees	2019	79012	79469	-0.58	4236	4002
All Trees	2024	79012	79540	-0.67	4236	3963
All Trees	2029	79012	79555	-0.69	4236	3927
All Trees	2034	79012	79565	-0.70	4236	3922
All Trees	2039	79012	79441	-0.54	4236	3919
All Trees	2044	79012	79443	-0.55	4236	3929
All Trees	2049	79012	79427	-0.53	4236	3927
All Trees	2054	79012	79403	-0.49	4236	3927
All Trees	2059	79012	79387	-0.47	4236	3953
All Trees	2064	79012	79371	-0.45	4236	3956

Tools

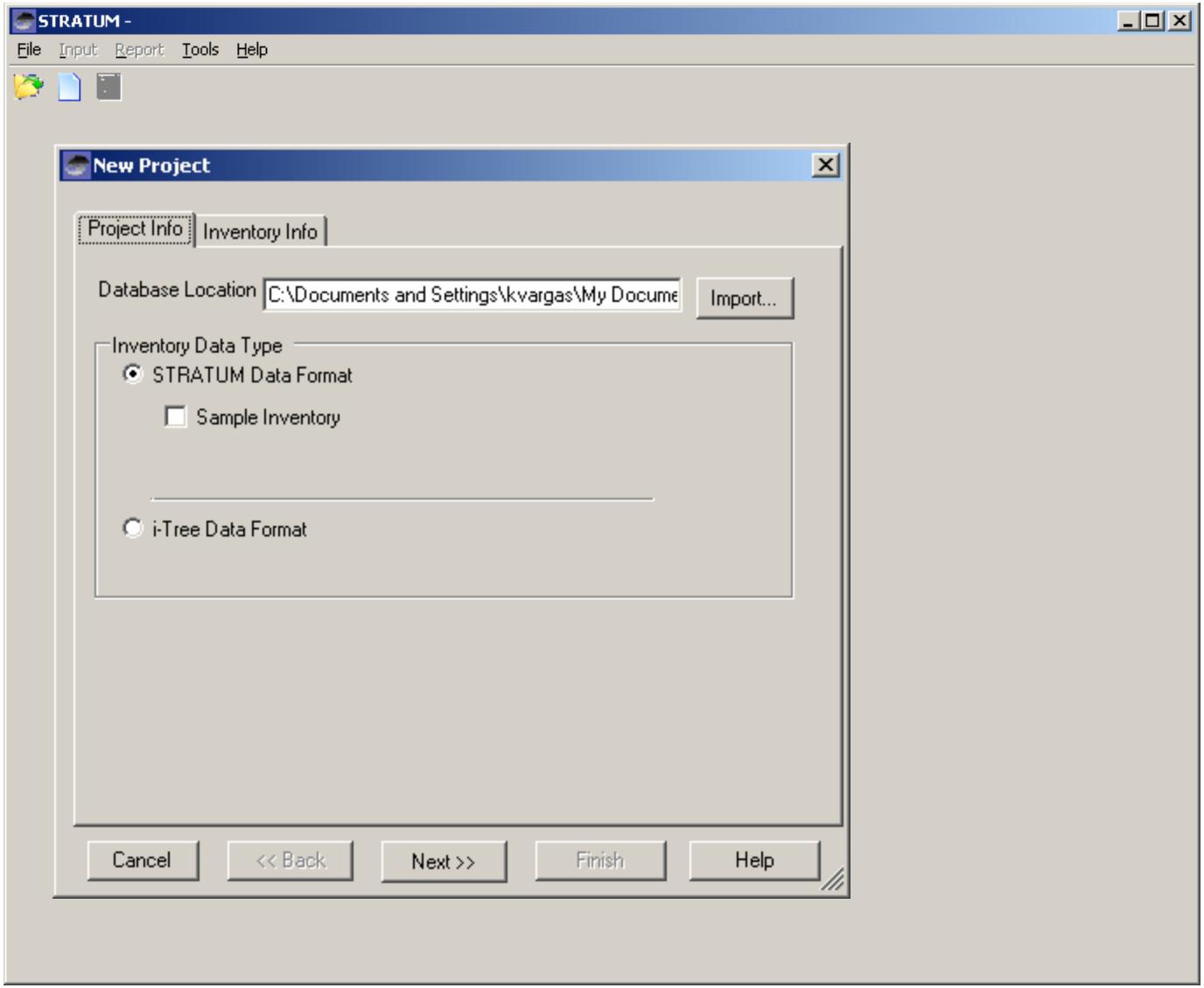
- iTree
- OpenTreeMap
- Tree Carbon Calculator
- EcoSmart Landscapes: free, enterprise

iTree Suite

- **Streets**
- **Design**
- **Canopy**
- Eco
- Hydro
- Vue
- Pest Detection

www.itreetools.org

iTree Streets



STRATUM - BOI STRATUM

File | Input | Reports | Tools | Help

- Define City & Costs
  - Define City
  - Define Cost
  - Define Benefit Prices
- Define Species
- Define Inventory

Define City

City Name: Boise

verage Sidewalk idth (ft): 5

otal Linear Miles Street (mile): 800

ancel | Help

Define Cost

Public | Private | All

Annual Planting ($)	40,920	Annual Price of Repair/mitigation of Infrastructure Damage ($)	87,780
Annual Pruning ($)	132,000	Annual Price of Litter/Storm Clean-Up ($)	33,000
Annual Tree And Stump Removal And Disposal ($)	149,820	Average annual Litigation And Settlements due to Tree-Related Claims ($)	825
		Annual Expenditure for Program Administration ($)	144,540
		Annual Expenditures for Inspection/Answer Service Requests ($)	79,497
		Other Annual Expenditures ($)	39,600

710,952

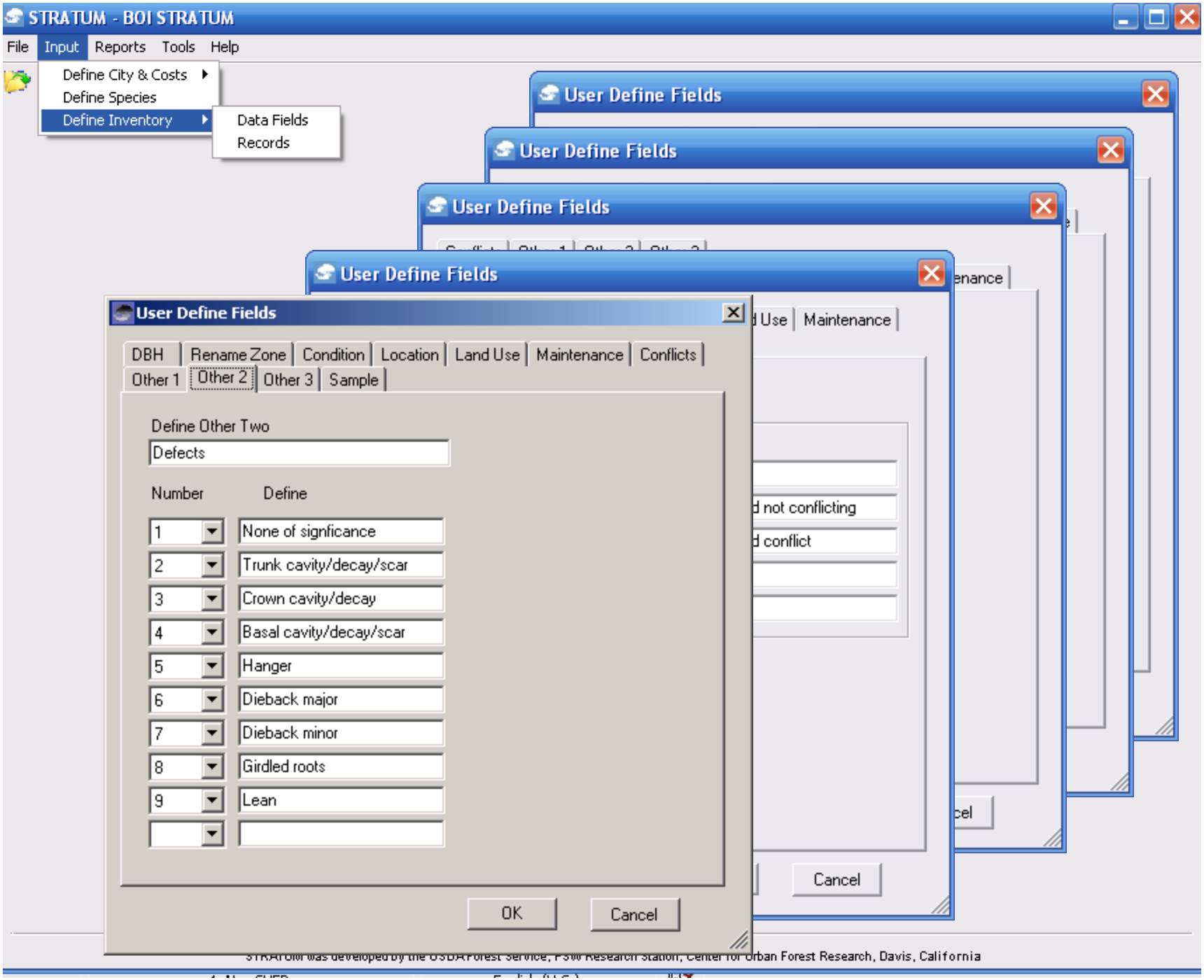
Ok | Cancel | Help

Benefit Prices

Electricity ($/Kwh)	0.060936	SO2 ($/lb)	0.06
Natural Gas ($/Therm)	1.14245	VOC ($/lb)	0.14
CO2 ($/lb)	0.00334	Stormwater Interception ($/gallon)	0.005
PM10 ($/lb)	0.92	Average Home Resales Value ($)	151,000
NO2 ($/lb)	0.51		

Ok | Cancel | Help

STRATUM was developed by the USDA Forest Service, PSW Research Station, Center for Urban Forest Research, Davis, California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File
Input
Reports
Tools
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Define City & Costs
Define Species
Define Inventory
Data Fields
Records
User Define Fields
DBH
Rename Zone
Condition
Location
Land Use
Maintenance
Conflicts
Other 1
Other 2
Other 3
Sample
Define Other Two
Defects
Number
Define
1
None of signficance
2
Trunk cavity/decay/scar
3
Crown cavity/decay
4
Basal cavity/decay/scar
5
Hanger
6
Dieback major
7
Dieback minor
8
Girdled roots
9
Lean
OK
Cancel
Cancel
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File Input Reports Tools Help

Species
Zone

Public | Private | All

MainReport

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Boise

Importance Values for Most Abundant Public Trees

1/16/2007

Species	Number of Trees	% of Total Trees	Leaf Area (ft^2)	% of Total Leaf Area	Canopy Cover (ft^2)	% of Total Canopy Cover	Importance Value
Norway maple	2,430	10.4	3,427,328	6.1	1,110,360	7.3	8.0
Silver maple	1,926	8.3	13,300,478	23.8	3,602,907	23.8	18.6
Honeylocust	1,607	6.9	2,382,679	4.3	903,552	6.0	5.7
Green ash	1,046	4.5	1,438,364	2.6	437,499	2.9	3.3
Crabapple	944	4.1	335,031	0.6	147,613	1.0	1.9
White ash	875	3.8	468,885	0.8	150,796	1.0	1.9
Maple	770	3.3	1,201,394	2.1	369,241	2.4	2.6
Callery pear	745	3.2	290,363	0.5	82,894	0.5	1.4
American sycamore	713	3.1	5,668,569	10.1	1,438,316	9.5	7.6
American basswood	672	2.9	991,999	1.8	286,878	1.9	2.2
Ash	621	2.7	1,781,251	3.2	539,219	3.6	3.1
Sweetgum	616	2.6	544,285	1.0	137,392	0.9	1.5
Black locust	601	2.6	1,224,755	2.2	356,163	2.4	2.4
Elm	500	2.1	3,221,936	5.8	579,637	3.8	3.9
Scotch pine	467	2.0	165,596	0.3	44,537	0.3	0.9
Northern red oak	465	2.0	1,410,519	2.5	395,024	2.6	2.4
Blue spruce	451	1.9	509,810	0.9	106,098	0.7	1.2
Black walnut	412	1.8	1,430,379	2.6	463,421	3.1	2.5
Hawthorn	390	1.7	256,311	0.5	114,678	0.8	1.0
Austrian pine	361	1.6	328,771	0.6	82,594	0.5	0.9
Sugar maple	352	1.5	350,606	0.6	80,020	0.5	0.9
Northern catalpa	345	1.5	880,510	1.6	229,941	1.5	1.5
London planetree	343	1.5	713,931	1.3	205,402	1.4	1.4
Siberian elm	307	1.3	1,634,050	2.9	295,987	2.0	2.1
English elm	303	1.3	2,947,684	5.3	530,133	3.5	3.4
Littleleaf linden	295	1.3	78,716	0.1	23,817	0.2	0.5
Plum	290	1.2	148,401	0.3	65,711	0.4	0.6
Cottonwood	272	1.2	1,122,196	2.0	308,663	2.0	1.7
Other trees	4,143	17.8	7,642,695	13.7	2,053,084	13.6	15.0
Total	23,262	100.0	55,897,468	100.0	15,141,576	100.0	100.0

Current Page No: 1 | Total Page No: 1 | Zoom Factor: Page Width

STRATUM was developed by the USDA Forest Service, PSW Research Station, Center for Urban Forest Research, Davis, California

STRATUM - BOI STRATUM

File Input Reports Tools Help

Species
Zone

Zone

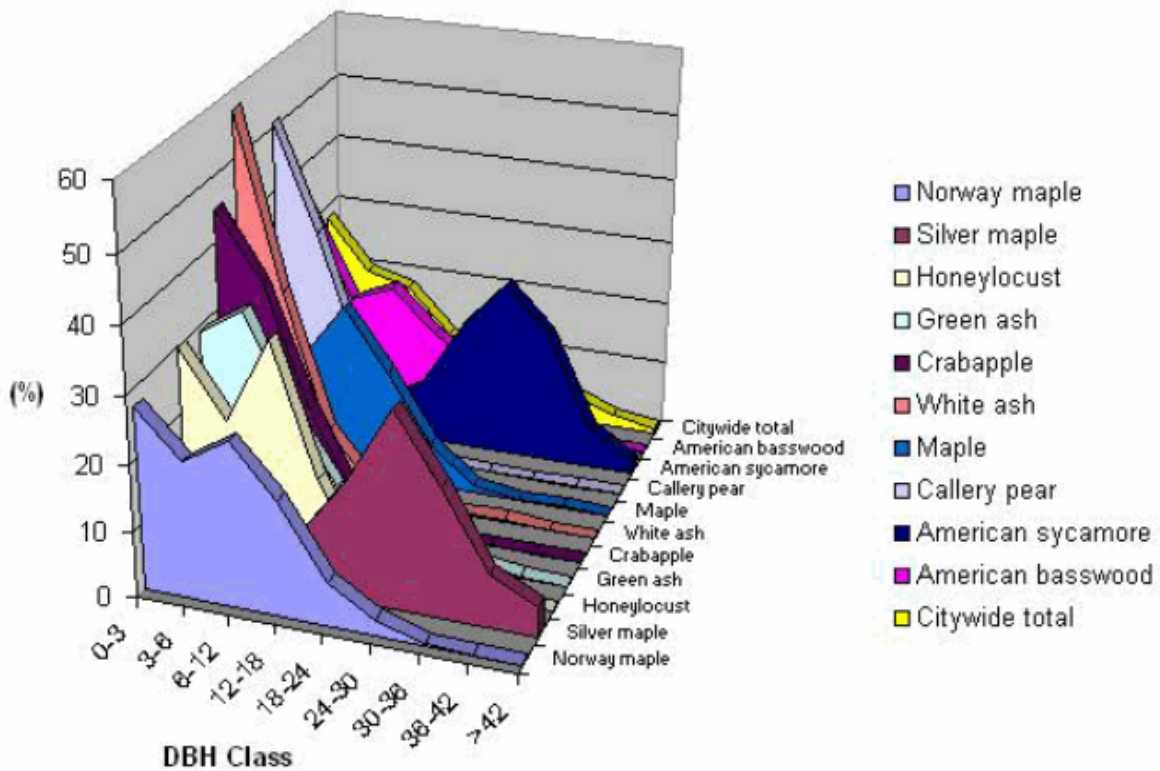
Refresh
Export
Print

Public | Private | All

MainReport

Relative Age Distribution of Top 10 Public Tree Species (%)

1/16/2007



Current Page No: 1 | Total Page No: 1 | Zoom Factor: 110%

STRATUM was developed by the USDA Forest Service, PSW Research Station, Center for Urban Forest Research, Davis, California

STRATUM - BOI STRATUM

File Input Reports Tools Help

Species
Zone

Condition Type
Structural (woody)

Refresh
Export
Print

Public | Private | All

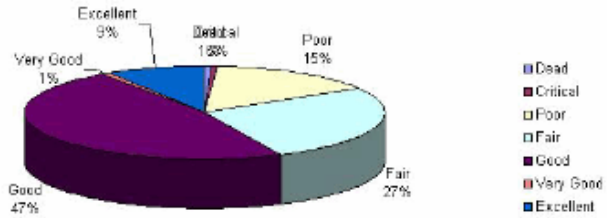
MainReport

Boise

Structural (Woody) Condition of Public Trees by Species (%)

1/16/2007

Citywide total



Species	Dead	Critical	Poor	Fair	Good	Very Good	Excellent
Norway maple	0.6	0.7	9.4	25.0	56.9	0.5	7.0
Silver maple	0.8	0.9	42.6	42.6	12.5	0.1	0.5
Honeylocust	0.3	0.2	4.5	20.5	60.8	1.3	12.4
Green ash	0.6	0.5	4.4	21.8	54.7	1.0	17.0
Crabapple	0.2	0.3	5.4	23.5	50.8	1.0	18.8
White ash	0.3	0.5	2.7	17.1	52.5	2.2	24.7
Maple	1.4	0.4	7.6	21.5	48.6	0.0	20.6
Callery pear	0.5	0.3	3.2	13.5	62.4	1.6	18.4
American sycamore	0.3	0.4	21.2	45.4	23.3	0.4	8.9
American basswood	0.4	0.1	7.0	22.3	45.1	0.0	25.0
Ash	0.3	0.0	19.3	35.7	41.2	0.0	3.4
Sweetgum	0.7	0.3	3.4	18.6	66.1	0.2	10.7
Black locust	2.3	1.7	71.4	19.6	3.5	0.0	1.5
Elm	1.4	0.4	37.6	37.0	23.0	0.0	0.6
Scotch pine	0.0	0.0	0.2	17.4	82.4	0.0	0.0
Northern red oak	0.6	0.0	3.2	9.5	71.0	1.1	14.6
Blue spruce	0.4	0.0	1.8	21.1	73.8	0.0	2.9
Black walnut	2.0	1.5	28.1	46.9	21.0	0.0	0.5
Hawthorn	0.5	0.8	5.4	39.7	40.3	0.0	13.3
Austrian pine	0.0	0.0	1.9	12.7	83.9	0.0	1.4
Sugar maple	0.3	0.9	5.1	9.1	71.9	6.3	6.5

Current Page No: 1 | Total Page No: 1+ | Zoom Factor: 60%

STRATUM was developed by the USDA Forest Service, PSW Research Station, Center for Urban Forest Research, Davis, California

STRATUM - BOI STRATUM

File Input Reports Tools Help

Species
Zone

Benefits
Summary

Report Type
$ per Tree
Total $

Refresh
Export
Print

Public | Private | All

MainReport

Boise

Annual Benefits of Public Trees by Species ($/tree)

1/16/2007

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error
Norway maple	11.57	0.41	0.19	2.66	21.12	35.94	(N/A)
Silver maple	36.65	-0.23	0.74	10.25	42.92	90.34	(N/A)
Honeylocust	11.38	0.23	0.21	3.44	30.14	45.40	(N/A)
Green ash	10.32	0.17	0.30	2.29	21.00	34.08	(N/A)
Crabapple	4.69	0.15	0.07	0.26	11.53	16.70	(N/A)
White ash	4.70	0.10	0.13	0.94	25.15	31.02	(N/A)
Maple	12.79	0.17	0.20	2.63	32.58	48.38	(N/A)
Callery pear	3.09	0.14	0.05	0.78	14.95	19.01	(N/A)
American sycamore	36.16	0.65	0.33	14.18	35.65	86.97	(N/A)
American basswood	10.52	0.19	0.29	3.05	20.49	34.54	(N/A)
Ash	20.18	0.33	0.63	4.76	24.82	50.71	(N/A)
Sweetgum	6.10	0.10	-0.01	1.14	17.79	25.13	(N/A)
Black locust	16.70	0.76	0.38	0.98	16.04	34.86	(N/A)
Elm	23.73	0.91	0.50	10.25	36.12	71.51	(N/A)
Scotch pine	0.00	0.06	0.01	1.90	13.17	15.15	(N/A)
Northern red oak	17.28	0.36	0.22	4.15	30.52	52.53	(N/A)
Blue spruce	5.85	0.11	0.07	5.42	15.92	27.36	(N/A)
Black walnut	25.67	0.58	0.47	5.96	28.60	61.28	(N/A)
Hawthorn	8.24	0.21	0.13	1.66	9.14	19.37	(N/A)
Austrian pine	5.61	0.13	0.03	4.67	20.17	30.61	(N/A)
Sugar maple	5.65	0.15	0.09	0.75	15.03	21.68	(N/A)
Northern catalpa	16.94	0.27	0.28	3.98	16.88	38.35	(N/A)
London planetree	12.98	0.20	0.14	4.21	42.18	59.71	(N/A)
Siberian elm	21.21	0.83	0.42	8.52	40.62	71.60	(N/A)
English elm	34.75	1.35	0.75	15.47	32.26	84.59	(N/A)
Littleleaf linden	2.24	0.09	0.06	0.58	23.09	26.05	(N/A)
Plum	6.76	0.22	0.11	0.38	14.77	22.22	(N/A)
Cottonwood	22.50	0.17	0.80	6.22	19.26	48.95	(N/A)
Other street trees	9.36	0.26	0.21	3.50	19.52	32.85	(N/A)

Current Page No: 1 | Total Page No: 1 | Zoom Factor: Page Width

STRATUM - Charlotte

File Input Report Tools Help

Species
Zone
Tree Type

Public | Private | All

MainReport

Refresh

Export

Print

Charlotte

Total Annual Benefits, Net Benefits, and Costs for Public Trees

3/31/2006

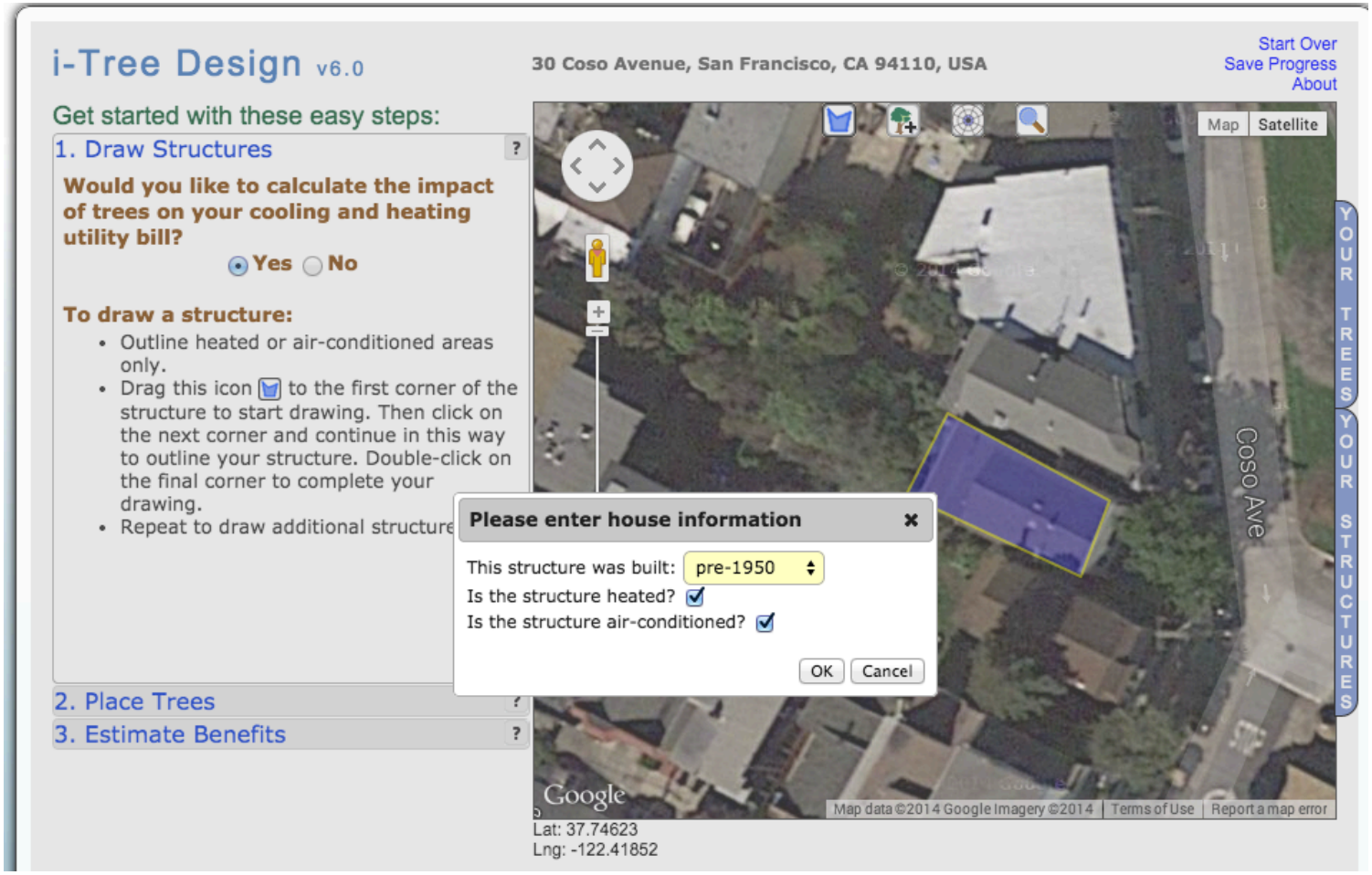
Benefits	Total ($)	Standard Error	$/tree	Standard Error	$/capita	Standard Error
Energy	682,799	(N/A)	8.02	(N/A)	1.14	(N/A)
CO2	192,330	(N/A)	2.26	(N/A)	0.32	(N/A)
Air Quality	-193,904	(N/A)	-2.28	(N/A)	-0.32	(N/A)
Stormwater	2,077,394	(N/A)	24.40	(N/A)	3.48	(N/A)
Aesthetic/Other	2,758,188	(N/A)	32.39	(N/A)	4.62	(N/A)
Total Benefits	5,516,807	(±0)	64.79	(±0)	9.24	(±0)
Costs						
Contract Pruning	380,000		4.46		0.64	
Tree & Stump	420,000		4.93		0.70	
Pest Management	1,500		0.02		0.00	
Irrigation	8,000		0.09		0.01	
Inspection/Servic	0		0.00		0.00	
Planting	180,000		2.11		0.30	
Administration	117,960		1.39		0.20	
Litter Clean-up	4,500		0.05		0.01	
Infrastructure	637,500		7.49		1.07	
Liability/Claims	70,000		0.82		0.12	
Other Costs	0		0.00		0.00	
Total Costs	1,819,460		21.37		3.05	
Net Benefits	3,697,347	(±0)	43.42	(±0)	6.19	(±0)
Benefit-cost ratio	3.03	(±0)				

Current Page No: 1 | Total Page No: 1 | Zoom Factor: 150%

iTree Streets

	iTree Streets
Understand the data as a whole	✔
Visualize data geographically	✖
Plan for (predict) the future	Coming soon
Share the data	✖
Translate into benefits	✔
Justify funding requests	✔
Useful reporting feature	✔
Effort required	A day or two
Format	Software
Cost	Free

iTree Design



i-Tree Design v6.0

30 Coso Avenue, San Francisco, CA 94110, USA

Start Over
Save Progress
About

Get started with these easy steps:

1. Draw Structures ?
2. Place Trees ?

Describe your tree:

- Tree species: Magnolia, Southern
- Tree diameter: 20 Inches
  or circumference: 62.8
- Tree condition: Excellent
- Tree exposure to sunlight: Full sun

Tree benefit zones:

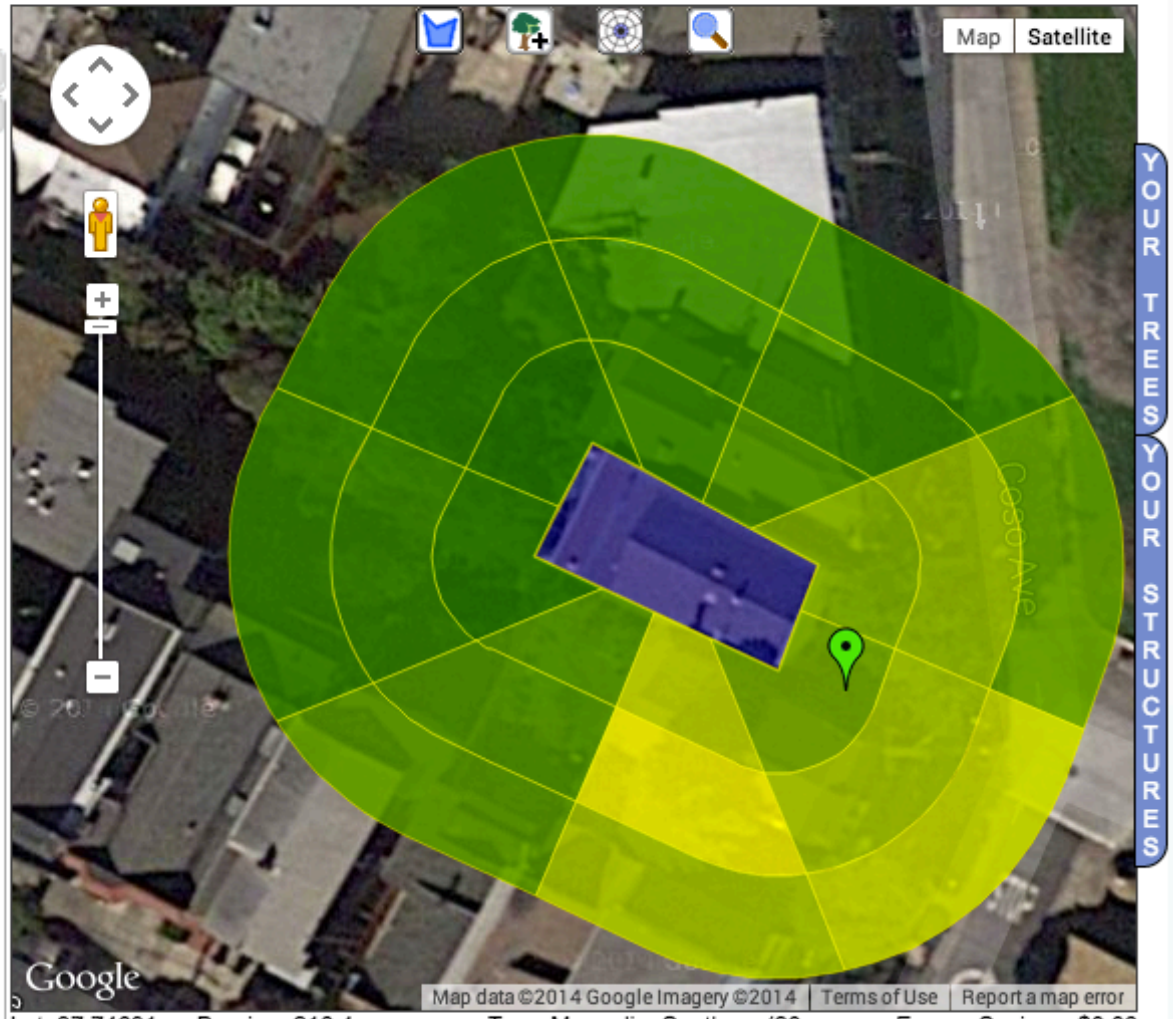
- The colored zones surrounding the structure, which appear as you describe your tree, illustrate the relative monetary value of energy savings that the tree would provide in each zone.
- Hover over each zone to see that energy benefit information displayed below the map.

To place a tree:

- Drag this icon to the location on the map where you would like to place your tree.
- Repeat to place additional trees.
- Hover over any tree you have placed on the map to display its benefits.

Model the tree(s) future crown growth over time:

Model Crown Growth



Lat: 37.74601 Bearing: 218.4
Lng: -122.41863 Distance: 18.6m (61.1ft)

Tree: Magnolia, Southern (20 Inches)
Total Savings: $20.46

Energy Savings: $0.00
kWh: 0.0 Therm: 0.0

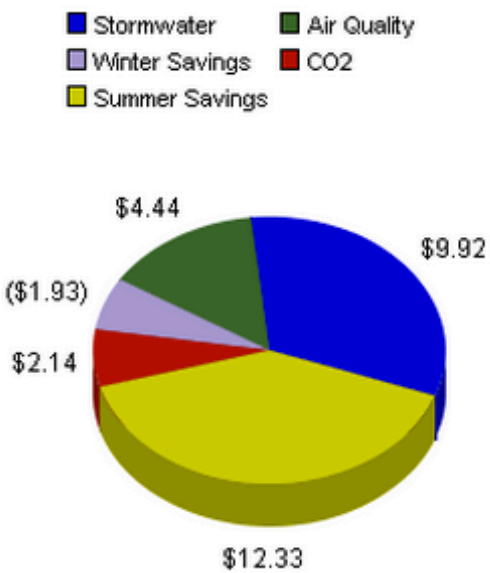
Less desirable — More desirable

Preferred planting zones to maximize tree benefits are shown around the structure.

iTree Design

Overall Benefits | Stormwater | Energy | Air Quality | Carbon Dioxide

Current Year (2014) | Future Year (2054) | Total (2014-2054) | Total to Date



Breakdown of tree benefits

Click on one of the tabs above for more detail

This 20-inch diameter southern magnolia will provide overall benefits of $27 in the current year.

While some functional benefits of trees are well documented, others are difficult to quantify (e.g., human social and communal health). Trees' specific geography, climate, and interactions with humans and infrastructure are highly variable and make precise calculations that much more difficult. Given these complexities, the results presented here should be considered initial approximations to better understand the environmental and economic value associated with trees and their placement.

Benefits of trees do not account for the costs associated with trees' long-term care and maintenance.

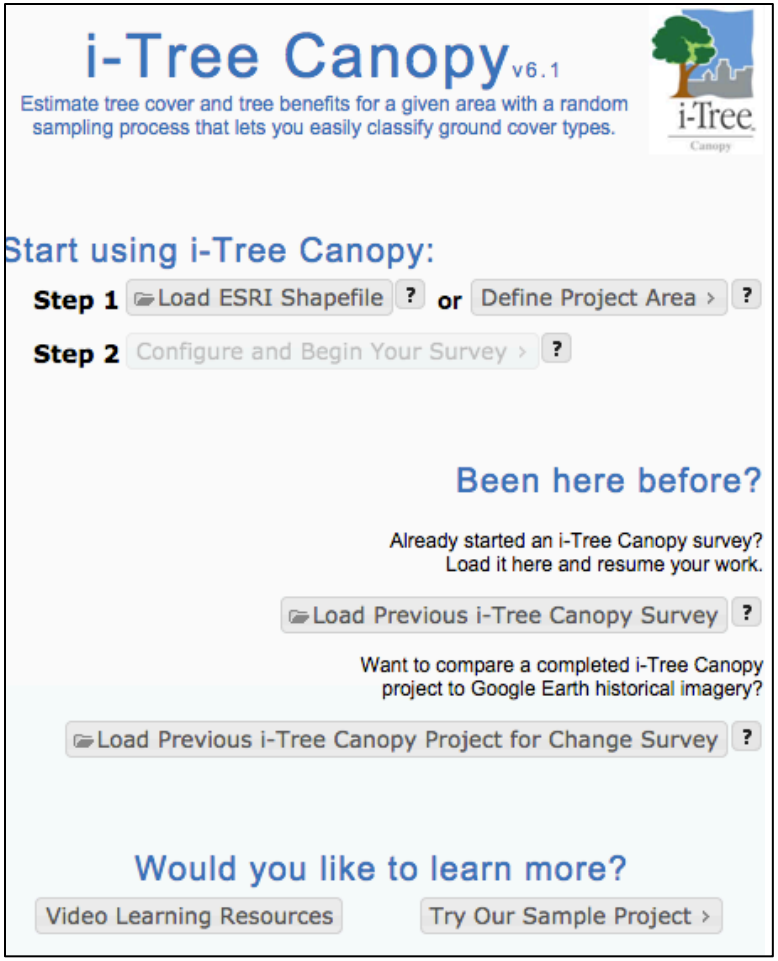
If this tree is cared for and grows, it will provide $66 worth of annual benefit in 40 years. See 'Future Year (2054)' tab at left for details.

Southern Magnolia
Magnolia grandiflora

iTree Design

	iTree Design
Understand the data as a whole	✖
Visualize data geographically	Small scale
Plan for (predict) the future	✔
Share the data	✖
Translate into benefits	✔
Justify funding requests/grants	✖
Useful reporting feature	✖
Effort required	Minutes
Format	Web
Cost	Free

iTree Canopy

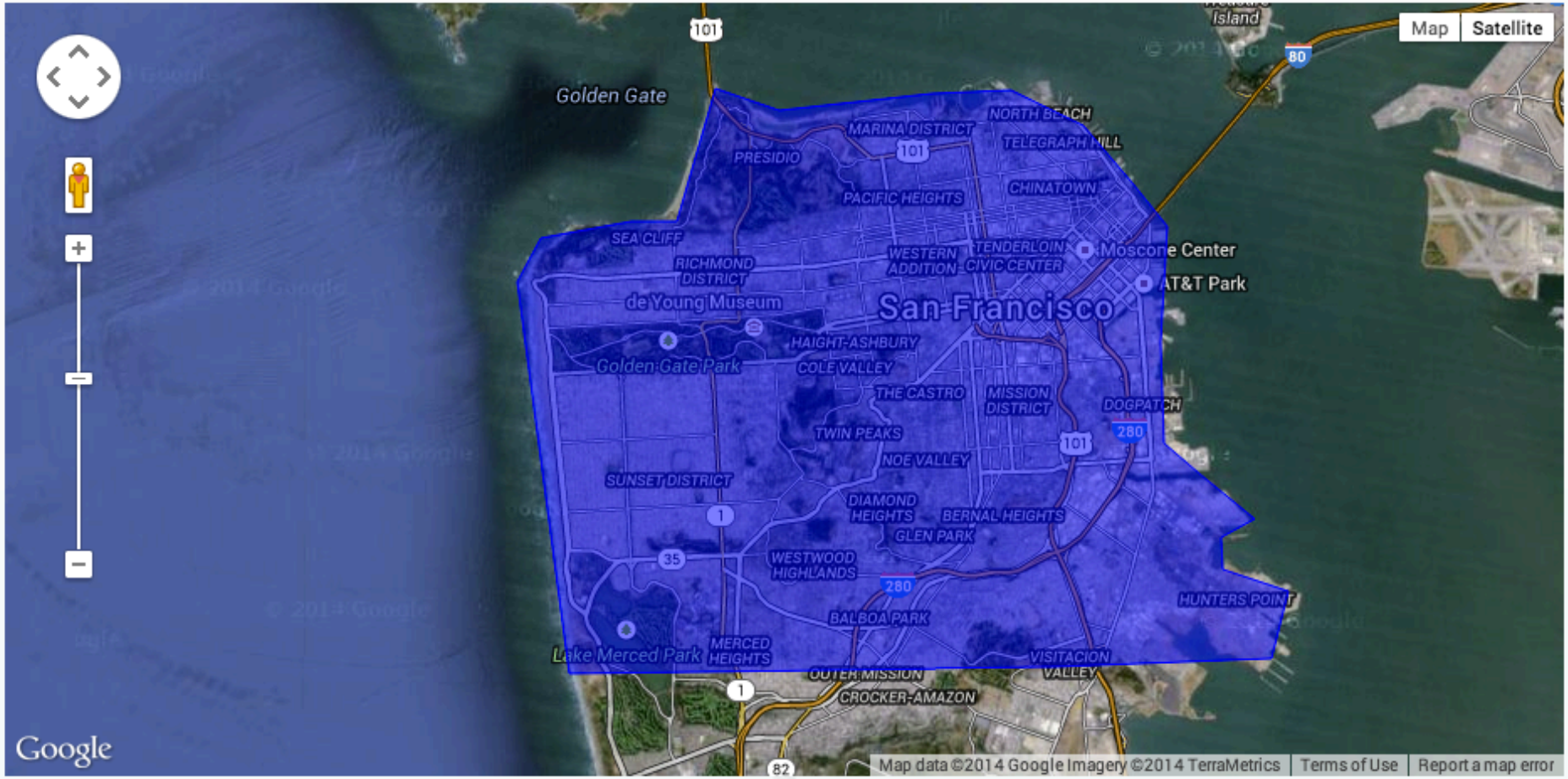


i-Tree Canopy v6.1

Define Project Area

san francisco, ca

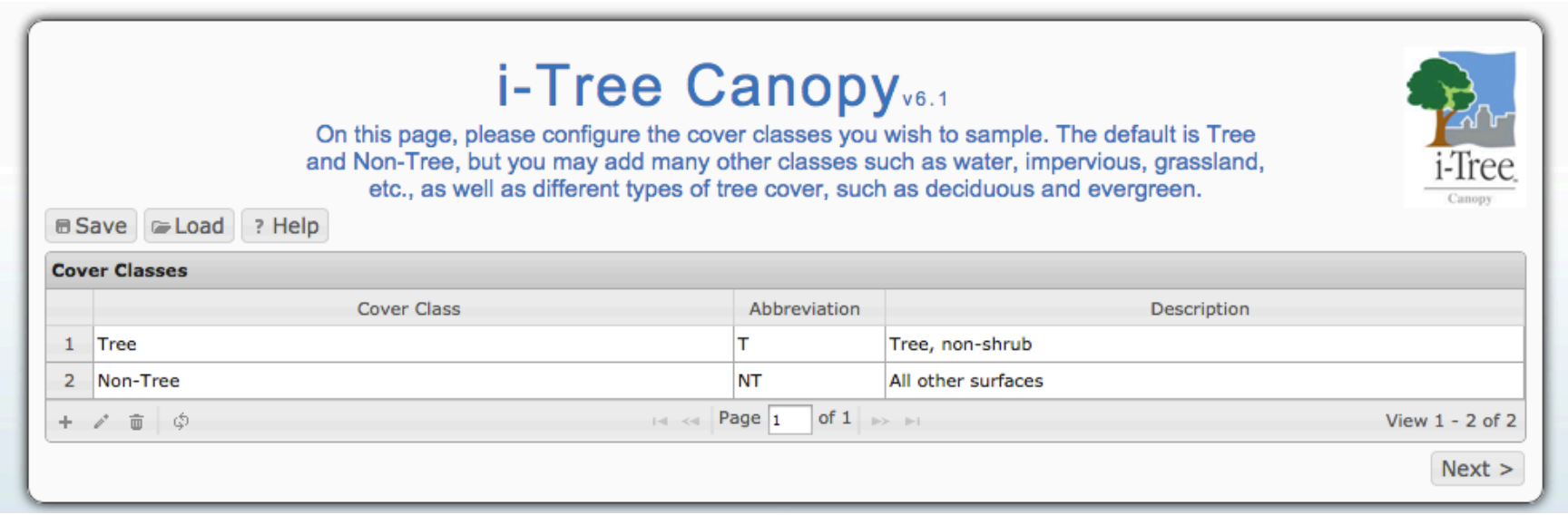
Find Location ›



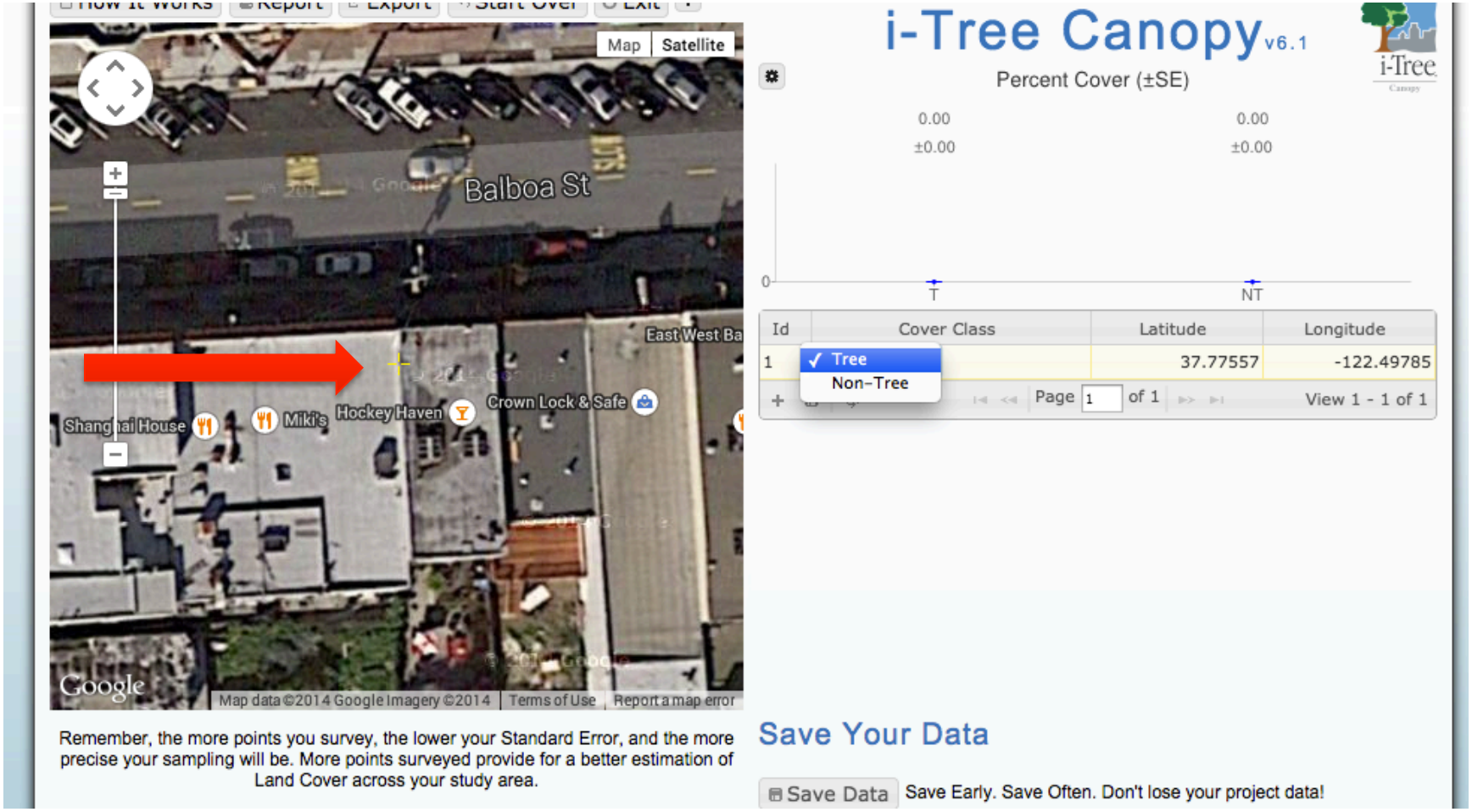
Lat:37.7568728 Lng:-122.53154755

Finish ›

Configure project

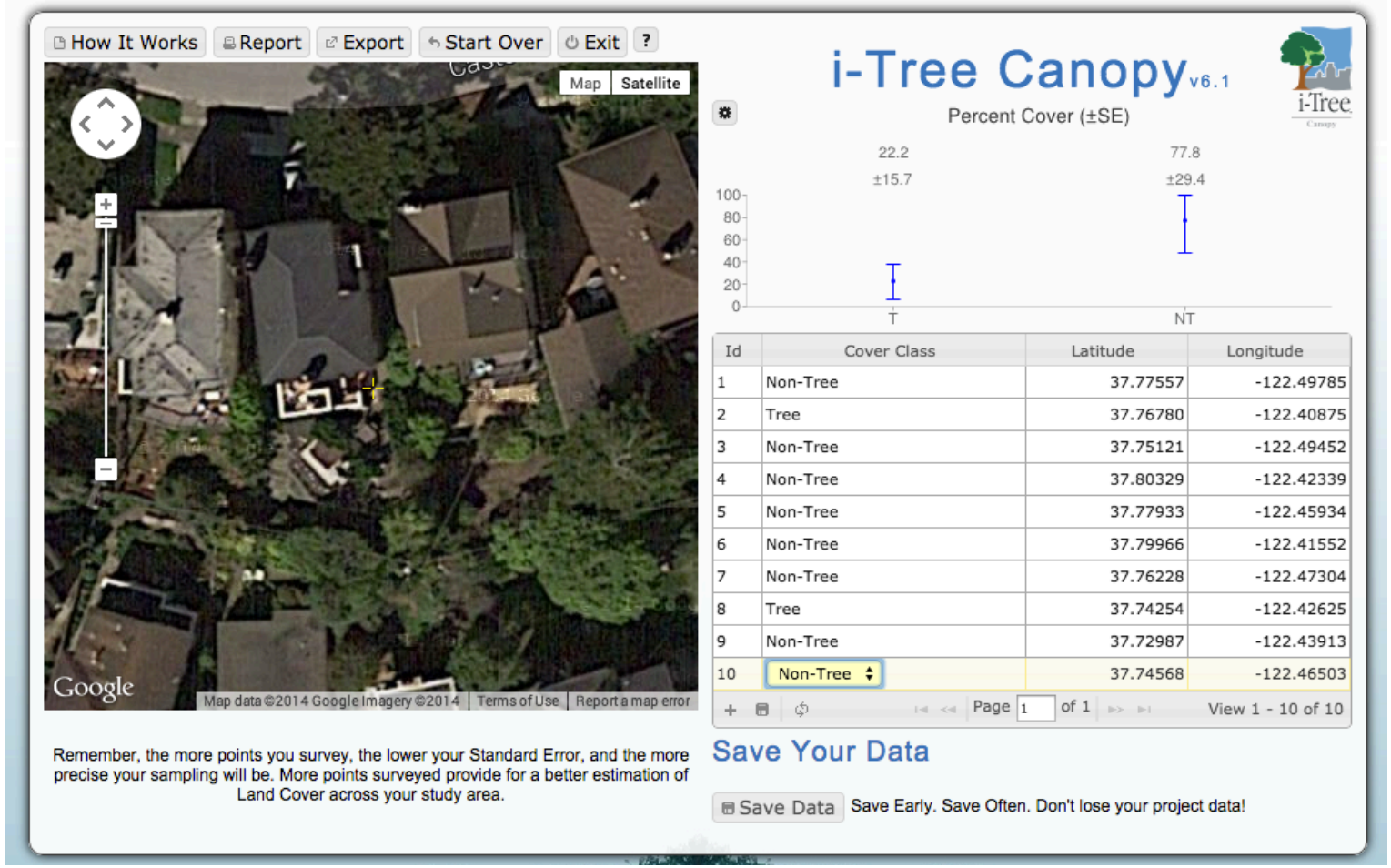


Plot by plot



Remember, the more points you survey, the lower your Standard Error, and the more precise your sampling will be. More points surveyed provide for a better estimation of Land Cover across your study area.

Plot by plot


How It Works
Report
Export
Start Over
Exit
?
Map
Satellite
Google
Map data ©2014 Google Imagery ©2014
Terms of Use
Report a map error
i-Tree Canopy v6.1
Percent Cover (±SE)
22.2
±15.7
77.8
±29.4
100
80
60
40
20
0
T
NT
Id | Cover Class | Latitude | Longitude
1 | Non-Tree | 37.77557 | -122.49785
2 | Tree | 37.76780 | -122.40875
3 | Non-Tree | 37.75121 | -122.49452
4 | Non-Tree | 37.80329 | -122.42339
5 | Non-Tree | 37.77933 | -122.45934
6 | Non-Tree | 37.79966 | -122.41552
7 | Non-Tree | 37.76228 | -122.47304
8 | Tree | 37.74254 | -122.42625
9 | Non-Tree | 37.72987 | -122.43913
10 | Non-Tree | 37.74568 | -122.46503
Page 1 of 1
View 1 - 10 of 10
Remember, the more points you survey, the lower your Standard Error, and the more precise your sampling will be. More points surveyed provide for a better estimation of Land Cover across your study area.
Save Your Data
Save Data
Save Early. Save Often. Don't lose your project data!

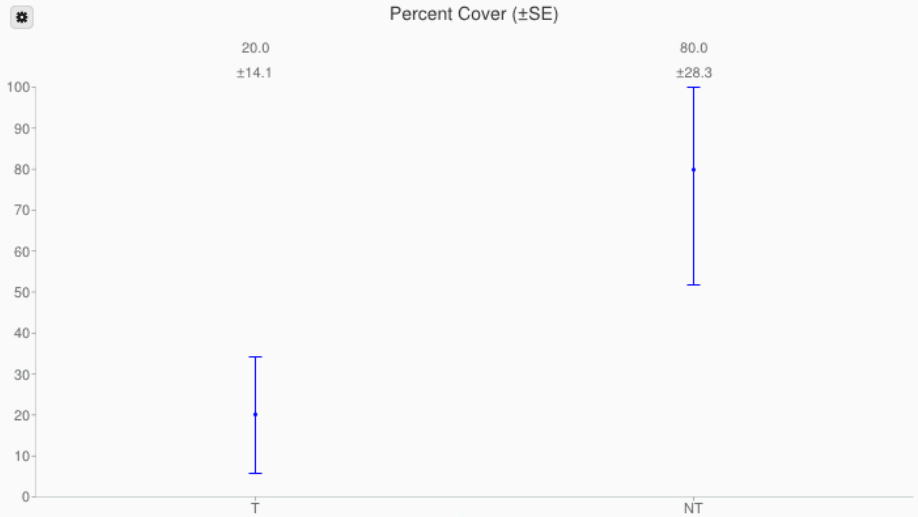
Results

‹ Back | Print | ? Help

i-Tree Canopy v6.1

Cover Assessment and Tree Benefits Report

Estimated using random sampling statistics on 12/08/14



Cover Class	Description	Abbr.	Points	% Cover
Tree	Tree, non-shrub	T	2	20.0 ±14.1
Non-Tree	All other surfaces	NT	8	80.0 ±28.3

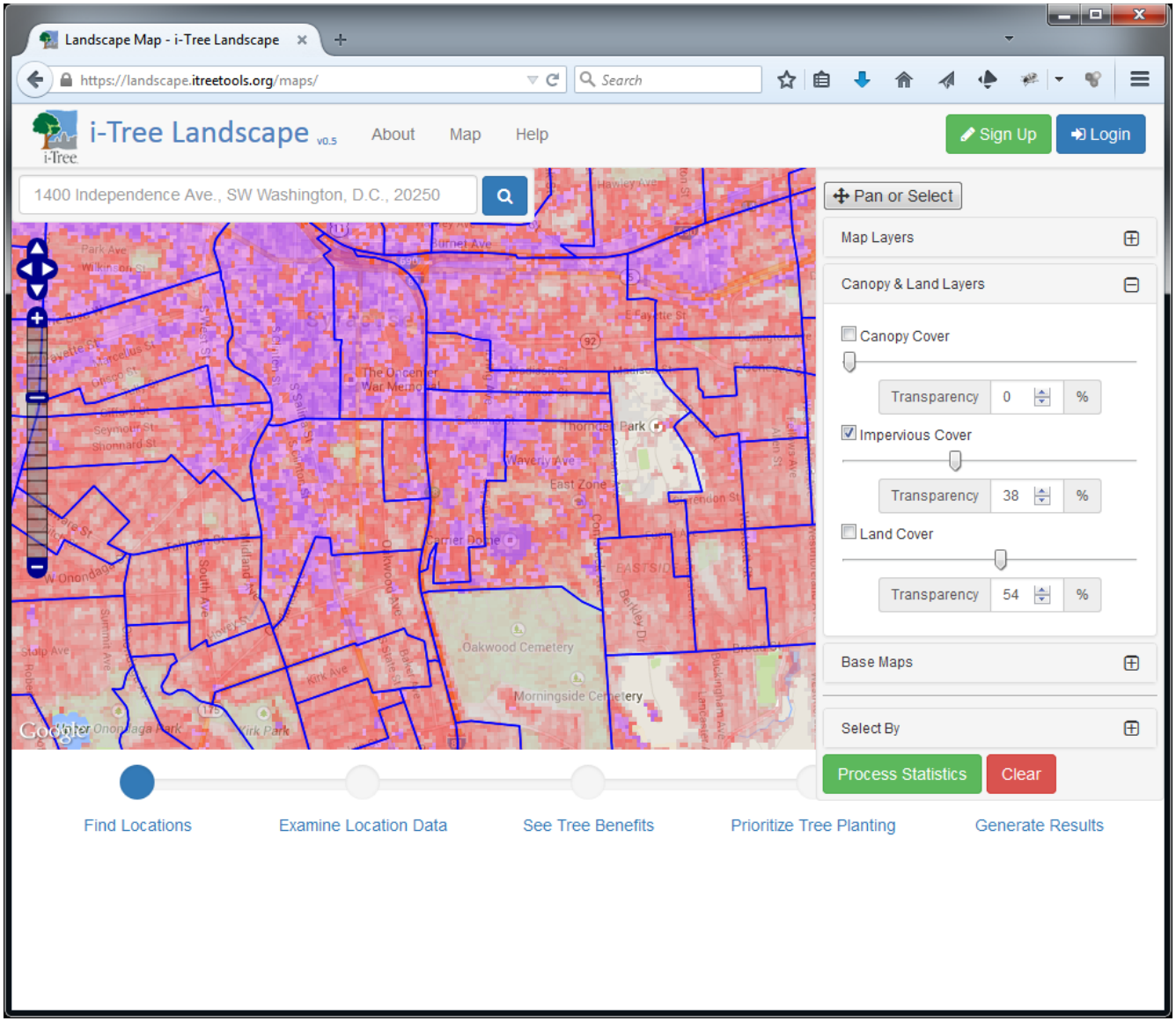
Tree Benefit Estimates

Abbr.	Benefit Description	Value	±SE	Amount	±SE
CO	Carbon Monoxide removed annually	$211.65	±149.66	2.50 T	±1.77
NO2	Nitrogen Dioxide removed annually	$364.38	±257.66	13.61 T	±9.63
O3	Ozone removed annually	$18,976.30	±13,418.27	135.57 T	±95.87
PM2.5	Particulate Matter less than 2.5 microns removed annually	$39,227.50	±27,738.03	6.59 T	±4.66
SO2	Sulfur Dioxide removed annually	$63.69	±45.03	8.58 T	±6.07
PM10*	Particulate Matter greater than 2.5 microns and less than 10 microns removed annually	$13,776.31	±9,741.32	45.41 T	±32.11
CO2seq	Carbon Dioxide sequestered annually in trees	$534,529.77	±377,969.63	27,605.25 T	±19,519.86
CO2stor	Carbon Dioxide stored in trees (Note: this benefit is not an annual rate)	$13,477,160.78	±9,529,791.78	696,014.36 T	±492,156.47

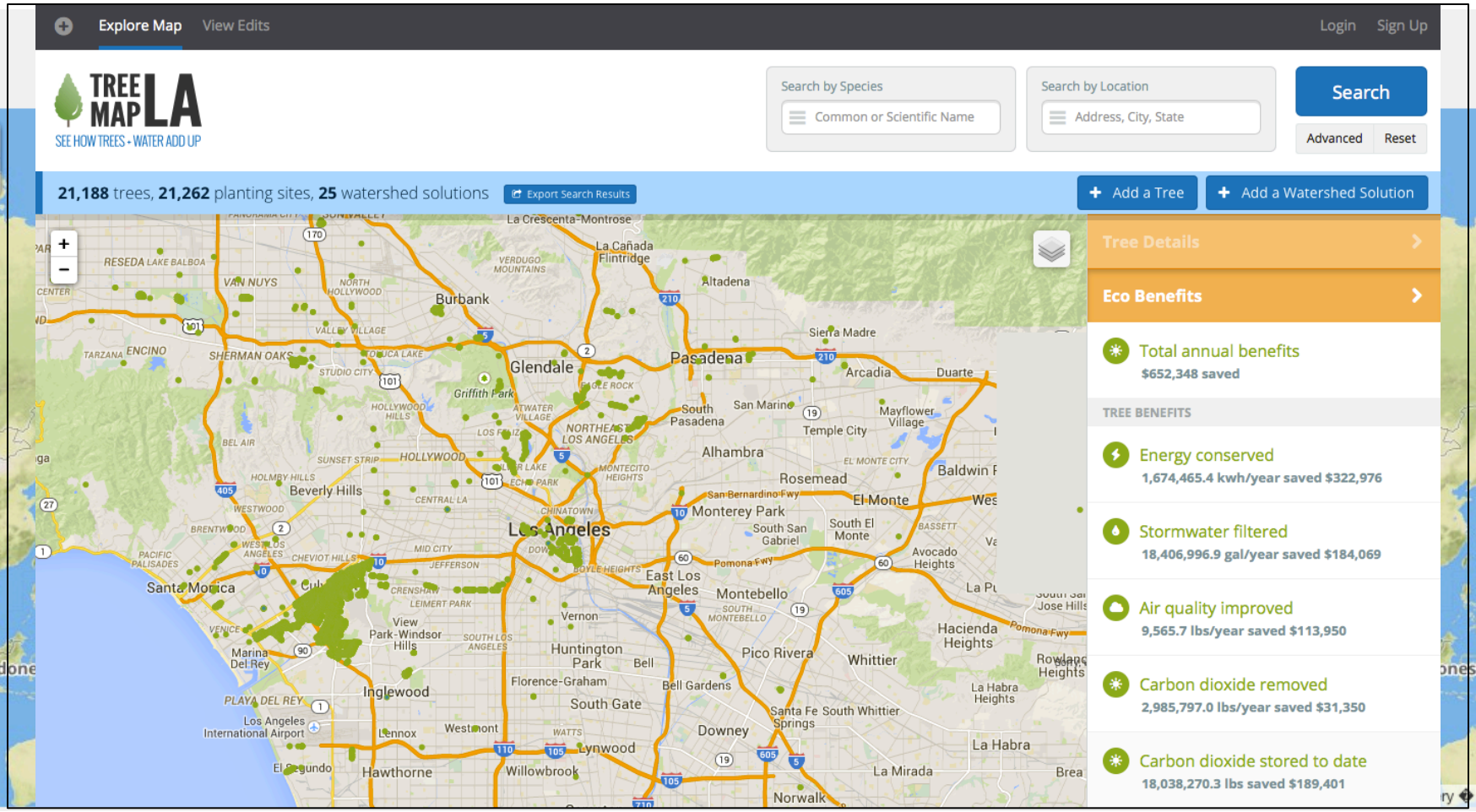
iTree Canopy

	iTree Canopy
Understand the data as a whole	✖
Visualize data geographically	✖
Plan for (predict) the future	✖
Share the data	✖
Translate into benefits	Some
Justify funding requests/grants	✔
Useful reporting feature	✔
Effort required	An hour or two
Format	Web
Cost	Free

iTree Landscape (coming soon)



OpenTreeMap



An open source, web-based collaborative tree mapping tool.

www.opentreemap.org

www.treemapla.org

Add Photo

Fig

515 S Olive St, Los Angeles, 90013

Edit Delete

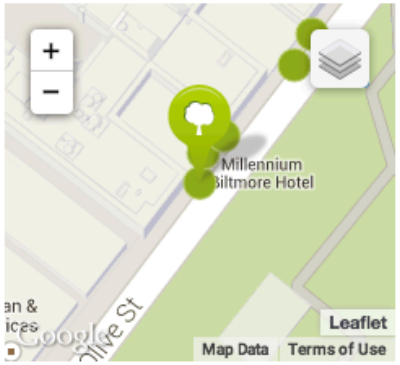
Tree Information

Tree Number	**256580**
Common Name	Fig
Scientific Name	*Ficus*
Trunk Diameter	20.0 in
Tree Height	
Date Planted	
Date Removed	
Special Projects	
Funded by	
Tree Caretaker	
Planted By	

Tree Alerts

No entries yet!

Tree Stewardship



Latest Update

willis updated the location on May 5, 2014

100% Complete

Recent Edits

willis

May 5, 2014 (9 months, 2 weeks ago)

- updated the location
- updated the location

willis

Jan. 17, 2014 (1 year, 1 month ago)

OpenTreeMap

Planting Site Information

Width	
Length	
Address	515 S Olive St
City	Los Angeles
Postal Code	90013
Original Owner Id	
Owned By	
Tree Location	Str
Powerlines Overhead	No
Sidewalk Damage	Mi

Yearly Ecosystem Services

Carbon dioxide stored to date	1,603.9 lbs	$16
Energy conserved	175.0 kwh/year	$42
Carbon dioxide removed	277.8 lbs/year	$2
Air quality improved	-1.1 lbs/year	$14
Stormwater filtered	4,142.2 gal/year	$41

Edit Permissions for public

Tree Fields	Permissions
Date Planted	Full Write Access
Readonly	Read Only
Stewardship	Full Write Access
Funded By	Read Only
Special Projects	Full Write Access
Tree Caretaker	Full Write Access
Planted By	Read Only
Id	Read Only
Height	Full Write Access
Date Removed	Read Only
Plot	Full Write Access
Species	Read Only
Diameter	Full Write Access
Canopy Height	Invisible
Alerts	Full Write Access
Photos	Full Write Access

Tree Stewardship

Action	Date

- ✓ Watered
- Pruned for a Damaged Branch
- Mulched
- Cleared of Trash or Debris
- Harvested for Fruits or Nuts
- Weeded
- Adjusted Stakes or Ties

+

Comments

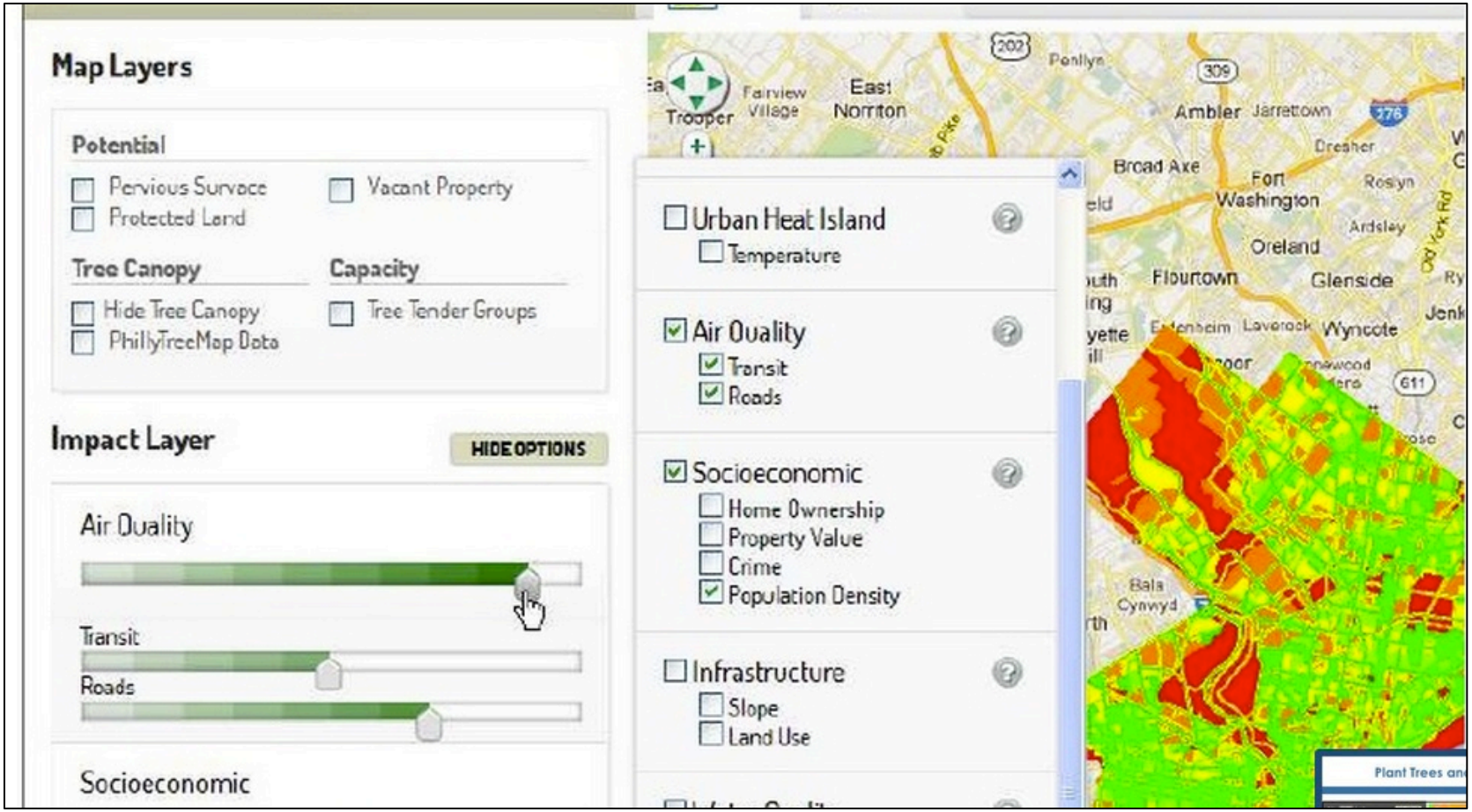
willis — 28 Jan 2014, 13:31 | **Reply** | **Flag**

I wasn't sure about the exact species of this tree. Can anyone help?

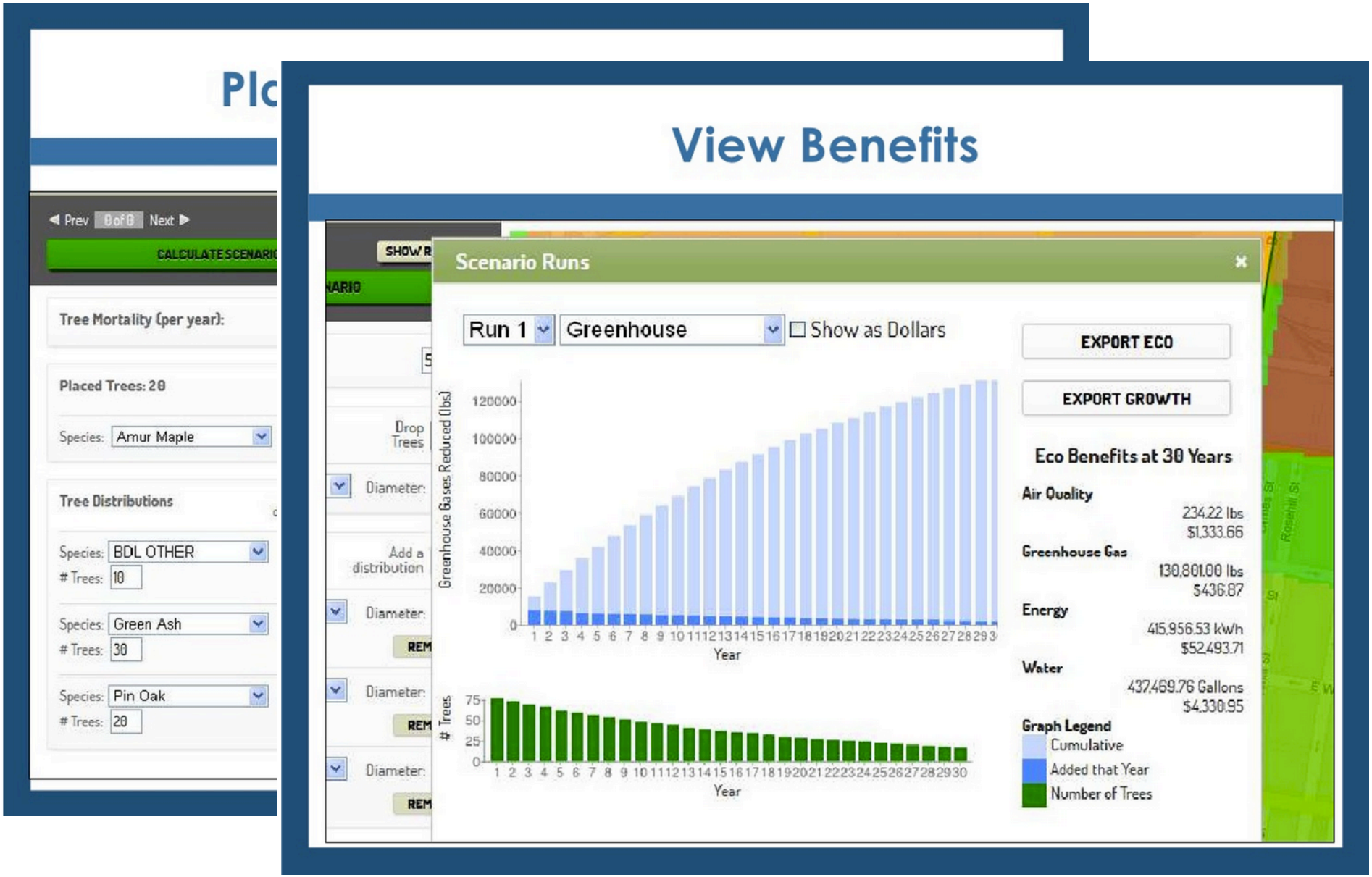
Linda Eremita — 04 Mar 2014, 17:59 | **Reply** | **Flag**

This tree is Ficus microcarpa, which sometimes is split into F.m. (more weeping habit) and F.m. var. nitida (more upright habit). Sometimes you'll see it labeled as Ficus nitida a totally separate species....but not now. We are just identifying them as FIcus microcarpa, the very, very common street tree see all over L.A. grown in too small a space and breaking up sidewalks. But there's a place for all trees, yes?

OpenTreeMap: Prioritization



OpenTreeMap: Simulation



OpenTreeMap

	OpenTreeMap
Understand the data as a whole	✔
Visualize data geographically	✔
Plan for (predict) the future	Coming soon
Share the data	✔
Translate into benefits	✔
Justify funding requests/grants	✔
Useful reporting feature	✔
Effort required	Setup: a few hours to a few days, Maintenance: a few hours a month
Format	Web
Cost	$82-1099/month

Tree Carbon Calculator

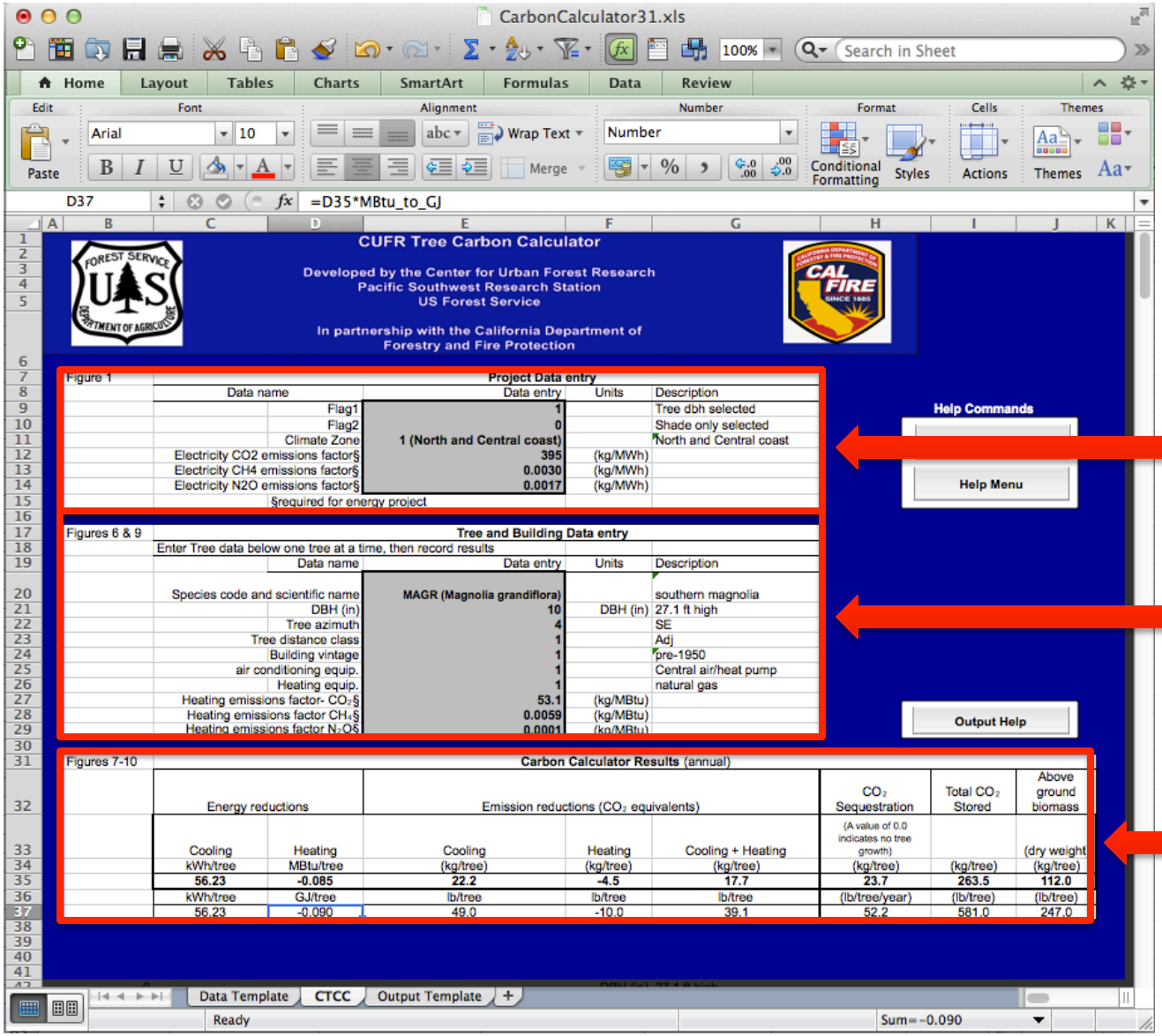


Figure 1	Project Data entry		
Data name	Data entry	Units	Description
Flag1	1		Tree dbh selected
Flag2	0		Shade only selected
Climate Zone	1 (North and Central coast)		North and Central coast
Electricity CO2 emissions factor§	395	(kg/MWh)	
Electricity CH4 emissions factor§	0.0030	(kg/MWh)	
Electricity N2O emissions factor§	0.0017	(kg/MWh)	
§required for energy project			

Figures 6 & 9	Tree and Building Data entry		
Enter Tree data below one tree at a time, then record results			
Data name	Data entry	Units	Description
Species code and scientific name	MAGR (Magnolia grandiflora)		southern magnolia
DBH (in)	10	DBH (in)	27.1 ft high
Tree azimuth	4		SE
Tree distance class	1		Adj
Building vintage	1		pre-1950
air conditioning equip.	1		Central air/heat pump
Heating equip.	1		natural gas
Heating emissions factor- CO_2§	53.1	(kg/MBtu)	
Heating emissions factor CH_4§	0.0059	(kg/MBtu)	
Heating emissions factor N_2O§	0.0001	(kg/MBtu)	

Figures 7-10	Carbon Calculator Results (annual)						
	Energy reductions		Emission reductions (CO_2 equivalents)			CO_2 Sequestration	Total CO_2 Stored	Above ground biomass
	Cooling	Heating	Cooling	Heating	Cooling + Heating	(A value of 0.0 indicates no tree growth)		(dry weight
	kWh/tree	MBtu/tree	(kg/tree)	(kg/tree)	(kg/tree)	(kg/tree)	(kg/tree)	(kg/tree)
	56.23	-0.085	22.2	-4.5	17.7	23.7	263.5	112.0
	kWh/tree	GJ/tree	lb/tree	lb/tree	lb/tree	(lb/tree/year)	(lb/tree)	(lb/tree)
	56.23	-0.090	49.0	-10.0	39.1	52.2	581.0	247.0

Project inputs

Tree inputs

Outputs

Projecting benefits into future

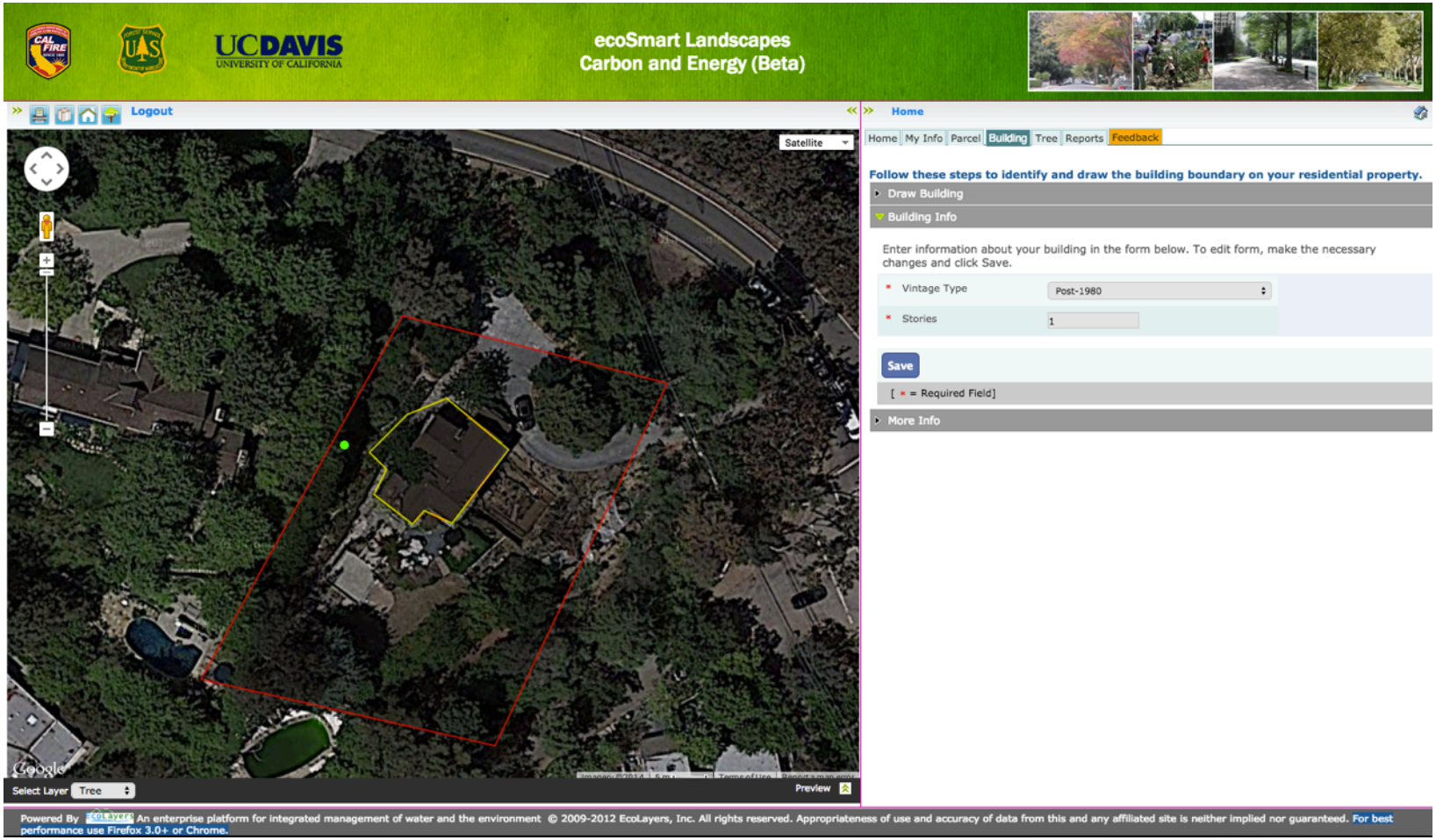
	A	B	C	D	E	F	G
1	**Species name**	Ginkgo biloba					
2	**Tree azimuth**	West					
3	**Tree distance**	Near (20-40 ft)					
4			**Energy reductions**		**Emission reductions (CO2 equivalents)**		
5	**Tree age**	**Project year**	**Cooling**	**Heating**	**Cooling**	**Heating**	**Cooling + Heating**
6			**(kWh/tree)**	**(MBtu/tree)**	**(kg/tree)**	**(kg/tree)**	**(kg/tree)**
7	7	1	1.63	-0.002	1.4	-0.2	1.2
8	8	2	2.45	-0.002	2.1	-0.3	1.9
9	9	3	8.49	-0.004	7.4	-0.5	6.9
10	10	4	14.98	-0.006	13.1	-0.7	12.4
11	11	5	21.86	-0.009	19.1	-0.9	18.1
12	12	6	29.08	-0.011	25.4	-1.2	24.2
13	13	7	36.60	-0.013	31.9	-1.5	30.4
14	14	8	44.39	-0.016	38.7	-1.8	37.0
15	15	9	52.97	-0.018	46.2	-2.0	44.2
16	…						
17	46	40	270.03	-0.055	235.5	-6.1	229.4
18	40-year total per tree		482.48	-0.14	420.77	-15.10	405.67
19							

Data Template | CTCC | Output Template | GIBI_W_Near | AllTrees | +

Tree Carbon Calculator

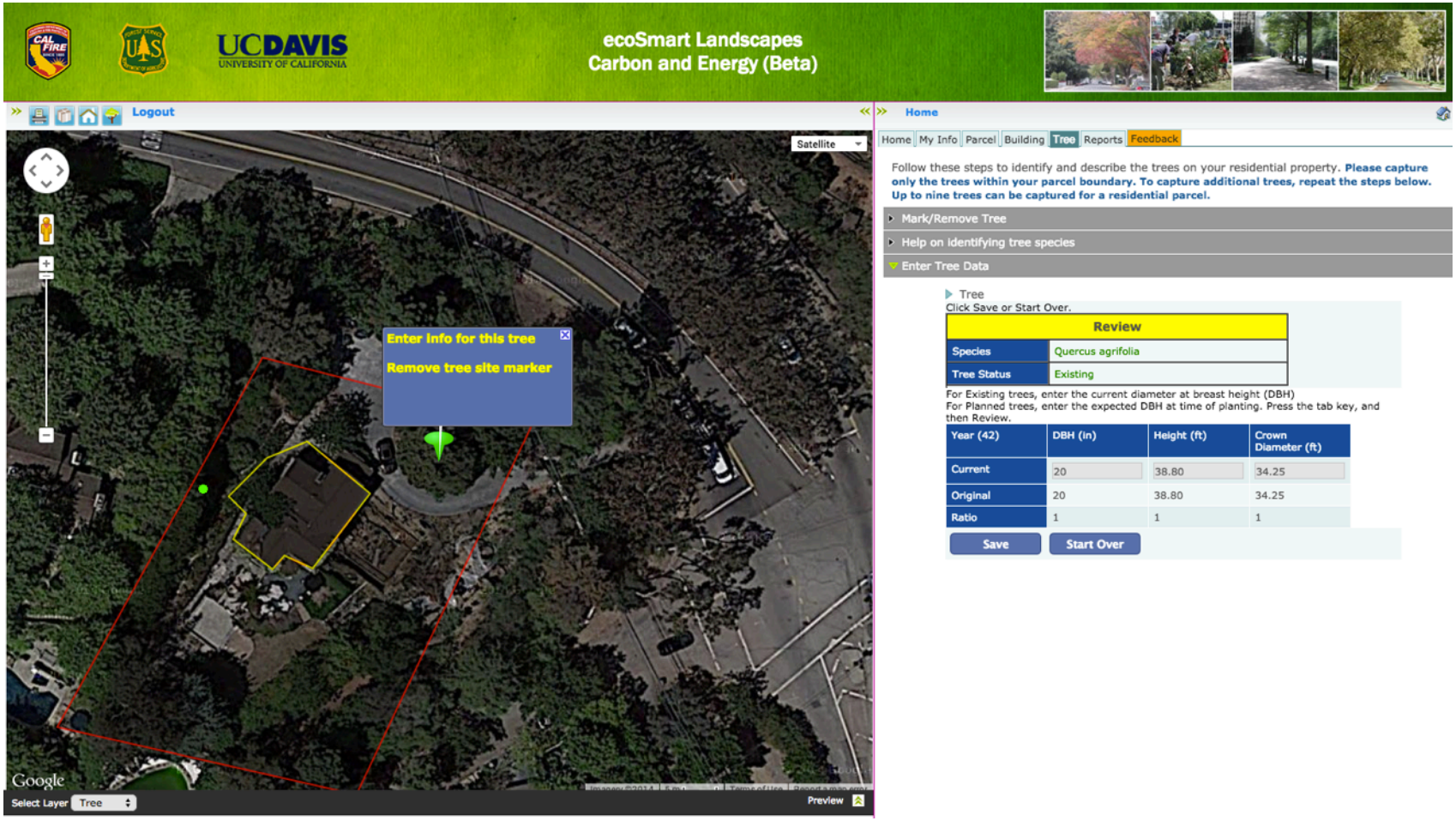
	Tree Carbon Calculator
Understand the data as a whole	✖
Visualize data geographically	✖
Plan for (predict) the future	Kind of
Share the data	✖
Translate into benefits	Some
Justify funding requests/grants	✔
Useful reporting feature	✖
Effort required	Minutes to hours
Format	Excel
Cost	Free

EcoSmart Landscapes (free)



1. Create account.
2. Draw parcel.
3. Draw building.
4. Enter building info.

EcoSmart Tree Inputs



1. Add trees to map one at a time.
2. May be existing or planned.
3. Enter species and dbh.
4. Once all trees are added, run reports.

EcoSmart reports

Summary Tree Report – Current and forecast estimates

Tree ID	Tree Site ID	Status	Scientific Name	Planting Date	Calendar Year	DBH (in)	Tree Height (ft)	Crown Height (ft)	Crown Diameter (ft)	Aboveground biomass (Lbs)	Total CO2 stored (Lbs)	CO2 sequestered/yr (Lbs)
1	1	Existing	Eucalyptus sideroxylon		2014	10.50	30.84	26.41	26.98	497.68	1170.82	163.61
1	1	Existing	Eucalyptus sideroxylon		2015	11.11	31.65	27.31	27.68	573.20	1348.50	177.68
1	1	Existing	Eucalyptus sideroxylon		2016	11.70	32.46	28.17	28.38	654.80	1540.45	191.95
1	1	Existing	Eucalyptus sideroxylon		2017	12.28	33.29	28.99	29.10	742.53	1746.86	206.41
1	1	Existing	Eucalyptus sideroxylon		2018	12.86	34.12	29.77	29.82	836.48	1967.86	221.00
1	1	Existing	Eucalyptus sideroxylon		2019	13.42	34.96	30.52	30.55	936.67	2203.57	235.71
1	1	Existing	Eucalyptus sideroxylon		2020	13.98	35.81	31.23	31.28	1043.14	2454.05	250.48
1	1	Existing	Eucalyptus sideroxylon		2021	14.53	36.66	31.92	32.02	1155.91	2719.34	265.29
1	1	Existing	Eucalyptus sideroxylon		2022	15.07	37.53	32.58	32.76	1274.97	2999.44	280.10
1	1	Existing	Eucalyptus sideroxylon		2023	15.60	38.39	33.21	33.51	1400.30	3294.30	294.86
1	1	Existing	Eucalyptus sideroxylon		2024	16.13	39.27	33.82	34.27	1531.88	3603.84	309.54
1	1	Existing	Eucalyptus sideroxylon		2025	16.64	40.15	34.40	35.02	1669.65	3927.95	324.11
1	1	Existing	Eucalyptus sideroxylon		2026	17.15	41.03	34.97	35.79	1813.54	4266.46	338.51
1	1	Existing	Eucalyptus sideroxylon		2027	17.64	41.92	35.51	36.55	1963.47	4619.19	352.72
1	1	Existing	Eucalyptus sideroxylon		2028	18.13	42.81	36.03	37.32	2119.34	4985.88	366.69
1	1	Existing	Eucalyptus sideroxylon		2029	18.61	43.70	36.53	38.09	2281.03	5366.26	380.38
1	1	Existing	Eucalyptus sideroxylon		2030	19.09	44.59	37.02	38.86	2448.40	5760.02	393.76
1	1	Existing	Eucalyptus sideroxylon		2031	19.55	45.49	37.49	39.63	2621.31	6166.79	406.77
1	1	Existing	Eucalyptus sideroxylon		2032	20.00	46.39	37.94	40.41	2799.57	6586.18	419.39
1	1	Existing	Eucalyptus sideroxylon		2033	20.45	47.29	38.38	41.18	2983.02	7017.75	431.57
1	1	Existing	Eucalyptus sideroxylon		2034	20.89	48.18	38.80	41.95	3171.44	7461.02	443.27
1	1	Existing	Eucalyptus sideroxylon		2035	21.32	49.08	39.21	42.73	3364.62	7915.48	454.46
1	1	Existing	Eucalyptus sideroxylon		2036	21.74	49.97	39.60	43.50	3562.31	8380.57	465.10
1	1	Existing	Eucalyptus sideroxylon		2037	22.15	50.87	39.98	44.26	3764.28	8855.72	475.15
1	1	Existing	Eucalyptus sideroxylon		2038	22.55	51.75	40.35	45.03	3970.26	9340.29	484.57
1	1	Existing	Eucalyptus sideroxylon		2039	22.95	52.64	40.71	45.79	4179.96	9833.63	493.34
1	1	Existing	Eucalyptus sideroxylon		2040	23.33	53.52	41.05	46.55	4393.10	10335.05	501.42
1	1	Existing	Eucalyptus sideroxylon		2041	23.71	54.39	41.38	47.30	4609.36	10843.82	508.77
1	1	Existing	Eucalyptus sideroxylon		2042	24.08	55.26	41.70	48.05	4828.43	11359.19	515.37
1	1	Existing	Eucalyptus sideroxylon		2043	24.44	56.12	42.01	48.79	5049.97	11880.37	521.18
1	1	Existing	Eucalyptus sideroxylon		2044	24.79	56.98	42.31	49.52	5273.63	12406.56	526.19
1	1	Existing	Eucalyptus sideroxylon		2045	25.13	57.82	42.60	50.25	5499.07	12936.92	530.36
1	1	Existing	Eucalyptus sideroxylon		2046	25.46	58.66	42.88	50.97	5725.92	13470.59	533.67
1	1	Existing	Eucalyptus sideroxylon		2047	25.79	59.48	43.15	51.68	5953.79	14006.68	536.09
1	1	Existing	Eucalyptus sideroxylon		2048	26.11	60.30	43.41	52.38	6182.32	14544.30	537.62
1	1	Existing	Eucalyptus sideroxylon		2049	26.42	61.10	43.66	53.07	6411.10	15082.53	538.23
1	1	Existing	Eucalyptus sideroxylon		2050	26.72	61.90	43.90	53.75	6639.75	15620.43	537.90
1	1	Existing	Eucalyptus sideroxylon		2051	27.01	62.68	44.13	54.42	6867.85	16157.06	536.63
1	1	Existing	Eucalyptus sideroxylon		2052	27.29	63.44	44.35	55.08	7095.00	16691.45	534.39
1	1	Existing	Eucalyptus sideroxylon		2053	27.56	64.19	44.57	55.72	7320.80	17222.64	531.19
1	1	Existing	Eucalyptus sideroxylon		2054	27.83	64.93	44.78	56.36	7544.82	17749.66	527.02
1	1	Existing	Eucalyptus sideroxylon		2055	28.09	65.65	44.98	56.97	7766.64	18271.53	521.87

Tree growth, annual and total CO2 values are presented for each tree, for each year going forward.

EcoSmart Reports

Saved Energy Report

Tree Status	Year	Baseline energy (kBtu) to heat this house	Energy (kBtu) to heat this house with the trees listed	Percent change in energy use for heating. Savings (+)	Energy (kwh) to cool this house without any trees	Energy (kwh) to cool this house with the trees listed	Percent change in energy use for cooling. Savings (+)
All Trees	2014	79012	79412	-0.51	4236	4030	4.86
All Trees	2019	79012	79469	-0.58	4236	4002	5.52
All Trees	2024	79012	79540	-0.67	4236	3963	6.44
All Trees	2029	79012	79555	-0.69	4236	3927	7.29
All Trees	2034	79012	79565	-0.70	4236	3922	7.41
All Trees	2039	79012	79441	-0.54	4236	3919	7.48
All Trees	2044	79012	79443	-0.55	4236	3929	7.25
All Trees	2049	79012	79427	-0.53	4236	3927	7.29
All Trees	2054	79012	79403	-0.49	4236	3927	7.29
All Trees	2059	79012	79387	-0.47	4236	3953	6.68
All Trees	2064	79012	79371	-0.45	4236	3956	6.61

Energy conservation due to strategic planting is presented for all trees together at 4-year intervals.

Avoided CO2 from All Trees

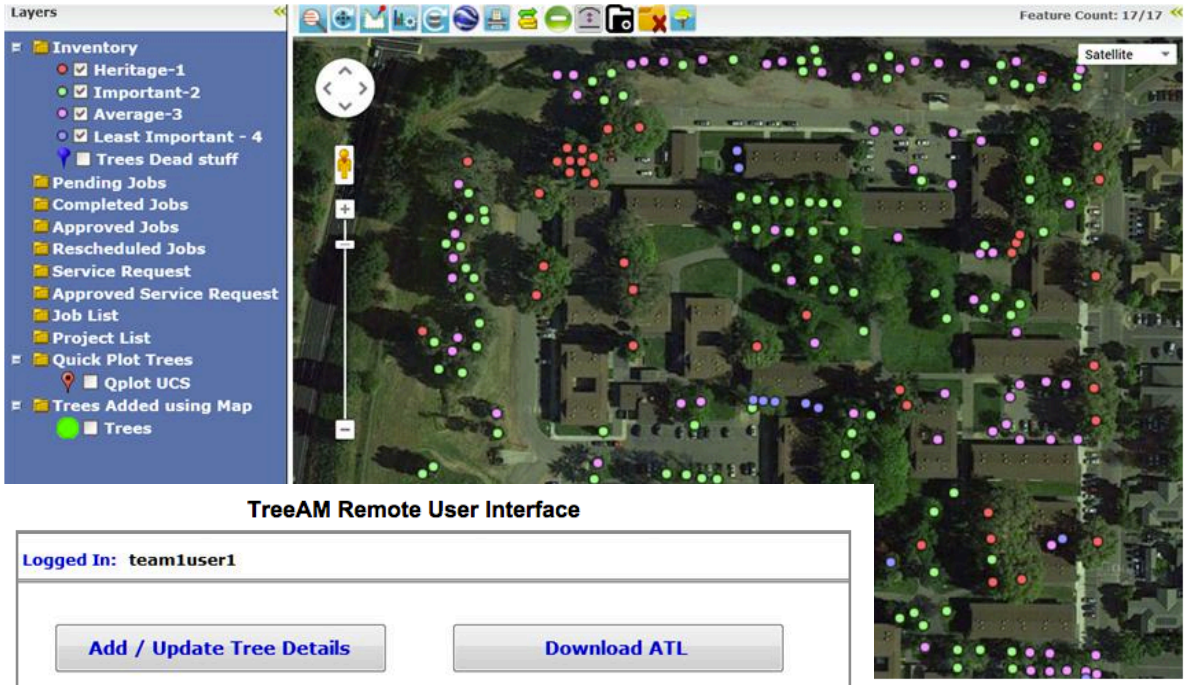
Year	Equivalent CO2 (Heating)(Lbs)	Equivalent CO2 (Cooling)(Lbs)	Avoided Equivalent CO2 Emissions from Heating and Cooling (Lbs)	Total CO2 Stored in Trees (all Trees)(Lbs)
2014	-21.31	78.51	57.20	7060.84
2019	-24.34	89.18	64.84	9735.96
2024	-28.12	104.05	75.92	12963.22
2029	-28.92	117.77	88.84	16720.94
2034	-29.46	119.67	90.22	20960.86
2039	-22.85	120.81	97.96	25608.56
2044	-22.96	117.00	94.05	30565.52
2049	-22.11	117.77	95.66	35712.98
2054	-20.83	117.77	96.94	40917.47
2059	-19.97	107.86	87.88	46037.62
2064	-19.12	106.71	87.59	50932.01

Avoided CO2 (reductions in CO2 due to lower energy use) are presented for all trees *together* at 4-year intervals

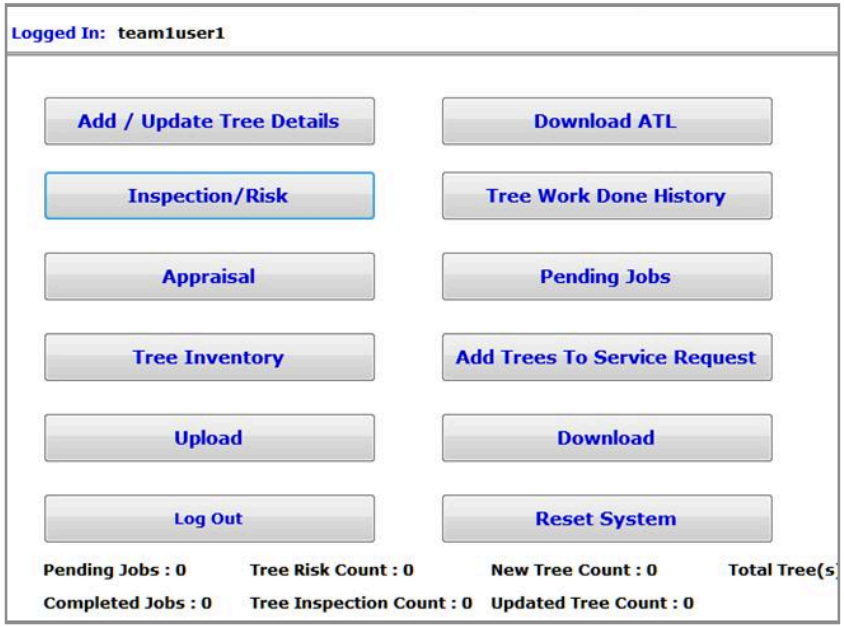
EcoSmart enterprise (Tree Asset Manager)

- Import large numbers of trees
- Estimate current and future:
  - Carbon benefits
  - Energy conservation
- Asset management (scheduling jobs, managing service requests, etc.)
- Reports

TreeAM Map-based User Interface



TreeAM Remote User Interface



EcoSmart

	EcoSmart (free)	EcoSmart Enterprise
Understand the data as a whole	✖	✔
Visualize data geographically	Small scale	✔
Plan for (predict) the future	✔	✔
Share the data	✖	✔
Translate into benefits	Some	Some
Justify funding requests/grants	✖	✔
Useful reporting feature	✔	✔
Effort required	Minutes	Not known
Format	Web	Software
Cost	Free	Custom

Urban Forestry Tools Comparison

	iTree Streets	iTree Design	iTree Canopy	OpenTree Map	Tree Carbon Calculator	EcoSmart (free)	EcoSmart Enterprise
Understand the data as a whole	✔	✖	✖	✔	✖	✖	✔
Visualize data geographically	✖	Small scale	✖	✔	✖	Small scale	✔
Plan for (predict) the future	Coming soon	✔	✖	Coming soon	Kind of	✔	✔
Share the data	✖	✖	✖	✔	✖	✖	✔
Translate into benefits	✔	✔	Some	✔	Some	Some	Some
Justify funding requests/grants	✔	✖	✔	✔	✔	✖	✔
Useful reporting feature	✔	✖	✔	✔	✖	✔	✔
Effort required	A day or two	Minutes	An hour or two	A few hours a month	Minutes to hours	Minutes	Not known
Format	Software	Web	Web	Web	Excel	Web	Software
Cost	Free	Free	Free	$82-1099/ month	Free	Free	Custom

Questions?

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Urban Ecos