Which suits your needs?

Continuous (updatable) Vs.
Periodic (slice-in-time)

Complete Vs. Representative Sample

CONTINUOUS INVENTORIES

PROS

- Always up to date
- Can be used for day to day scheduling and record keeping
- Can be used to develop a maintenance history for individual trees
- Needs to be updated less frequently than periodic inventories

- It is a lot of work to keep the inventory always up to date... if you don't, it quickly becomes a huge mess!
- Typically more expensive than a periodic inventory (especially in terms of software)

PERIODIC INVENTORIES

PROS

- Do not require constant upkeep – once it's done, it's done
- More options for free or inexpensive software
- Generally quicker, easier, and less expensive to complete

- Quickly become outdated
- Cannot be updated, so must be <u>periodically</u> repeated.
- Cannot be used for day to day scheduling and record keeping

COMPLETE INVENTORY

PROS

- 100% "census" all trees are counted.
- Can provide specific details on location of vacant planting locations, broken sidewalks, etc.
- Can provide a complete accounting of hazards, maintenance needs, etc.

- Time consuming
- Very time consuming
- More expensive

PROS

- Quicker to complete, much less labor intensive
- Takes less time, so costs less money
- Some information is better than no information

- Takes more time to set up (what will you sample?)
- Must be random
- Must be enough to be statistically significant

- Requires a random sample of plot locations or street segments.
- i-Tree has step by step instructions for US Census TIGER map data and ESRI ArcGIS software
- Regardless of the method you use to create your sample, the end result should be a simple random sample of street segments.
- Work with your municipality's GIS or Engineering department.

- i-Tree Streets recommends a 3–6% sample of total street segments, depending on community size and variation from segment to segment.
- This level will produce about a 10% standard error for the total number of trees citywide.
- you must know the total number of street segments in your study area.
- If you will be dividing your study area into management zones or neighborhoods, you must also know the total number of street segments in each zone.



- Statistics
- Random Sample
- Stratified Random Sample
- Variance
- Standard Error

Statistics

- Statistics are used to estimate population parameters (constants that describe the population as a whole).
- The sample is the aggregate of sample units (trees) from which measurements or observations are taken.

Random Sample

Data collection in which every member of the population has an equal chance of being selected.

Stratified Random Sample

 Sometimes a population can be broken into subpopulations (stratified) to improve precision in the data.

BOROUGH CODE	SPECIES COUNT
1 (Bronx)	53
2 (Brooklyn)	74
3 (Manhattan)	70
4 (Queens)	99
5 (Staten Island)	80



BOROUGH CODE	TREE COUNT IN BORO	NUMBER DEAD	PERCE MORTA (from all y
1	4409	510	11.5
2	6113	838	13.7
3	10946	888	8.11
4	17149	1016	5.92
5	6321	653	10.3

PERCENT MORTALITY (from all years)
11.56
13.70
8.11
5.92
10.33



LANDUSE CODES

- 01 One & Two Family Buildings 02 Multi-Family Walk-up Buildings 03 Multi-Family Elevator Buildings 04 Mixed Residential and Commercial Buildings 05 Commercial and Office Buildings
- 06 Industrial and Manufacturing
- 07 Transportation and Utility
- 08 Public Facilities and Institutions
- 09 Open Space and Outdoor Recreation
- 10 Parking Facilities
- 11 Vacant Land
- 12 Blank data field

		Bronx	(1)	I	Brooklyn	(2)	Ν	/lanhatta	n (3)		Queens	(4)	Sta	aten Isla	nd (5)
	Tree	counts	% dead	Tree of	counts	% dead	Tree	counts	% dead	Tree	counts	% dead	Tree of	ounts	% dead
Land Use		% in boro code	in Land Use category		% in boro code	in Land Use category		% in boro code	in Land Use category		% in boro code	in Land Use category		% in boro code	in Land Use category
1	79	1.8	3.8	1815	31.2	9.5	4121	38.2	5.5	9009	59.3	4.8	3857	65.4	7.9
2	565	13.1	12.0	1022	17.5	15.6	2131	19.8	8.6	1561	10.2	6.2	407	6.9	9.8
3	968	22.4	10.1	700	12.0	18.3	781	7.2	9.3	606	3.9	6.1	34	0.6	11.8
4	1227	28.4	13.9	442	7.6	17.0	1122	10.4	9.6	613	4.0	9.3	52	0.9	9.6
5	380	8.8	13.9	296	5.1	12.8	443	4.1	7.4	880	5.7	8.3	323	5.4	16.4
6	57	1.3	0.0	121	2.1	22.3	223	2.1	13.9	293	1.9	6.8	33	0.5	0.0
7	38	0.8	7.9	116	1.9	6.0	225	2.1	9.3	201	1.3	11.4	62	1.0	43.5
8	446	10.3	9.9	511	8.7	17.8	812	7.5	11.6	928	6.1	6.3	193	3.2	12.4
9	348	8.1	10.6	304	5.2	18.4	337	3.5	10.6	624	4.1	13.5	193	3.2	9.8
10	69	1.5	17.4	153	2.5	13.7	181	1.7	13.3	176	1.1	6.3	49	0.8	6.1
11	77	1.7	9.1	209	3.6	10.5	275	2.6	13.8	267	1.7	7.5	678	11.5	18.6
blanks	63	1.5	7.9	125	2.1	10.4	69	0.6	2.9	41	0.3	0.0	15	0.3	0.0

Table 1 Species levels in NYC study area which comprise over five percent of the total study population (trees planted on request by contract from NYC DPR) 1995-2006

Species	population	mortality
	percentage	percent
ZESE	5.17	7.93
TITO	6.78	10.81
TICO	5.87	9.09
GLTR	11.51	6.59
PRVISH	5.13	6.77
PYCA	16.31	7.28

Six species comprise 50.77 of the total test population



Variance

- Measure of how much individual sample populations vary
- The less the individual measurements vary from the mean (average), the more reliable the mean
- Different traits to investigate (variables) may have different variances

Standard Error SEM

- The Standard Error (Standard Error of the Mean) calculates how accurately a sample mean estimates the population mean
- The Formula is $SEM = SD/\sqrt{N}$
 - SD = Standard Deviation
 - N = sample size
- As SD goes down or N goes up, SEM gets smaller (meaning the estimate gets better)

Partial

Complete inventory of <u>part</u> of town

Specific Problem

How many ash trees?

Windshield

Drive-By Arboriculture





Specific Problem...

Emerald Ash Borer

- Complete a simple, specific problem inventory
- Identify the location and diameter of all ash trees (by genus)
- Use i-Tree default diameter classes

POSSIBILITIES...







Specific problem issues



Condition Assessment



Public Private All					
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Main Report					
G4 4 1 0		CD-LP-T	1	1	
Structural (woody) Conditi	on of Public 1 ree	es by S	species	
10/20/2014					20
Constant	Condition	Tree Count Stee level	0/ - f	0/ - f D-1-1:-	
Species	Condition	Error	Species	Trees	
African sumac	Dead or Dving	0 (±0)	0.00	0.00	
	Poor	10 (±9)	3.85	0.04	
	Fair	80 (±32)	30.77	0.33	
	Good	169 (±59)	65.38	0.71	
	Total	259 (±85)	100.00	1.09	
Algarrobo europeo	Dead or Dying	0 (±0)	0.00	0.00	
	Poor	0 (±0)	0.00	0.00	
	Fair	0 (±0)	0.00	0.00	
	Good	20 (±13)	100.00	0.08	
	Total	20 (±13)	100.00	0.08	
Almendro	Dead or Dying	0 (±0)	0.00	0.00	
	Poor	10 (±9)	25.00	0.04	
	Fair	20 (±13)	50.00	0.08	
	Good	10 (±9)	25.00	0.04	
	Total	40 (±19)	100.00	0.17	
American sycamore	Dead or Dying	20 (±19)	14.29	0.08	
	Poor	30 (±28)	21.43	0.13	

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Uneven-aged: a stand with trees of three or more distinct age classes, either intimately mixed or in small groups.



Two-aged: a stand with trees of two distinct age classes separated in age by more than plus or minus 20% of the rotation age.

Relative Age Distribution



Even-aged: a stand composed of a single age class of trees in which the range of tree ages is usually plus or minus 20% of the rotation age.

www.nrs.fs.fed.us



Relative Age Distribution (Cornell University)



If you are planting trees regularly, the trend line should be relatively even, tapering off at the larger (older) sizes.



If your inventory shows few small diameter trees you may want to concentrate on planting new trees until size classes even off.



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Dopulation	Cumment	any of	Dubli	Tuon	2					
ropulation	Summ	ary of	rubli	c Trees	5					
10/20/2014										
10/20/2014										
			1	OBH Class	(in)					
Species	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42	Total Standard
3										Error
Broadleaf Deciduous I	arge (BDL))								
London planetree	507	597	1,253	358	60	70	20	0	20	2,884 (±465)
Chinese hackberry	149	209	189	229	318	249	80	0	0	1,422 (±295)
Hind walnut	109	139	50	30	0	20	159	179	129	815 (±525)
Honeylocust	20	10	40	269	209	10	0	0	0	557 (±191)
Modesto ash	10	0	0	0	90	159	90	30	0	378 (±141)
Hackberry	60	60	109	80	50	0	0	0	0	358 (±91)
Walnut	0	0	269	80	0	0	0	0	0	348 (±312)
Velvet ash	0	0	0	50	169	109	10	0	0	338 (±214)
California white oak	70	60	80	10	30	0	0	0	0	249 (±78)
BDL OTHER	269	129	249	269	60	80	50	10	10	1,124 (±202)
Total	1,193	1,203	2,238	1,372	985	696	408	219	159	8,473 (±840)
8 <u>4 - 18</u> 1923 - 1923 - 1929 - 12	20025 R-52	10.042	13	19						
Broadleaf Deciduous N	Medium (BI	DM)			12121	1.2	120		0.25	
Chinese pistache	457	507	418	308	30	0	0	0	0	1,720 (±330)
Tallowtree	50	99	358	457	199	10	0	0	0	1,173 (±366)
Callana and Das dfand	1.60	100	200	1.00	<u> </u>	<u> </u>	A	0	1.0	1 104(1277)

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