



ECO GUIDE TO Data Collection Options for Supplemental Analyses

There are supplemental analyses that you can include in your custom Eco project. Review the following descriptions and tables to help you decide which analyses are relevant to the goals of your project. Supplemental analyses will require you to collect specific data, specified in the tables below.

Energy (available for complete and plot-based sample inventories):

Trees located near buildings can affect the amount of energy used to heat or cool the structure by reducing air temperatures, blocking wind, and providing shade. If you would like to assess the effects your urban forest is having on energy consumption, you will need to collect information related to nearby buildings (i.e., distance and direction from trees). (Note: Energy effects are only calculated for residential buildings, maximum three stories high, within 60 feet of the tree(s)).

Because this model component is designed specifically for the U.S., its utility is limited in international applications. Some International users with energy modeling available will receive energy results that are based on the characteristics of the user-defined U.S. climate region, including emission factors, typical construction practices and building characteristics, and energy composition (i.e., type of and amount used). Therefore, results should be used with caution as they assume that the building types, energy use, and emission factors of the U.S. are the same as those internationally.

Avian Habitat (only available for plot-based sample inventories in the United States):

Eco estimates the suitability of an area to sustain the populations of nine different bird species based on the habitat features that relate to and influence the patterns of abundance for each species. These estimates are based on the species' range, local forest structure, and tree, shrub, and ground cover provided by the study area. To assess wildlife suitability, percent shrub cover and ground cover composition must be collected. Additional tree characteristics are highly recommended for better estimates.

Forecast (available for complete and plot-based sample inventories):

The Forecast model uses structural estimates generated by Eco along with growth and mortality rates to estimate what your urban forest composition and structure will look like in the future as well as future carbon sequestration, carbon storage, and pollution removal. Please see the guide to [Using the Forecast Model](#) for detailed information.

Shrubs (available for plot-based sample inventories):

Eco primarily analyzes the trees in your study area, but shrubs are another important resource and provide numerous benefits. If you would like to analyze the shrubs in your study area, you will need to collect information on the species, height, and cover of shrubs within the plots.

Plantable space (available for plot-based sample inventories):

If you would like to estimate the available planting space for your area, you will need to collect information on the fraction of each plot that is plantable.

Pests (IPED) (available for complete and plot-based sample inventories):

The i-Tree [Pest Detection Protocol](#) allows you to document signs and symptoms of tree pests and diseases as part of your Eco project. To complete this module, you will need to record information related to tree health in the field.

i-Tree Eco v6 COMPLETE INVENTORY PROJECT > Data Collection Options

Tree Information

Use this table to help guide your field data collection decisions: The Description column provides more information about each data variable. The extra model components shown in the right-hand columns require certain optional data to be collected. The optional data that must be collected for each extra model component are designated by an "x".			Energy	Pests (IPED)
Data Variables	Description			
Minimum required fields				
Species	Identify and record the species and genus names of each tree		REQUIRED	
DBH	Exact measurement or categories of the tree stem diameter at breast height for each tree		REQUIRED	
General site fields				
Tree address	Street address of tree or notes for locating trees in areas without street addresses			
Land use	Land use type in which tree is located			
Strata	Sub-units by which study area are divided for analysis (e.g., land use, neighborhood)			
Status	Status of tree as planted or self-seeded			
Street tree/non-street tree	Identify if tree is a street tree or not (Y/N)			
Map coordinates	Longitude and latitude of tree			
Public/private	The classification of each tree as city managed (public) or not (private)			
Tree detail fields				
Total tree height	Height from the ground to the top (alive or dead) of the tree			
Crown size	Live tree height	Height from the ground to the live top of the tree		
	Height to crown base	Height from the ground to the base of the live crown		
	Crown width	The width of the crown in two directions: north-south and east-west		
	Percent crown missing	Percent of the crown volume that is not occupied by branches and leaves		
Crown health	Dieback	Estimate of the percent of the crown that is composed of dead branches		
	Condition	Estimate of the condition of the crown recorded as 100 minus the percent of the crown composed of dieback (i.e., dead branches)		
Crown light exposure	Number of sides of the tree receiving sunlight from above (maximum of 5)			
Energy	Direction	Direction from tree to the closest part of the building	x	
	Distance	Shortest distance from tree to the closest part of the building	x	
Management fields				
Maintenance recommended	User defined general maintenance recommendations (e.g. routine prune) for the tree			
Maintenance task	User defined priority maintenance tasks (e.g., pest treatment) for the tree			
Sidewalk conflict	Extent of damage to sidewalks from nearby trees defined by user			
Utility conflict	User defined potential or existing conflicts between tree branches and overhead utility lines			
Pests (IPED)	Signs and symptoms of tree stress	Absence or presence of signs and symptoms of dieback, epicormic sprouts, wilted foliage, environmental stress, or human stress		x
	Signs and symptoms of foliage/twigs	Absence or presence of signs and symptoms of defoliation, discolored foliage, abnormal foliage, or insect signs and extent of foliage affected		x
	Signs and symptoms of branches/bole	Absence or presence of signs and symptoms of insects or diseases on the branches/bole and location of signs or symptoms		x
User Tree ID	User created tree identifier, can be alphanumeric & non-alphanumeric			

i-Tree Eco v6 PLOT-BASED SAMPLE PROJECT > Data Collection Options

Plot Information

Data Variables		Description	Shrubs	Plantable space	Avian Habitat	Grass/Herbaceous pollution removal
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Minimum required fields						
Percent measured		The amount of plot than can be accessed, measured, and/or included in this study				REQUIRED
Percent tree cover		The amount of the plot covered by tree canopy (in percent).				REQUIRED
General fields						
Land use	Actual land use	Land use type(s) that are seen in the field				
	Percent of plot	The amount of the plot area covered by each land use				
Percent shrub cover		The amount of the plot covered by shrub canopy (in percent)	x		x	
Percent plantable space		The amount of the plot area that is plantable for trees (i.e., plantable soil that is not under tree canopy or other overhead restrictions and where tree planting/establishment would not be prohibited due to land use, such as a baseball field)		x		
Plot address		Street address of plot or notes for locating plots in areas without street addresses				
Map coordinates		Longitude and latitude of plot center				
Reference objects	Object type	Visible landmark(s), such as a stop sign or permanent structure, that are seen when standing at plot center				
	Direction	The direction from the plot center to the reference object				
	Distance	The distance from the plot center to the reference object				
	DBH	Stem diameter measured at breast height (DBH) if the reference object is a tree				
Ground cover	Ground cover	Ground cover type(s) that are seen in the field			x	x
	Percent of plot	The amount of the plot area covered by each ground cover			x	x
Shrub details	Species	Name of shrub species	x			
	Height	Average height of shrub group (i.e., mass of shrubs of the same species)	x			
	Percent of area	The amount of the shrub area in the plot covered by each shrub group	x			
	Percent missing	The percent of the shrub group volume that is missing (i.e., not occupied by leaves)	x			

Tree Information

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Data Variables	Description			
Minimum required fields				
Species	Identify and record the species and genus names of each tree		REQUIRED	
DBH	Exact measurement or categories of the tree stem diameter at breast height for each tree		REQUIRED	
General site fields				
Land use	Land use type in which tree is located			
Status	Status of tree as planted or self-seeded			
Distance to plot center	The distance from the tree to plot center			
Direction to plot center	The direction from the tree to plot center			
Street tree/non-street tree	Identify if tree is a street tree or not (Y/N)			
Public/private	The classification of each tree as city managed (public) or not (private)			
Cover under canopy	Percent impervious	The percent of the area beneath the drip line of the tree that is impervious		
	Percent shrub	The percent of the area beneath the drip line of the tree that is shrub		
Tree detail fields				
Total tree height	Height from the ground to the top (alive or dead) of the tree			
Crown size	Live tree height	Height from the ground to the live top of the tree		
	Height to crown base	Height from the ground to the base of the live crown		
	Crown width	The width of the crown in two directions: north-south and east-west		
	Percent crown missing	Percent of the crown volume that is not occupied by branches and leaves		
Crown health	Dieback	Estimate of the percent of the crown that is composed of dead branches		
	Condition	Estimate of the condition of the crown recorded as 100 minus the percent of the crown composed of dieback (i.e., dead branches)		
Crown light exposure	Number of sides of the tree receiving sunlight from above (maximum of 5)			
Energy	Direction	Direction from tree to the closest part of the building	x	
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Management fields				
Maintenance recommended	User defined general maintenance recommendations (e.g. routine prune) for the tree			
Maintenance task	User defined priority maintenance tasks (e.g., pest treatment) for the tree			
Sidewalk conflict	Extent of damage to sidewalks from nearby trees defined by user			
Utility conflict	User defined potential or existing conflicts between tree branches and overhead utility lines			

Tree Information (plot based sample project) (continued). Use this table to help guide your field data collection decisions: The Description column provides more information about each data variable. The extra model components shown in the right-hand columns require certain optional data to be collected. The optional data that must be collected for each extra model component are designated by an "x".			Energy	Pests (IPED)
Data Variables	Description			
Management fields (continued)				
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	Signs and symptoms of foliage/twigs	Absence or presence of signs and symptoms of defoliation, discolored foliage, abnormal foliage, or insect signs and extent of foliage affected		x
	Signs and symptoms of branches/bole	Absence or presence of signs and symptoms of insects or diseases on the branches/bole and location of signs or symptoms		x
User Tree ID	User created tree identifier, can be alphanumeric & non-alphanumeric			