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ASSESSING THE BENEFITS AND ECONOMIC VALUES OF TREES

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Introduction

Understanding the environmental, economic, and social/community benefits of nature, in particular trees and forests, can lead to better vegetation management and designs to optimize environmental quality and human health for current and future generations. Computer models have been developed to assess forest composition and its associated effects on environmental quality and human health. While research is still needed regarding many of the environmental services that trees provide, resource managers can utilize existing models to better understand the role of vegetation in improving human health and environmental quality, lower costs of maintenance, and increase resource stewardship as an effective means to provide substantial economic savings to society.

Understanding the myriad of potential services and costs associated with forests are critical to estimating net benefits of vegetation and for guiding appropriate vegetation management plans. However, while many of the ecosystem services and costs of vegetation cannot be adequately quantified or valued at this time, it is important to understand within decision-making processes that these services or costs do exist. Discounting nature or vegetation as having no value leads to uninformed decisions regarding nature (e.g. Costanza et al., 1998). Quantifying or understanding monetary and non-monetary values of nature in a given context, though difficult, will lead to more informed environmental and economic decisions.

Trees provide numerous economic and ecosystem services that produce benefits to a community, but also incur various economic or environmental costs. Through proper planning, design, and management, trees can improve human health and well-being in urban areas by moderating climate, reducing building energy use and atmospheric carbon dioxide (CO₂), improving air quality, providing an aesthetic environment and recreational opportunities, mitigating rainfall runoff and flooding, lowering noise levels and producing other social/environmental services. However, inappropriate landscape designs, tree selection, and tree maintenance can increase environmental costs such as pollen production, chemical emissions from trees and maintenance activities that contribute to air pollution, and can also increase building energy use, waste disposal, infrastructure repair, and water

consumption. These potential costs must be weighed against the environmental benefits in developing natural resource management programmes.

Specific attributes of the vegetation resource structure such as abundance, size, species, health and location affect the amount of services and costs provided by vegetation. Many of the services and costs provided by vegetation and their management affect human health. Thus, designing nature and management to maximize these benefits and minimize the costs can help improve human health.

There are four main steps needed to quantify ecosystem services and values from forests:

- 1 Quantify the forest structural attributes that provide the service for the area of interest (e.g. number of trees, tree cover). These structural data are essential as they quantify the resource attributes that provide the services.
- 2 Quantify how the structure influences the ecosystem service (e.g. tree density, tree sizes, and forest species composition are significant drivers for estimating carbon storage).
- 3 Quantify the impact of the ecosystem service. In many cases, it is not the service itself that is important, rather the impact that the service has on human health or other attributes of the environment that provide value to society.
- 4 Quantify the economic value of the impact provided by the ecosystem service.

There is an interdependence between forest structure and ecosystem services and values as valuation is dependent upon good estimates of the magnitude of the service provided, and the service estimates are dependent upon good estimates of forest structure and how structure affects services. The key starting point to valuing services provided by forests is quality data on forest structure. Services and values cannot be adequately valued without good forest data. Combining accurate forest data with sound procedures to quantifying ecosystem services will lead to reliable estimates of the magnitude of ecosystem services provided by the forest. Finally, with sound estimates of forest ecosystem services, values of the services can be estimated using valid economic estimates and procedures. Thus three critical elements in sequence are needed to value forest ecosystem services: structure → services → values. Errors with precursor elements will lead to errors in subsequent estimates (e.g. errors in forest structure will lead to errors in estimating services and valuation). All current estimates and means of estimation can be improved to varying degrees.

Assessing forest structure

Structure is a key variable as that is what managers manipulate to influence forest services and values. Managers often choose what species to plant, where and when to plant it, and what trees are removed from the landscape. These actions directly influence forest structure and consequently the values derived from the forest.

While managers make these structural decisions, it is important to understand that nature often has a more substantial influence on urban forest structure and that management decisions that affect these natural interactions will influence structure. Natural influences include natural regeneration, climate, insects and diseases, invasive tendency of various species, etc. Management decisions to allow regeneration (e.g. limiting mowing) and regarding species selections, which have varying susceptibilities to insects and climate, and varying invasive characteristics, will influence forest structure. In the United States, it is estimated that two-thirds of the existing urban forest is from natural regeneration (Nowak, 2012a). However, the influence of tree planting tends to increase in cities in grassland and desert areas, more densely populated cities, and on land uses that are highly managed in relation to trees (e.g. residential lands).

There are two basic means to quantify urban forest structure:

- 1 top-down aerial-based approaches; or
- 2 bottom-up ground-based assessments.

Top-down assessments provide basic metrics on tree and other cover types (e.g. percentage tree cover) and can include specific locations of these cover elements when maps are produced. Tree cover can often be estimated by interpreting aerial photographs or by developing tree cover maps using moderate to high resolution imagery (e.g. Nowak, 2012b). If just the amount or percentage tree cover is needed, photo-interpretation provides the most cost-effective and accurate means of assessing tree and other cover attributes, but lacks specific cover location information. If tree and other cover locations are needed, tree cover maps can provide both tree cover estimates and specific locations of cover elements (e.g. to be integrated within Geographic Information Systems). Tree cover and distribution are important elements of urban forest structure as they provide a simple means to convey the magnitude and distribution of the forest resource. However, more detailed data are often needed on forest structure to assess ecosystem services and values, and to help guide forest management (e.g. species composition, number of trees, tree sizes, tree condition, leaf area, leaf biomass, tree biomass). To obtain these more detailed forest structural data, field measurements are often required.

In assessing the structure of the urban forest, there are various steps that should be followed:

- 1 *Delimit the study area.* The first step is to bound the region of analysis – in what area do you want to assess the forest services and values? This area could be any size (e.g. backyard, park, city boundary), but the area or tree population must be delimited.
- 2 *Inventory or sample?* After the area or tree population is delimited, the next question on assessing structure is: are all trees in the area to be measured (inventory) or only a small proportion of the total population sampled. Inventories have the advantage of increased precision as all trees are measured and are useful for individual tree management (e.g. street tree population), but inventories have higher costs and are often inefficient for large tree populations. Sampling of large tree populations provide population information at a more reasonable cost, but lack the comprehensive individual tree information that is useful for individual tree management. Sampling is more useful for population management that is not focused on every individual tree.
- 3 *What services or values do you want to quantify?* There are several variables that can be measured on individual trees or forests, with each variable used to quantify specific services and values. As each variable adds additional cost to the assessment of structure, variable selection is critical to meet the specific needs for the inventory or sample and reduce assessment costs. Often most of the cost of measurement is getting to the trees, but extraneous measured tree variables will add cost with no benefit (e.g. if effects on building energy use are not desired, measuring variables specific to energy conservation estimates are not needed).
- 4 *Select tree and/or plot variables to be measured.* There are numerous variables that can be measured on trees. The core variables are typically tree species, diameter at breast height (dbh – diameter at 1.37 m), crown variables and tree condition. Other variables can be measured depending upon needs, including tree damage, maintenance needs, risk, etc.
- 5 *Collect field data and assess services and values.* Once field (e.g. species, number of trees, tree size) or aerial data are collected, various ecosystem services and values can be quantified using various tools. This process will be described in the section on modelling urban

forest ecosystem services and values. Field data collection procedures are detailed in another chapter.

While various aerial-based approaches are being researched and developed to derive specific tree information, the current best methods to derive many of the tree variables are field measurements. While future technologies may allow complete assessments using remote sensing technologies, many variables are currently measured more accurately from ground-based assessments. Some measurements of tree attributes (e.g. tree cover, leaf area) may be more accurately assessed using aerial images, but some key tree variables (e.g. species, condition) are often more accurately collected using field measurements. More research is needed to adequately and cost-effectively estimate these variables using aerial platforms. At the individual tree scale, field measurements are the best means to assess tree variables. For large tree populations, field data in conjunction with aerial based assessments will likely provide the best and most cost-effective means to assess forest structure. In urban forestry, field measurements are particularly important, as not only do they provide data, but they put the manager in the field where citizens reside. Interactions between urban foresters and citizens are critical for proper urban forest management.

Focusing on tree variables that are measured in the field, the most important variables are tree species, diameter, crown dimensions, and condition. This information is helpful to managers regarding population management, but is also essential for estimating ecosystem services. With regards to most services, the most important tree attribute is leaf area. While not directly measured in the field, this variable can be directly estimated from species, crown and condition information. In addition, several aerial-based methods can be used to estimate overall leaf area, but are typically not done to the species level. Diameter measures are also essential for estimating carbon storage. Leaf and tree biomass are other important variables that can be estimated from the core tree variables. Other information that is important for estimating ecosystem services is crown competition (important for tree growth estimation and carbon sequestration) and location around buildings (important for energy conservation). Numerous ecosystem effects and values can currently be estimated from these tree variables, along with information on local cover types and other local information (e.g. weather, pollution concentrations, population data). In addition to variables needed to assess ecosystem services from trees, other variables can also be collected to aid in urban forest management (e.g. soils data, risk assessments, maintenance needs) or assessing ecosystem services from other vegetation types (e.g. grass and shrub cover).

As urban forests can provide numerous services and disservices, it is important to understand how urban forest structure affects these various services and values.

Quantifying urban forest benefits and disbenefits

As detailed in separate chapters of this handbook (see especially Chapter 13), there are numerous benefits and disbenefits/costs (or disservices) associated with urban vegetation. In general, the costs are easier to quantify as many of these are direct costs borne by the land manager. These costs include planting, pruning, maintenance, tree removal, property repair (e.g. lifted sidewalks, damage from falling branches, clogged drains), injuries from vegetation, damage from forest fires, and leaf raking. Often these costs are known and can be quantified by the land manager. However, there are other costs incurred by the land manager or society that are often not directly paid for in managing vegetation. These disbenefits include costs associated with allergies from tree pollen, emission of plant volatile organic compounds

(VOCs) that can lead to the formation of ozone, carbon monoxide and particulate air pollutants, trees limiting pollutant dispersion near polluted roadways, increases in winter building energy use due to tree shade, invasive plant altering local biodiversity, increased tax rates due to increased property values, water use in arid regions and increased fear of crime (e.g. Brasseur and Chatfield, 1991; Gromke and Ruck, 2009; Tallamy and Shropshire, 2009; Carinanos et al., 2014). Although the list of these disbenefits is smaller than the list of potential benefits, these disbenefits need to be understood and quantified to help minimize these negative attributes of vegetation. Many of these disbenefits have been or are currently being input into modelling/management systems to quantify these disservices based on measured field data (e.g. pollen, VOC emissions, winter energy effects, invasive species).

In addition to the costs and disservices of vegetation, there are a myriad of services and values derived from vegetation. Unlike most costs, many of these beneficial services do not directly affect the cash balance of land managers (i.e. they do not directly pay the land manager like the manager directly pays for costs). Rather, these services indirectly save the land owner money or provide services that affect the health and well-being of the land owner and surrounding residents, and have a monetary value to the land owner and to society at large.

The Millennium Ecosystem Assessment (Hassan et al., 2005) describes four categories of ecosystem services:

- 1 supporting (e.g. nutrient cycling, primary production);
- 2 provisioning (e.g. food, fuel);
- 3 regulating (e.g. climate regulation, water purification); and
- 4 cultural (e.g. aesthetic, spiritual).

Many of these services are described in other chapters, with many services not able to be easily quantified from data on urban forest structure (e.g. tourism, recreation, aesthetics, social and physiological benefits, noise reduction). While science continues to advance in understanding and quantifying the relationships between forest structure and many of these services, several of these services can be currently quantified based on local urban forest, environmental and human population data. These services include tree effects on:

- *Air temperature.* By transpiring water through leaves and shading surfaces, trees reduce air temperatures. Reduced air temperatures can have a direct impact on human health (e.g. Martens, 1998) and can also reduce pollutant emissions from various sources (e.g. power plants) (Nowak et al., in review), which will consequently affect human health. Models have been developed to estimate urban tree effects on air temperature (e.g. Yang et al., 2013; Heisler et al., 2016) and illustrate that doubling tree cover in Baltimore, MD, would reduce daily temperature by 0.35°C (± 0.02) (Ellis, 2009).
- *Pollution removal.* Vegetation directly removes air pollution through leaf stomata (Nowak et al., 2014) or intercepting particles on plant surfaces (Nowak et al., 2013b). Woody plants also sequester and store carbon in their biomass, reducing levels of the greenhouse gas carbon dioxide (Nowak et al., 2013a). They also emit oxygen (Nowak et al., 2007). Models have been developed to estimate these effects and show that in the United States, urban forests remove 651,000 metric tons (tonnes) of air pollution in 2010, store 643 million tonnes of carbon, annually sequester 25.6 million tonnes of carbon and annually produce 61 million tonnes of oxygen.
- *Building energy use.* Trees near buildings alter building energy use by cooling air temperatures, blocking winds and shading building surfaces (Heisler, 1986). Energy use

- is decreased during the summer season, but depending on location and species, can be increased or decreased during the winter season due to altering wind speeds and solar access around buildings. Changes in energy use will consequently alter pollutant and greenhouse gas emissions from power plants and thus air quality and human health. Procedures have been developed to estimate urban forest effects on building energy use (e.g. McPherson and Simpson, 1999) and reveal energy savings of 38.8 million Mwh and 246 million MMBtus in urban/community areas of the United States, which equates to a 7.2 per cent reduction in building energy use (Nowak et al., in review).
- *Water cycles and quality.* Through intercepting rainfall, absorbing soil moisture and chemicals, transpiring water, and increasing soil infiltration, tree and forests can reduce storm water runoff and improve water quality. These hydrologic effects can reduce risk to flooding and improve human health related to sediments, chemicals and pathogens found with waterways. Various hydrologic models exist to estimate the effect of trees or land cover on stream flow (e.g. Bicknell et al., 1997; Tague and Band, 2004; Wang et al., 2008).
 - *Ultraviolet radiation.* Tree leaves absorb 90–95 per cent of ultraviolet (UV) radiation and thereby affect the amount of UV radiation received by people under or near tree canopies (Na et al., 2014). This reduction in UV exposure affects incidence of skin cancer, cataracts and other ailments related to UV radiation exposure (Heisler and Grant, 2000).
 - *Wildlife populations.* Tree species composition and structure directly affect wildlife habitat and local biodiversity. Various procedures estimate the relationship between local forest structure and wildlife species habitat suitability and insect biodiversity (Tallamy and Shropshire, 2009; Lerman et al., 2014).

Trees affect many other attributes of the physical and social environment in cities, many of which remain to be quantified at the local site scale through the regional scale. Understanding the effects of trees at both of these scales is important in terms of developing vegetation policies and specific landscape designs. For example, while trees reduce overall pollution concentration in cities through pollution removal, at the local scale pollution concentrations may be increased or decreased more than city wide estimates depending upon local vegetation designs (e.g. Gromke and Ruck, 2009; Nowak et al., 2014). Once the magnitude of a service is quantified, the next step, if so desired, is to convert the service to a monetary value.

Estimating the economic values of ecosystem services

Once the ecosystem services are quantified, various methods of market as well as non-market valuation can be applied to characterize their monetary value. Some valuing procedures use direct market costs. For example, for altered building energy use, the local cost of electricity (USD/kWh) and heating fuels (USD/MBTU) can be applied to changes in energy use due to local vegetation. For other ecosystem services, proxy values often need to be used as many of the services derived from trees are not accounted for in the cost of a market transaction. That is, many forest benefits produce externalities. An externality arises whenever the actions of one party either positively or negatively affect another party, but the first party neither bears the costs nor receives the benefits. Externalities are not reflected in the market price of goods and services. A classic example of a negative externality is air pollution, where the associated health costs are paid by society and not the producer of the pollutant. Trees often produce positive externalities (e.g. cleaner air). There are various ways to estimate externality costs including general systems analysis, the social fabric matrix, direct cost, contingent valuation, travel cost, and the property approach (Hayden, 1989).

In urban forestry, various methods of valuation have been used depending on the service or value being estimated. For air pollution removal, common methods include health care costs and externality values (Nowak et al., 2014), for carbon storage and sequestration – the social cost of carbon (Nowak et al., 2013a), for energy effects – utility costs (Nowak et al., in review), for water values – storm water control or treatment costs (e.g. Peper et al., 2009), and for structural values – tree appraisal methods (e.g. Nowak et al., 2002). Many services remain to be quantified and valued.

These values can vary locally depending on local forest structure and its impact. Nationally, these values can be in the billions of dollars annually. In the United States, it is estimated that the annual values of urban forests is 4.7 billion USD from energy conservation and 2.3 billion USD from avoided pollutant emissions (Nowak et al., in review), 4.7 billion USD from air pollution removal (Nowak et al., 2014), 2 billion USD from carbon sequestration (Nowak et al., 2013a) and is negligible for oxygen production (Nowak et al., 2007). While annual service values are on the order of billions of dollars per year in the United States, the structural asset value of US urban forests is in the trillions of dollars (Nowak et al., 2002).

By understanding how vegetation affects numerous services, values and costs, better decisions can be made relating to landscape management to improve environmental quality and human health. To this end, tools can be used that incorporate local data to estimate ecosystem services and its economic value to help guide management and sustain optimal vegetation structure through time.

Modelling urban forest ecosystem services and values

There are various models that quantify ecosystem services. Some free models include InVEST (Natural Capital Project, 2016), Biome-BGC (Numerical Terradynamic Simulation Group, 2016) and numerous tools to assess forest carbon (e.g. US Forest Service, 2016). To date, the most comprehensive model developed to quantify urban forest structure, ecosystem services and values is i-Tree (www.itreetools.org). This free suite of tools was developed by the U.S. Forest Service through a public-private partnership. The model has and can be used globally with over 125,000 users in over 120 countries, but tools vary in their ease-of-use and functionality globally. i-Tree was designed to accurately assess local vegetation composition and structure and its impacts on numerous ecosystem services and values (Table 11.1). The model focuses on estimating forest structure and the magnitude of services received (e.g. tonnes removed). It then relies on economic valuation (e.g. \$/tonne removed) to estimate a value of the service. These values can vary depending upon how the receivers of the benefits (e.g. humans) are distributed across the landscape relative to the trees. i-Tree tools can also be used to target tree species and locations to sustain or enhance ecosystem services and human health. Threats to trees and associated services can also be assessed.

The core program is i-Tree Eco – this model uses sample or inventory data to assess forest structure, ecosystem services and values for any tree population (including number of trees, diameter distribution, species diversity, potential pest risk, invasive species, air pollution removal and health effects, carbon storage and sequestration, runoff reduction, VOC emissions, building energy effects) (Nowak et al., 2008). It runs on local field data and hourly meteorological and pollution data. The program includes plot selection programs, data entry programs or mobile application data entry, table and graphic reporting and exporting, and automatic report generation. Not all ecosystem services are, or can be, evaluated due to scientific limitations. However, this model was created as a continuously developing platform to incorporate newly available science on vegetation services. This tool can be used globally if users provide local

geographic data, but is currently set to easily run in the United States, Canada, Australia and the United Kingdom (i.e. required city and environmental data are preloaded).

Other tools in i-Tree include:

- *i-Tree Forecast* uses tree data from i-Tree Eco to simulate future tree population totals, canopy cover, tree diversity, dbh distribution and ecosystem services and values by species based on user-defined planting rates and default or user-defined mortality rates (e.g. user can simulate effect of emerald ash borer by specifically killing off ash trees).
- *i-Tree Streets* is similar to Eco, but focuses on street tree populations. The program is only designed to work in the United States.
- *i-Tree Species* is a free-standing utility designed to help users select the most appropriate tree species based on desired environmental functions and geographic area. Tree species are mainly temperate tree species.
- *i-Tree Storm* helps assess widespread street tree damage in a simple and efficient manner immediately after a severe storm. It is adaptable to various community types and sizes and provides information on the time and funds needed to mitigate storm damage.
- *i-Tree Hydro* is designed to simulate the effects of changes in tree and impervious cover within a watershed on hourly stream flow and water quality. It contains auto-calibration routines to help match model estimates with measured hourly stream flow and produces tables and graphs of changes in flow and water quality due to changes in tree and impervious cover within the watershed. This tool can be used globally where gauged stream data exist.
- *i-Tree Canopy* allows users to easily photo-interpret Google aerial images of their area to produce statistical estimates of tree and other cover types along with calculations of the uncertainty of their estimates. This tool provides a simple, quick and inexpensive means for cities and forest managers to accurately estimate their tree and other cover types. i-Tree Canopy can be used anywhere in the world where high-resolution, cloud-free Google images exist (most urban areas). Use of historical imagery can also be used to aid in change analyses. From US cover data, users can also estimate pollution removal and carbon storage/sequestration amounts and values.
- *i-Tree Design* links to Google maps and allows users to outline their home and see how the trees around their home affect energy use and savings, and provide other environmental services. Users can use this tool to assess which locations and tree species will provide the highest level of benefits. This is a simple tool geared toward homeowners, school children or anyone interested in tree benefits. This program allows users to add multiple trees, illustrate future and past benefits, and display priority planting zones around buildings to conserve energy use. i-Tree Design is currently set to work in the United States and Canada.
- *i-Tree Landscape* is a web-based tool that allows users to explore tree canopy, land cover, and basic demographic information anywhere in the conterminous US. With the information provided by i-Tree Landscape, users can learn about their location (e.g. tree and impervious cover, population statistics), the benefits of trees (carbon storage, air pollution removal, reduced runoff) in their area, and map areas in which to prioritize their tree planting and protection efforts.

While some of these tools are currently limited in the global context due the requirement for tree cover maps (i.e. Landscape) or national processing of environmental data (i.e. Design), these tools are continuously updated with new features and can be developed

to work globally. Many new ecosystem services are currently being added to the model, including tree effects on air temperature (Yang et al., 2013), ultraviolet radiation (Na et al., 2014), wildlife habitat (Lerman et al., 2014), pollen and human comfort (Table 11.1). New features are also in development including mobile apps, a web-based global importer

Table 11.1 Ecosystem effects of trees currently quantified and in development in i-Tree. Many of the listed ecosystem effects are both positive and negative depending on specific conditions or perspective. For example, trees can increase or decrease energy use depending upon location; pollen can be positive in terms of food production or negative in terms of allergies depending upon species

<i>Ecosystem effect</i>	<i>Attribute</i>	<i>Quantified</i>	<i>Valued</i>
Atmosphere	Air temperature	○	○
	Avoided emissions	●	●
	Building energy use	●	●
	Carbon sequestration	●	●
	Carbon storage	●	●
	Human comfort	○	
	Pollen	○	
	Pollution removal	●	●
	Transpiration	●	
	UV radiation	●	○
	VOC emissions	●	
Community/Social	Aesthetics / property value	○	○
	Food / medicine	○	
	Health Index ¹	○	
	Forest products ²	○	○
	Underserved areas	●	
Terrestrial	Biodiversity	○	
	Invasive plants	●	
	Nutrient cycling	○	
	Wildlife habitat	●	
Water	Avoided runoff	●	●
	Flooding	○	○
	Rainfall interception	●	
	Water quality	●	○

● Attribute currently quantified or valued in i-Tree.

○ Attribute in development in i-Tree.

¹ Developing a health index based on mapping of green viewing ('forest bathing').

² Estimating product potential based on forest structure (e.g. timber, wood pellets, ethanol).

of species and city data to aid international users in operating i-Tree Eco, climate change projections, green infrastructure impacts (e.g. rain gardens, retention ponds) on water flows and water quality in i-Tree Hydro, automatic assessment of change between remeasured field data sets, new species in i-Tree Species to aid in selecting appropriate species, and new map layers and querying abilities in i-Tree Landscape.

i-Tree is built based on a collaborative effort among numerous partners to better understand and quantify how changes in forest structure will affect ecosystem services and values. Some of the goals of the program are to (a) provide global standards for data collection and analyses, (b) aid managers in optimizing ecosystem services from their forest for current and future generations, (c) better understand risks to forest and human health, and (d) integrate multiple ecosystem services and values to allow users to see trade-offs among various services based on proposed or actual changes to forest structure (e.g. designs to improve water quality may reduce wildlife habitat or also enhance air quality). Through a better understanding of how forest structure affects numerous services, better management strategies can be designed to maximize benefits and minimize costs associated with forests and their impacts on environmental quality and human health and well-being.

Conclusion

By understanding and accounting for the ecosystem services provided by trees, better planning, design and economic decisions can be made toward utilizing trees as a means to improve environmental quality and human health and well-being. A key to this improvement is data on urban forest structure and how structure (i.e. species composition, tree locations) affects services and values. i-Tree tools offer a means to assess and value the impact of trees and forests from the local parcel level to a regional landscape scale for several key ecosystem services. While more research is needed regarding several ecosystem services and costs, and associated impacts on human health and well-being, landscape management plans and designs that better incorporate the impacts of vegetation could lower costs and improve human health and environmental quality, and thereby provide substantial economic savings to society.

Acknowledgements

The use of trade names in this chapter is for the information and convenience of the reader. Such does not constitute an official endorsement or approval by the United States Department of Agriculture or Forest Service of any product or service to the exclusion of others that may be suitable.

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