



IOWA DEPARTMENT OF NATURAL RESOURCES

COMMUNITY BENEFITS FROM PUBLIC TREES IN IOWA



TREES AND FORESTS MAKE IOWA COMMUNITIES STRONGER

If properly cared for, trees provide a wide variety of benefits to people, communities and the economy.
An investment in our trees is an investment in our future.

WASTEWATER TREATMENT:

- Urban forest can reduce annual stormwater runoff by 2 to 7 percent, and a mature tree can store 50 to 100 gallons of water during large storms.
- When a city uses green infrastructure practices in its sewage and water department, combined sewer overflow volumes can be reduced by 10 to 20 percent.
- In a small California city each urban tree could reduce stormwater runoff by 845 gallons annually, with a benefit valued at \$7 per tree.

STREETS DEPARTMENT:

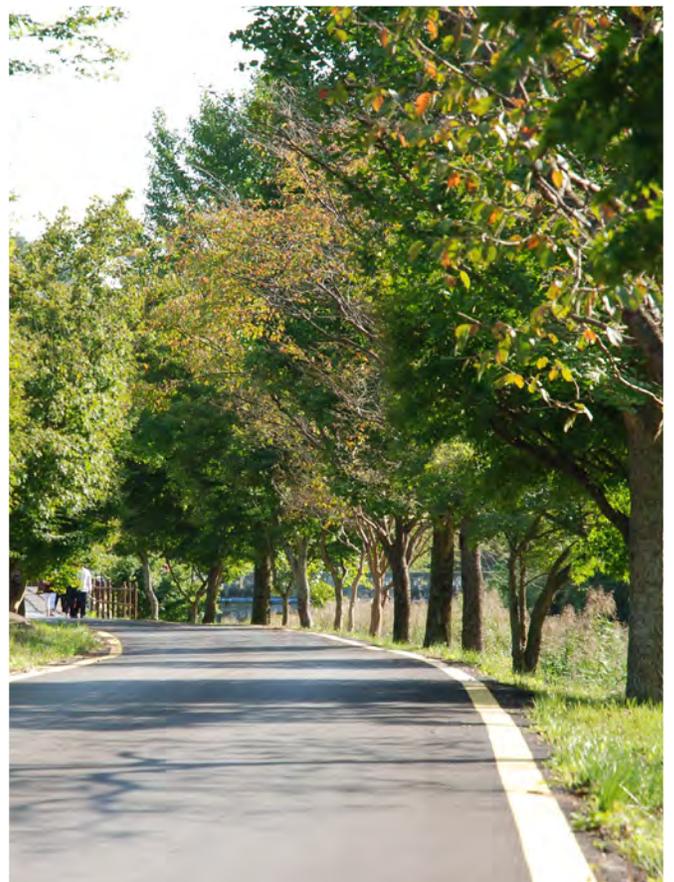
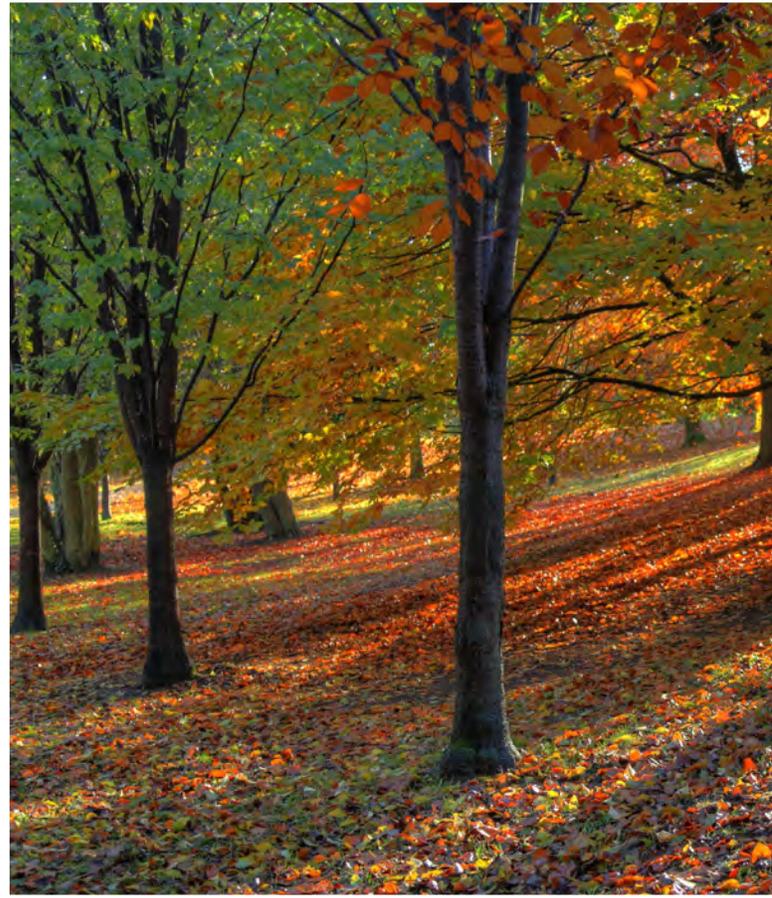
- Tree shade has shown to reduce pavement fatigue, cracking, rutting, shoving and other distress, saving on repair costs.
- Street trees prolong the life of pavement. Shaded roads can save up to 60% of repaving costs. That is a lot of savings, considering the four million miles of roadways in the U.S.
- Street trees help extend the life of expensive asphalt by 40 to 60 percent by reducing daily heating and cooling of roads.

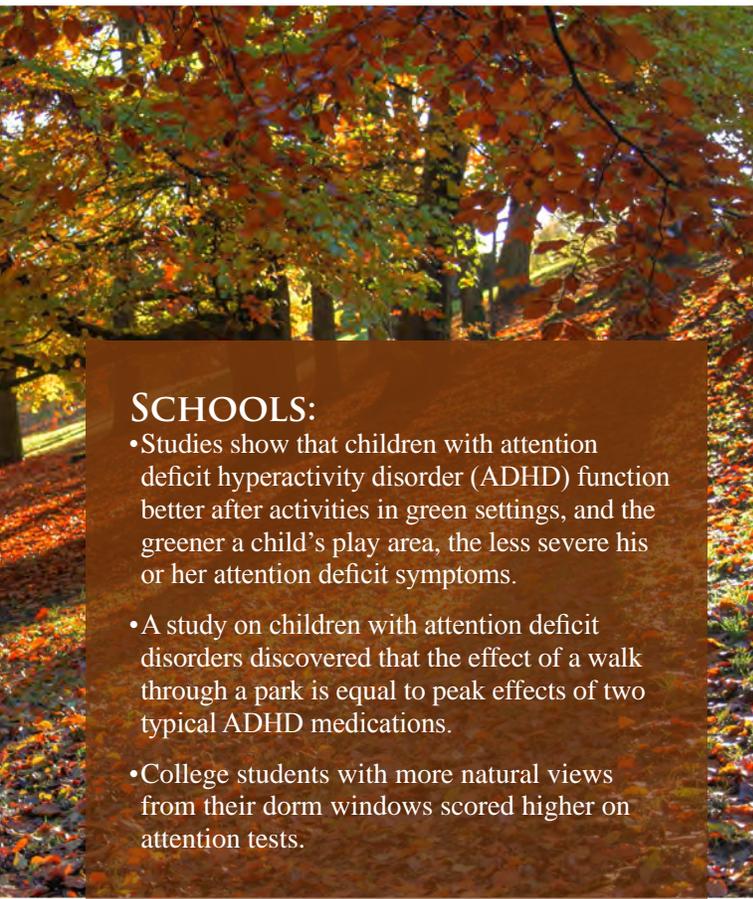
ECONOMIC DEVELOPMENT:

- Shoppers will travel further and longer to visit a district with high quality trees, and spend more time there once they arrive.
- Visitors to well-treed central business districts will spend 9 to 12 percent more for products.
- A 7 percent higher rental rate for commercial offices having high quality landscapes.

HEALTH DEPARTMENT:

- Researchers from Columbia University found the highest rates of childhood asthma in parts of the city where tree density was lowest. The rate of asthma fell by 25 percent for every extra 340 trees per square kilometer, a pattern that held true even after taking into account differing sources of pollution, levels of affluence and population density.
- Pregnant woman's proximity to green space has been shown to be related to an increase in the baby's birthweight.
- Residents of areas with the highest levels of greenery were three times as likely to be physically active and 40 percent less likely to be overweight or obese than residents living in the least green settings.
- Patients recovering from surgery in hospital rooms with window views of natural scenes had shorter post-operative hospital stays, received fewer negative evaluations in nurses' notes, and took fewer potent analgesics than matched patients in similar rooms with windows facing a brick wall.





SCHOOLS:

- Studies show that children with attention deficit hyperactivity disorder (ADHD) function better after activities in green settings, and the greener a child's play area, the less severe his or her attention deficit symptoms.
- A study on children with attention deficit disorders discovered that the effect of a walk through a park is equal to peak effects of two typical ADHD medications.
- College students with more natural views from their dorm windows scored higher on attention tests.

PARKS AND RECREATION:

- Park users report lower levels of anxiety and sadness after visiting parks.
- Mental well-being improves from exercising outdoors compared to exercising indoors. Exercising in natural environments is associated with greater feelings of revitalization and positive engagement, decreases in tension, confusion, anger and depression, and increased energy.
- Children and youth living in greener neighborhoods have lower body mass index.



PLANNING:

- Planting big enough trees and earth berms can cut traffic noise by up to half.
- Trees improve driving safety. One study found a 46 percent decrease in crash rates across urban arterial and highway sites after landscape improvements were installed.
- The presence of trees in a suburban landscape significantly reduced the cruising speed of drivers by an average of 3 miles per hour. Faster drivers and slower drivers both drove slower with the presence of trees.
- Tree planting is one of the most cost-effective means of mitigating urban heat islands. Air temperature differences of approximately 4-6 degrees F have been observed across urban areas having variable tree cover, with a nearly 2 degrees F of temperature difference being associated with 10 percent canopy cover difference.

CITY ADMINISTRATOR:

- Trees create stronger communities. In buildings near trees, people report significantly better relations with their neighbors. People report a stronger feeling of unity and cohesion with their neighbors; they like where they are living more and they feel safer than residents who have few trees around them.
- For every dollar spent on tree planting and maintenance, the city of Providence, Rhode Island reaps \$3.33 in benefits.



CITY COUNCIL

A remarkable five-year study of senior citizens in Japan found that readily available space for taking walks and the presence of parks and tree-lined streets near the residence significantly predicted higher survival rates. Living in areas with walkable greenspaces positively influenced the longevity of urban senior citizens independent of their age, sex, marital status, baseline functional status, and socioeconomic status.



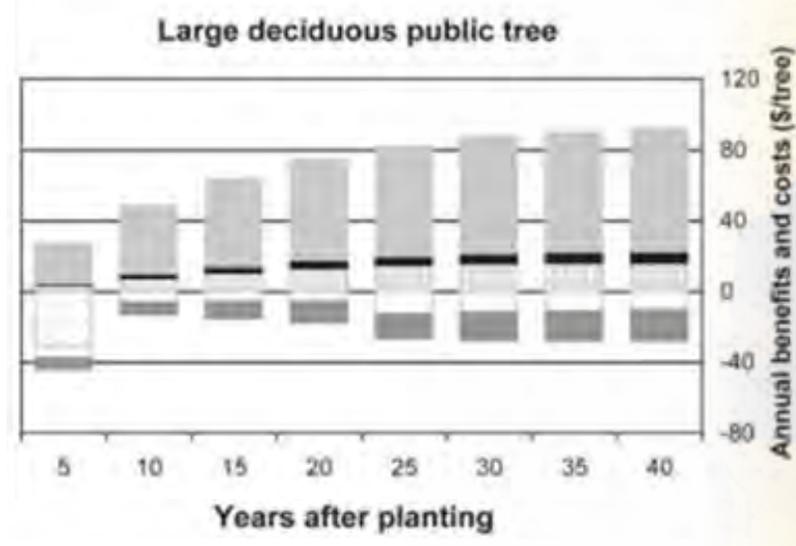
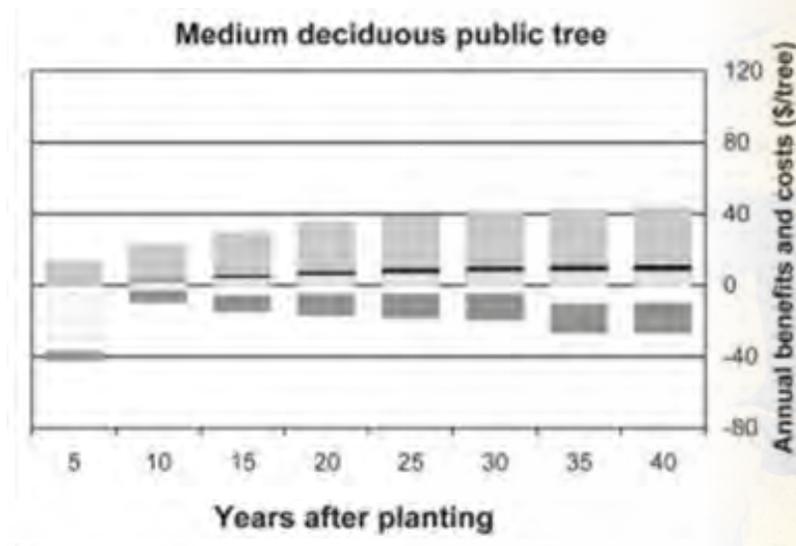
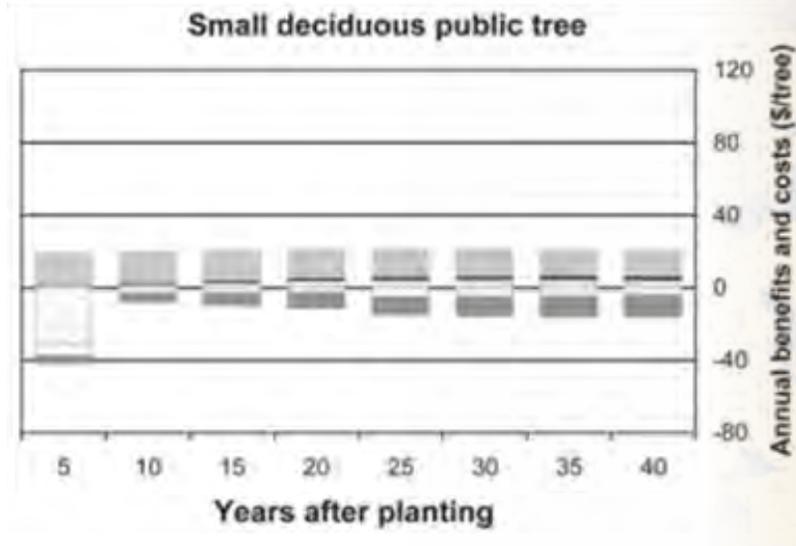
- Researchers are finding signs of stronger communities where there are trees. In buildings near trees, people report significantly better relations with their neighbors. People report a stronger feeling of unity and cohesion with their neighbors; they like where they are living more and they feel safer than residents who have few trees around them.

POLICE

- Public housing residents with nearby trees and natural landscapes reported 25 percent fewer acts of domestic aggression and violence.
- There is less graffiti, vandalism and littering in outdoor spaces with natural landscapes than in comparable plant-less spaces.
- Apartment buildings with high levels of greenery had 52 percent fewer crimes than those without any trees. Buildings with medium amounts of greenery had 42 percent fewer crimes.

HUMAN RESOURCES

- Workers without nature views from their desks claimed 23 percent more sick days than workers with views of nature.
- College students with more natural views from their dorm windows scored higher on attention tests.



Net energy, CO₂ ■ Air quality ■ Other benefits
 Tree and planting □ Pruning ■ Other costs





MAXIMIZE THE BENEFITS & LESSEN THE COSTS OF PUBLIC TREES

TREE SELECTION

Selecting the appropriate tree species is very important to insure that the tree is suited to the planting location. match the mature tree size and requirements to the site. Proper landscape planning takes each tree into consideration:

- 1. Size when fully grown.** Will the tree fit into the space when it is fully grown? How wide will the tree grow, how tall will it get?
- 2. Is the tree deciduous or coniferous?** (Will it lose its leaves in the winter?) Evergreens can provide important windbreaks to reduce winter energy usage if planted on the North and West sides of a building, but can create shading in winter when sunlight is desired to warm your house, if planted on the south side of your building.
- 3. Form or shape.** A columnar tree will grow in less space. Round and vase-shaped species provide the most shade. Certain structural forms are more storm resistant than others.
- 4. Growth rate.** How long will it take for your tree to reach its full height? Slow growing species typically live longer, are more storm resistance, and store more carbon than fast growing species.

5. Soil, sun and moisture requirements. Do the conditions of your site match what your tree needs?

6. Fruit. Many communities are incorporating edible landscape trees in planting designs, and it is important to have a maintenance and use plan for the fruit for these to succeed.

7. Hardiness zone indicates the temperature extremes in which a tree can be expected to grow.

QUALITY NURSERY STOCK

Tree selection does not end with choosing the appropriate species or cultivar for the planting site. Suitable nursery stock must be chosen based on planting site conditions and intended after-care, which should dictate maximum tree size at planting, root ball characteristics, appropriate tree production method, and tree structure. Nursery stock must be inspected carefully to pick high quality trees. Pay particular attention to roots.

Trees of poor quality may be inexpensive, but might perform poorly in the landscape. Quality factors to evaluate include root ball defects, size, shape and structure of the canopy,

nursery planting depth, presence of included bark, trunk form and branch arrangement, pruning cuts, presence of pests and disease, leaf color, top die-back, clear trunk-length, and canopy uniformity.

There are advantages to selecting good quality nursery trees. Good quality trees are more likely to survive post planting, establish more quickly, and live longer in the landscape. Choosing a good quality tree also can reduce the likelihood of failure from structural defects during a storm. Defects in the trunk and branch structure are easier to correct than defects in the root system. This makes it very important to choose trees from a grower with a demonstrated capacity to produce good root systems. The best way to insure a good root system for containerized trees is to purchase trees grown in root pruning culture. Root pruning containers are highly effective in eliminating encircling roots.

IRRIGATION AND MULCHING

Watering and mulching after planting greatly increase the survival rate and vigor of your trees. Watering rate depends upon the size of tree planted, soil conditions, heat, wind, and natural rainfall. In general, water 10 gallons at time of planting, then 1-2 gallons for every diameter inch each time you water. Water 2-3 times per week for the first two growing seasons. If you are planting in an area where following the watering schedule isn't feasible, then consider planting smaller size stock. Smaller planting stock is more likely to establish without irrigation than larger stock.

Mulching your tree 3- 5 inches deep all the way to the dripline helps the health and survival of your tree. Mulching

regulates soil temperature and moisture levels, and improves soil structure and nutrients. Do not pile mulch on the stem of the tree, as this can cause the bark to decay and lead to early mortality. Re-mulch annually to replenish depth, and cover the dripline as the branches grow.

EARLY AND SCHEDULED CORRECTIVE PRUNING & MAINTENANCE

Scheduled structural pruning improves a tree's storm resistance and can dramatically increase the life span of your tree. Structural pruning when the tree is young is less expensive and results in smaller wound sizes than pruning mature trees. The ideal time to prune is when branches are between 1" and 2". Ideally, cuts larger than 4" should never be made. Only cuts that improve structure or meet other important goals should be utilized. Primary goals of structural pruning are: training for single trunk and leader, and structural strength.

PLANTING THE LARGEST TREE THE SPACE ALLOWS

Size is a primary consideration in tree selection. Every benefit a tree provides increases exponentially with that size of a tree, so that largest tree appropriate for the space will maximize the impact.

SET CANOPY GOALS

Iowa's urban forests are currently experiencing declines in canopy cover, species diversity, and overall health. This trend can be reversed by setting realistic canopy goals and specific plans to reach those goals. Evidence shows that without setting canopy goals, the urban canopy decreases in communities of all sizes. Call your State Urban Forester to get the facts and start the discussion of canopy cover in your community.





IOWA DEPARTMENT OF NATURAL RESOURCES

IN PARTNERSHIP WITH UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE



**FOR MORE INFORMATION ON URBAN FORESTRY
AND THE BENEFITS OF GREEN CITIES, VISIT:**

http://depts.washington.edu/hhwb/Thm_Physiology.html
