Report of the Committee on Management of Roadside Trees

with recommendations regarding utility tree trimming, collaboration among roadside tree managers and public involvement in managing the roadside forest

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Completed February 22, 2012

Executive Summary

The trees along Connecticut's roads are one of the state's major assets. However, the August 2011 Tropical Storm Irene and the October 2011 Snow Storm show what can occur when the roadside forest is not fully managed and when that management is too narrowly focused on specific goals. These storms demonstrated the need to broaden the focus of management to include all trees that have the potential to fall into the public right-of-way, block the roadways and damage elements of the utility distribution system.

This approach will mean increasing the involvement of each of the entities that own and maintain these trees, including municipalities, the state Department of Transportation (DOT), those private property owners who own trees adjacent to the public right-of-way, and utilities. It also means engaging the general public more widely in this discussion. This will help to develop a shared perspective regarding the work to be done, and should increase the public will for securing and applying the resources needed for better management of roadside trees.

It also likely means, at least in the near-term, an increase in the number of trees to be removed.

Ownership and Responsibilities

There are four entities with direct responsibilities over the trees that line the state's roads:

- The municipalities. The person within each municipality most responsible for roadside trees is the tree warden. The tree warden manages these trees for the purpose of public safety, and for additional purposes such as might be spelled out in local ordinance.
- The State Department of Transportation (DOT). Safety of the traveling public is the main responsibility of the DOT with regards to tree maintenance. Other responsibilities may also apply, including the retention of trees along scenic highways.
- Private property owners, who own trees outside the public right-of-way.
- The utilities, who have a responsibility to manage those trees that may impact upon their distribution system, within limits established by the Connecticut General Assembly and the state Public Utilities Regulatory Authority (PURA).

Budgetary Comparisons

Taken together, extensive authority is given to the owners and managers of the roadside forest in Connecticut. Actual ability to manage, however, is not well-balanced among these parties. According to data assembled by the Two Storm Panel, the municipalities together expend approximately $10 million per year on tree maintenance, while DOT expends approximately $500,000 and the electrical utilities, in aggregate, over $28 million.

The Condition of the Roadside Forest

Dr. Jeffrey Ward, Station Forester at the Connecticut Agricultural Station did an preliminary analysis of Connecticut's roadside trees. Dr. Ward's report focuses on several key points, including the imbalance in diversity of tree species; the condition of the roadside trees as they

age; and the number of trees with branches in or above the utility wires (approximately 40% of all trees over 12 inches in diameter).

Dr. Ward notes the presence of tree defects recorded in these inventories, especially weak forks. Weak forks are frequent in larger maples trees.

A study of the condition of the roadside forest of Westchester County, NY, reached conclusions similar to those of Dr. Ward's.

Both reports show that the number of roadside trees in poor condition is less than 10%. However, this becomes a large number when compared to the number of trees in a typical city or over the state as a whole.

In a survey conducted by CT Department of Energy and Environmental Protection's Division of Forestry, tree wardens estimated that 35% to 40% of the impact caused by trees during the two recent storms were from private trees falling into the right-of-way.

Recommendations

- Each municipality has a well-planned, targeted and efficient urban forestry program.
- Develop new strategies by which local urban forestry programs can become more efficient and effective
- Required certification of tree wardens.
- The role of municipalities in the management of roadside trees should be given greater prominence.
- Explore means of raising revenue for local tree programs.
- Seek to develop a common understanding and agreement regarding tree removals.
- Private property owners, especially those who own trees adjacent to the roadside, need to play a greater role.
- Explore means for assisting private property owners in paying for needed tree removals.
- Smarter tree trimming and roadside tree management.
- PURA should seek the input of the CT Agricultural Experiment Station, DEEP Division of Forestry and/or the University of Connecticut in its review of utility tree trimming plans.
- Solicit public opinion into PURA's tree trimming standards and utility performance regarding tree management through public hearings.
- Educational campaigns will be critical for public and professional buy-in.
- A Master Plan for DOT's Roadside Forest.
- Adopt the recommendations of the Two Storm Panel.

Introduction

The trees along Connecticut's roads are one of the state's major assets. People throughout Connecticut value these trees for the beauty and sense of place that they provide, and for the numerous benefits that they produce. These benefits include cleaner air, cleaner water, reduced energy bills, increased property values, increased tourism and improved health among the citizens of the state.

However, the recent storms of 2011 have shown what can occur when the roadside forest is not fully managed and when that management is too narrowly focused on specific goals rather than on the collaborative whole.

Since Hurricane Gloria in 1985, the state's utilities have made a strong and consistent effort to provide management of the trees along the roadside in a way that improves the reliability of the utility distribution system. By and large, these management efforts have been successful in the context of ordinary weather events and normal conditions.

The August 2011 Tropical Storm Irene and the October 2011 Snow Storm were not ordinary weather events. These storms demonstrated the need to broaden the focus of management of roadside trees to include those trees that have the potential to fall into the public right-of-way, block the roadways and damage elements of the utility distribution system. This approach will mean increasing the involvement of all who own and maintain these trees, including municipalities, the state Department of Transportation (DOT), those private property owners who own trees adjacent to the public right-of-way, and utilities. It also means engaging the general public more widely in this discussion, so as to develop a shared perspective regarding the work that needs to be done along with an increase in the public will for securing and applying the resources needed for better management of roadside trees.

It also likely means, at least in the near-term, an increase in the number of trees to be removed.

Background on the Roadside Forest

Throughout the state there are some 21,000 miles of roads. Of these roads, approximately 17,300 miles are managed by the municipalities and 3,700 are managed by DOT. Managing the trees along these roads is a complicated endeavor. It involves intersecting ownerships, diverging goals, a wide array of tree conditions and a broad range of viewpoints about how these trees should be managed. This roadside forest is also one of the state's most visible resources, shared by millions of people on a daily basis.

Ownership and Responsibilities

There are four entities with direct responsibilities over the trees that line the state's roads:

- the municipalities, with each municipality owning the trees within the public right-of-way along that municipality's streets and roads
- the state Department of Transportation (DOT), which owns the trees within the right-of-way alongside state highways

- private property owners, who own trees outside the public right-of-way, including those trees adjacent to the right-of-way that may fall into it
- the utilities, which typically do not own the trees but have a responsibility to manage those trees that may impact upon their distribution system, within limits established by the state Public Utilities Regulatory Authority (PURA).[1]

The responsible agent for municipally owned trees is the tree warden. In each municipality, the tree warden is appointed by the chief elected official and is given "care and control" over that municipality's trees as well as trees not owned by the municipality but that extend, in whole or in part, into the public right-of-way (CGS 23-59). Tree wardens have the authority to order the pruning or removal of any tree, municipally-owned or not, if that tree extends into the right-of-way and the tree warden determines it to be a threat to public safety. He or she also has the authority to approve or deny requests to prune or remove trees within the public right-of-way, and to take to court anyone who removes or prunes trees without the tree warden's permission. The statute includes a posting requirement. In non-emergency situations, the tree warden must give 10 days notice before ordering the pruning or removal of a tree under his or her jurisdiction. This provision ensures the opportunity for public involvement in municipal roadside forest management decisions.

Through its Commissioner, the state DOT has similar authority over trees along state highways, but without the posting requirement. For larger trees, DOT may not give permission for a tree to be pruned or removed without the municipality within which that tree is located first being notified.

Under State Statutes, private property owners are under no specific obligation to maintain their trees or to take steps to protect the public with respect to the trees they own. Similarly, with a few exceptions under local ordinance, unless a private tree extends into the public right-of-way, public officials do not have the authority to require the removal or pruning of private trees.

Public utilities tend not to own trees within the roadside forest. However, they do have an obligation, under direction from PURA, to maintain their distribution system. These directives include the need to regularly maintain those trees and those parts of trees that would otherwise have a negative impact on the integrity of the distribution system.

Purposes for Managing Roadside Trees

Tree Wardens

Public safety is a primary purpose for which the tree warden performs his or her duties, including through the removal of trees and shrubs in the municipal right of way that constitute a public hazard. Additional potential responsibilities for the tree warden mentioned in State Statute are

[1] Electrical utilities also have responsibility for managing trees along their transmission lines. Wire maintenance for electric transmission lines is primarily regulated by the Federal Energy Regulatory Commission (FERC).

"setting out, care and maintenance" of trees and shrubs along roads, "preservation" of trees and shrubs along roads, and "roadside beauty".

In certain municipalities, local ordinance further defines the purpose of public trees and the tree warden's responsibilities. For example, the City of Norwalk's Tree Ordinance[2] states:

> Public street trees and public park trees provide important benefits to the City, including the beautification of City streets and neighborhoods, the provision of shade, an improvement in air quality, the buffering of noise, and the enhancement of property values. The intent of this chapter is to provide clear direction to the designated Tree Warden to implement the City's goals for the maintenance of its public street trees and public park trees.

DOT

Along state highways, public safety is again a primary reason for management of roadside trees. CGS 13a-140 allows DOT to "cut, remove or prune any tree, shrub or other vegetation situated within the limits of any state highway so far as is reasonably necessary for safe and convenient travel thereon". Within this Statute, recognition is not given to the amenity benefits of trees along state highways, although state highways may be designated as scenic roads, with special consideration given to trees (CGS 13b-31c). Under CGS 13a-140, the potential for trees to interfere with the use of an adjoining property is singled out, as DOT must permit removal of a tree when it interferes with the "use of such adjoining land which is of the highest pecuniary value."

State Statute also states that DOT shall not interfere with the utilities ability to trim trees in order to protect their distribution system.

The Utilities and PURA

The electrical utilities distribute electricity under what PURA terms a "Regulatory Compact". Under this compact, the utility provides electricity as a public service and the government, through PURA, allows the utility to recover its operating costs in a manner consistent with the utility company's financial integrity. Additionally, the electric distribution company must perform its public responsibilities with "economy, efficiency and care for public safety and energy security."[3]

Through its ability to set rates, PURA has influence over the tree trimming and removals undertaken by the electrical utilities. Each year, electrical utilities must file their tree trimming standards with PURA. These standards include specifications for the removal of limbs and branches around distribution lines. When reviewing a specific rate request from a utility, PURA considers such information as expenditures by that utility on tree trimming and how the

[2] City of Norwalk Ordinances, Chapter 112, Trees.
[3] Drawn from “Comments Concerning Tree-Trimming Practices and Regulatory Requirements Imposed by the Public Utilities Regulatory Authority (PURA)” – testimony submitted to the Governor’s Two Storm Panel on November 9, 2011.

distribution system has performed with regards to trees and tree-caused outages, with reliability being the primary criterion. PURA will recommend enhancing or improving aspects of a tree trimming program if it determines there is a need, such as along sections of service where outages are greater than elsewhere.

Budgetary Comparisons

Taken together, extensive authority is given to the owners and managers of the roadside forest in Connecticut. However, the actual ability to manage is not well-balanced among these parties. According to data assembled by the Two Storm Panel[4], the municipalities together expend approximately $10 million per year on tree maintenance, while DOT expends approximately $500,000 and the electrical utilities, in aggregate, over $28 million. In other words, the utilities outspend the municipalities on tree maintenance by nearly a 3:1 ratio. Electrical utility tree management is currently, far and away, the main type of roadside tree management that occurs, when assessed in monetary terms.

The Condition of the Roadside Forest

For foresters, the management of any sizeable forest tract always begins with an inventory of the trees that exist within that forest. On a consistent, statewide basis, no such inventory exists of the roadside forest in Connecticut.

The closest to such a state-wide assessment of the roadside forest in Connecticut is an analysis performed by Dr. Jeffrey Ward, Station Forester at the Connecticut Agricultural Station and submitted as testimony to the Two Storm Panel.[5] Dr. Ward's analysis is based on street tree inventories undertaken by 11 communities within the state, and then extrapolated state-wide.

Dr. Ward's report focuses on several key points, including the imbalance in diversity of tree species, with nearly half of the trees being maples; the condition of the roadside trees as they age; and the number of trees with branches in or above the utility wires (approximately 40% of all trees over 12 inches in diameter).

Dr. Ward pays particular note to the presence of tree defects recorded in these inventories, especially weak forks. Weak forks result either from co-dominant stems or poorly anchored branches, and are often associated with tree or limb failure. Weak forks are frequent in larger maples trees, with 26% of the maples larger than 23 inches in diameter having weak forks, as opposed to 12% of the larger trees of other genera.

John Goodfellow of BioCompliance Consulting Inc. recently completed a study on the condition of the roadside forest of Westchester County, NY, commissioned by Con Edison.[6] Mr.

[4] "Report of the Two Storm Panel", January 2012, page 13.
[5] "Connecticut's Street Trees, A Preliminary Analysis" by Dr. Jeff Ward, November 2011. Submitted as Testimony to the Two Storm Panel.
[6] "Condition Assessment of the Forest of Westchester County" by John W. Goodfellow, Bio-Compliance Consulting, Redmond, WA. December 29, 2008.

Goodfellow's findings were consistent with Dr. Ward's on many points. Additionally, Mr. Goodfellow concludes that there are:

> ...a disproportionately large number of trees are advancing through their natural life cycle as a group. As they pass maturity and begin to decline, the risk of structural failure and potential damage to Con Edison's overhead system will continue to increase. This effect is already apparent in Norway maple and some species of ash.

Although both Dr. Ward and Mr. Goodfellow indicate that better than 75% of the trees alongside the roads in Connecticut and Westchester County respectively are in good condition, they also point out the large number of trees with structural defects to be found alongside these roads. In percentage terms, the inventories show that the number of roadside trees in poor condition is less than 10%. However, when dealing with a roadside forest that consists of 16,000 trees (the approximate number of street trees in Milford) or of 1.1 million trees (Dr. Ward's extrapolated number of roadside trees in the state), this relatively low proportional number of trees becomes a very large actual number.[7]

This concern about potentially hazardous trees should not extend just to those trees owned by the public. In a survey conducted by CT Department of Energy and Environmental Protection's Division of Forestry[8] following the two recent storms, the average of the tree wardens' estimates of the impact that was caused by trees that was due to private trees falling into the roadway during either storm was between 35% to 40% of the total.

Data from that same survey also illustrates the differences in storm damage between storms. In general, tree damage from a storm does vary by type of storm. A storm with heavy winds such as Tropical Storm Irene will cause relatively more trees to uproot, while a storm that overloads branches, such as the October Snow Storm or an ice storm, will cause more branches to break. The way in which any tree is apt to respond to a storm depends upon many factors, including weather conditions prior to the storm itself. Predicting tree damage from any given type of storm will always be an inexact science, due to these many factors and the complicated nature of trees themselves.

Additional Perspectives

Through tools such as those developed by the USDA Forest Service, forest managers are much more able to demonstrate the benefits of trees and to quantify these benefits in tangible terms, such as dollars saved, tons of air pollutants removed or property value increased.

This view of urban trees, based on their social value and the ecosystem benefits that they provide, is still just becoming absorbed into municipal management planning. However, it is not too early to begin taking stock of the lessons learned from viewing trees from this perspective and to begin incorporating these lessons learned into ongoing roadside tree management.

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[7] Estimates by consulting firms hired by CL&P and by UI following Hurricane Gloria each came up with significantly higher estimates of the number of trees per mile along the state's roads – up to perhaps 7 times the estimate generated by Dr. Ward.

[8] Unpublished as of yet.

For example, within the State Department of Energy and Environmental Protection, efforts through the Environmental Justice Program and the Pollution Prevention Program have sought to increase tree planting and tree cover in the core city population centers, for the sake of improving public health, instilling a sense of environmental awareness and improving the quality of life of people in those population centers. The Watershed Management Program has worked with municipalities on innovative ways of planting trees so that the water retention and water filtering capabilities of trees are part of a green infrastructure approach to large scale management of environmental quality. The Air Quality and Standards Division has recognized that trees are a valuable component and tool in reducing the urban heat island effect. Brush and stump management and the encouragement of composting and mulching is a part of the Reduce/Reuse/Recycle project within DEEP's Waste Management Program.

And the list goes on. The point is that trees have a great, and largely under-valued, potential to contribute to the resolution of a large number of environmental problems. This potential should not be overlooked in the approach to solving near-term problems regarding trees and the utility infra-structure.

The phrase "right tree, right place" still remains perhaps the best summary of how these problems should be addressed. The phrase is often interpreted to be an expression of the importance of planting only small trees under utility wires. That is one important interpretation. However, the terms also should mean planting large trees where these large trees can thrive and contribute to the overall quality of life in a community. It means working towards realistic but ambitious tree canopy goals for communities, so that the benefits of trees are not lost in the discussion of how to manage them.

Recommendations

In order to improve the management of the roadside forest in a way that reduces damage following major storms, the management of these trees must become more broadly based, be more collaborative and be given a higher priority by citizens within the state. Emphasis should be placed on equally balancing public safety, the reliability of utility services and the benefits that come from roadside trees. In this time of highly restricted public funds, steps in that direction cannot depend upon new funding sources. Improved management must come from increases in efficiency, better defined targets for management, increased education and a greater synthesis of effort among all who manage roadside trees.

Specific recommendations:

- **Each municipality has a well-planned, targeted and efficient urban forestry program.** Roadside trees are not separate from the broader urban forest. The goals and targets of the community for its trees should be expressed in an urban forestry plan that then becomes a basis for community decision-making. These plans should be collaborative and inclusive, and include input from the full range of roadside tree owners and managers along with the local citizenry.
- **Develop new strategies by which local urban forestry programs can become more efficient and effective.** DEEP Forestry currently has a project underway that will result in recommendations to municipalities about how they might best use the wood that comes from urban forestry management. These recommendations will be based on specific models for the handling of wood from the urban forest. Too often, that wood is now considered to be waste and an expense. By demonstrating the value of this material so as to allow costs to be cut and useful products to be produced, local urban forestry managers will be incentivized to manage their forests in a more pro-active manner. These and other means by which the efficiency and effectiveness of local urban forestry programs could be increased should be explored.
- **Required certification of tree wardens.** At the local level, the tree warden is pivotal in the management of roadside trees. The State of Connecticut should issue guidelines as to what constitutes a qualified tree warden and work with such entities as the Tree Wardens of Association of Connecticut (TWAC) in providing certification to those tree wardens who meet these qualifications. The State need not get involved in issuing certificates itself, as the TWAC already has a certification program in place.
- **The role of municipalities in the management of roadside trees should be given greater prominence.** Due to limited resources and competing local priorities, many municipalities do not adequately manage their roadside trees. This places a greater burden on utilities, who already have well-defined priorities of their own priorities to deal with. Municipalities need to play a larger role. What work that can be done jointly by the municipalities, DOT and the utilities should be done jointly, with the roles of each of

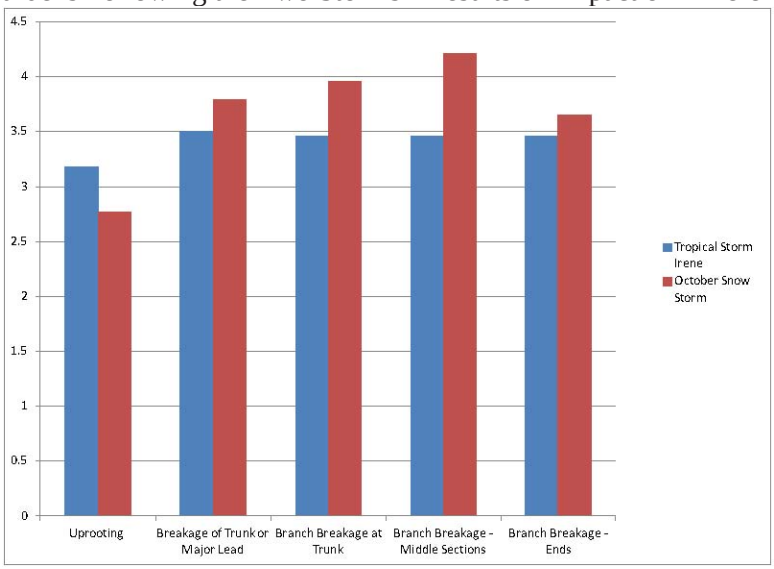
the partners more clearly stated. Needed resources, including needed additional financial resources, should be identified, even if they cannot be readily provided. Without the necessary resources at the local level, this sort of cooperation is unlikely to be sustained on a consistent and successful basis.

- **Explore means of raising revenue for local tree programs.** While public funds may not be readily available for enhancing local tree programs, various suggestions exist for alternative sources of funding. Such recommendations include a small surcharge on trees sold at the retail level that could then be put into a fund for tree management, or various "adopt-a-tree" programs whereby commercial interests underwrite local tree programs. If funds are found at the state level, the state could encourage progress in local roadside tree management programs by creating incentives for the receipt of these funds, such as requiring that the tree warden be certified or the municipality has an effective urban forestry plan.
- **Seek to develop a common understanding and agreement regarding tree removals.** In order to improve the roadside forest from its current condition, trees will need to be removed. The burden for removing these trees needs to fairly shared among those who own the trees and all of those who are responsible for roadside tree management. Common agreement about tree removals is needed, particularly within the professional community, with explicit and clear guidelines as to when tree removal is the preferred option. These agreements will be very helpful, both with regards to generating wider public acceptance and support for warranted tree removal, and for ensuring that these trees do in fact come down as planned.
- **Private property owners, especially those who own trees adjacent to the roadside, need to play a greater role.** Tree wardens can be given authority to require the removal or pruning of trees on private property that are seen as public hazards. However, this increase in authority only increases the tree warden's responsibilities and establishes additional financial burdens on the municipality if the municipality must prune or remove that tree. Private property owners need to be encouraged to take greater responsibilities for their trees, so that more trees will be either better maintained or removed and not cause damage during storms.
- **Explore means for assisting private property owners in paying for needed tree removals.** The Two Storm Panel suggested a Hazardous Tree Removal Fund that would be created through funds generated by the rate-payers of the electrical utilities that could be used to help property owners offset costs of hazardous tree removals. A proposal to establish a means by which insurance companies may provide property owners loans has also been proposed. These proposals should be considered for the potential to encourage more property owner involvement in recognizing and removing hazardous trees.

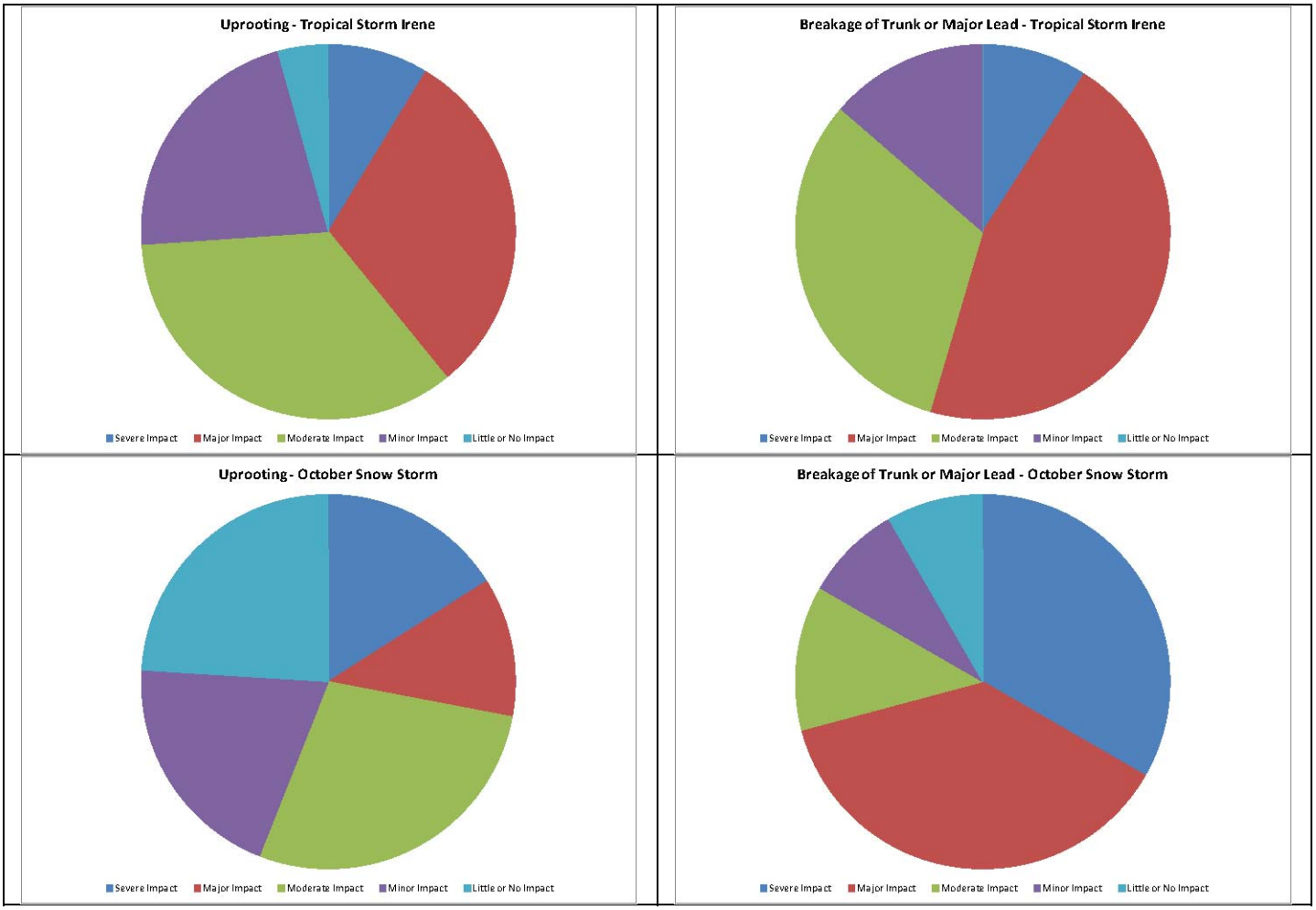
- **Smarter tree trimming and roadside tree management.** Great advances continue to be made in both the fields of arboriculture, which relates to the management of individual trees, and urban forestry, which in turn relates to the management of populations of trees in the urban setting. Continuous dissemination of these advances need to occur, so that those involved in the management of roadside trees are aware of the best techniques and latest scientific insights. Ways in which these latest understandings can be incorporated into practice are particularly important, and so all parties that can be play a role in this effort need to be involved, including professional associations, university outreach programs, state agencies and municipal organizations. Lessons from the field, including from the crews who work on storm damage, should also be used to inform future planning and decision making.
- **PURA should seek the input of the CT Agricultural Experiment Station, DEEP Division of Forestry and/or the University of Connecticut in its review of utility tree trimming plans.** By drawing on the expertise of organizations such as these, PURA will be able to get unbiased feedback regarding the technical details of the utility tree trimming specifications. This will help encourage the utilities to be forward-leaning in the development of these specifications. It will also encourage the involvement of these research and professional groups in utility tree trimming programs, which currently makes up the bulk of roadside tree management.
- **Solicit public opinion into PURA's tree trimming standards and utility performance regarding tree management through public hearings.** Public feedback will prove very helpful in the establishment of standards that will both prove effective and acceptable to the citizens of the state as a whole.
- **Educational campaigns will be critical for public and professional buy-in.** Change does not come easily, and there will be a need for leadership if improvements in roadside tree management are to take root. The ability to lead is often based on having knowledge and being convinced of its importance. Educational campaigns will need to be directed to the general public, so that more people understand the importance of trees and of managing trees. Educational programs will also need to be directed towards professional groups, so that there is a common understanding of goals, techniques and responsibilities. Potentially, this could lead to commonly accepted decision making tools, such as a 'decision matrix' relating to the removal of trees.
- **A Master Plan for DOT's Roadside Forest.** As the largest individual owner and manager of roadside trees in the state, DOT has the potential to be highly influential in how the rest of the roadside forest is managed. A Master Plan created by DOT that addresses the diverse array of roadsides that it owns and manages could become a valuable resource for all other roadside tree managers.

- **Adopt the recommendations of the Two Storm Panel.** The Two Storm Panel came up with some excellent recommendations regarding trees and roadside tree management. The eight recommendations relating to tree trimming (Recommendations #20 - #27) should be given full consideration and be adopted into state policy

DEEP Survey of Tree Wardens Following the Two Storms - Results on Impact of Different Types of Tree Damage



In the above chart, tree wardens rated the impact of various types of tree damage for the two storms, on a scale of 1 to 5, with 1 being 'little or no impact' and 5 being 'severe impact'. The chart is based on the average rating by damage category. For the Tropical Storm, 'uprooting' rated higher, while for the Snow Storm, all forms of breakage rated higher.



The above four charts show the actual responses regarding the tree wardens assessment of impact, two of the types of tree damage from each of the storms are compared, to show how the damage did differ between the two storms.

The full results of the survey have not yet been published. They will be made available on the CT DEEP web site.