NEWS RELEASE
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Hurricane Irene, Lessons Learned

Luckily, Hurricane Irene lost much of its punch before reaching RI early Sundayas most of us were waking up. The eye of Irene actually tracked west, batteringConnecticut with severe winds and flooding rains that for the most part,we escaped. But despite being downgraded to a tropical storm locally, this first major threatof the 2011 storm season still caused a lot of tree damage across the Ocean State. What follows is a brief description of the tree damage and what measures shouldbe taken to repair the damage.

The National Weather Service has been predicting since May that 2011 will be a veryactive year for late summer-early fall storms. We should, therefore, treat Ireneas a practice run and use what we can learn from her to be even better prepared for the next storm threat that comes down the pike. To help you with this, we haveincluded several tips for future storm planning.

Tree Damage- In general observations made in the aftermath of tropical storm Irene,indicate that the tree damage was basically of 3 types. These included **sheared tops,split branches and toppled trees.** The first two were by far and away the most common.Wind gusts, mostly between 50 and 65 miles per hour, were the main reason for thebroken limbs. Most damage occurred to trees growing as solitary specimens in parks,on residential property or along streets. On the contrary, trees arranged in dense associations (forests, woodlands, groves, etc.,) where somewhat protected from buffetingwinds and sustained far less injury. Also, a closer inspection of injured treesshowed that structural pre-disposition played a significant role in which plantsfailed and which ones did not. For example, trees with co-dominant stems or long,poorly tapered branches were more likely to break apart in the upper crown of thetree. But the most frequent cause of stem failure was due to weak crotch development.
This could be ascertained by the amount of included wood often found on the insideof severed branches lying on the ground after the storm. The final type of treedamage in the wake of Irene was classified as total tree failure, better known astoppling trees.

The culprit in this case was the combination of soil softening rain and high wind. In this scenario, the rain saturates the soils, initially weakening the tight bondthe tree's root system has with the soil environment. Next, the wind force actingon the tree causes the weakened root plate to slide or shift over the rain-soakedsoil. The tree topples once the wind load (force against the tree) exceeds the weightof the tree's unstable root plate. Usually, under the right conditions, winds aslight as 20-30mph can easily fell large trees. Street trees with confined soil-rootspace are easy targets for this type of wind-
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throw. Trees growing in low-lying areas,high water tables or very windy sites are also extremely vulnerable.

General observations by the Rhode Island Urban and Community Forester, Frank Mastrobouno corroborate the latter statements. Initial surveys performed within 36 hours ofthe storm abatement showed most damage to trees was a result of already compromisedstructure or soil saturation. The vast majority of trees damaged but left standingshowed evidence of rotted cankers or cavities, poor crotch formation, or co-dominantleaders, with only few exceptions. Most toppled trees observed had root systemsintact, suggesting soil saturation played a large role in their demise. Of thesetoppled trees, the majority were observed in confined-space urban areas where rootspace was constricted. For example, one uprooted Tulip Poplar that had fallen ona house was planted in close vicinity to a road edge and sidewalk, so restricted space and soil compaction likely inhibited the tree's development of a complex root system, ultimately leading to its demise.

Following up with a recent Rhode Island Tree Council Project, a brief survey wasperformed in Warwick to ascertain an initial estimate of the extent of storm damageto trees. This survey showed a rate ofdamage to the city's tree resources of approximately14%.

General observations made during the survey suggest that areas impacted most heavilywere those most exposed to fetch (wind traveling a distance over open area), demonstratedby a higher rate of downed trees in areas with the following geographic characteristics:

* Forested coastal and bayside communities
* Solitary trees in neighborhoods generally lacking forestation
* Forested communities with open tracts of land to the south and east
* Forested slopes with a southern exposure

What to do with damaged trees. The first thing to do is to assess the severity ofthe storm damage. Walk around the entire tree, inspecting all of its parts. Startat the top of the tree working your eyes downward toward the base of the trunk. Look for broken branches high in the tree. Are any of them partially broken or lodged in a branch crotch? Also, look for cracks. Cracks on branches or trunksare very serious and often mean the internal wood is weakened beyond repair. Then,examine the trunk to determine if it is still vertical. Even a slight lean one wayor the other could be a sign that the trunk has moved and is now unstable. Last,but not least, take a look at the soil surrounding the tree. Have any roots broken through the surface, or has the original soil grade changed in any way? Also, raisedsoil around the base of the tree (i.e. soil mounding) usually is associated with broken roots and a badly leaning trunk. On the contrary, a soil crater or depressionnear the tree trunk is a sign that the underground soil environment has fracturedand can no longer be counted on to anchor the tree roots. All of these are structuraldefects, and should be considered tree hazards to be taken seriously. If hazardsexist, keep others away from the tree by placing caution tape around the trunk orby erecting a no trespass zone at the drip line of the tree. The latter can be constructedby tying string or wire to old fence posts or garden stakes. The next step is toseek the help of a certified Arborist. The Arborist can assist with the tree evaluation
but, also, help prepare a mitigation plan.

Tips For the NEXT Storm- As mentioned earlier, we didn't get the full measure of Hurricane Irene this time, but that isn't to say we won't get the worst of the storm next time. The key is to be prepared and try to do as much as humanly possibleto limit your risk of future tree damage.

First, conduct a visual tree assessment as discussed above. Look for existing structuraldefects that may be prone to fail. Be particularly mindful of narrow angled crotchesand competing stems at the top of the tree. Make a diagram of the tree, describingthe location and type of tree defect.

Next, perform an inventory of the environmental conditions near your trees. Arethe trees growing in a wet area subject to flooding during a bad storm? Is the sitepoorly drained? Are the trees sheltered from the wind by buildings, large objectsor even other trees? Have tree roots been exposed to new construction in recentyears? Has the soil grade been changed as a result of recent utility work or otherhome improvements? These are all important things to consider when evaluating thepotential threats to trees from storms.

Finally, determine what target or targets on your property might be at risk froma fallen tree during a storm. A target is defined as any object within the tree'sreach should it fail. It could be a play swing, a vehicle, house roof, or even acow in a pasture. The key is to identify the limits of this tree target zone so damage to property or personal injury can be prevented or avoided. To determinethese limits simply estimate the height and crown width in feet of the tree. Usethese measurements to draw a sketch of the property and the foot-print of each treetarget zone. Next, note what targets are at risk should a tree fail. Use this guideto reduce or eliminate risk by either moving the target or by reducing the size of the tree target zone. The latter can be done by reducing the height or widthof the tree by pruning.