

NEWS RELEASE
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## Hurricane Irene, Lessons Learned

Luckily, Hurricane Irene lost much of its punch before reaching RI early Sunday as most of us were waking up. The eye of Irene actually tracked west, battering Connecticut 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 threat of 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 should be taken to repair the damage.

The National Weather Service has been predicting since May that 2011 will be a very active year for late summer-early fall storms. We should, therefore, treat Irene as 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 have included 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 the broken 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 buffeting winds and sustained far less injury. Also, a closer inspection of injured trees showed that structural pre-disposition played a significant role in which plants failed 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 the tree. 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 inside of severed branches lying on the ground after the storm. The final type of tree damage in the wake of Irene was classified as total tree failure, better known as toppling 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 bond the tree's root system has with the soil environment.** Next, the wind force acting on the tree causes the weakened root plate to slide or shift over the rain-soaked soil. The tree topples once the wind load (force against the tree) exceeds the weight of the tree's unstable root plate. Usually, under the right conditions, winds as light as 20-30 mph can easily fell large trees. Street trees with confined soil-root space are easy targets for this type of wind-

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 of the storm abatement showed most damage to trees was a result of already compromised structure or soil saturation. The vast majority of trees damaged but left standing showed evidence of rotted cankers or cavities, poor crotch formation, or co-dominant leaders, with only few exceptions. Most toppled trees observed had root systems intact, suggesting soil saturation played a large role in their demise. Of these toppled trees, the majority were observed in confined-space urban areas where root space was constricted. For example, one uprooted Tulip Poplar that had fallen on a 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 was performed in Warwick to ascertain an initial estimate of the extent of storm damage to trees. This survey showed a rate of damage to the city's tree resources of approximately 14%.

General observations made during the survey suggest that areas impacted most heavily were those most exposed to fetch (wind traveling a distance over open area), demonstrated by 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 of the storm damage. Walk around the entire tree, inspecting all of its parts. Start at 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 trunks are 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 way or 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, raised soil 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 depression near the tree trunk is a sign that the underground soil environment has fractured and can no longer be counted on to anchor the tree roots. All of these are structural defects, and should be considered tree hazards to be taken seriously. If hazards exist, keep others away from the tree by placing caution tape around the trunk or by erecting a no trespass zone at the drip line of the tree. The latter can be constructed by tying string or wire to old fence posts or garden stakes. The next step is to seek 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 possible to limit your risk of future tree damage.

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

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

**Finally,** determine what target or targets on your property might be at risk from a fallen tree during a storm. A target is defined as any object within the tree's reach should it fail. It could be a play swing, a vehicle, house roof, or even a cow 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 determine these limits simply estimate the height and crown width in feet of the tree. Use these measurements to draw a sketch of the property and the foot-print of each tree target zone. Next, note what targets are at risk should a tree fail. Use this guide to 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 width of the tree by pruning.