

Michael Stout:

It's not unusual to have Louisiana referred to as something other than the United States, so I'm fine with that introduction, basically a banana republic. But anyway, yes I am an urban planner, my background, so I'll preface with that and go ahead and get started here. I just want to make one comment -- a lot of references to Katrina today. Obviously, those of us in New Orleans have a pretty firsthand feel for that, so you'll see some of the work we've done since Katrina. One of the many themes that the Corps of Engineers stood up in the wake of Katrina was this tree removal theme and I was volunteered -- I mean I volunteered to lead this team and so knowing that it would be well received by the population in New Orleans. So, anyway, our scope includes three tasks, the Lake Pontchartrain and vicinity projects of which I'll show you a graphic in a few minutes is the project that protects New Orleans -- the east bank of New Orleans. It's the project that was heavily damaged during Katrina.

And so, our main focus of my team has been involved in removing trees that lower the -- I mean that induce risk to the system of this project and it's done under the repair and rehabilitation work after Katrina, that was authorized. So, that involves removing trees and fences and I'll get to fences. I haven't heard that come up today but I wanted to share that with you because I think this is an issue elsewhere. But, removing trees and fences within 15 feet of levee or burn sections or flood walls and that though is limited by where we have right-of-way available or preexisting right under state law, and I'll cover that. Another task that we had were to get inventories of encroachments of other levee systems in our district. We have about 1300 miles in the New Orleans district and so we have gotten a lot of that inventoried as far as GPS locations of trees and fences and other encroachments. And, then another one of our responsibilities is within the organization to champion, to be an advocate for the Corps' vegetation management policy so that we don't -- as we go about the repair and enlargement of the hurricane protections system in New Orleans and in the region -- that we not get back in the same situation we

were in pre-Katrina, with a lot of encroachments that we believe are harmful for the system.

This graphic illustrates the project. The red lines are the Mississippi River okay. So, the other colors here on the right hand and top side and I'll see if I can get the pointer here -- these represent the levees that protect the urbanized areas of New Orleans, okay. And, if you are familiar with Katrina, the damages -- the heavy damages were to the MRGO, the levee that goes along the Mississippi River Gulf outlet here in green, some of the levees here in New Orleans East and then some of the spectacular levee breaches occurred on these outfall canals as well as the industrial canal right here. So, a lot of these levees since Katrina have been repaired. Other sections were not so heavily damaged and that's where our work is focused. We're -- there was not active repair work going on because the trees that were a problem there were being taken care of as part of the repair work. So, this is the status of our work. It really got underway a little more than a year ago and all we're showing you here is that it started in April of last year as far as the actual removal of trees and it continues.

The area we are focused on right now is along the 17th Street Canal which is one of the outfall canals that I illustrated there. The total cost estimate for what we're doing as far as removing trees from the Lake Pontchartrain project is about 5.3 million. To date, we've spent 3.2 million. Just a plan map to help you orient the outfall canals you know. Here is first St. Bernard and lower Ninth Award is here. These areas were heavily devastated by levee break. New Orleans East is this area. I'm looking at -- the work we've been doing is mostly focused here in New Orleans proper and then this is Jefferson Parish over here and these are the three outfall canals. One thing I want to illustrate for you is this is the London MU Canal. It's residential on both sides of the canal. The Orleans Avenue Canal is the middle one and you might be able to see that on one side it's a city park, on the other side there's a roadway and then the canal

furthest to the west is the 17th Street Canal which is residential on both sides. Okay, so a lot of this has been covered. I'll go through this quickly and then I have illustrations. Why are trees a problem? We get asked this all the time and we've covered these things. I know some of these things, these points may have been disputed by some of the previous speakers and so obviously there is still work to be done here. But, tree roots and levees provide pathways for seepage especially when the trees or the roots are dead.

The root balls of blown over trees can create critical voids during a storms, worsening seepage and weakening stability. Large overturned trees can fall on and damage flood walls or other features. The shading from trees can result in erosion of the levee embankment and poor turf establishment and I've got some illustrations of that. Trees too close to the levees impair maintenance, inspections and flood fighting activities. And for all the science I heard today that spoke to levees increase, you know, slope stability, the caveat I seem to hear very frequently is well we didn't address maintenance or we didn't address inspection. Well, I've got to tell you that we have to live with that so we're addressing it. Fences. I haven't heard fences come up but this came up early in our mission because initially, our goal was to simply -- where trees that were behind fences that were a problem, remove the section -- if there was a gate, we go through the gate, remove the tree and leave the fence alone. But, what we came to realize is we did more inspections of encroachments were that in many ways fences were a big part of the problem. One of those being that fences are where trees -- volunteer trees -- are going to grow up. In our environment, it's largely hack berries or sugar berries and Chinese Tallow. These trees will -- anytime there is a fence that's not well maintained, these trees are going to grow and they're going to get large pretty quickly. The fence lines that are on the slope or at the toe cause a problem in terms of doing levee inspections, especially say, a privacy fence at the toe.

There's no way when you are doing your levee inspections from the levee you see problems that may exist in the toe area. They also impair maintenance of the levee in terms of cutting the grass -- you may not be able to get down to the toe to cut the grass. The vegetation is coming up. It can also hinder flood fighting. We found that out in the immediate days after Katrina and we had to build roadways in because there was too much development close to some of the levee break. This is an illustration we use at some of our public meetings to try to illustrate why a blown over tree, especially along the outfall canals in New Orleans could be a major problem during a storm. And, I'll point out a few things here. One is that even in -- I know we've made the distinction between levees and dams, that there is a higher standard of care for dams and we understand that. In this case, these structures are essentially dams year around because the adjoining neighborhoods are below sea level. Now, I heard somebody say 10 feet below sea level and there are very few areas in New Orleans that are that low to be quite frank.

There are a lot of parts in New Orleans that are two or three or four feet below sea level and if -- these canals are open to Lake Pontchartrain and the typical water elevation plus one. So, you have a four foot head maybe along a lot of the outfall canals. So, these levees are essentially dams and they are -- and as I'll show you an illustration, there are lots of trees -- there were lots of trees at the toe. Tree falls near levees. Okay, we can say this is hypothetical or impossible. Here's a couple of illustrations of where they actually occurred. This is on the 17th Street Canal within a few thousand feet of where the major breach occurred and here's a large tree right at the toe. I don't know if you can tell but this fence is actually a few feet up on the slope. The toe is about where the tree has uprooted, removing a lot of -- creating a large void there right at that critical spot along the levee. This is on the London Avenue Canal also near one of the breach sites, again showing a large tree. This one has fallen sort of toward the flood wall but still right at the toe and you can see the fence section

that was lifted up and the problem that creates. Here's some other views along London Avenue.

The toe is about basically where the bricks are and you can see trees, large trees on the slope, as well as fencing climbing the slope. Another area along London Avenue Canal with trees right at the toe and getting to the issue in vegetation and fences, getting to the issue of inspection, there is no way to see the toe area you know, in this kind of setting. And this is a portion of the London Avenue Canal after we had removed the tree. In this case, we removed the trees, we cut them off and then we removed the stumps as well as dug out the root, down to half inch in diameter. So, it was essentially a levee repair job and then brought in clay and compacted the fill. And, this is before the grass has taken seed but this is after the job has been finished along the stretch of the London Avenue Canal. And, you can see the improvements in terms of removing the trees and the fences and now we can inspect that area and it can be maintained properly. This is along the Orleans Avenue Canal which is along City Park and you can this is a large live Oak that was unfortunately was actually killed by the salt water that sat for weeks, but what you may not be able to see in this slide too well is the fact that due to the heavy canopy over the levee slope, there was no grass establishment in this area and the embankment had eroded and there was actually like a pretty good divot in the side of the levee there holding that flood wall up. 17th Street Canal which is the one furthest west.

There we have fences and trees coming right up to the crown of the levee and this kind of illustrates it from somebody's backyard. Most of New Orleans is flat and if you are one of the few property owners along the outfall canals, you might have a hill in your backyard, unfortunately a levee. The fences went up to the property line and then you had all kinds of features in the levee section to include steps, retaining walls, structures, even swimming pool. And, this is the other side of the 17th Street Canal, the Jefferson Parish side and again you can see trees right at the toe and

you might be able to see that there is no grass growing in the shade of these trees. There is gravel that's been put down by the levee district but obviously the preferred surface cover is grass, and then fences again that prevent inspections in the toe area. Some of the challenges we face -- obviously in a storm like Katrina, we lost a lot of our urban tree cover and now on the heels of that, here is the Corps of Engineers removing more. So, that has not been very popular because some of the areas we've worked in have been public parks. There are many trees in backyards and behind fences and that work has been done under authority that's in the Louisiana State law and it's covered here.

The footprint of the levee is covered by the Doctrine of Unopposed Use and then there is an additional state law that says levee districts can remove obstructions within six feet of that levee. So, under this, we are actually going on to private property to remove trees and you can be sure that's not popular. Okay. We took advantage of the fact that we were going to remove hundreds of trees to get a tree root study underway. We got with LSU Forestry Department through an AE contractor, Dr. Jim Chambers, Dr. [unintelligible], developed a methodology very similar to the study that Dr. Berry represented. In fact, it's a little eerie hearing her talk about her study. It's almost exactly what we did. Okay, one thing that I want to point out here is we looked at trees of various sizes and distances from the levee and then we tried to be specific to speed the [unintelligible]. This illustration shows three different trees actually being studied. In the foreground there was a pecan tree about 25 feet away where we did trenches looking at its root extent and that hole is being backfilled and compacted. Then, in the middle ground, there were some cypress trees that we were studying that were maybe about 6 feet from the toe and then in the background, there is a large water oak tree that we were studying.

So, this is just a good illustration of the kind of areas we were looking at. And, then again, it was a similar type profile wall method to the other

study. 79 trees studies, 8 species common to Louisiana, 217 trenches and again, we were restricted to shallow depth. On average, one of our findings were that the edge of the crown or the canopy, pretty much defines the extent of roots that are half inch or larger in diameter. However, we did find there was variation by species. This table summarizes the results looking at the radial extent of roots of these different species and in this table we are showing the roots that are larger than half inch and then the roots that are larger than one inch, accounting for 50% of the roots that we counted in the profile. So, you can see, it starts out cypress sugar berry about 10 and one-half feet, sycamore and pecan for roots that are half inch apart. If we want to account for 95% of the accounted roots then we have to go much further and we have some species where the distance is around 18 feet but when you get to sycamore and pecan, we found much greater distances. If your concern is about roots half and inch or larger, then you know, the 15 foot guideline may need to be examined, at least in the soil that we were working with. Okay, I'll summarize real quickly here. Our trenches were shallow.

We did document that tree roots climb the levee slope. However, because of the shallow trenches, there's more work needed to determine what their behavior is into levee sections and below levee. I think others have pointed out that that's a significant data to get. Then, we think there's some research needed in looking into preexisting trees, those that have established root systems before the levees were built and those trees that have grown since the levee was there because we think there are differences. And, again, deeper roots need -- we noted some during some exploratory trenches, they have concern and this additional study definitely needed to document that. I'll just close and say that we've been focused on the Lake Pontchartrain levees around New Orleans. We've got about 900 miles of other levees and we've got lots of tree encroachments along the Mississippi River and the [unintelligible] Bay, so we have lots of work ahead of us. Thank you.