



# NEWS RELEASE

U.S. ARMY CORPS OF ENGINEERS

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## USACE Releases Report on Initial Research into the Effects of Woody Vegetation on Levees

**WASHINGTON** – The U.S. Army Corps of Engineers (USACE) today released the results of an advanced, quantitative research effort on the impacts of trees on levees. The research, conducted by the U.S. Army Engineer Research and Development Center (ERDC), focused primarily on the gathering of root characterization and site conditions through fieldwork, and modeling of single, living trees for both slope stability analyses and seepage analyses.

USACE will use this new information to inform its decision making for trees on levees in the USACE levee safety program. The research report, *Initial Research into the Effects of Woody Vegetation on Levees*, is available at <http://wri.usace.army.mil>.

“Life safety is a top priority,” said Steven Stockton, USACE director of Civil Works. “We are always looking for new and better information to improve our levee safety policies and procedures, while helping levee sponsors make better informed decisions about safety and setting priorities.”

The research included an extensive literature search (263 publications from 30 countries), which revealed minimal information on the complex scientific relationship between levees and trees. USACE started this initial research effort to help determine and quantify the effects, both positive and negative, of trees on levees. The research team included scientists and engineers with geotechnical, environmental, geological, biological and geophysical expertise.

In addition to the global literature review, the research included site characterizations and assessments, field data collection (root mapping, root strength and soil properties) and numerical model development. The research team modified a root pull-out apparatus and applied non-intrusive methods to map tree roots. The team also developed two-dimensional and three-dimensional computer models to help quantitatively define tree root impacts on levee slope stability and seepage.

This initial research advanced USACE knowledge and understanding of some aspects of this complex issue. The presence of trees on a levee increases the uncertainty associated with levee integrity and performance. ERDC researchers considered the effects of trees at various locations on levees and found that a tree may either increase or decrease the factor of safety. At some locations where a tree was found to increase the factor of safety under one set of conditions, that same tree was found to decrease the factor of safety when other likely conditions were considered. ERDC researchers have determined that because of the many variables, including climate, moisture, soil types, tree species and levee designs, the full impacts of trees on levees may never be fully quantifiable.

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[WWW.USACE.ARMY.MIL/LEVEESAFETY](http://WWW.USACE.ARMY.MIL/LEVEESAFETY)

Though this initial research on impacts of vegetation on levees resulted in additional valuable information, the total impact of vegetation, such as large trees, on levees continues to be extremely complex, highly variable, and unquantifiable. USACE remains confident that a well-constructed levee with well-maintained grass cover represents the optimal goal for reducing the uncertainty of the performance of levee systems. This better ensures long-term reliability throughout the project life. Although the results of this initial research do not warrant a change to the USACE national vegetation management standard, USACE will use the results to inform its decision making for trees on levees in the USACE levee safety program, such as prioritizing deficiencies.

USACE will, however, consider continued research into the impact of trees on levees as it seeks to improve its levee safety policies and procedures. Furthermore, the addition of quantitative and qualitative research will help levee sponsors make better informed decisions about safety and set priorities for operation and maintenance among limited resources. As a next step, USACE will work with other science professionals and stakeholders to identify mutually beneficial research topics.

USACE is working on three levee vegetation management-associated products, intended to improve levee safety policy. Release of these final actions will be in a phased approach in the latter half of 2011. The first is today's report release on ERDC's initial research on the effects of woody vegetation on levees. The second, scheduled for release this fall, is a system-wide improvement framework policy. This policy provides committed levee sponsors an opportunity to implement an interagency approach to identify solutions that optimize resources and prioritize improvements and corrective actions based on risk. The third action is the revised vegetation variance request policy guidance, which outlines the process by which a levee sponsor may request a variance to its current vegetation standards. The revised draft will be posted in the Federal Register late this year after which comments will be considered before issuing the final policy.