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Treatment of Vegetation within Local Flood-Damage-Reduction Systems

20 April 2007

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Prepared by CECW-CE

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Executive Summary

A review of the U. S. Army Corps of Engineers (USACE) Levee Safety Program has identified numerous flood-damage-reduction systems requiring actions to address deficiencies. These systems risk losing "Active Status" in the USACE Rehabilitation Inspection Program and the loss of certification within the National Flood Insurance Program.

Two prevalent deficiencies are the presence of vegetation and insufficient widths of vegetation-free-zones that do not meet current guidance. A vegetation-free-zone is an area adjacent to the landside and/or riverside toe of a levee or floodwall and appurtenant structures where no type of vegetation, with the exception of grass, is permitted. USACE requires this zone for maintenance and flood-fighting activities and it must be easily accessible at all times.

In reviewing our policy, USACE has guidance for landscaping and for granting variances. The policy for vegetative-free-zone is relatively new; consequently, there are systems that do not meet current guidance. Therefore, USACE's recommendations for additional easement areas will require discussions with the administration.

USACE has to communicate to the Districts, the sponsors, and those parties for non-Federal systems within Rehabilitation and Inspection Program that they need to clear vegetation that impacts public safety and acquire additional easement areas where necessary. A few general communications principles will guide the plan. USACE must do more than communicate its conclusions on vegetation and levee maintenance standards. Stakeholders need to understand what guided those conclusions, including the process USACE used to develop the conclusions, the rational and technical data that supports these conclusions, and that project sponsors and levee owners should implement these conclusions.

In order to achieve coordination and consistency, it is crucial that USACE first communicate these elements within its own organization. Every USACE commander, manager, and employee who is involved with levee safety or comes in to contact with the public needs to fully understand the key messages and talking points on this issue in order to present a consistent message to the public.

Key findings are:

(1) Current USACE policy and guidance provides the technical requirements for landscaping local flood-damage-reduction systems. There is a need to update and clarify specific features.

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(2) There are projects that do not meet current minimum vegetation-free-zones.

(3) Where this white paper focuses on vegetation management, inspections revealed various kinds of public and private encroachments to include USACE permitted facilities.

(4) Local sponsors claim that since USACE allowed some vegetation on levees in the past, it is USACE's responsibility to consult with the U. S. Fish and Wildlife Service and the National Marines Fishery Service according to Section 7 of the Endangered Species Act.

(5) There are levees "grandfathered in" with a significant amount of vegetation not in compliance with policy.

(6) Until recently, levee inspections did not identify large trees on levees as an issue for correction; therefore, sponsors did not remove trees. In addition, there are instances Districts permitted vegetation as mitigation solutions.

The white paper provides recommendations to maintain the integrity of the flood-damage-reduction system, to provide clear and direct access for inspections, to provide access and minimize risk during flood fighting activities, and to meet environmental needs where public safety is paramount.

USACE can act within existing policy to remove vegetation, but only within existing project easements areas. Environmental mitigation is the most likely solution to addressing impacts to the Endangered Species Acts (ESA). It is the opinion of some Districts, USACE is responsible for this cost. USACE should prepare itself to advise the administration and congress as to the costs associated with complying with the ESA for both Federal and non-Federal systems, and anticipate funding compensation in the form of mitigation.

Therefore, it is necessary for USACE to assess and report to the administration and congress the costs associated with environmental mitigation and procurement of easements, and the cost to the nation for lost benefits for projects placed in an inactive status for not meeting requirements in a timely manner.

USACE should establish a multidisciplinary Project Delivery Team (PDT) to develop and implement plans. The PDT's primary goal is to achieve public safety with processes to manage the impacts (e.g. environmental, real estate, regulatory). The PDT should continue through the period necessary to assist with the national implementation plan. The process includes 12 tasks performed over a minimum 4-month period with extended support for probably another two years. The estimated cost for the PDT is $.

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ABREVIATIONS

ASA (CW)	Assistant Secretary of the Army (Civil Works)
ASDSO	Association of State Dams Safety Officials
CFR	Code of Federal Regulations
CWA	Clean Water Act
DA	Department of the Army
EM	Engineering Manual
EP	Engineering Pamphlet
EPA	Environmental Protection Agency
ER	Engineering Regulation
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
HCP	Habitat Conservation Plan
HQUSACE	Headquarters, United States Army Corps of Engineers
ICOLD	International Committee on Large Dams
ICW	Inspection of Completed Civil Works
LCA	Local Cooperation Agreements
MSC	Major Subordinate Command
NEPA	National Environmental Protection Act
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
OHWM	Ordinary High Water Mark
OMRR&R	Operation, Maintenance, Repair, Replacement, and Rehabilitation
Q&A	Questions and Answers
PAO	Public Affairs Office
PCA	Project Cooperation Agreements
PDT	Project Delivery Team
PL	Public Law
RIP	Rehabilitation and Inspection Program
USACE	United States Army Corps of Engineers
USC	United States Code
USFWS	United States Fish and Wild Life Service

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Definitions

Ordinary High Water Mark (OHWA) – A line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area.

Root-Free-Zone – An area that provides a margin of safety between the greatest expected extent of plant roots and the beginning face of the basic project structure. The basic project structure is the engineered feature required for human safety. The bottom of the root-free-zone will be the external limits of the cross section of the levee, embankment, or floodwall established by the design engineer for stability and/or seepage control.

Vegetation-Free-Zone - An area adjacent to the landside and/or riverside toe of a levee or floodwall and appurtenant structures where no type of vegetation, with the exception of grass, is permitted. The zone is required for maintenance and flood-fighting activities and it must be easily accessible at all times.

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1. Introduction

The review of the U. S. Army Corps of Engineers (USACE) Levee Safety Program and the development of a National Levee Inventory have resulted in numerous flood-damage-reduction systems requiring actions to address deficiencies. These systems risk losing "Active Status" in the USACE Rehabilitation Inspection Program and the loss of certification within the National Flood Insurance Program. USACE is in the process of issuing guidance to the Districts on how to address deficiencies and notifications procedures to local sponsors to take corrective actions.

Two prevalent deficiencies are the presence of vegetation and insufficient widths of vegetation-free-zones that do not meet current guidance. A vegetation-free-zone is an area adjacent to the landside and/or riverside toe of a levee or floodwall and appurtenant structures where no type of vegetation, with the exception of grass, is permitted. USACE requires this zone for maintenance and flood-fighting activities and it must be easily accessible at all times.

In reviewing our policy, USACE has guidance for landscaping and for granting variances. The basis for all this guidance is public safety. Yet, we have many situations that are not in line with the guidance and, in addition, encroachments that have a similar impact.

Section 2 discusses the effects vegetation can have on the reliability of a flood-damage-reduction system. Section 3 provides a compendium of Federal programs applicable to local flood-damage-reduction systems. Section 4 examines policy for vegetation, vegetation-free-zone, and variances, and adds a discussion pertaining to encroachments. Section 5 examines the environmental considerations in eradicating unwanted vegetation. Section 6 presents findings and Section 7 presents recommendations.

2. The Effects of Vegetation on Reliability and Risk:

Any debate about vegetation will demonstrate both detrimental and beneficial effects on local flood-damage-reduction systems. Vegetation in the wrong place can harm structural integrity, obscure the visibility of slopes, impede access for maintenance and inspection, and hinder emergency flood fighting operations. Trees (greater than 4-inches in diameter) might have open passages along its roots, become uprooted in wind and remove soil from a levee, or possibly fall across the crown of a roadway during patrolling. On the waterside, uprooting can divert water flowing in the channel against a levee, resulting in erosion. Flow around a trunk in the watercourse can create downstream eddies resulting in erosion. On the landward side, fallen trees can cause a concentration of seepage near the resulting root-ball hole. This could happen near the toe of the slope where the seepage

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potential is the greatest. Roots seek water, which can make drainage systems ineffective or provide paths for seepage and undermining. In addition, rodent borrows can weaken systems, and provide paths for seepage and undermining. Excessive vegetation on levee slopes makes it difficult to detect rodent burrows.

However, USACE guidance as far back as 1971 recognizes beneficial aspects as simple as ground cover protecting slopes from rain-induced surface erosion, and strategic plantings for aesthetics. Current guidance promotes vegetation in the floodway to provide habitat and protection for fish and wildlife species as long as it balances impacts on channel capacity, minimizes possible build-up of debris, and does not cause additional flooding. Species planted or allowed to remain on levees should not present a hazard to system maintenance and flood-damage-reduction. For example, on landward levee slopes, thickets of trees and bushy plants can obscure the view from the crown to the toe where boils and leaks are most likely to occur. These same plants may also physically impede flood-fighting efforts, such as the construction of ring dikes to control boils, and will interfere with monitoring of problem areas.

On the riverward slopes, observation and visibility are not as important because internal erosions is not a consideration. However, the riverward side slope from the normal high still water level should be free of obstructions so that in times of flood emergency, protective measures can be placed to stabilize structural problems such as erosion or sloughing. Armored levee slopes are generally more stable than unarmored slopes. They are, however, susceptible to the same problems that unarmored slopes exhibit, and inappropriate vegetation can result in damage to an armored revetment.

Overbuilt levees as compared to minimum levee sections have a greater safety margin by virtue of their increased size. The increased dimensions allow the trees to grow in an area outside of the minimum levee section. However, a designer must validate the reason for the overbuild section on a case-by-case basis. Although a levee section has an overbuilt section, the designer must verify the larger section is appropriate for planting as oppose to meeting some stability requirement.

USACE is developing technical guidance to assess the reliability of local flood-damage-reduction systems in order to quantify the risk a system presents to a community. This is part of a Federal effort to shift to risk based analysis to better prioritize infrastructure investment to maximize flood damage reduction.

The equation for risk is the probability of an event such as flood (or a hurricane) times the probability of the flood-damage-reduction system will not perform when protecting against the flood times the consequences measured in loss of life or economic impacts. This will give decision makers a means to measure which systems are most reliable. It will determine if the residual risk is tolerable within nationally established guidelines, and determine whether the system will perform as authorized. Residual risk is the remaining level of risk at any time before, during, and after a program of risk mitigation measures has been taken (ICOLD Bulletin 130, 2005). It will help the decision makers to prioritize flood-damage-reduction investment on a national level.

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A building code in the form of design guidance for a flood-damage-reduction system dictates a certain standard of reliability. That design guidance includes landscaping that is compatible with meeting that standard of reliability. Furthermore, it is important to maintain that reliability through an effective operations and maintenance program. When USACE grants variances that deviate from the design guidance or result in an ineffective maintenance program, the vegetation reduces the reliability of the system to perform during a flood or coastal storm and increases the residual risk.

Where vegetation has detrimental effects, it reduces the strength and perhaps the weight of a levee, it can cause underseepage and piping, it clogs drains causing uplift pressures, and over turned trees change the stability geometry of a levee or crack a wall. Overall, such effects weaken the structure, reduce its reliability, and increase its probability that it will fail during a flood.

Engineering Manual (EM) 1110-2-301 provides guidance on where to place vegetation to avoid detrimental effects and maintain reliability. Revised inspection guidance provides a means to qualify the impacts of vegetation that deviate from the engineering manual. The reliability analysis will equate the inspection findings to the system's ability to perform during a flood with the presence of any harmful vegetation that could cause harm.

Therefore, in making arguments to protect and retain vegetation that deviates from the engineering manual, there is a trade off. The presence of vegetation detrimental to the system's ability to perform during a flood, results in a lower reliability. That lower reliability in the above risk equation will result in a higher probability of loss. The decision makers need to understand that the presence of vegetation can increase the risk for the loss of life and economic hardship in their community.

3. Federal Programs

The ownership and maintenance responsibilities of the vast majority of local flood-damage-reduction systems reside with the local community or a private entity. Even though Federal agencies such as the USACE, Natural Resources Conservation Service, Tennessee Valley Authority, and the U. S. Bureau of Reclamation designed and built many flood-damage-reduction systems, the local sponsor has the responsibility for maintenance and operations of the systems. Some of these systems are in the USACE Rehabilitation and Inspection Program under the authorities of Public Law (PL) 84-99 whereby USACE will provide emergency repair of the levees on a cost-shared basis, and under certain situations. There are also many privately held levees and certain states, such as California, have established special levee Districts to maintain the public levees in these Districts.

Congress established the National Flood Insurance Program (NFIP) with the National Flood Insurance Act of 1968 (PL 90-448). The program provides management measures to reduce vulnerability to flood damage while also providing a flood insurance safety net for individuals generally not available through commercial markets.

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The NFIP enables levee owners in participating communities to purchase insurance as protection against flood losses. A community's participation in the NFIP is voluntary based on an agreement between communities and the Federal Government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk in floodplains, the Federal Government will make flood insurance available within the community.

As part of the NFIP, Federal Emergency Management Administration (FEMA) requires certifications as outlined in Title 44 of the *Code of Federal Regulations* (CFR) 65.10. FEMA also requires owners to coordinate with the USACE in establishing a nationwide inventory of levees (local flood-damage-reduction systems).

For local flood-damage-reduction systems within the NFIP, 44 CFR 65.10 outlines the code regulations that safeguard the public health and safety in all communities, large and small. FEMA is responsible for the identification and mapping of special flood hazard areas as defined in 65.10. Per the CFR, FEMA will only recognize those systems that meet, and continue to meet, minimum design, operations, and maintenance standards that are consistent with the level of protection sought through the comprehensive flood plain management criteria established by 44 CFR 65.3.

The 44 CFR 65.10 outlines the design criteria requirements to give evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists. It provides performance requirements where "…shall evaluate expected seepage during loading conditions associated with the base flood and shall demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability." The CFR offers USACE guidance as a standard of care.

USACE conducts operations and maintenance inspections of Federal and non-Federal, flood-damage-reduction projects under the Inspection of Completed Works (ICW) and Rehabilitation and Inspection Program (RIP).

USACE requires inspections within ICW for all Federal flood-damage-reduction systems which have non-Federal sponsors responsible for the projects operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) or as otherwise specified in Project Cooperation Agreements (PCA), Local Cooperation Agreements (LCA), and other agreements based on Section 221 of the Flood Control Act of 1970 (PL 91-611) or other legislation.

The primary purpose of these inspections is to assure sponsor compliance with existing agreements; insure that owners properly operate and maintain facilities constructed by the United States; and make eligibility determinations for rehabilitation assistance based on whether levee owners performed the necessary minimum project maintenance.

Engineering Regulation (ER) 1130-2-530, Flood Control Operations and Maintenance Policies and ER 500-1-1, Emergency Employment of Army and other Resources Civil

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Emergency Management Program provides the current policy and inspection guidance for the ICW program. However, as of Fiscal Year 2007, USACE directed Districts to use ER 500-1-1 to perform inspections of all Federal and non-Federal projects.

The RIP is the USACE program that provides for inspections of constructed Federal and non-Federal flood-damage-reduction systems that meet the minimum program eligibility requirements defined in ER 500-1-1. This program also provides rehabilitation assistance to both Federal and non-Federal projects damaged by floods and storms. Rehabilitation assistance is limited to repairs or restoration to the project's pre-disaster condition and level of protection. Rehabilitation of eligible non-Federal projects is cost shared with the projects public sponsor, while rehabilitation of eligible Federal projects is funded 100 percent by the Federal government. In order for projects to be eligible for rehabilitation assistance, they must maintain acceptable project ratings during routine operation and maintenance inspections conducted by USACE under the ICW and RIP inspection programs.

In addition, 33 CFR 208.10 outlines USACE and sponsor responsibilities for the operation and maintenance of local flood-damage-reduction systems. The guidance provides detailed requirements restricting encroachments (208.10.a.4), improvements without approval of the Department of the Army (208.10.a.5), and maintenance and operation requirements for various features such as levees, floodwalls, drainage structures, etc. (208.10.b through h). Guidance for levees (208.10.b) specifically states, "Measures shall be taken to promote the growth of sod, exterminate burrowing animals, and to provide for routine mowing of the grass and weeds, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. Where practical, measures shall be taken to retard bank erosion by planting of willows or other suitable growth on areas riverward of the levees." For floodwalls (208.10.c) it states, "No trees exist, the roots of which might extend under the wall and offer accelerated seepage paths."

For all federally constructed projects, USACE negotiates a project cooperation agreement where the sponsor is to comply with various requirements. As part of the agreement, USACE prepares an operations and maintenance manual, and the sponsor agrees to follow the requirements as part of the compliance with 33 CFR 208. USACE has developed a levee owner's manual for non-Federal project sponsors of projects active in the RIP as directed by the Water Resources Development Act of 1996 (PL 104-303). The purpose of this manual is to provide public sponsors of non-federally constructed levees a single reference that describes proper operation and maintenance of flood-damage-reduction projects, and outlines the assistance that USACE can provide before, during and after floods.

ER 1165-2-119 provides policy and guidance on the modification of completed USACE projects, and describes the specific circumstances under which USACE approves modifications. For any proposed modification to an existing federally or locally maintained project that goes beyond those modifications required for normal operations and maintenance, requires approval under 33 *U. S. Code* (USC) 408. 33 USC 408 states

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that there shall be no temporary or permanent alteration, occupation or use of any public works including but not limited to levees, sea walls, bulkheads, jetties and dikes for any purpose without the permission of the Secretary of the Army. Under the terms of 33 USC 408, any proposed modification requires a determination by the Secretary that such proposed alteration or permanent occupation or use of a Federal project is not injurious to the public interest and will not impair the usefulness of such work. 33 USC 408 delegates the authority to make this determination and to approve modifications to Federal works under to the Chief of Engineers.

4. Status of Current Policy and Guidance

4.1 Vegetation

The Federal agencies and the professional engineering community at large recognizes vegetation in and around flood-damage-reduction systems such as dams, levees, and flood walls can undermine the integrity of the systems by impacting seepage protection measures and stability. Therefore, the Federal agencies promote and enforce the practice of proper maintenance and control of vegetation to avoid impacts on structural integrity, allow for proper visual inspections, and to allow access for emergency actions. The reference, *Dams and Public Safety, A Water Resources Technical Publication*, by Robert B. Jansen, published by the U. S. Department of the Interior, Bureau of Reclamation, includes the following passage:

"Grass on the embankment and in its immediate vicinity should be mowed to permit observation of any cracking, sliding, or seepage. Trees and bushes must not be allowed on embankments, not only because they limit access and visibility, but also because they pose potential hazards due to toppling in windstorms, fill cracking by root invasion, or opening of seepage paths by root decay. The embankment must also be kept free of burrowing animals."

At the state level, the Commonwealth of Virginia actually has a law that prohibits vegetation on dams, in the *Code of Virginia*, § 10.1-609.2:

"Dam owners shall not permit the growth of trees and other woody vegetation and shall remove any such vegetation from the slopes and crest of embankments and the emergency spillway area, and within a distance of 25 feet from the toe of the embankment and abutments of the dam. Owners failing to maintain their dam in accordance with this section shall be subject to enforcement pursuant to § 10.1-613."

USACE has long recognized that the science and engineering that applies to dams also applies to local flood-damage-reduction systems and treats vegetation as a public health, safety, and welfare issue for both dams and local flood-damage-reduction systems. The failure mode mechanics are the same and USACE generally limits vegetation to ground cover. However, following the emergence of environmental legislation, USACE first issued a technical letter in 1971 followed by an engineering manual in 1972 providing

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guidance for landscaping at floodwalls, levees, and dams combining public safety with environmental enhancements.

Current USACE guidance for vegetation policy applicable to both Federal levees and non-Federal levees under the Rehabilitation and Inspection Program is in three documents: EM 1110-2-1205, Environmental Engineering and Local Flood Control Channels; EM 1110-2-301, Guidelines for Landscape Planting for Floodwalls, Levees, and Embankment Dams; and ER 500-1-1, Emergency Employment of Army and Other Resources Civil Emergency Management Program.

ER 1110-2-1205 provides guidance for incorporating environmental considerations in the planning, engineering, design, and construction of flood control channels, levees, and associated structures. Section 4.8 addresses levees and floodwalls, and in discussions about root caused seepage and erosion around the base of trees, it refers to EM 1110-2-301. Chapter 5 addresses environmental considerations for operating and maintenance and references 33 CRF 208.10, EM 1110-2-301, and two 1130 series engineering regulations now superseded by ER 500-1-1. The guidance is silent on the assessing impacts under 33 USC 408 that may require the approval by the Chief of Engineers in accordance with ER 1165-2-119. Any enhancements that alter the hydraulic capacity of the flood-damage-reduction system will impact the authorized level of protection.

EM 1110-2-301, Chapter 2, discusses vegetation and root-free-zones. Paragraph 2.2- defines the vegetation free zone as the area adjacent to the landside or riverside of the toe of the levee, floodwall, or embankment and appurtenant structure and limits growth to grass. The zone is required for maintenance and flood fighting activities and must be easily accessible at all times. Figures 2-1 through 3 show the waterside and landside Vegetation Free Zone as 5 Meters (15 feet).

However, this guidance is in not in agreement with 33 CFR 208.10, a policy that encourages the planting of willows or other suitable growth on areas riverward of the levees. Nor does the manual provide guidance where the riverside slope of the levee extends into a river. Therefore, EM 1110-2-301 needs to clarify landscaping needs to foster the ecological enhancements in EM 1110-2-1205 with the needs for safety, particular below the regulatory Ordinary High Water Mark.

Paragraph 2.3 defines the root free zone as the margin of safety between the greatest expected extent of roots and the beginning face of basic project structure. The basic project structure is the engineering feature required for public safety. The bottom of the root structure zone is the external limits of the cross section of the levee, embankment, or floodwall established by the design engineer for the stability and/or seepage control. Figures 2-1 through 3 show the levee cross section, foundation, and any drainage collection (blanket, toe, etc.) features free of having roots.

ER 500-1-1, Section 5-22, provides the policy for regional variances on vegetation standards policy and a process to request for variances. Paragraph 5-22.c Policy-Federal and -Federal Levees, states the public sponsor of an active flood control levee may seek a

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variance from USACE policy…so as to allow additional vegetation to grow on levees, when allowing such vegetation would preserve, protect, and/or enhance natural resources, and/or protect the rights of Native Americans. USACE only will grant variances if:

(1) The safety, structural integrity, and functionality of the levee are retained; and

(2) Accessibility for inspection and flood fighting purposes is retained; and

(3) The level of protection does not fall below the level necessary for levee certification under the National Flood Insurance Program if the levee is currently so certified; and

(4) The level of protection does not fall below the minimum permissible for PL 84-99 acceptability…

Engineering Pamphlet (EP) 500-1-1, paragraph 5.8.k provides the procedures for preparing Regional Variances for Vegetation Standards in Appendix E (not D as stated in the paragraph). However, where ER 500-1-1, Section 5-13, Environmental Considerations, paragraph 5-13.a (6) refers to EM 1110-2-301 for guidance on root-free and vegetation free zones, the procedures in EP 500-1-1, Appendix E are not in agreement with the engineering manual. Paragraph E-3.b (4) (c) states under where the consequences are low, it may be more amenable to allow more vegetation where the engineering manual makes no such distinction. A more egregious conflict is in the model Regional Variance Agreement, Figure E-1, VI.B (1), which allows non-herbaceous (such as trees) with a diameter less than 5 inches where the horizontal distance between such vegetation will generally be at least 25 feet apart. This statement does not take into consideration the requirements for vegetation and root-free-zones defined in the manual.

ER 500-1-1, paragraph 5-5.b (2) (b) defines the following project condition as presented in EP 500-1-1, Table 5-2:

a. Acceptable – No immediate work required, other than routine maintenance. The flood control project will function as designed and intended, with a high degree of reliability, and necessary cyclic maintenance is being adequately performed.
b. Minimally Acceptable – One or more deficient conditions exist in the flood control project that needs to be improved/corrected. However, the project will essentially function as designed and intended; but with a lesser degree of reliability than what the project should provided. Specific items of the project must be improved/corrected.
c. Unacceptable – One or more deficient conditions that can reasonably be foreseen to prevent the project from functioning as designed intended or required.

However, USACE is in the process of modifying the levee inspection checklist provided in the *Levee Owner's Manual for Non-Federal Works* available at http://www.usace.army.mil/cw/em/fcw/lom/html to address both Federal and non-Federal levees and establish a new rating criterion. Vegetation control is part of the checklist.

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Unwanted vegetation growth will fall in to one of two categories under the proposed modifications.

a. Minimally Unacceptable – A minimum number of trees (2 inch diameter or smaller) and/or brush are growing on the levee or within the 15-foot zone or existing easement limits that do not currently threaten the integrity of the system but which need to be removed.
b. Unacceptable – Significant vegetation growth (brush, weeks, or any trees greater than 2 inches in diameter) exits on the levee, and needs to be removed to reestablish or ascertain levee integrity.

For systems that have an unacceptable rating for vegetation, Districts will perform an engineering assessment to determine if there is an immediate impact on the project overall rating. If it does, the system will receive and an overall rating of unacceptable, and will have an inactive status in the IRP program until the sponsor corrects all items rated unacceptable. If not, the project receives a minimally acceptable rating and the sponsor has up to two years to correct unacceptable items.

USACE developed its guidance on an effective maintenance program to control vegetation to meet the requirements in EM 1110-2-301. Therefore, it is silent on appropriate measures and procedures for eradicating poorly managed vegetation on both dams and levees. However, recent publications by FEMA in support of the National Dam Safety Program and assistance to states offer recommendations to remove unwanted vegetation and to treat animal burrows usually found in over grown areas.

In 1999, FEMA conducted a workshop with The Association of State Dam Safety Officials (ASDSO) on the plant and animal impacts on earthen dams. The workshop participants represented interdisciplinary interests from academia; Federal, state and local agencies; and private interests. The workshop led to the development of two FEMA Technical Manuals for Dam Owners, FEMA 473, *Impacts of Animals on Earthen Dams*, and FEMA 534, *Impacts of Plants on Earthen Dams*, published September 2005. This guidance is applicable to local flood-damage-reduction systems since the technology is the same, particularly for those systems that function as a dam

4.2 Vegetation-Free-Zone

A review of historic guidance indicates, in 1993 USACE established a need for a vegetation-free-zone required for maintenance and flood-fighting activities that must be easily accessible at all times. Apparently, prior to this time, USACE used judgment to establish vegetation-free-zones that were most compatible with site specific conditions that fulfilled the requirement as best as possible.

An appropriate setback is a function of the presence of vegetation that could induce seepage and instability, access for inspection, and room for emergency operations. A review of historic guidance indicates USACE first defined a specific zone required for maintenance and flood fighting in a 1993 edition of EM 1110-2-301, which is in the

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current 2000 edition. Figure 2 shows vegetation-free-zones and recommends a minimum of 15 feet from toe drains for levees, and Figure 3 shows a minimum of 8 feet from toe drains for walls. FEMA 534 recommends half the height of a dam embankment.

However, EM 1110-2-301 is the only document that mentions requirements, which consists of one sentence to define a zone that must be acceptable at all times. There is no other discussion in guidance for planning, real estate, or manuals for the design of levees and floodwalls.

At a minimum, the setback should be sufficient to allow for the inspection of the downstream area for seepage and piping, and access for taking corrective action such as the construction of sand bag rings to contain seepage. EM 1110-2-1913, section 8-9 recommends roads at reasonably close intervals to allow access for the purpose of inspection, maintenance, and flood-fighting operations. Section 6-1.c recommends for normal maintenance operations and flood fighting operations a minimum crest width for a levee as 10-12 feet with wider turnaround areas provided at specified intervals. Section 8-9.b provides recommendations for turnouts every 2500 feet and turnarounds at least at dead ends.

EM 1110-2-2502, Retaining Walls, and Floodwalls discuss easements in section 7-15. Its focus is on impacts to adjacent structures and seepage protection measures needed to maintain protection against uplift pressures. It makes no specific setback requirements and section 7-16 references EM 1110-2-301 for landscaping considerations.

USACE guidance is silent on the hazards of falling trees outside the vegetation-free zones. This is particularly critical where a falling tree can damage a wall. At a minimum, USACE should require cutting any tree to the ground that is outside the vegetation-free zone on the riverside or protected side of wall large enough to fall and damage the wall.

At a minimum, a 15 foot setback would provide access if supplemented with turnouts and turnarounds; however, greater vegetation-free-zones are warranted where a professional engineer considers it necessary for maintaining public safety.

USACE has projects where existing easements widths do not comply with current landscaping standards. Therefore, it is necessary for USACE to execute necessary actions within existing easements. However, USACE needs to rectify the deficiency and quantify the impacts.

4.3 Variances

Flood-damage-reduction systems are designed and constructed to a certain “standard of care” to insure reliability during the flood events. The systems include operation and maintenance manuals to insure owners maintain the system’s reliability.

The challenge is when subsequent activities or inadequate maintenance infringes on thresholds without the full appreciation of the impacts on the public safety. For example,

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USACE has allowed vegetative growth that has fostered ecological enhancements at the possible expense of the project's intended purpose, flood-damage-reduction. As noted, ER 500-1-1 gives the District Commander authority to grant a variance to allow additional vegetation to grow on levees, when allowing such vegetation would preserve, protect, and/or enhance natural resources. This variance is acceptable provided such a variance retains the safety, structural integrity, and functionality of the flood-damage-reduction system. However, we have a contradiction between the approval authority presented in ER 500-1-1 and the professional registration requirements in ER 690-1-1212, which is in TAB C.

In addition, it is apparent from the recent inspection that USACE has allowed vegetation to remain in place without assessing the impacts of variances on the reliability of the systems. The resultant growth has become an ecological benefit, but proponents of this benefit may not recognize how such growth has compromised the integrity of the system. As a result, we can expect internal resistance, resistance from sponsor and other interested parties such as those sensitive to ecological issues.

4.4 Encroachments

Where this white paper focuses on vegetative management, the inspections revealed various kinds of public and private encroachments. Districts follow ER 1165-2-119, Modifications to Completed Projects to assess requests for public infrastructure such as utilities and highway bents. More troubling are the private structures such as houses, docks, poles, and pools. The presence of docks indicates USACE regulators are not aware a permit is affecting a flood-damage reduction project.

5. Environmental Considerations:

Under the ICW and RIP programs, USACE's responsibility is to public safety. Districts shall perform accurate and responsible inspections, inform the local sponsor of the condition of the project, list any recommendation necessary, and communicate any other programs under the USACE authority, which may be able to assist them in performing the required work; however, the responsibility for action and environmental compliance rests with the local sponsor.

USACE's responsibility to public safety does not obviate the need for compliance with environmental laws, regulations, and policies. ER 500-1-1, Environmental Considerations outlines the necessary permits needed for a rehabilitation project.

Otherwise, as noted in ER 500-1-1, Section 5-13.a (3), Section 404(f) (1) of the Clean Water Act (CWA), as implemented by 33 CFR 323.4 (a) (2), specifically exempts routine maintenance of levees (which includes tree cutting and tree root removal) from the requirement to obtain a Department of the Army (DA) permit, pursuant to Section 404. ER 500-1-1, Section 5-13.a (3) provides guidance on how the exemption should be applied. It refers to EM 1110-2-301 for guidance on root-free and vegetation free zones. It also notes maintenance does not include modifications to the project and mechanized

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removal may require authorization under Section 404 and/or Section 10. Other permits (e.g. from a State Fish and Wildlife Agency) may be required regardless of the need for a DA permit. ER 500-1-1, Section 5-13.a (5) notes that "[m]echanized tree and root removal within non-structural channels may require authorization under Section 404 and/or Section 10" because it is not subject to the Section 404(f)(1) exemption for routine maintenance of levees. In order to avoid circumstances in which an entity may need to obtain a permit for maintenance of a levee because mechanized tree or root removal is required, vegetation should be treated early and often. Regular treatment will preclude the types of growth that necessitate the invasive, mechanized activities that require a permit.

Generally, activities conducted above the Ordinary High Water Mark (OHWM) of a jurisdictional water and that do not directly result in the discharge of material into that water do not require DA approval under Section 404 or Section 10. However, wetlands adjacent to other jurisdictional waters, regardless of whether the wetlands are natural or artificially created, and regardless of whether the wetlands are above or below the OHWM, may be jurisdictional and subject to the same CWA permitting requirements and exemptions. USACE will assess adjacent wetlands on a case-by-case basis, to determine if they are jurisdictional. A possible source of water for wetlands is seepage under a wall or through a levee, and possibly induced by harmful vegetation clogging a drain or weakening the foundation or embankment.

When considering animal and plant habitat during levee construction and maintenance, it is necessary to take into account the Endangered Species Act of 1973 (ESA). Certainly, during levee construction and rehabilitation, the USACE is responsible for ESA consultation; however, once USACE turns over the levee to the local sponsor for operations and maintenance activities, the sponsor should conduct any consultation required. Once transferred, sponsors pay 100% of the cost associated with operations and maintenance.

USACE has issued corrective actions to sponsors to remove thick brush, which inhibits maintenance, inspections, floodlighting and reduces channel capacity. Districts also have advised local sponsors that they are required to complete any required consulting activities with resource agencies; and that USACE has no action or involvement when dealing with vegetation management on levees maintained by local sponsors. <u>However, local sponsors claim that since USACE allowed some vegetation on levees in the past, it is our responsibility to consult with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) according to Section 7 of the ESA.</u>

Because of USACE's directions to remove vegetation, sponsors have brought up several issues regarding coordination with USFWS and NMFS, particularly in the western Major Subordinate Commands<u>. Two primary issues are that 1) several of the levees in their current system were "grandfathered in" with a significant amount of vegetation on them, and 2) until recently, levee inspections did not identify large trees on levees as an issue for correction; therefore, sponsors did not remove trees. In fact, there are instances Districts permitted vegetation as mitigation solutions.</u>

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Section 7 states, in part, that federal agencies must consult on "any action authorized, funded, or carried out by such agency" to ensure that agency actions are "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical] habitat…". Furthermore, Section 7 imposes a similar requirement for species that are proposed for listing as endangered or threatened and for habitat that is proposed for designation as "critical habitat." In the case of proposed species listings and habitat designations, agencies must confer with USFWS or NMFS on any agency action "which is likely to jeopardize the continued existence of any species proposed to be listed under Section 4 or result in the destruction or adverse modification of critical habitat proposed to be designated for such species." Clearly, in many instances, clearing vegetation could be considered an adverse modification to critical habitat and possible adverse effect on listed species.

Section 7 establishes a timeline for response, and is preferred by environmental agencies because settling an issue with another federal agency is typically more expedient than working with a State or other non-federal agency. Under ESA, State or other non-Federal agencies are subject to ESA Section 10, which requires a Habitat Conservation Plan (HCP) and an incidental take permit. Section 10 does not establish a completion timeline. If local sponsors proceed under Section 10, an approved HCP and permit could be expensive and time consuming. However, the HCP provides for operations and maintenance actions that are necessary over the life of the project, but incidental take permits contain an expiration date, and a new permit will have to be obtained if work is to occur after the permit expires.

In discussions with the headquarters of the Environmental Protection Agency, U. S. Fish and Wildlife Administration, the National Marine Fisheries Service, and the Department of Interior, they recognize that public safety is paramount. Furthermore, they advised that addressing environmentally sensitive areas would take a collaborative effort.

They recommend a top-down message to field offices to work together to reestablish public safety as the paramount purpose for flood-damage-reduction systems, and to seek means to mitigate impacts. Possible outcomes can range from preservation of environmentally sensitive areas where public safety is not at risk to some form of compensation. Where resolution is difficult or causes hardship, placing flood-damage reduction-system in an in-active status is distinct possibilities until regulating agencies reach a solution.

In executing the above actions, USACE must communicate requirements for National Environmental Protection Act (NEPA) compliance. USACE will need to quantify the impacts where there are conflicting laws and/or conflicts with agreements based on Section 221 of PL 91-611 or other legislation that prohibits action.

6. Key Findings

Any debate about vegetation will demonstrate both detrimental and beneficial effects on local flood-damage-reduction systems. The Code for Federal Regulations, and USACE

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and FEMA guidance are clear that the integrity of the system and public safety are paramount, and that the presence of vegetation can impact and inhibit flood fighting activities. Therefore, the control of vegetation is essential to maintaining the integrity of the flood-damage-reduction systems, to provide clear and direct access for inspections, and to provide access and minimize risk during flood fighting activities.

A key element is a communication plan. USACE has to communicate to the Districts, the sponsors, and those non-Federal systems within RIP that they need to clear vegetation that impacts public safety. USACE is responsible for federally owned and operated systems. USACE will classify other projects as inactive within RIP unless public sponsors take corrective action. With an inactive status rating, FEMA may disqualify these projects for the National Flood Insurance Program.

The recommendations have implications. Policy already exists for vegetation management, yet many systems are not in compliance. The policy for vegetation-free-zones is relatively new and consequently, there are systems that do not meet current guidance.

Key findings are:

(1) Current USACE policy and guidance provides the technical requirements for landscaping local flood-damage-reduction systems.

(2) Where the white paper focuses on vegetation management, inspections revealed various kinds of public and private encroachments to include USACE permitted facilities.

(3) Local sponsors claim that since USACE allowed some vegetation on levees in the past, it is USACE's responsibility to consult with USFWS and NMFS according to Section 7 of the ESA.

(4) There are levees "grandfathered in" with a significant amount of vegetation not in compliance with policy.

(5) Until recently, some Districts did not identify large trees on levees as an issue for correction; therefore, sponsors did not remove trees. In addition, there are instances where Districts permitted vegetation as mitigation solutions and instances where sponsors did not maintain the mitigation in accordance with agreements.

(6) Since USACE developed its landscaping guidance based on an effective maintenance program to control vegetation, it is silent on appropriate measures and procedures for eradicating poorly managed vegetation.

(7) USACE guidance is silent on the hazards of falling trees outside vegetation-zones. This is particularly critical where a falling tree can damage a wall.

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(8) USACE guidance for the minimum setback needed for inspections and emergency operations lacks emphasis. Only one document mentions a zone required that must be assessable at all times and in only one sentence.

(9) There is a contradiction between the approval authority for variances presented in ER 500-1-1 and the professional registration requirements in ER 690-1-1212.

(10) Where ER 500-1-1 refers to EM 1110-2-301 for landscaping, Engineering Pamphlet 500-1-1 is in conflict with the requirements in the engineering manual.

7. Recommendations:

In order to maintain the integrity of the flood-damage-reduction systems, to provide clear and direct access for inspections, to provide access and minimize risk during flood fighting activities, and meet environmental needs where public safety is paramount, USACE recommends the following actions:

7.1 Coordination with Environmental Regulatory Agencies

Headquarters USACE (HQUSACE) should emphasis coordination with environmental regulatory agencies to discuss the implementation of current guidance nation-wide. HQUSACE should work out immediate issues prior to strict enforcement of guidance at the field level. -Federal sponsors with endangered species issues due to required operation and maintenance activities should begin consultation under Section 10 of the ESA. USACE should encourage and guide local sponsors to begin this consultation as soon as possible.

USACE should anticipate the need to compensate under Section 10. Environmental mitigation is the most likely solution to addressing impacts associated with the ESA. Therefore, it is necessary for USACE to assess and report to the administration and congress the costs associated with environmental mitigation, and the cost to the nation for lost benefits for projects placed in an inactive status for not meeting requirements in a timely manor. USACE should consider the amount of time it will take for the sponsor to consult with the resource agencies before USACE places a flood-damage-reduction system in an “Inactive Status.”

7.2 New Policy, Guidance, and Administrative Actions

7.2.1 Interim Supplemental Guidance for EM 1110-2-301

(1) Limit ground cover to a good growth of sod maintained with grass, from two to twelve inches in height, substantially free of weeds and bare spots.

(2) The cross section of the levee or wall constructed for stability, which includes drainage berms, stability berms, impervious blankets, drainage systems, relief wells, or any feature built to maintain structural reliability should remain free of vegetation other

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than ground cover needed to provide protection from erosion. Projects require a regular maintenance program to maintain ground cover, and remove unwanted vegetation. Over built sections can have vegetation, in addition to ground cover, provided plantings meet the requirements for vegetation-free zones and root-free zones, as presented in EM 1110-2-301.

(3) For clarification, Districts should measure the vegetation-free-zones in EM 1110-2-301 to the centerline of the tree trunk.

(4) For vegetation on the riverside, the 33CFR208.10 encourages measures taken to retard bank erosion by planting of willows or other suitable growth on areas riverward of the levees. ER 1110-2-1205 provides guidance for incorporating environmental considerations in the planning, engineering, design, and construction of flood control channels, levees, and associated structures provided the considerations with EM 1110-2-301, which addresses the requirements to protect the public's safety. Any modifications to a completed project that alter hydraulic capacity and reduce the authorized level of protection must comply with the requirements in ER 1110-2-119.

For levees where the Ordinary High Water Mark (or mean high tide or mean high water mark) is below the toe, heavy vegetation to promote ecological needs on the riverside is appropriate provided it is at least 15 feet outside the toe of the levee as shown in EM 1110-2-301. For levees where the Ordinary High Water Mark is above the levee toe, growth two inches in diameter, or less on the levee is appropriate to retard bank erosion from the Ordinary High Water Mark out to 15 feet beyond the toe of the levee. It is important that the operation and maintenance manual include an annual maintenance program to control growth and animal burrows to avoid the need for mechanized removal.

For floodwalls, vegetation on the riverside should be limited to ground cover (or paving) within the vegetation-free zones shown in EM 1110-2-301, to preserve the lateral earth pressures essential for wall stability and provide access. In the area beyond the vegetation free zone, maintenance activities should remove any trees large enough to fall and damage the wall.

(5) For vegetation on the landside of a levee, the minimum vegetation-free zone is 15 feet from the back edge of the levee toe or any interior drainage system such as foundation drains, relief wells, etc.

For floodwalls, vegetation on the landside should be limited to ground cover (or paving) within the 15 feet of the base of the wall at ground level with a minimum 8 feet from the back edge of an interior drainage system such as foundation drains, relief wells, etc.

(6) For clearing and grubbing all vegetation not in compliance with EM 1110-2-301; Districts should cut trees having a stump diameter four inches or less flush with the ground and treat the stump to retard stump and root ball decay; and remove all trees having stump diameters greater than four inches including root balls, and backfill all

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voids with compacted impervious fill or, if judged necessary, install filters and drain systems in root ball cavities where seepage, boiling, or piping is likely to occur. Districts should follow FEMA 437 for the treatment of animal burrows.

7.2.2 New Policy and Guidance

(1) Update EM 1119-2-301 to include the following:

(a) Clarify the graphics and descriptions for vegetation and root-free-zones.

(b) Research the extent of the root system diameter by species to provide guidance for vegetation-free-zones based on the type of local vegetation.

(c) Provide treatment of vegetation on the riverside of the levee linking with the ecological enhancements promoted in EM 1110-2-1205.

(d) Provide guidance for establishing and maintaining appropriate ground cover.

(e) Include requirements for clearing and grubbing of harmful vegetation and treatment of animal burrows.

(f) Address the hazard of falling trees to walls out side of the vegetation-free zone. Maintenance activities should cut to the ground any tree outside the vegetation-free zone large enough to fall and damage the wall. Such a requirement requires a change in policy to implement the need for easements to control such growth outside the minimum vegetation-free-zones.

(2) Include within the Levee Safety Program a data call to identify those conditions where the existing easements do not meet the requirements in EM 1110-301, section 2.2, a description of what is needed and a cost to acquire recommended easements.

(3) Update EM 1110-2-1913 and EM 1110-2-2502 to clarify appropriate vegetation-free-zones to satisfy needs for access and emergency operations and to develop planning and real estate guidance setting these vegetation-free-zones as project requirements. An appropriate setback from the toe of a levee is one-half the height of the structure with a minimum of 15 feet. An appropriate setback from the base of a floodwall is 15 feet plus an 8-foot clearance for root-free-zones to protect drainage systems. However, where the Chief of Engineering considers it necessary for maintaining public safety, the project should have a greater setback from a levee or wall. Such a requirement requires a change in policy to implement the need for wider easements.

(4) Revise EP 500-1-1 to remove content that conflicts with EM 1110-2-301.

(5) Revise ER 500-1-1 to require the Chief of Engineering to assess any variance in vegetation and/or vegetation-free-zones in accordance with the public safety requirements of the regulation. Any case where the Chief of Engineering's

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recommendations are non-concurrent with the District Commander's decision, the non-concurrence should be elevated to the Major Subordinate Command (MSC) and, if necessary, HQUSACE. Such a process for non-concurrence requires a change in policy that would have to model the process set-up for the Office of Counsel.

(6) Revise ER 1110-2-110 to clarify that any changes to a completed system that alters its purpose from flood-damage-reduction to ecological restoration or modifies the hydraulic capacity and reduces the authorized level of protection is a major change that requires the approval of the Chief of Engineers.

7.2.3 New Administrative Actions

(1) Collate all related regulation and guidance into a system assessment of local flood-damage-reduction system. Such an approach is included in the "12 Actions for Change" and is the first proposed guidance within the Guidance Update and Maintenance Program.

(2) Clarify in Civil Works Planning guidance for agreements and models, requirements to comply with USACE policy and guidance for landscaping.

(3) Include in the Civil Works Review Board process, a requirement for a presentation on the project's compliance with USACE's policy for landscaping.

(4) Include in the Regulatory permit process a need to check the location for impacts on a local flood-damage-reduction system.

7.3 The Need to Report Impacts

Enforcing the requirements for maintaining vegetation and root-free-zones, and for minimum easements will have impacts. USACE needs to communicate to the Administration the number of projects impacted, the cost to provide environmental mitigation, the cost to acquire easements, and the cost to the nation for lost benefits for projects placed in an inactive status for not meeting requirements in a timely manor. The HQUSACE, Levee Safety Program Manager needs to establish a means to role-up the following information:

7.3.1 Environmental Mitigation

In executing the program, Districts must communicate requirements for National Environmental Protection Act (NEPA) Compliance to the levee owners. Where there are conflicting laws and/or conflicts within PCAs, LCAs, and other agreements based on Section 221 of PL 91-611 or other legislation that prohibits action, the Districts should provide HQUSACE a list of projects, a description of the conditions that preclude action, and any estimated cost for mitigation.

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7.3.2 Easements

The Districts should execute the necessary actions within existing project easement areas. For those actions required outside of current easements areas, the Districts should collect and provide HQUSACE the following data: a list of projects, a description of the deficiency of easements areas, the responsible party acquiring and maintaining a wider easement area (if necessary) together with an estimate of the easement acquisition and cost to clear the necessary easements area.

7.4 The Need for an Effective Communications Plan

As noted, vegetation management and removal can become an emotionally- and politically-charged issue for Districts, local sponsors, and groups promoting environmental interests. If USACE does not address the issue properly, countervailing public pressure will make it difficult to implement the program and achieve its goal of assuring public safety. It is crucial; therefore, that USACE communicates this issue in a coordinated, consistent, and effective manner.

As the final guidance is developed, the national levee safety team will work with Public Affairs and other elements to develop a comprehensive communication plan and execution matrix to communicate the vegetation issue.

A few general communications principles will guide the plan. First off, USACE must do more than communicate its conclusions on vegetation, levee maintenance standards, and easements. Stakeholders need to understand what guided those conclusions, including the process USACE used to develop the conclusions, the rational and technical data that supports these conclusions, and project sponsors and levee owners should implement these conclusions.

In order to achieve coordination and consistency, it is crucial that USACE first communicate these elements within its own organization. Every USACE commander, manager, and employee who is involved with levee safety or comes in to contact with the public needs to fully understand the key messages and talking points on this issue in order to present a consistent message to the public. Some of those messages and talking points are in TAB B.

While the full communication plan will address specific audiences, tactics, and timelines, generally speaking, USACE intends to proactively reach out to the public and explain why vegetation can put their lives and communities at risk, and the public needs to do to manage properly that vegetation.

7.5 A proposed Policy Guidance Development, Strategic Communication, and Implementation Plan

The recommendations have implications, because policy already exists for proper landscaping and maintenance; but USACE has been complacent and inconsistent in its

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inspections and use of variances. Therefore, USACE needs to move forward in a deliberate and structured manner to issue guidance via strategic and tactical (implementation) communication plan.

Feedback from the Districts, FEMA, levee owners, and local and State government express concerns such as funding responsibilities, NFIP eligibility impacts, FEMA MapMod program impacts, and environmental responsibilities. For example, many of our flood-damage-reduction projects have multiple maintaining agencies. Each agency is individually responsible for meeting all legal and permitting requirements for their maintenance activities. If a permitting agency denies a permit based on cumulative impacts from the multiple maintaining agencies, what role, if any, should USACE take to ensure proper levee maintenance?

USACE should establish a multidisciplinary Project Delivery Team (PDT) to develop and implement the plans. The PDT's primary goal is to achieve public safety with processes to manage appropriately the impacts (e.g. environmental, real estate, regulatory). The PDT should continue through the period necessary to assist with the national implementation plan.

The strategic communication and implementation plan should contain at a minimum the following:

- Funding and timeline for implementing the policy and guidance
- Briefings to the Administration, for congressional interest, to MSCs, Districts, and key Federal agencies followed by a media release/briefing. USACE should issue guidance only after briefings are complete.
- Description of District, MSC, levee owner, and HQ roles and responsibilities
- Public Affairs packet complete with program fact sheet, Questions and Answers (Q&A), and plain English documents
- List of policy for implementing the guidance in the field

Table 1 summarizes a proposed process. The estimated cost to implement the PDT for the 17 weeks and for follow-on support to the national implementation plan is $.

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Table 1 – Proposed PDT Activity Milestones

Key Task	Activity	Start Week	Completion Week
1	Engineering leads development of draft guidance letter and vetted in HQUSACE	0	2
2	Establish a multidisciplinary PDT that includes MSC and District participation	0	3
3	PDT/PAO develops program fact sheet, initial set of Q&A, briefing packet, and strategic communication plan	0	3
4	HQ briefs ASA(CW) and Chief		4
5	Deputy Director of Civil Works issues email to MSC's requesting review, comments, and impacts of implementing proposed guidance		5
6	MSC comment and review period	5	9
7	HQUSACE/PDT discussions with Federal agencies USFWS, EPA, NMFS, FEMA	5	9
8	HQUSACE briefings with the Administration and Congress		11
9	HQUSACE/PDT discussions with non-Federal organizations NAFSMA, ASFPM	9	12
10	PDT submits guidance and implementation plan for final HQUSACE review and approval		15
11	HQUSACE briefs ASA(CW) and the Chief on final guidance and implementation plan		16
12	PDY issues guidance and implementation plan via communication plan.		17

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TAB A

References

A.1 U. S. Army Corps of Engineers

EM 1110-2-301, Guidelines for Landscape Planting at Floodwalls, Levees and Embankment Dams, U. S. Army Corps of Engineers, 1 Jan 2000

EM 1110-2-1205, Environmental Engineering and Local Flood Control Channels, 15 Nov 1989

EM 1110-2-1913, Design and Construction of Levees, U. S. Army Corps of Engineers, 30 Apr 2000

EM 1110-2-2502, Retaining Walls and Floodwalls, U. S. Army Corps of Engineers, 29 Sep 1989

EP 500-1-1, Emergency Employment of Army and Other Resources - Civil Emergency Management Program - Procedures

ER 200-2-2, Procedures for Implementing NEPA

ER 500-1-1, Emergency Employment of Army and Other Resources Civil Emergency Management Program, 30 Sep 2001

ER 690-1-1212, Professional Registration as a Selective Placement Factor, 31 Mar 2004

ER 1110-1-8152, Professional Registration, 8 Aug 85

ER 1130-2-530, Flood Control Operations and Maintenance Policies, 30 Oct 1996

ER 1165-2-119, Modifications to Completed Projects, 20 Sep 82

A.2 Federal Emergency Management Agency

FEMA 473, Technical Manual for Dam Owners, Impacts of Animals on Earthen Dams, September 2005

FEMA 534, Technical Manual for Dam Owners, Impacts of Plants on Earthen Dams, September 2005

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A.3 U. S. Department of Interior

Dams and Public Safety, A Water Resources Technical Publication, by Robert B. Jansen, U. S. Bureau of Reclamation, 1983

A.4 Code of Federal Regulations

Title 33 of the Code of Federal Regulations 208.10, Revised 1 Jul 2004

Title 33 of Code of Federal Regulations 203

Title 33 of the Code of Federal Regulations 325.2

Title 44 of the Code of Federal Regulations 65.10

A.5 Other

Code of Virginia, Title 10.1 Conservation, Chapter 6, Flood Protection, and Dam Safety

International Committee on Large Dams (ICOLD), Bulletin 130, Risk Assessment in Dam Safety Management, January 2005

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TAB B

Talking Points – Treatment of Vegetation within Local Flood-Damage-Reduction Systems

B.1 Public safety is our number one priority.

- Our goal with the Levee Safety Program is to reduce risk and increase public safety.
- Vegetation on levees has the potential to harm structural integrity, obscure the visibility of levee's slopes, impede access for maintenance and inspection, and hinder emergency flood fighting operations.
- USACE understands that millions of people depend on our programs and projects to help reduce damage from storms and floods.
- Public safety depends on our flood-damage-reduction systems performing as intended.
- Vegetation can compromise the performance and reliability of these projects, and therefore it is crucial that a comprehensive levee maintenance program includes vegetation control.

B.2 Maintenance inspection standards, including vegetation, for USACE levees have not changed.

- While the Levee Safety Program (inventory and assessment) is new, inspection of USACE levees has been ongoing for years.
- USACE conducts biennial inspections to ensure sponsors properly operate and maintain their projects and the projects are capable of performing as intended.
- Projects remain eligible for Federal rehabilitation assistance if the local owner properly maintains the project. USACE will still provide emergency response assistance regardless of maintenance status.
- USACE is committed to clear and consistent policies and standards that ensure these flood damage reduction systems work as intended.
- USACE recognizes the value of trees and other vegetation for individuals and communities; however, public safety is non-negotiable.

B.3 We will work with our partners to find solutions compatible with their legal authorities that keep public safety as the paramount concern.

- Levee safety is a shared responsibility with our local, state, and other Federal partners.
- Local communities should be interested in and concerned about flood and storm damage reduction, so we welcome dialogue about the levee safety program.
- Our goal is to fulfill our responsibility to maintain public safety while also complying with relevant environmental laws, regulations, and policies.

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TAB C

Contradiction in Policy in the Approval Authority for Variances

C.1 Introduction

USACE has a contradiction in the approval authority for granting variances in accordance with ER 500-1-1 and the qualifications in ER 690-1-1212 required for those positions having independent responsibility for making decisions or preparing products that could substantially impact public health and safety and welfare. ER 500-1-1 presents an organizational process where an agency head not meeting the qualifications within a "standard of care" can over rule an assessment made by a qualified standard-bearer.

C.2 Standard of Care

The public recognizes the need to established code and regulations to protect the public health, safety, and welfare. In support of the design and construction of building systems and public works infrastructure, governments have issued code or a “standard of care” to insure competent infrastructure and professionals.

For example, the *International Building Code* addresses the design and installation of building systems through requirements emphasizing performance. The *Code* meets these needs through regulations that safeguard the public health and safety in all communities.

In addition, licensure as a professional in the practice of architecture, engineering, and surveying is the statutory process through which a person meets the legal requirements sufficient to practice his or her profession as permitted by law. Licensing and registration are the terms used, often interchangeably, in the state statutes to establish these requirements. State licensure laws for design professionals are predicated upon and justified only as a means to protect the public health, safety, and welfare.

For example, the *Code of Virginia*, Title 54.1, Chapter 4, Architects, Engineers, Surveyors, Landscape Architects and Interior Designers, defines the regulations and code of professional practice and conduct for the subject professions. It defines “Responsible Charge” as the direct control and supervision of the practice of architecture, professional engineering, and land surveying. The Virginia *Code* provides six provisions for the code of professional practice and conduct (54.1-404) applicable to all the professions. Two key provisions are the protection of the public health, safety, and welfare, and the limitation of professional service to the area of competence of each professional.

As noted, for local flood-damage-reduction systems within the NFIP, 44 CFR 65.10 outlines the code regulations that safeguard the public safety. In the absence of a published “Building Code” specific to local flood-damage-reduction systems, the CFR offers an USACE engineering manual, EM 1110-2-1913, The Design and Construction of Levees.

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C.3 USACE Policy

ER 500-1-1, Section 5-22, provides regional variances on vegetation standards policy and a process to request for variances. Paragraph 5-22.f states the authority is the District Commander. However, the findings from the recent inspections raise questions as to whether the four bullets in ER 500-1-1, were fully addressed or variances were granted for reasons other than public health, safety and welfare. Where the regulation gives this authority to the District Commander, not all District Commanders are licensed professionals and/or experienced with such issues. The fact that USACE gives the responsibility to the Commander may be in conflict with its own personnel policy.

As noted, codes define requirements for public health, safety, and welfare, and place that responsibility in the hands of licensed professionals in "responsible charge" where two key provisions are the protection of the public health, safety, and welfare, and the limitation of professional service to the area of competence of each professional. Within USACE, the organizational set-up and responsibility for insuring the protection of public safety, and insuring the appropriate application of competence is with a licensed professional.

Where the Federal engineer is exempt from requirements for professional registration, personnel policy embraces it to promote "public trust' in a world class engineering organization. ER 690-1-1212 provides policy for those positions that require a professional registration. USACE recognizes professional registration as an important measure of competency of an engineering workforce as a metric recognized by our customers and the public.

Registration is required for those positions having independent responsibility for making decisions or preparing products that could substantially impact public health, safety, and welfare. Final approval of engineering and architectural products applies to the principal discipline that is responsible for the technical adequacy of that discipline's products and services. The individual's registration must be current and in good standing. **Section 6.g specifically states professional registration is required for military personnel assigned to a position requiring registration**. Section 6.d does state when a position involves multiple functions, and engineering and/or construction functions do not comprise a major portion of the duties and responsibilities, professional registration is not required. However, the appropriate professional registration is required for the next lower level position (s) that is primarily responsible for engineering or construction.

In reviewing ER 500-1-1, USACE gives that authority to a District Commander, but USACE appoints Commanders (at Districts and MSC's) without the requirement for professional licensure. This creates a situation where a position without the requirement for professional licensure can over rule the recommendation of a qualified person. This raises the question as to whether this policy meets the intent and requirements of the personnel regulation and is a violation of the public's trust.

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ER 1110-1-8152, Section 6 identifies those organizational positions that require a registered professional. District chiefs of engineering will sign and date all in-house design documents and associated certifications as well as all appropriate permit applications executed by the USACE. District chiefs of construction and construction-operations will sign and date certifications required during or after construction. The responsible professional's signature shall be followed by the appropriate designation indicating that the signer is currently a registered professional. Note the regulation makes no distinct or separate mention of a chief of operations or any other position.

C.4 Possible Professional Ramifications

If a military or senior leader without professional qualifications presumes to exercise control over the process, could one argue that it is an act of negligence? The public sees flood protection as a public safety issue and the 44 CFR 65.10 as the "standard of care"; recognizes the standard of competence as a professional engineer with related experience; and places its trust in the "engineer's stamp" that the engineering product is competent and will maintain, protect, and enhance the public's health, safety, and welfare.

As has happened with the failure in Louisiana, the public sees itself as the "innocent victim" and is treating the failure as negligence which can be defined in the following terms as a "...failure to exercise the standard of care of a reasonable person under similar circumstances. The standard in turn is based upon the reasonable foreseeability of the risk. The legal duty of reasonable care becomes a calculus of three components: the risk of an accident occurring, the magnitude of harm should the risk materialize, and the availability of alternatives." (Binder, 1992)

As stated, USACE must provide flood-damage-reduction within acceptable levels of thresholds to achieve the overall best solution and avoid impacting the public's safety. This is the purpose of the "engineer's stamp" to demonstrate to the public that the agency has placed the responsibility for the public safety with a person in "responsible charge." It is the public's protection against detrimental trade offs in public safety.

A similar circumstance exits within the Office of Council where a District Commander might want to overrule a counsel legal non-concurrence. In April 2001, Lieutenant General Robert B. Flowers signed a CECC-ZA memorandum (that is still in effect) that says District and Division Commanders cannot take an action in contravention of a legal non-concurrence. The District Commander needs to elevate the issue to the Division for resolution with the Division Counsel. If necessary, the issue will then go to HQUSACE. Only the Chief of Engineers can choose a course of action in which counsel non-concurs.

C.5 An Alternative Policy

USACE could create a similar reporting channel outside of the Chain of Command to elevate such issues. Like attorneys, Dam and Levee Safety Officers make assessments that result in grim and frank results that might not always be popular. A similar process

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requiring elevation might work well to protect those Dam and Levee Safety Officer assessments from dismissal at the District level.

Under "USACE 2012", the Chief of Engineers agreed that only attorneys should evaluate other attorneys (except the Chief Counsel and his Deputy who are rated by the Chief of Engineers). The idea is that attorneys should be evaluated on the accuracy, not the popularity, of their legal advice. It encourages the full exploration of legal issues. The Directorate of Contracting recently received permission from the Chief of Engineers to establish a similar rating chain in which contracting professionals are only evaluated by other professionals. It may be that the Chief of Engineers would be amenable to a similar system to ensure that Dam and Levee Safety Officers may deliver their full and frank engineering assessments without having to worry about their next rating.

In summary, USACE must avoid an organizational process where an agency leader not meeting the qualifications within the "standard of care" can over rule an assessment made by a qualified standard-bearer. Traditionally, as with dam safety, it is the responsibility of the Chief of Engineering to adequately assess the impacts of vegetation, make the determination for their application, and make the determination as to variances where it is in the interests of public health, safety, and welfare.

C.6 References

a. U. S. Army Corps of Engineers

CECC-ZA, 5 April 2001 Memorandum, Subject: The Importance of Preventative Law in the Execution of Corps Programs – The Role of Legal Review and Resolution of Non-Concurrence, signed LTG Robert B. Flowers

ER 500-1-1, Emergency Employment of Army and Other Resources Civil Emergency Management Program, 30 Sep 2001

ER 690-1-1212, Professional Registration as a Selective Placement Factor

ER 1110-2-8152, Professional Registration

b. Code of Federal Regulations

Title 44 of the Code of Federal Regulations 65.10

c. Other

Legal Liability for Dam Failure, by Professor Denis Binder, published by ASDSO, 1992.

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