

Lonnie G. Harper & Associates, Inc.

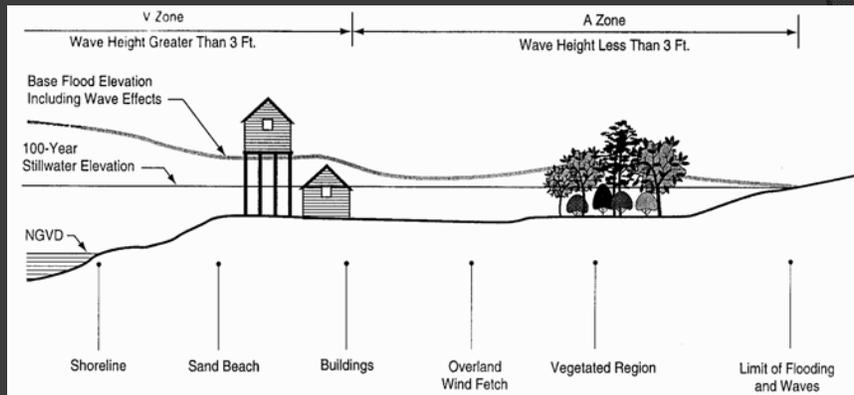
FEMA FIRM MAP REVISION

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FLOOD MAP EXPLANATION

- X ZONE: AREAS OUTSIDE OF THE “SPECIAL FLOOD HAZARD AREA” (SFHA)
- A ZONE: AREAS WITHIN THE SFHA THAT ARE NOT WITHIN THE COASTAL HIGH HAZARD FLOOD AREA (WAVE HEIGHTS OF LESS THAN 3 FEET)
- V ZONE: AREAS WITHIN THE SFHA THAT ARE SUBJECT TO HIGH VELOCITY WAVE ACTION (WAVE HEIGHTS OF THREE (3) FEET OR GREATER)

FLOOD MAP EXPLANATION



KEY CONCERNS

- THE PRELIMINARY DFIRMS RESULT IN A SIGNIFICANT CONVERSION OF A ZONES TO V ZONES IN CAMERON PARISH
- BUILDING WITHIN V ZONES RESULTS IN INCREASED CONSTRUCTION COSTS
- FEDERAL ASSISTANCE IS UNAVAILABLE IN V ZONES

ADMINISTRATIVE ISSUES

- FINAL ENGINEERING REPORT HAS NOT BEEN PRESENTED TO THE PARISH
- AFTER THREE (3) REQUESTS, FEMA HAS NOT PRESENTED THE PARISH WITH THE SL15 ADCIRC GRID USED IN FIS FOR CAMERON PARISH

NOTE: AN EQUIVALENT ADCIRC GRID HAS BEEN OBTAINED FROM OTHER SOURCES AND IS BEING USED FOR PRELIMINARY EVALUATION
- WHAFIS INPUT/OUTPUT FILES HAVE BEEN RECEIVED FOR ALL BUT SIX (6) TRANSECTS

Flood Insurance Study: Southwestern Parishes, Louisiana

Intermediate Submission 1: Scoping and Data Review

15 February 2008



Federal Emergency
Management Agency
Region 6

INDICATES STATUS
OF FIS



US Army Corps
of Engineers®
New Orleans District

DRAFT: NOT FOR EXTERNAL RELEASE

MODELING SOFTWARE

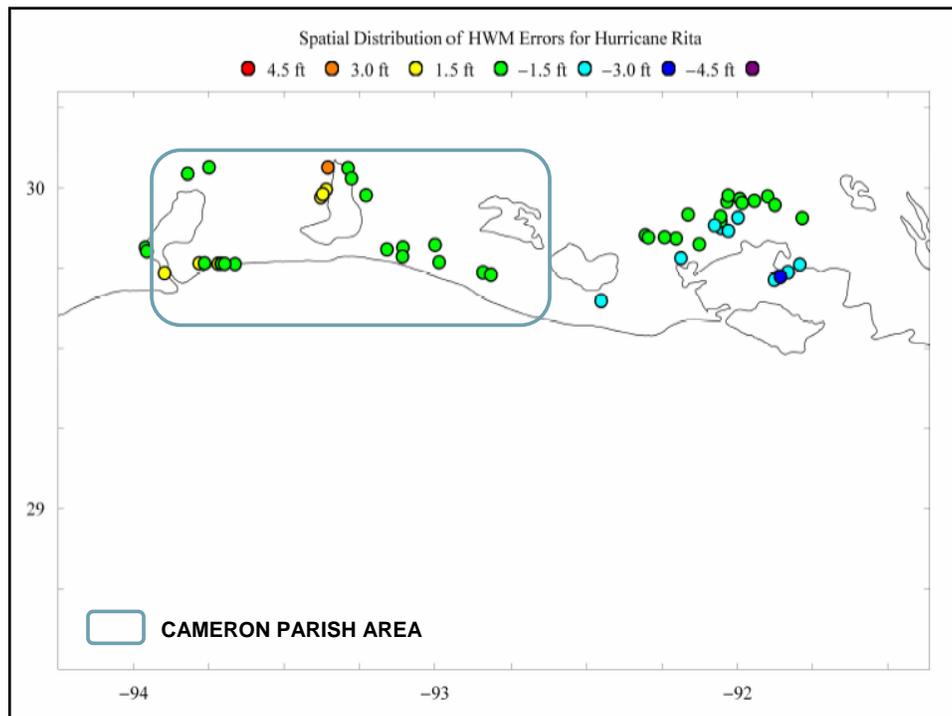
- ADCIRC: ADvanced CIRCulation MODEL
 - COASTAL SURGE MODEL WHICH DETERMINES STILL WATER ELEVATION (SWEL)
- STWAVE: STeady state spectral WAVE MODEL
 - COASTAL WAVE MODEL WHICH GENERATES NEARSHORE WAVES

MODELING SOFTWARE

- WHAFIS
 - WAVE HEIGHT MODEL WHICH COMPUTES WAVE CREST ELEVATIONS BASED ON SWELs OUTPUT FROM ADCIRC MODEL
 - DETERMINES THE FLOOD HAZARD ZONE AND FLOODPLAIN MAP ELEVATION BASED ON WAVE HEIGHTS

TECHNICAL ISSUES: ADCIRC

- CALIBRATION ERRORS ARE PRESENT ASSOCIATED WITH THE HINDCAST FOR HURRICANE RITA: ERRORS IN PREDICTED HIGH-WATER MARKS (HWM) COMPARED TO MEASURED HWM ARE +/- 4.5 FEET
- AN EXAMINATION OF THE PRELIMINARY ADCIRC GRID HAS REVEALED MAJOR CHENIER RIDGES, LEVEES, MANMADE FEATURES, AND OTHER TOPOGRAPHIC DATA WERE OMITTED FROM THE MODEL

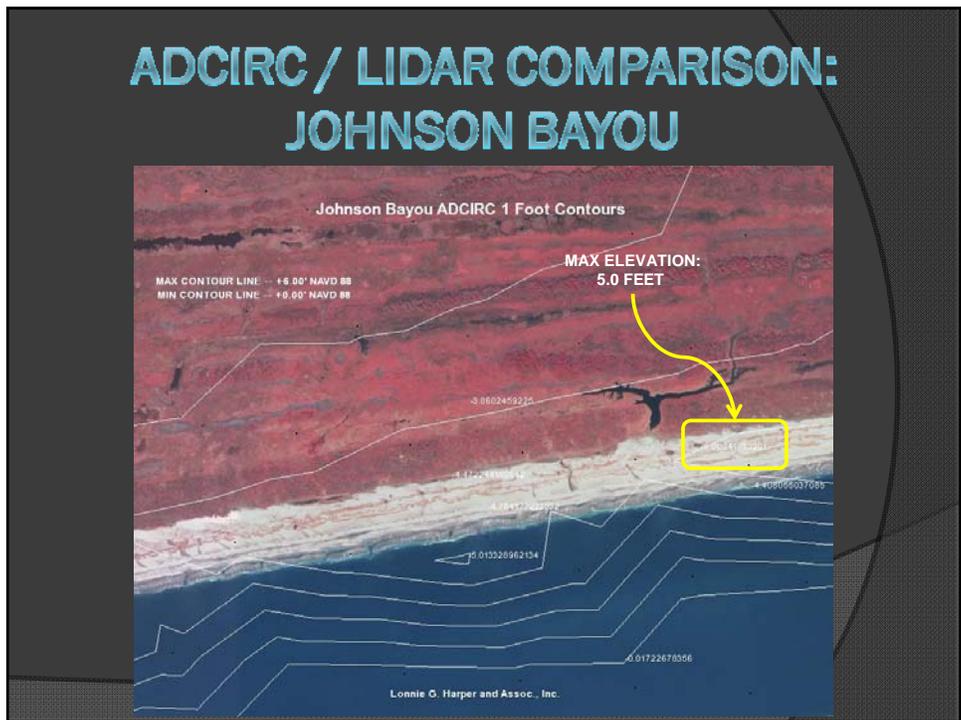
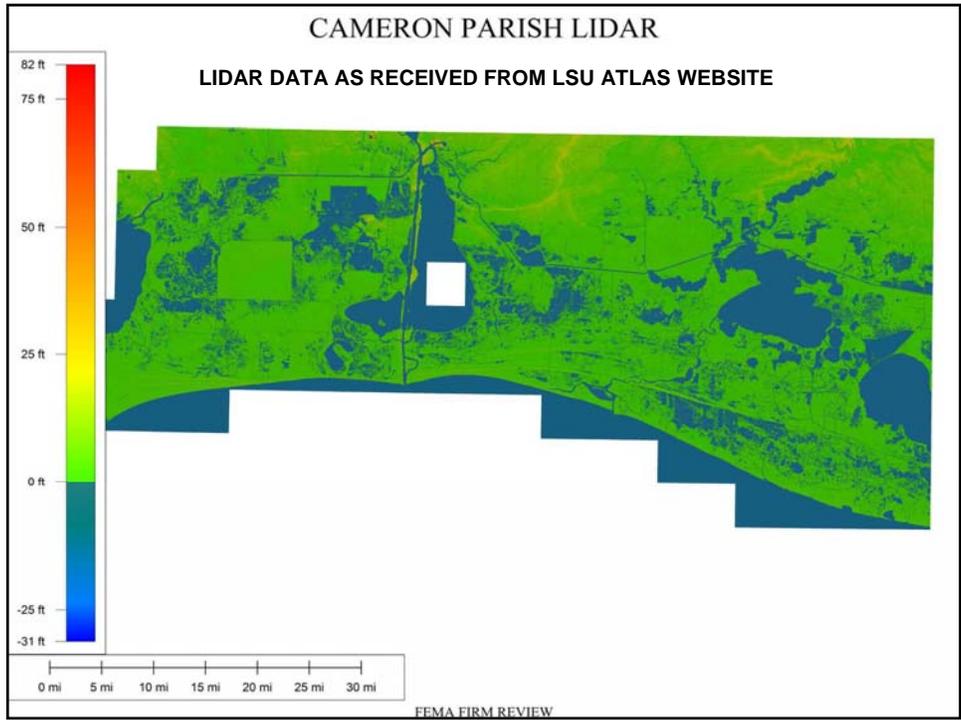


ELEVATION COMPARISON

- ◉ ADCIRC ELEVATIONS TYPICALLY DIFFER FROM LIDAR ELEVATIONS
- ◉ WHAFIS ELEVATIONS TYPICALLY DIFFER FROM LIDAR ELEVATIONS
- ◉ LIDAR ELEVATIONS TYPICALLY DIFFER FROM GPS SURVEY ELEVATIONS

ADCIRC / LIDAR COMPARISON

- ◉ BASED ON AN EXAMINATION OF ADCIRC GRID OBTAINED FROM OTHER SOURCES AND REPORTEDLY USED FOR THE CAMERON PARISH FIS, IT IS APPARENT THAT THE LIDAR TOPOGRAPHY HAS BEEN MISREPRESENTED IN THE ADCIRC MODEL



ADCIRC / LIDAR COMPARISON: JOHNSON BAYOU



ADCIRC / LIDAR COMPARISON: CAMERON/CREOLE LEVEE



ADCIRC / LIDAR COMPARISON: CAMERON/CREOLE LEVEE

Cameron Creole Levee Lidar 1 Foot Contours



ADCIRC / LIDAR COMPARISON: OAK GROVE

Oak Grove ADCIRC 1 Foot Contours



ADCIRC / LIDAR COMPARISON: OAK GROVE



ADCIRC / LIDAR COMPARISON: LITTLE CHENIER



ADCIRC / LIDAR COMPARISON: LITTLE CHENIER



ADCIRC / LIDAR COMPARISON: GRAND CHENIER



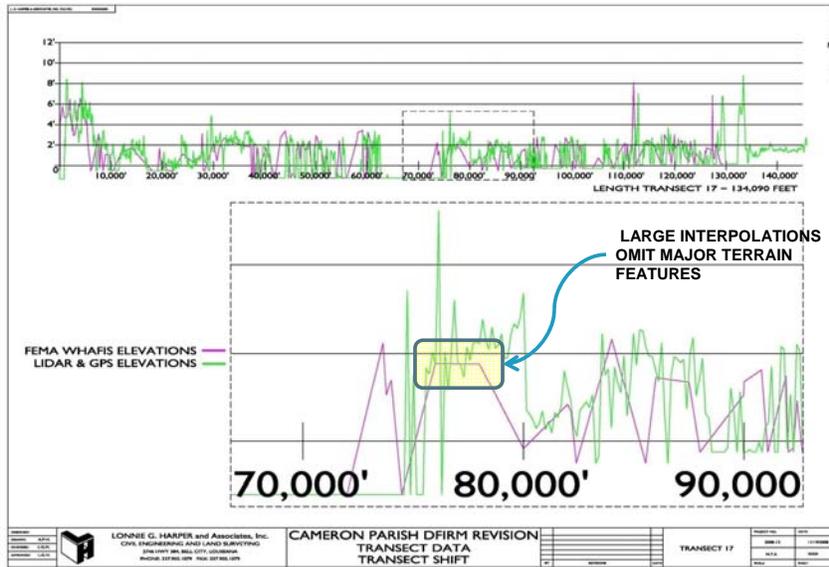
ADCIRC / LIDAR COMPARISON: GRAND CHENIER



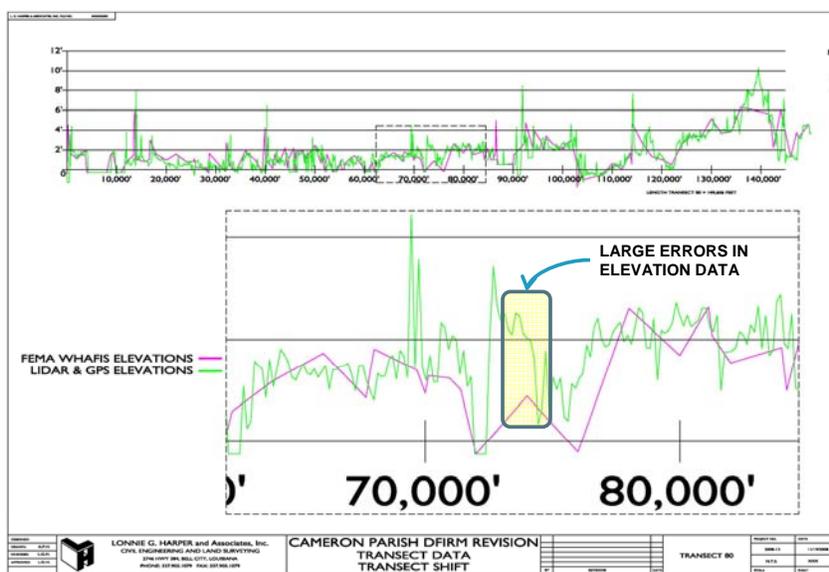
LIDAR CONCERNS

- LIDAR NAVD88 (2004.65) WAS REPORTEDLY USED AS THE VERTICAL DATUM
- THE SPARSENESS OF FEMA'S TOPOGRAPHIC DATA USED IN THEIR WHAFIS MODEL OMITS MAJOR TERRAIN FEATURES
- FOLLOWING SLIDES ILLUSTRATE DIFFERENCES BETWEEN ELEVATIONS FROM FEMA'S WHAFIS MODEL AND ELEVATIONS EXTRACTED FROM LIDAR NAVD88 (2004.65)

LIDAR COMPARISON



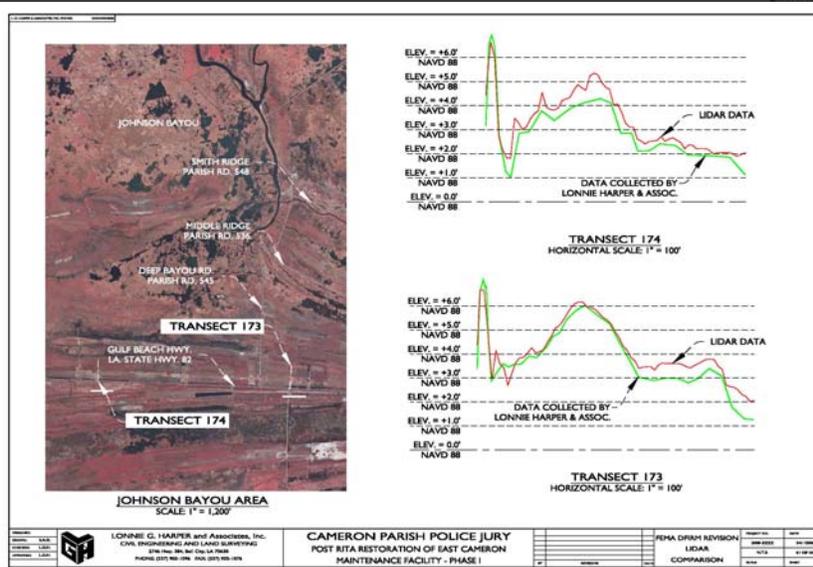
LIDAR COMPARISON



LIDAR / SURVEY COMPARISON

- THE FOLLOWING SLIDES ILLUSTRATE THE DISCREPANCIES BETWEEN LIDAR TOPOGRAPHIC DATA AND LGH & ASSCS GPS SURVEYED TOPOGRAPHIC DATA

LIDAR / SURVEY COMPARISON



MODEL ERRORS

WHAFIS ERRORS

- ◉ STARTING POINT TYPICALLY BEGINS 500 FEET IN GULF OF MEXICO
- ◉ DUNE (DU) COMMAND LINE USED TO MODEL STRUCTURES SUCH AS LEVEES OR SEAWALLS OMITTED FROM THE WHAFIS MODEL
- ◉ WHAFIS TERRAIN DATA DOES NOT REFLECT ACTUAL CONDITIONS
 - OVERWATER FETCH (OF) VS. INLAND FETCH (IF) AND VEGETATION HEADER (VH)

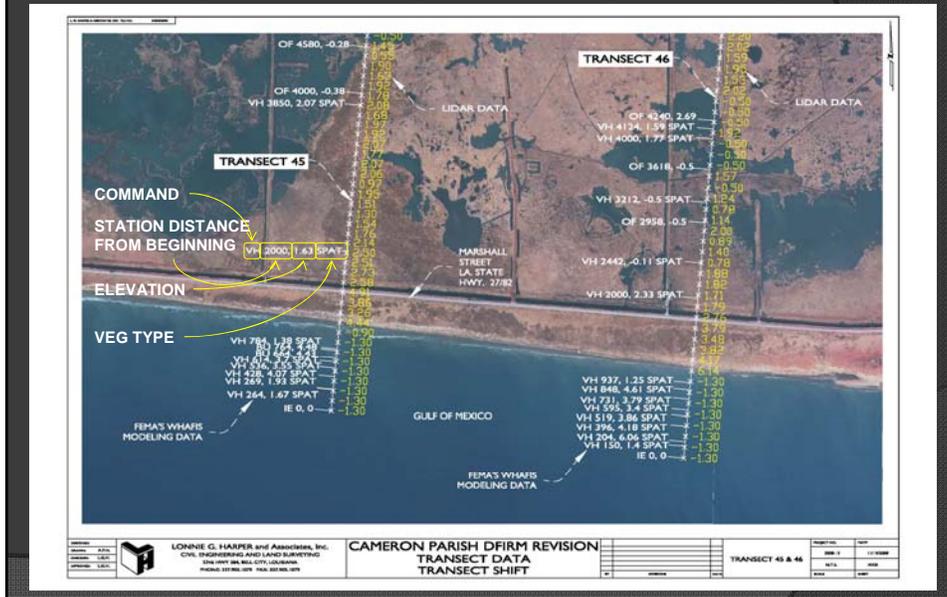
WHAFIS ERRORS

- A ZONE AREAS AS DEFINED BY WHAFIS ARE OMITTED FROM DFIRMs
- IMPROPER DEFINITION OF DRAG COEFFICIENT FOR VEGETATION HEADER COMMAND LINES

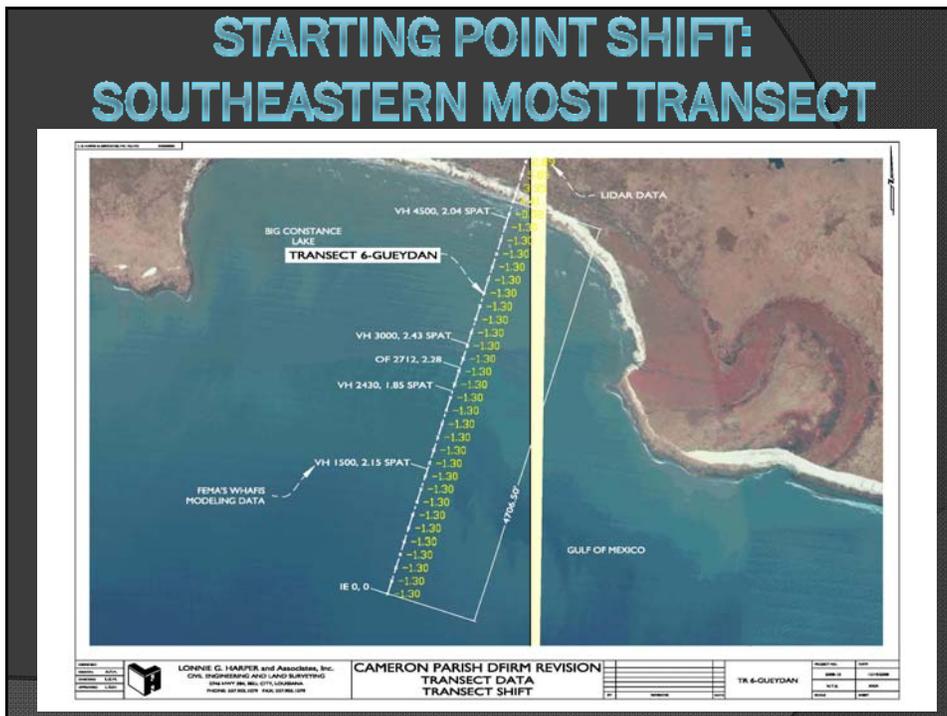
STARTING POINT SHIFT

- EVERY WHAFIS TRANSECT (104) HAS BEEN SHIFTED SOUTH RESULTING IN THE STARTING POINT OF EACH TRANSECT BEING OVER THE OPEN WATER OF THE GULF OF MEXICO
- THIS HAS RESULTED IN STATIONS, WITH COMMAND LINES MODELING VEGETATION (VH OR VE), BEING LOCATED OVER OPEN WATER

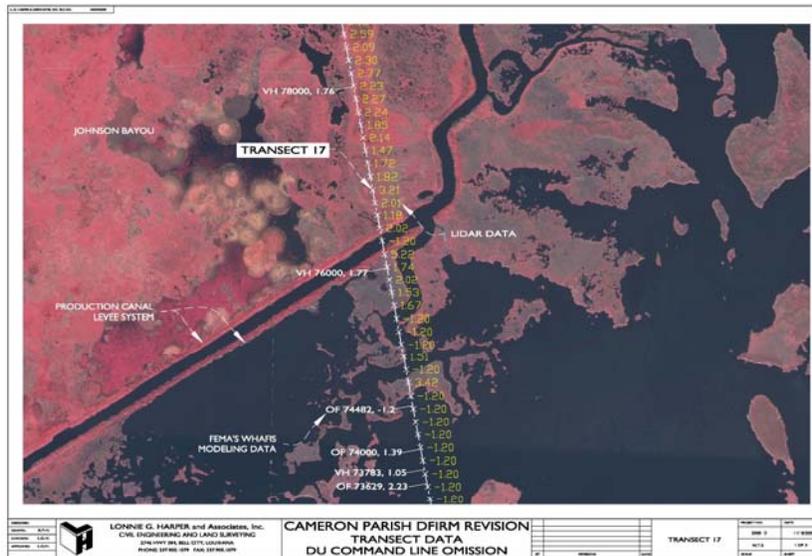
STARTING POINT SHIFT: AREA BETWEEN HOLLY BEACH AND CAMERON



STARTING POINT SHIFT: SOUTHEASTERN MOST TRANSECT



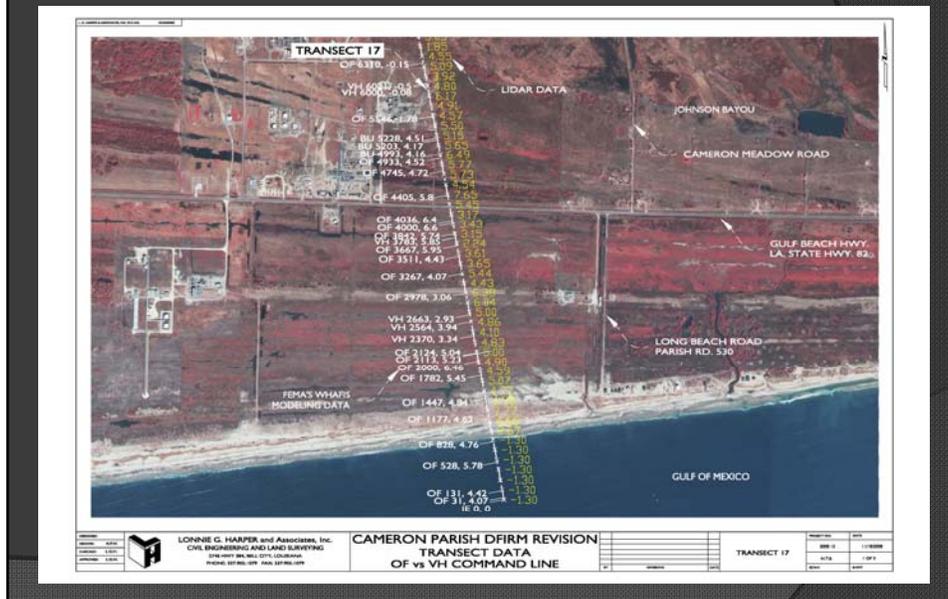
DU CARD OMISSION



OF vs VH COMMAND LINE

- THERE ARE MANY INSTANCES OF OVERWATER FETCH (OF) COMMAND LINES BEING USED WHERE VEGETATION HEADER (VH) COMMAND LINE SHOULD BE USED. THIS, IN EFFECT, CAUSES A LAKE TO MODELED IN REGIONS WHERE EMERGENT LAND EXISTS
- ONE EXAMPLE IS THE SOUTHERN END OF TRANSECT 17, LOCATED IN THE JOHNSON BAYOU AREA

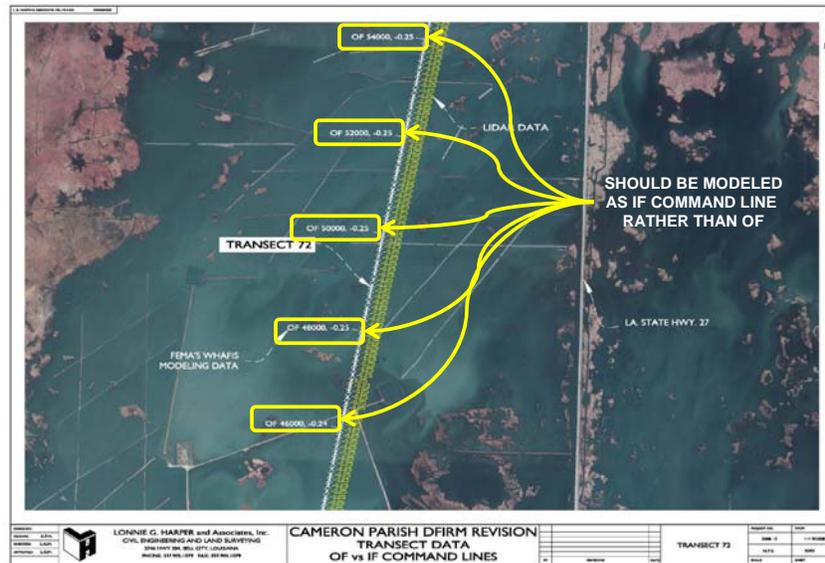
OF vs VH COMMAND LINE



OF vs IF COMMAND LINE

- OF (OVERWATER FETCH) COMMAND LINE IS USED FOR WATER WITH DEPTHS GREATER THAN 10 FEET, SUCH AS LAKES OR BAYS
- IF (INLAND FETCH) COMMAND LINE IS FOR SHELTERED WATER WITH A DEPTH OF LESS THAN 10 FEET

OF vs IF COMMAND LINE



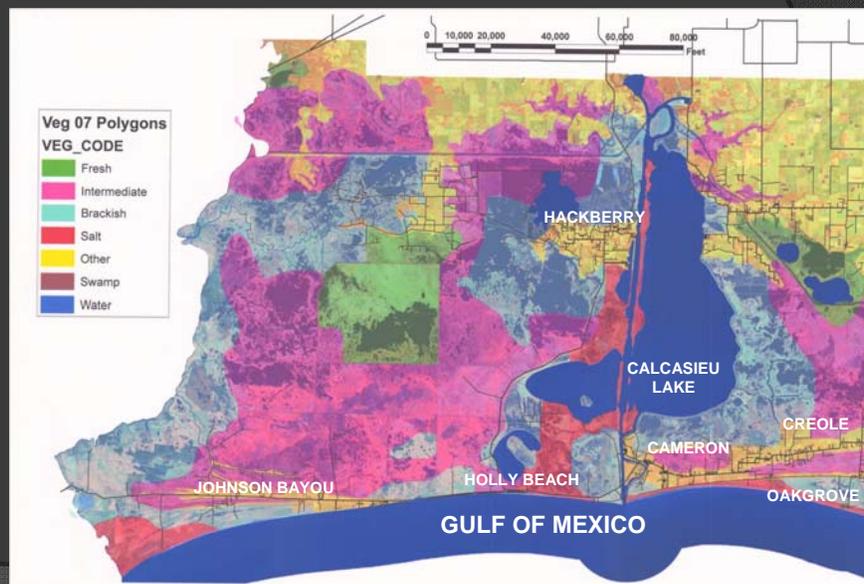
VEGETATION MAPS

- CAMERON PARISH CONTAINS AT LEAST FIVE (5) DIFFERENT TYPES OF TERRAIN:
 - FRESHWATER MARSH
 - INTERMEDIATE MARSH
 - BRACKISH MARSH
 - SALTWATER MARSH
 - OTHER (EMERGENT TERRAIN USUALLY FOUND ON CHENIER RIDGES)

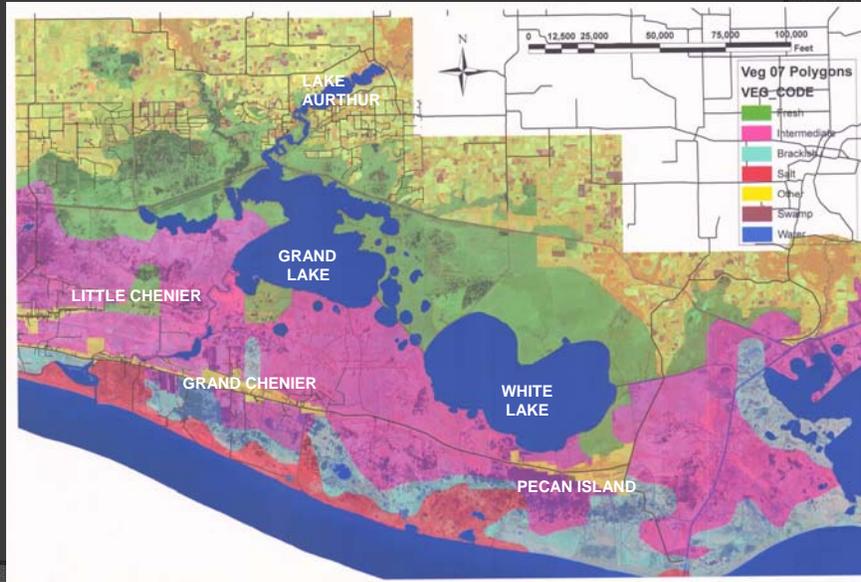
VEGETATION MAPS

- EACH VEGETATION TYPE HAS DIFFERENT PHYSICAL CHARACTERISTICS WHICH HELP TO RESTRICT SURGE FLOW
- ONLY ONE TYPE OF VEGETATION (SPARTINA PATENS) WAS USED IN FEMA'S WHAFIS MODEL

VEG MAPS: WEST CAMERON PARISH



VEG MAPS: EAST CAMERON PARISH



OMITTED A ZONE

- A ZONES WERE FOUND IN FEMA'S ORIGINAL WHAFIS OUTPUT FILES THAT WERE OMITTED FROM THE DFIRMS
- A ZONE OMISSIONS OCCUR IN SEVERAL TRANSECTS
- THE FOLLOWING SLIDE IS A GRAPHICAL REPRESENTATION OF FEMAS OUTPUT FILE FOR TRANSECTS 50, 51, 58, AND 59

OMITTED A ZONE



DRAG COEFFICIENT

- A PLANT SPECIES' VARIOUS PHYSICAL CHARACTERISTICS (i.e. HEIGHT, DENSITY, STEM DIAMETER) DEFINE ITS DRAG COEFFICIENT (C_d)
- THE WHAFIS MODEL HAS SHOWN TO BE HIGHLY SENSITIVE TO C_d

DRAG COEFFICIENT

- ACCORDING TO *WHAFIS TECHNICAL DOCUMENTATION VERSION 3.0*, Cd RANGES BETWEEN 0.069 & 0.25 FOR MARSH GRASS PLANT TYPES OF INTEREST
- Cd=0.1 IS FEMA'S DEFAULT VALUE FOR DRAG COEFFICIENT, AND WAS USED EXCLUSIVELY IN THEIR WHAFIS MODELS

CORRECTED WHAFIS SIMULATIONS

- TRANSECTS 50, 51, 58, 59, AND 71 WERE MODIFIED AND RECOMPUTED BASED ON THE FOLLOWING INPUT MODIFICATIONS:
 - STARTING POINT PLACED IN PROPER POSITION
 - PROPER COMMAND LINES INSERTED IN INPUT FILES
 - CORRECTED ELEVATIONS
 - VARIED Cd TO DETERMINE MODEL SENSITIVITY

SUMMARY

- ◉ LOW RESOLUTION OF TOPOGRAPHIC DATA IN ALL MODELS
- ◉ POOR CALIBRATION OF SURGE MODEL
- ◉ IMPROPER APPLICATION OF INPUT DATA
- ◉ INCONSISTENT ELEVATION DATA BETWEEN MODELS
- ◉ OMISSION OF INPUT DATA
- ◉ USE OF REGIONAL SURGE MODEL FOR A SMALL GEOGRAPHIC AREA WITH UNUSUAL TOPOGRAPHIC FEATURES MAY YIELD QUESTIONABLE SWEL RESULTS