APPLICATION OF THE USACE RAPID INUNDATION MAPPING PROGRAM TO THE NUECES RIVER

Roham Bakhtyar, PhD
Civil Engineer, USACE Galveston District
Lee von Gynz-Gettle, P.E., CFM
Sr. Project Manager, WEST Consultants

Outline

- Rapid Inundation Modeling Tool (RIM)
- RIM General Guidance
- Nueces River Watershed
- CWMS & RTS Modeling Suite
- Methodology & Application to Nueces River

USACE Map Layer Hierarchy

- USACE EAP Layers
  Static layers showing breach/non-breach layers for 5 standard flood loading scenarios. Mapping available on 573 dams in USACE portfolio. Products include PDF map books, dam failure models, consequence data. Available for download from NID site on all available dams.

- USACE Corps Water Management System (CWMS) Layers
  Dynamically created layers by local district water management offices. These layers will include the latest forecast and reservoir operations. Layers would typically be provided by districts once daily during a flood event.

- USACE CWMS Static Inundation Map Layers
  Statically created layers for multiple events. Accurate near gages but less accurate between gages. Provides a flood estimate rapidly while the CWMS forecast layers can be produced. Also helpful for emergency planning exercises.
Rapid Inundation Modeling Tool (RIM)
Buffalo Bayou, White Oak, Brays Bayou

What is the RIM Tool?
Statically created layers for multiple events (Intermediate Mapping to assist current EAP maps). Accurate near gages but less accurate between gages. Doesn’t replace CWMS!

How is it useful?
Provides a flood estimate rapidly while the CWMS forecast layers can be produced. Can provide initial consequence estimates for damages. Also helpful for emergency planning exercises.


- The watershed is broken down into smaller reaches (reach polygons)
- Critical Gauges
- Lower/higher limits of flow (flow ranges and increments)

RIM General Guidance

1. From the All Div’s dropdown menu, select the Division for the watershed you are interested in.
2. From the Select Your Project dropdown menu, choose the watershed you are interested in mapping.
3. Click on the Reach Locations link to display the reach polygons on the map.
4. Click on a radio button to activate the first reach you want to display on the map.
5. Adjust the slider bar until you find the flow/stage you want to appear on the map.
6. You can access the NWS or USGS site for a gage by clicking on the link next to the Reach Info.
RIM General Guidance – Cont.

To view consequence estimates for the layers that have been turned on, click on the Consequences button.

You may choose to add more layers to the map, such as live traffic, hurricane data, etc.

Tropical Storm Imelda (September 2019) Event Comparison

Nueces River Watershed

The Nueces River watershed is located in south Texas and has a drainage area of about 7,087 square miles. There are 2 aquifers: Edwards and Carvajal-Wells. The surface water is mostly composed of salt and clay. The average rainfall range from 20 to 30 inches across the entire watershed area.

There are two major river management districts: Dickerson Park Reservoir, operated by the City of Corpus Christi, and the U.S. Bureau of Reclamation and Lake Corpus Christi, operated by the City of Corpus Christi. The USACE project in the area is the Three Rivers Levee.

Nueces River Watershed maps highlight areas like City of Three Rivers and Corpus Christi.
Nueces Reservoir System Simulation Model (ResSIM)

- Reservoir simulation software program
- Designed for modeling the operations of one or more reservoirs in a river system for a variety of operational goals and constraints
- Rule-based operations

Nueces HEC-RAS

HEC-RAS 5.6 MODEL

The Nueces River HEC-RAS model is a 1D, steady/unsteady model, which includes portions of the Nueces River, Padre River, and San Antonio River. It uses the complete one-dimensional flow equations of the Reynolds-Averaged Navier-Stokes equations to model the flow of water through the system.

- Reservoirs (Corpus Christi and Nueces HEC-RAS models managed by the City of Corpus Christi for water supply)

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MAPPING “REACHES”

@ Dam 1,000 cfs
@ Gage 3,000 cfs
Apx. 2,000 cfs
Apx. 1,000 cfs
@ Gage 4,000 cfs

MAPPING INTERVALS

• National Weather Service warning thresholds
• Channel bank
• Impacts
• Infrastructure
• Flow frequency
• Data limits
MAPPING INTERVALS

Selected Profiles

NWS Thresholds

Historic Flow Rates

Calallen Tilden Lake Corpus Christi Frio River confluence near Three Rivers

• 195 profiles
• 25-100 profiles per reach

Nueces - Rapid Inundation Modeling Tool (RIM)
Thank You

Roham Bakhtyar, Ph.D.
Coastal / Hydraulic Engineer
USACE Galveston District
Roham.Bakhtyar@usace.army.mil

Lee von Gynz-Guethle, P.E., CFM
Senior Project Manager, WEST Consultants
Houston, Texas
lgynzguethle@westconsultants.com