Single Event Consequence Analysis Tools

The HEC-FIA (Flood Impact Analysis) software was designed to support the CWMS (Corps Water Management System) and HEC-WAT (Watershed Analysis Tool) software applications; and, the Dam and Levee Safety programs - all requiring a single event modeling capability for consequences. The software evaluates most consequences for single events as defined by USACE (U.S. Army Corps of Engineers) guidance; however, in some cases a more detailed approach to life loss estimation is required. The HEC-LifeSim softwqare is being developed to evaluate more complicated flood warning and life loss situations, especially in cases where traffic congestion during an event can have a major impact on life loss estimation.
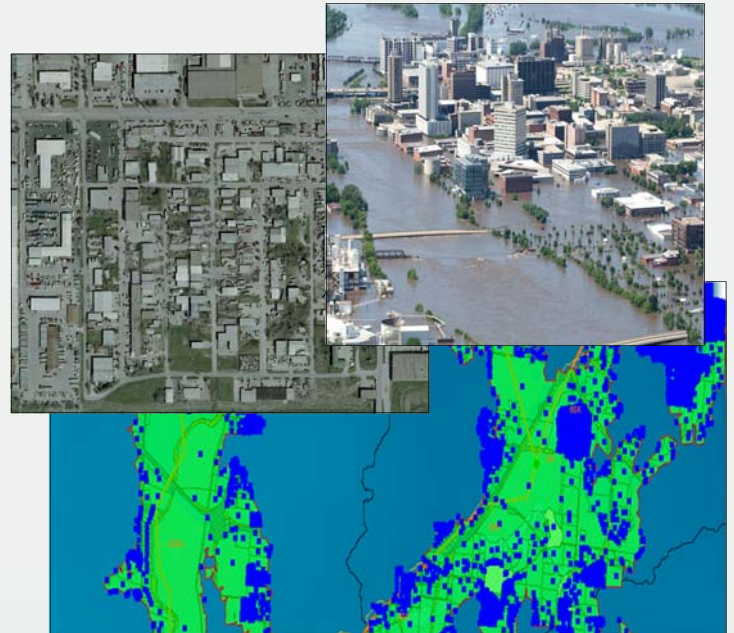
HEC-FIA

- HEC-FIA is a single event consequence assessment model designed to evaluate the economic, agricultural, and life loss impacts from flood events.

- HEC-FIA assists USACE Economists in evaluating:

  1. Direct structure, content, and car damages from a structure inventory

  2. Direct agricultural damages from an inventory of crops

  3. Direct hydraulic impacts to critical infrastructure

  4. Direct impacts to humans through a simplified LifeSim model

  5. Thresholds throughout the floodplain with Impact Response Curves

  6. Indirect impacts to the regional economy through the Economic Consequences Model (ECAM)

  7. Impacts to critical infrastructure

- HEC-FIA can express these consequence accounts with uncertainty through Monte Carlo sampling
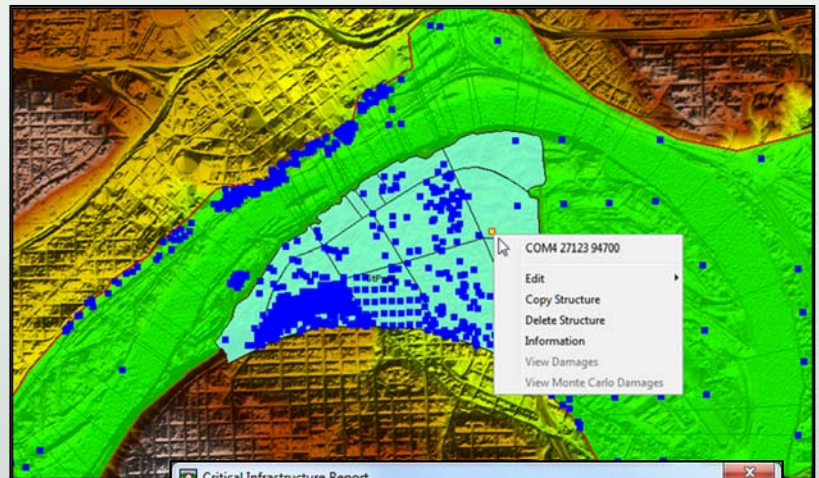
Critical Infrastructure Report

for alternative ALT_Grids
for event Fail_Upper_Design
for time window Grids_TimeWindow

CI Name	Ground	WSE	Depth	Arrival	DV	Duration
CHEM_PHARM_PREP_MAN_0000	703.66	712.86	9.20	266.94	na	na
CHEM_CHEM_INDUSTR_0000	702.94	712.86	9.93	266.37	na	na
CHEM_CHEM_INDUSTR_0001	708.94	712.84	3.90	273.09	na	na
CHEM_CHEM_INDUSTR_0002	704.50	712.87	8.37	267.82	na	na
CHEM_CHEM_INDUSTR_0003	703.66	712.86	9.20	266.94	na	na
CHEM_CHEM_INDUSTR_0004	704.38	710.51	6.13	176.76	na	na
EDUC_PUB_SCH_0000	705.56	712.86	7.29	268.97	na	na
EDUC_PUB_SCH_0001	705.62	712.87	7.24	269.03	na	na
EDUC_PUB_SCH_0002	699.66	712.87	13.21	264.61	na	na
ENRG_ELEC_POW_GEN_PLT_00...	703.69	713.05	9.36	157.27	na	na
ENRG_SUBSTN_0000	702.69	713.07	10.38	151.93	na	na
MAIL_USPS_PO_0000	699.28	712.85	13.57	264.49	na	na

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HEC-LifeSim

- HEC-LifeSim is an agent-based simulation model for evaluating potential life loss from a flood event.

- HEC-LifeSim simulates the re-distribution of people in response to an emergency warning by implementing a traffic simulation model which interacts directly with flood wave propagation.

- HEC-LifeSim allows USACE to evaluate:
    1. The effectiveness of various warning systems.
    2. Alternative evacuation planning scenarios (e.g. road closures).
    3. Potential life loss from various flood events in support of risk analysis.
    4. Potentially high risk areas due to flooding both on roads and in structures.

- HEC-LifeSim supports both natural and knowledge uncertainty through its use of Monte Carlo sampling.