On September 1, 2008, Hurricane Ike began forming in the Gulf of Mexico, eventually strengthening into a Category 4 Hurricane and threatening the Texas Coast. As part of preparations, on September 7, FEMA extended the deployment of the FEMA IST Cache and support personnel for Hurricane Gustav. The following day, on September 8, GDEM directed TX-TF1 to activate all available search and rescue resources and forward deploy as required. TX-TF1 resources activated included a Quick Reaction US&R Task Force, Type-I US&R Task Force, Hurricane Water Task Force, 6 HSARTS, 3 ESF-9 Coordinators, 4 ESF-9 Liaison Officers, and personnel to support operations of the State of Texas ESF-9 Unified Command Team located at Reliant Stadium. Based on a request from GDEM, FEMA resources already pre-staged in Houston for Hurricane Gustav the previous week colocated at Reliant Stadium to assist if needed. These FEMA assets included a FEMA IST, 3 Type-I US&R Task Forces, and 6 Type-III US&R Task Forces.

Prior to landfall, TX-TF1 teams completed a preventive Search and Rescue (SAR) mission, which included utilizing helicopter crews to complete low-level area reconnaissance of over 13,000 square miles. The reconnaissance allowed teams to prepare and take note of any special use facilities that may need special attention after landfall of Hurricane Ike.

Hurricane Ike made landfall on September 13 near Galveston Island, and had sustained winds of 110 miles per hour and a 20 foot storm surge. Within hours, TX-TF1, along with other state and federal teams, moved into the impacted areas and immediately began search and rescue operations. Areas of impact included Galveston Island and Bolivar Peninsula.

On September 18, after all SAR operations were completed and the threat of major flooding associated with Hurricane Ike had subsided, GDEM released all deployed task forces and TX-TF1 personnel from operation.