



## Environmental Assessment

*Hurricane Ike*  
*Turks and Caicos Islands*  
*8-21 September 2008*



JOINT  
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ENVIRONMENT UNIT

Mobilizing and coordinating  
the international response to  
environmental emergencies



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## EXECUTIVE SUMMARY

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Hurricane Ike struck the Turks and Caicos Islands (TCI) on Saturday September 7, 2008, which had already been affected by Tropical Storm Hanna. At the time of impact, Ike was a Category 4 storm on the Saffir-Simpson Scale. Most severely affected in TCI were Grand Turk, South Caicos and Salt Cay.

A United Nations Disaster Assessment and Coordination (UNDAC) mission took place between 8 and 21 September 2008, during which an UNDAC-trained environmental expert undertook an environmental assessment to identify urgent and life-threatening secondary risks.

The major outcome of the Environmental Assessment is that the storms have immediate environmental impacts on, and pose risks to, human health that need to be addressed urgently.

Key concerns identified to date include disaster waste management and disposal of debris. Debris on the ground is causing injuries to residents and damaging vehicles, while improper debris disposal could lead to a range of problems and damage ecosystems. A waste site on Grand Turk is flooded, posing a risk of polluting connected water bodies.

Bearing in mind that these above-mentioned concerns pose a potential risk to health, the Minister of Home Affairs of TCI requested urgent assistance from the Joint OCHA/UNEP Environment Unit (JEU) to address disaster waste management issues as well as to conduct water analysis on the dump site itself (stagnant water), adjacent water bodies and groundwater.

This report recommends that urgent attention be given to the issue of disaster waste management and chemical analysis of water bodies. Furthermore, the report makes a number of recommendations for consideration and inclusion in the recovery phase.

The **Joint UNEP/OCHA Environment Unit**, integrated into the Emergency Services Branch of the Office for the Coordination of Humanitarian Affairs, is the United Nations mechanism to mobilize and coordinate the international response to environmental emergencies.

The Joint Environment Unit works with affected countries to identify and mitigate acute negative impacts stemming from emergencies, providing independent, impartial advice and practical solutions. It also works with organizations dedicated to medium and long-term rehabilitation to ensure a seamless transition to the disaster recovery process.

# 1 INTRODUCTION

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## 1.1 CONTEXT

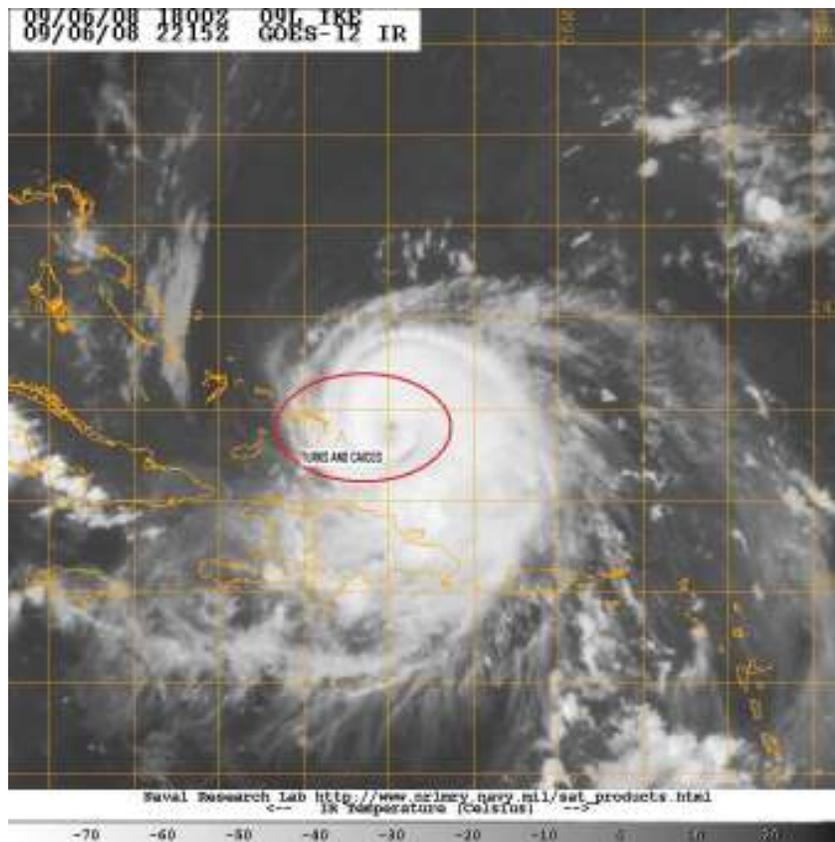
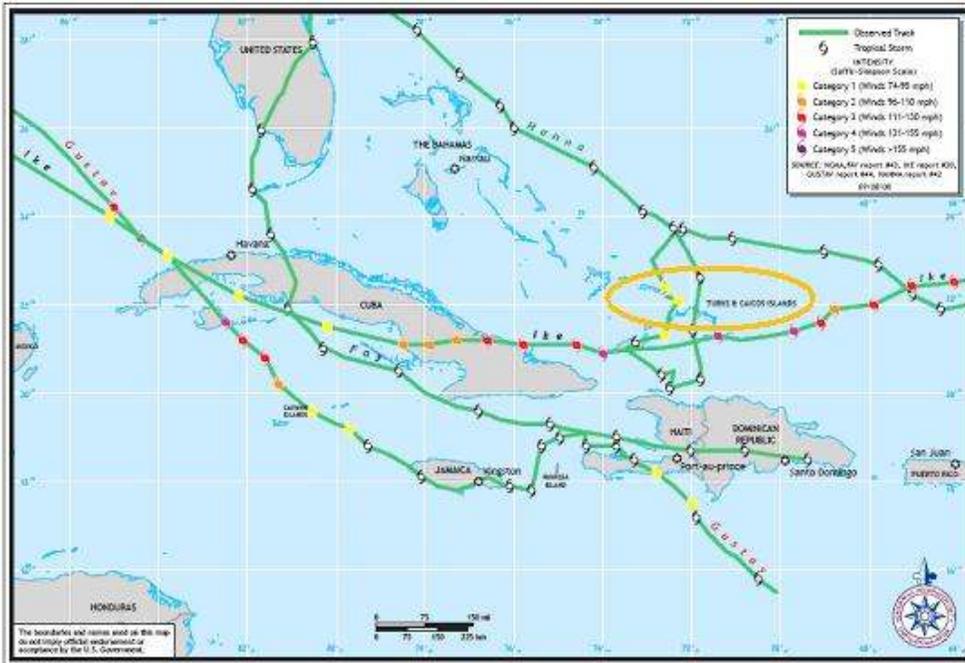
After Tropical Storm Hanna had already affected the Turks and Caicos Islands (TCI), Hurricane Ike struck TCI and the Great Inagua Bahamas Islands on Saturday, September 7, 2008. At the time of impact, Ike was a Category 4 storm on the Saffir-Simpson Scale. The most affected islands in TCI are the Grand Turk, South Caicos and Salt Cay islands. In view of this situation, the Government of TCI declared a disaster area for Grand Turk and South Caicos, due to the extent and magnitude of damage and number of affected persons. (Source: TCI UNDAC reports)



The Turks and Caicos Islands are a British Overseas Territory made up of 40 islands, eight of which are inhabited and located at 21 45 N, 71 35 W southeast of the Bahamas, north of Hispaniola, and 914 kilometers (494 nautical miles) from Miami in the United States, with a total area of 430 km<sup>2</sup> and a coastline of 389 km. The islands have a total population of about 20,556 (July 2005), of whom approximately 75% live on Providenciales in the Caicos Islands. Cockburn Town, the capital, is situated on Grand Turk. (Sources: <http://www.eird.org/perfiles-paises/fulltext/perfiles-paises/perfiles/turks-perfiles.htm>; [http://en.wikipedia.org/wiki/Turks\\_and\\_Caicos\\_Islands](http://en.wikipedia.org/wiki/Turks_and_Caicos_Islands))

The tropical and marine climate is moderated by trade winds. The terrain is low, and the ground consists of flat limestone, featuring extensive marshes and mangrove swamps. The islands have limited natural fresh water resources; private cisterns collect rainwater for drinking. The primary natural resources are spiny lobster, conch and other shellfish. As the Islands are relatively low lying, they are very vulnerable to hurricanes and flooding. (Source: [http://en.wikipedia.org/wiki/Turks\\_and\\_Caicos\\_Islands](http://en.wikipedia.org/wiki/Turks_and_Caicos_Islands))

Every year between June 1 and November 30, hurricanes threaten the eastern and gulf coasts of the United States, Mexico, Central America and the Caribbean. During this year's season, the Turks and Caicos Islands were hit by Tropical Storm Hanna and Hurricane Ike (see map on the following page for the storm tracks).



Source: <http://stormcarib.com/>

Major disasters, such as hurricanes often have acute, negative environmental impacts that can threaten human life and welfare. These impacts may include damage to industrial facilities containing hazardous materials, as well as increased likelihood of erosion and landslides. Some effects are not life-threatening, and are therefore less urgent. Nonetheless they may well be important and require attention in the recovery process – for example, waste management.

The Joint UNEP/OCHA Environment Unit (JEU) is the United Nations mechanism to mobilize and coordinate the international response to environmental emergencies, including natural disasters with major environmental impacts. In situations such as the hurricanes in Turks and Caicos, the JEU has the primary function of identifying any acute issues that could have an impact on the health and/or livelihoods of human populations. If needed, the JEU can mobilize assistance to ensure that these issues are addressed. It can also help to ensure appropriate transition and follow-up so that less urgent, longer-term issues can be addressed during the recovery and rehabilitation phases by national authorities, with possible assistance from the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP) and other bodies concerned with environmental recovery and development issues.

## 1.2 ENVIRONMENTAL ASSESSMENT

The REA was carried out in two stages:

1. Information-gathering and scoping of potential major hurricane-related environmental problems was conducted through interviews and discussions with several agencies, including the National Disaster Management Office of the Ministry of Home Affairs and Public Safety; environmental authorities such as the Department of Environment and Coastal Resources of the Ministry for Coastal Resources, Fisheries and the Environment, the Department of Environmental Health of the Ministry of Health; United Nations organizations and agencies, such as the United Nations Children's Fund (UNICEF) and the Pan American Health Organization (PAHO); the British Red Cross, and several humanitarian non-governmental organizations (NGOs). Interviews were conducted in Providenciales and Grand Turk.
2. Field assessments were performed with the assistance of the disaster management authorities of the areas affected by the storms in Providenciales and Grand Turk. South Caicos, which was also impacted, was not visited during the mission.

The environmental concerns identified were categorized on the basis of urgency:

1. Those of an emergency nature, requiring immediate remedial action;
2. Those posing potential secondary risks that need to be addressed in the early recovery phase.



Image: Debris spread over South Creek in Grand Turk (photo: P. Ugarte)

## 2 ASSESSMENT FINDINGS AND OBSERVATIONS

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### 2.1 ASSESSMENT OF GRAND TURK, INCLUDING WASTE DUMP SITE AND ADJACENT WATER COURSES

Grand Turk is a treeless, brush-covered, bean-shaped dot of an isle, just 6.5 miles (10.5 km) long and 1.5 miles (2.4 km) wide. The center of the island is dominated by several salinas, or salt ponds with salt production, once being the island's most important industry. There are no major industrial facilities in the devastated zones resulting in very few sources of potential chemical contamination. (Source: [http://www.cdera.org/members\\_tc.php](http://www.cdera.org/members_tc.php))

The most visible impact of the hurricane was debris from collapsed infrastructure. Waste management had already been a major problem in Grand Turk before the hurricane season. However, according to the government storms Hanna and Ike aggravated the situation.

The main sources of the waste generated by Hanna and Ike were the following: construction material (plastic, metal, wood, rubble); hospital waste (sharps: needles, scalpel blades, lancets, syringes, etc), domestic (organic) waste and natural debris (vegetation and trees). Additionally, the effects of the storms on power lines and water supply systems caused the spread of human (faecal) waste.

Along the islands, waste was spread in different locations. Despite some clean-up activities that were in progress, several areas were observed that required urgent clean-up and/or protection. For example, metal sheets from roofs and collapsed buildings were blown into the North Back Salina. Likewise, drums with insecticides were placed in open air close to the hospital without any protection.

As regards waste classification, there is an urgent need to classify hazardous and non-hazardous waste from collapsed buildings, medical waste, food, etc. It is also necessary to re-organize the dump site and clean-up the hurricane debris spread over salt ponds and creeks.

With a view towards evaluating waste management-related issues during the post-disaster phase, the UNDAC Team conducted an on-site assessment of the municipal waste dump site as it was reported that the hurricanes contributed to its flooding and spreading of waste and possibly contaminated water to nearby water bodies. For that reason, special attention was paid to identify any acute environmental impacts that could pose risks to human health.

During the assessment, it was observed that there was little security and organization at the entrance of the dump site to receive the waste brought in by the local population. Due to its location - alongside a road in open air with no security protection - the disposal site has tremendous potential of spreading diseases to people living in the vicinity.

The assessment concluded that the current status of the dump site poses a risk of contamination of ground water and adjacent water bodies, mainly due to the presence of hazardous substances. Likewise, the stagnant water that remains from the flooding is located very close to a creek that is connected to a salt pond also connected to the beach. Therefore, there is a need to collect ground water samples from nearby surface or bore wells and analyze them for possible contamination; in particular in view of the rainwater catchments, which are located nearby the dump site.

During a meeting with the Environmental and Health Department, the government shared the above-mentioned concerns. In view of their potential risk to health, the Minister of Home Affairs requested urgent assistance from the JEU to address disaster waste management issues and to conduct a chemical analysis of the water located at the dump site itself (stagnant water), as well as in adjacent water bodies and local groundwater.



Image: Collapse building in Grand Turk (photo: P. Ugarte)

## 2.2 ASSESSMENT OF THE COASTAL RESOURCES, FISHERIES AND THE ENVIRONMENT IN TCI

The most visible signs of environmental damage were caused by the storms' high winds, uprooting trees and vegetation.

In order to gather official information, the UNDAC Team met with the environmental authorities representing the Department of Environment and Coastal Resources (DECR). This office works under the supervision of the Ministry of Natural Resources, Fisheries and the Environment, and is responsible for conservation, environmental and coastal resources, land registry, lands and survey, land valuation and fisheries. DECR offices are located on Grand Turk, South Caicos and Providenciales, and both the Protected Areas Division and the Fisheries Division are represented in each office. The office is staffed with two technical experts and several enforcement officers. DECR buildings have been partly affected by Hurricane Ike. DECR officials began activities one day after the hurricane, and since then, all offices have been fully operational.

Research and assessments conducted by DECR included the planning and implementation of original studies and monitoring programs of the environment and natural resources of TCI. The environmental authorities conducted an assessment of the coastline to map out Providenciales, North Caicos and Grand Turk. The assessment only covered the marine environment. Evaluation of the terrestrial environment was not carried out due to limited human resources. A preliminary report indicated the following environmental impacts:

### *Coastal Environment*

Several beaches such as East Grace Bay suffered substantial erosion, in particular loss of up to five feet sand in height; and loss of linear side of the beach. A restoration project of Emerald Beach completed in June 2008 was completely lost. Monitoring was in process to calculate the losses;

Damage to the coral reefs was not expected to be severe, as they are located between 30-40 feet under water, and therefore below the hurricane's zone of impact;

In the sites assessed, mangroves have been damaged. Also, in South Creek National Park located in Grand Turk, mangroves were affected (confirmed by PAHO);

### *Terrestrial vegetation*

The percentage of loss of vegetation was not assessed. However, the hurricane uprooted a large quantity of trees.

## *Fisheries*

The impact on fish stocks in South Caicos had not been assessed at the time of writing of this report, nor was the impact on fisheries livelihoods; the government emphasized that technical support in this area is needed and it offered its support in granting access to South Caicos.



Image: Impacts on Coastal Environment (Department of Environment and Coastal Resources)

## 3 CONCLUSIONS AND RECOMMENDATIONS

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### 3.1 ENVIRONMENTAL EMERGENCIES

To prevent potential risks to the health of the TCI population, the most important issue is the risk of water pollution by hazardous substances, particularly considering that medical waste was found on the dump site. Water analysis of the dump site and adjacent water bodies should be conducted as soon as possible.

### 3.2 ENVIRONMENT AND EARLY RECOVERY

The Environmental Assessment focused on the immediate impacts caused by the last Tropical Storm Hanna and Hurricane Ike. It is important, however, to consider the findings with a medium-term and long-term approach.

Due to the lack of human resources needed to complete a comprehensive environmental assessment, the environmental authorities representing the Ministry of Natural Resources, Fisheries and the Environment requested the assistance of experts in fisheries, and marine and terrestrial ecology experts to conduct a thorough post-disaster environmental impact assessment in TCI, mostly in Grand Turk and South Caicos.

Environmental impacts are expected to affect the tourism industry in the short term. Bearing in mind that the economy of TCI relies heavily on tourism, damages should thus be addressed as soon as possible in order to expedite economic recovery.

### 3.3 RECOMMENDATIONS

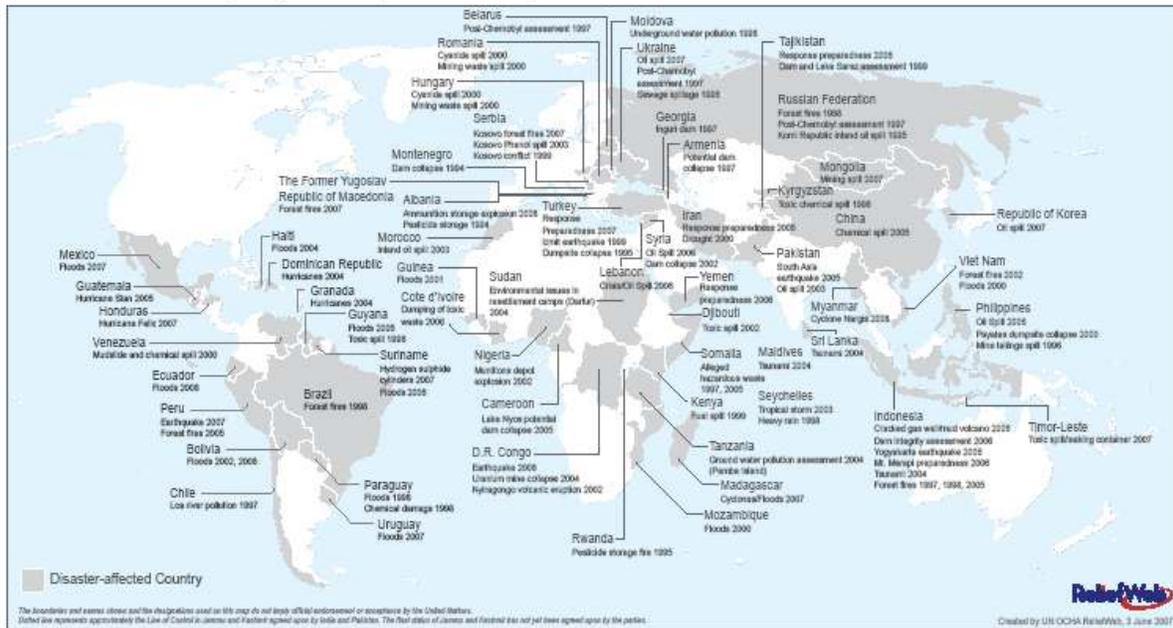
- An improved waste management system is essential for the optimal and sustainable recovery of TCI. Public awareness, urban planning and the mainstreaming of environmental issues in disaster preparedness and risk reduction should also be taken into account.
- Water and sanitation infrastructure of TCI is exposed to increasing levels of risk with each disaster. Worse, certain populations do not yet have water and sanitation systems. Proper access to these services as well as improved infrastructure for TCI should be thoroughly incorporated in the reconstruction phase.
- Continuity of the UN's presence in support of the government in mainstreaming environment in recovery efforts should be ensured.

- Environmental issues should be included in the assessment to be conducted by the team of the Economic Commission for Latin America and the Caribbean (ECLAC), particularly with regards to impacts on fishing livelihoods and fish stocks.
- Waste management, water and sanitation, and health should be included in current and future projects implemented by UN agencies such as UNDP's Bureau for Crisis Prevention and Recovery (BCPR), UNICEF and PAHO.

#### Further information

*Further technical information may be obtained from the Joint UNEP/OCHA website at:  
<http://ochaonline.un.org/ochaunep/>*

Environmental Emergency Section (UNEP/OCHA): Activities as of June 2008



The Joint Unit's key functions include:

**Monitoring**

Continuous monitoring and ongoing communication with an international network of contacts.

**Notification**

Prompt notification and dissemination of emergency information in the event of an environmental disaster.

**Information**

Serving as an effective focal point for providing technical information such as maps and satellite images, scientific information and other expert assistance that can be channelled directly to requesting countries.

**Brokerage**

Facilitating contact between an affected country and donor countries who are ready to assist and provide needed response resources.

**Assistance**

Mobilise multilateral assistance from the international donor community when requested to by countries affected by environmental emergencies. OCHA Emergency Cash Grants may also be released in certain circumstances.

**Assessment**

Arrange for the urgent dispatch of international experts to conduct impartial and independent assessment of the environmental impacts of an emergency.



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