



Natural Disaster Survey Report

Hurricane Iniki September 6 - 13, 1992

April 1993

U.S. DEPARTMENT OF COMMERCE
Ronald H. Brown, Secretary

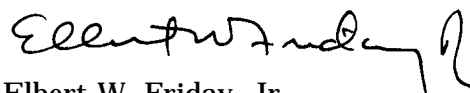
National Oceanic and Atmospheric Administration
Diana Josephson, Acting Under Secretary
for Oceans and Atmosphere

National Weather Service
Elbert W. Friday, Jr., Assistant Administrator
for Weather Services

Preface

Although hurricanes are common over the eastern Pacific and annually are seen in parts of the central Pacific, they are not routinely found over Hawaii. Only four of these have impacted the Aloha State since 1950. Hurricane **Iniki**, with winds up to 160 MPH, was by far the strongest and most destructive. This storm also completed a “clean sweep” of National Weather Service (NWS) offices responsible for issuing hurricane warnings. The National Hurricane Center (**NHC**) in Coral Gables, Florida (Hurricane Andrew), the Joint Typhoon Warning Center (**JTWC**) in Guam (Typhoon Omar), and the Central Pacific Hurricane Center (CPHC) in Honolulu, Hawaii (Hurricane Iniki) were all struck by strong hurricanes within a 2-month span.

Relying on one geostationary satellite providing satisfactory, but less than ideal, coverage and an extremely sparse surface data network, NWS forecasters and meteorological technicians across the state provided excellent warning service to residents and visitors alike. I commend all who took part in this endeavor for their skill and professionalism under trying circumstances. This is especially true for those in Honolulu and Lihue.



Elbert W. Friday, Jr.
Assistant Administrator
for Weather Services

April 1993

Foreword

The report on Pacific Hurricane Iniki was prepared by a National Oceanic and Atmospheric Administration (NOAA) Disaster Survey Team (DST) following on-scene assessments and interviews conducted between September 17-22, 1992. DSTs are convened and such investigations are performed at the direction of the Assistant Administrator for Weather Services when significant storms occur.

The DST is extremely grateful to all those who assisted in conducting the survey. This includes NWS Pacific Region personnel; state and local civil defense and governmental officials; Army, Navy, Coast Guard, Air Force, and Hawaiian Air National Guard personnel; and representatives of the various media outlets from Oahu and Kauai.

The purpose of this survey was to evaluate how the warning and detection system in Hawaii worked in the case of Iniki. It was to identify systemic strengths and weaknesses so that necessary improvements could be developed and implemented. Although some scientific examination of Iniki was a necessary part of this process, this survey was not intended to produce an in-depth scientific analysis of the event. That will be left to others.

Some problems developed during the course of the investigation. The members of the DST felt these problems needed to be addressed in the survey report even though they were not directly connected with the events surrounding Iniki. First, although it is recognized that assembling a team on short notice can be very difficult, having a team member from an office involved can be uncomfortable for the person and for other team members especially during evaluative discussions. **DST Recommendation: NOAA and NWS procedures for putting together a DST should be annotated to suggest that it is not advisable to have a member of the DST be from the local office that was involved with the event.** It would be very beneficial, however, for the DST to have the fulltime assistance of such a person during its visit.

Second, whenever a storm such as Iniki strikes, many agencies are usually involved in assessing what happened. **DST Recommendation: NOAA should consider assigning responsibility for coordinating disaster survey overflights to the Office of the Federal Coordinator for Meteorology (OFCM).** One set of aerial photographs, for example, could undoubtedly serve the needs of all agencies involved in the disaster precluding the need for each agency to arrange for separate, and costly, flights. By establishing procedures beforehand, data gathering could begin quickly after the event so as to enhance its utilization by those involved and so that cleanup efforts would have minimal impact on the evaluation process. Had the DST had access to aerial photographs of the damage patterns before it went to the field, it could have identified and focused its efforts on the most seriously affected locations saving time and money.

Third, the DST suggests that its activities could have been more efficient if it had access to a cellular telephone. Meeting arrangements are often hastily made while the team is in the field, and opportunities may be short lived. Access to a cellular phone would enhance the DST's ability to schedule its time and fulfill its mission.

The Disaster Survey Team

Table of Contents

	<u>PAGE</u>
PREFACE	ii
FOREWORD	iii
ACRONYMS AND ABBREVIATIONS	v
DISASTER SURVEY TEAM MEMBERS	vii
EXECUTIVE SUMMARY	viii
FINDINGS AND RECOMMENDATIONS	ix
CHAPTER I THE EVENT AND ITS IMPACT	1
CHAPTER II SCIENTIFIC ANALYSIS OF THE EVENT	12
CHAPTER III DATA ACQUISITION AND AVAILABILITY	32
CHAPTER IV PREPAREDNESS	37
CHAPTER V WARNING SERVICES	40
CHAPTER VI COORDINATION AND DISSEMINATION	43
CHAPTER VII USER RESPONSE	50
APPENDIX A SAMPLES OF ADVISORIES AND STATEMENTS ISSUED IN CONJUNCTION WITH HURRICANE INIKI	
APPENDIX B EXTRACTS FROM LIHUE AND HONOLULU STATION DUTY MANUALS	

Acronyms and Abbreviations

AFB	Air Force Base
AP	Associated Press
ATCF	Automatic Tropical Cyclone Forecast
AVN	Aviation Model
BAM	Beta-advection Models
CD	Civil Defense
COMSTA	Communications Station
CPHC	Central Pacific Hurricane Center
DST	Disaster Survey Team
EOC	Emergency Operation Center
ET	Electronics Technician
FEMA	Federal Emergency Management Agency
FNOC	Fleet Numerical and Oceanographic Center
GMS	Geostationary Meteorological Satellite
GOES	Geostationary Operational Environmental Satellite
HAWAS	Hawaii Warning System
HIPS	High Resolution Picture Transmission Information
HST	Hawaiian Standard Time
JTWC	Joint Typhoon Warning Center
KT	Knot
LABS	Leased Service A and B System
MB	Millibar
MG PACOM	Meteorological Group, United States Pacific Command
MIC	Meteorologist in Charge
MPH	Miles Per Hour
MWT	Marine Wind and Telephone Interface
NAVWESTOCEANCEN	Naval Western Oceanography Center
NAWAS	National Warning System
NHC	National Hurricane Center
NMC	National Meteorological Center
NOAA	National Oceanic and Atmospheric Administration
NOGAPS	Navy Operational Global Atmospheric Prediction System
NWR	NOM Weather Radio
NWS	National Weather Service
NWWS	NOAA Weather Wire Service
OCD	Oahu Civil Defense
OFCM	Office of the Federal Coordinator for Meteorology
OIC	Official in Charge
RECON	Reconnaissance
SAB	Synoptic Analysis Branch
SCD	State Civil Defense
SDM	Station Duty Manual

SLOSH	Sea Lake and Overland Surges from Hurricanes
TELEFAX	Telephone Facsimile
USACOE	United States Army Corps of Engineers
USAF	United States Air Force
USCG	United States Coast Guard
USN	United States Navy
WPM	Warning Preparedness Meteorologist
WSFO	Weather Service Forecast Office
WSMC	Weather Service Message Center
w s o	Weather Service Office
WSOM	Weather Service Operations Manual

Disaster Survey Team Members

On September 14, 1992, the NOAA Assistant Administrator for Weather Services directed that a DST be formed to investigate the services provided by the NOAA/NWS associated with destructive Hurricane **Iniki** and to develop suggestions for improving these services.

The members of the team included:

Team **Chief...John** Carey, NOAA Associate Deputy Under Secretary for Oceanic and Atmospheric Affairs, Washington, D.C.

Team **Technical Leader...Robert** Jacobson, NOAA/NWS, Marine and Applied Services Branch, Silver Spring, Maryland

Team **Member...William** Alder, Area Manager/Meteorologist in Charge (MIC), NOAA/Weather Service Forecast Office (WSFO), Salt Lake City, Utah

Team **Member...Dr.** Mark Handel, Private Consultant, Cambridge, Massachusetts

Team **Member...Benjamin** Hablutzel, Deputy MIC, NOAA/WSFO Honolulu, Hawaii

Team **Member...Scott** Smullen, Public Affairs Office, NOAA/National Marine Fisheries Service, Silver Spring, Maryland