CHAPTER 3

GENERAL OPERATIONS AND PROCEDURES OF THE NATIONAL WEATHER SERVICE HURRICANE CENTERS

3.1. General. This chapter describes the products, procedures, and communications headers used by the Tropical Prediction Center/National Hurricane Center (TPC/NHC) and the Central Pacific Hurricane Center (CPHC). See Appendix A for a description of local National Weather Service (NWS) office products which support the tropical cyclone forecast and warning program.

3.2. Products.

3.2.1. Tropical Weather Outlook (TWO). Tropical weather outlooks are prepared and issued by the TPC/NHC and CPHC during their respective hurricane seasons. The TPC/NHC writes TWOs for both the Atlantic and Eastern Pacific Basins. They are transmitted at 0000, 0600, 1200, and 1800 UTC. In the Central Pacific, TWOs are transmitted by the CPHC at 0200, 0800, 1400, and 2000 UTC. The outlook briefly describes significant areas of disturbed weather and their potential for tropical cyclone development out to 48 hours.

3.2.2. Tropical Cyclone Discussion. The TPC/NHC and the CPHC will, as appropriate, issue tropical cyclone discussions on Atlantic, Eastern Pacific, and Central Pacific tropical cyclones at 0300, 0900, 1500, and 2100 UTC. Discussions will contain preliminary prognostic positions and maximum wind-speed forecasts up to 120 hours; will describe objective techniques, synoptic features, and climatology used; and will provide reasons for track changes.

3.2.3. Tropical Cyclone Public Advisories. TPC/NHC and CPHC will issue tropical cyclone public advisories at 0300, 0900, 1500, and 2100 UTC. WFO Guam issuance times are 0400, 1000, 1600, and 2200 UTC. The advisories will be discontinued when (1) the tropical cyclone ceases to be a tropical cyclone (e.g., becomes extratropical, a remnant low, or dissipates); (2) the tropical cyclone is centered over land, is below tropical storm strength, and is not forecast to move back over water as a tropical cyclone; or (3) there are no coastal tropical cyclone watches or warnings in effect.

3.2.3.1. Atlantic/Eastern Pacific. Tropical cyclone public advisories are issued by the TPC/NHC for all tropical cyclones in the Atlantic and eastern Pacific. Watch and warning break points for the Atlantic are listed in Appendix B.

3.2.3.2. Central Pacific. In the Central Pacific, tropical cyclone public advisories are issued by CPHC for all tropical cyclones within its area of responsibility. In addition to the main Hawaiian Islands, CPHC also issues watches and warnings for Johnston Atoll, Midway, and the northwest Hawaiian Islands (with designated break points listed in Appendix B.).

3.2.3.3. Western Pacific. In the Western Pacific, WFO Guam issues public advisories, using Joint Typhoon Warning Center's (JTWC) and RSMC Tokyo forecast products

as guidance, for all tropical cyclones within the Territory of Guam and Micronesia. Watches and warnings are issued for specific, designated sites in the Territory of Guam, the Commonwealth of the Northern Marianas, the Republic of Palau, the Federated States of Micronesia, and the Republic of the Marshall Islands.

[NOTE: To further publicize local products, when a tropical cyclone threatens a land area, the following statement shall be included in the advisory..."For storm information specific to your area...please monitor products issued by your local weather office." Tropical cyclone public advisories use statute miles for distance and miles per hour for speed. Nautical miles and knots may be added at the discretion of the centers. Atlantic advisories should include the metric units in kilometers and kilometers per hour following the equivalent English units except when the United States is the only country threatened.]

3.2.4. Tropical Cyclone Forecast/Advisories. Tropical cyclone forecast/advisories are issued by the TPC/NHC and the CPHC. See Section 4.3 for content and format of the advisories. In both the Atlantic and Pacific, the advisories are scheduled for 0300, 0900, 1500, and 2100 UTC. Pacific advisories should be transmitted 15 minutes before the effective time. In the Western Pacific, tropical cyclone forecasts/advisories are issued by the JTWC; Appendix C provides a listing of the abbreviated communications headings and titles for JTWC products. Information on the broadcast of tropical cyclone information to coastal and high-seas shipping can be found in Chapter 9, Marine Weather Broadcasts.

3.2.5. Tropical Cyclone Surface Wind Speed Probabilities. This product will be issued for all named tropical and subtropical cyclones in the Atlantic, East Pacific and Central Pacific basins and will be available no earlier than 15 minutes following the issuance deadlines for routine advisories (03, 09, 15, and 21 UTC) and after special advisories. Probabilities are statistically based on track, intensity, and wind structure uncertainties during recent years in the official tropical cyclone forecasts. The first section of the product provides categorical maximum wind speed (intensity) probabilities at standard forecast hours (12, 24, 36, 48, 72, 96, and 120) for various intensity stages (dissipated, tropical depression, tropical storm and hurricane) and for the five categories on the Saffir-Simpson Hurricane Scale. These probabilities apply to the maximum sustained surface wind associated with the cyclone, and not to winds that could occur at specific locations.

Probabilities for specific locations are provided in the second section for sustained wind speeds equal to or exceeding three wind speed thresholds: 34, 50 and 64 knots. Two types of probability values are provided in this table: individual period and cumulative. Individual period probabilities are provided for each of the following time intervals: 0-12 hours, 12-24 hours, 24-36 hours, 36-48 hours, 48-72 hours, 72-96 hours, and 96-120 hours. These individual period probabilities indicate the chance that the particular wind speed will start during each individual period at each location. Cumulative probabilities are produced for the following time periods: 0-12 hours, 0-24 hours, 0-36 hours, 0-48 hours, 0-72 hours, 0-96 hours, and 0-120 hours. These cumulative probabilities indicate the overall chance the particular wind speed will occur at each location during the period between hour 0 and the forecast hour.

3.2.6. Tropical Cyclone Updates. Tropical cyclone updates (TCU) are issued by NHC and CPHC in lieu of or preceding special advisories to inform users of unexpected changes in tropical cyclones. The TCU may also be used to announce changes to international watches or warnings made by other countries, and to cancel U.S. watches or warnings.

3.2.7. Tropical Cyclone Position Estimates. The hurricane centers and WFO Guam may issue a position estimate between 2-hourly intermediate public advisories whenever sufficient, reliable radar center fix information is available. Position estimates disseminated to the public, DOD, and other Federal agencies will provide geographical positions in two ways: by latitude and longitude and by distance and direction from a well-known point.

3.2.8. Special Tropical Disturbance Statement. Special tropical disturbance statements may be issued to furnish information on strong formative, non-depression systems.

3.2.9. HPC Public Advisories (TCP). The National Centers for Environmental Prediction's Hydrological Prediction Center (HPC) will issue public advisories after TPC/NHC discontinues its on subtropical and tropical cyclones that have moved inland in the United States or Mexico, but still pose a threat of heavy rain and flash floods in the conterminous United States or Mexico. The last TPC/NHC advisory will normally be issued when winds in an inland tropical cyclone drop below tropical storm strength, and the tropical depression is not forecast to regain tropical storm intensity or reemerge over water. The TCP is an alphanumeric product (see Figure 3-1), and advisories are issued at 0300, 0900, 1500, and 2100 UTC. TCPs will continue to be numbered in sequence with tropical cyclone advisories by TPC/NHC and will reference the former storm's name in the text. Content will refer to the decaying system's position, intensity, general forecast trends, highlight impacts which occurred and are expected to occur (usually in relation to heavy rain/flooding and tornadoes), and indicate when the next summary will be issued. Advisories will terminate when the threat of flash flooding has ended or when the remnants of these storms can no longer be distinguished from other synoptic features capable of producing flash floods.

3.2.10. Tropical Disturbance Rainfall Estimates. As required, the TPC/NHC/CPHC will issue satellite-based rainfall estimates for tropical disturbances and tropical cyclones within 36 hours of forecasted landfall.

3.2.11. Tropical Weather Summary (Monthly). NHC and CPHC will prepare and issue these products each month during the hurricane season. The product will summarize the previous month's tropical cyclone activity. The last product issued at the end of the hurricane season will summarize November's activity plus the activity for the whole season.

3.2.12. Tropical Cyclone Summary - Fixes. CPHC will issue these products when a tropical cyclone is classifiable using the Dvorak technique. Fixes will be issued for the north central Pacific from 140ºW to 160ºE and for the south central Pacific from 120ºW to 160ºE. After the initial tropical cyclone fix, succeeding fixes will be done at approximately 0000, 0600, 1200, and 1800 UTC as long as the system is classifiable using the Dvorak technique.

WTNT3i KWNH DDHHMM
TCPATc

PUBLIC ADVISORY NUMBER XX FOR (TROPICAL CYCLONE TYPE) (NAME)
NWS HYDROMETEOROLOGICAL PREDICTION CENTER CAMP SPRINGS MD
BBCCYYYY
time am/pm time_zone day of week month DD YYYY

TEXT

SZATANEK/BANN

FORECAST POSITIONS

INITIAL 25/2100Z 29.0N 77.4W
12HR VT 26/0600Z 33.1N 72.6W
24HR VT 26/1800Z 39.4N 65.2W
36HR VT 27/0600Z 43.1N 58.2W
48HR VT 27/1800Z...DISSIPATED

$$

Figure 3-1. **HPC Public Advisory Product Format**

3.2.13. Tropical Cyclone Danger Area Graphic. The Tropical Cyclone Danger Area is a graphical marine product depicting a tropical cyclone's track (out to 72 hours) and shades in a danger area determined by adding 100, 200, and 300 nautical miles plus the 34-knot wind radii to the 24-, 48-, and 72- hour forecast position respectively in the Atlantic and east Pacific. For the central Pacific, the shaded danger area will vary in width dependent upon the hurricane specialist's confidence in the track and the length of the 34-knot wind radii. In addition, areas of possible tropical cyclone genesis (out to 48 hours) are included and depicted as either a circular, rectangle, oval, or polygon shaped area. The product is prepared by the TPC and covers the entire Atlantic north of the equator and the Pacific north of the equator from the Mexican and Central America coast west to 140ºW. CPHC prepares a separate chart for 140ºW to the International Dateline north of the equator. The product is disseminated four times per day during the hurricane season within 1 hour after the advisory package issuance. This would be at 0400, 1000, 1600 and 2200 UTC.

3.2.14. Aviation Tropical Cyclone Advisory (TCA). The TCA is intended to provide short-term tropical cyclone forecast guidance for international aviation safety and routing purposes. The product is prepared by TPC/NHC and CPHC for all ongoing tropical cyclone activity in their respective areas of responsibility. This requirement is stated in the World Meteorological Organization Region IV hurricane plan. TCAs list the current TC position, motion and intensity, and *6*-, 12-, *18*-, and 24-hour forecast positions and intensities. It is an alphanumeric text product produced by hurricane forecasters and consists of information extracted from the official forecasts. This forecast is produced from subjective evaluation of current meteorological and oceanographic data as well as output from numerical weather

prediction models, and is coordinated with affected WFOs, the National Centers, and the Department of Defense. It is prepared four times daily and issued at 0300, 0900, 1500, and 2100 UTC.

FKaa2i CCCC DDHHMM
TCAxxx

(TROPICAL CYCLONE TYPE) ICAO ADVISORY NUMBER ##
ISSUING OFFICE CITY STATE BBCCYYYY
time am/pm time_zone day mon DD YYYY

TEXT

$$

Figure 3-2. Aviation Tropical Cyclone Advisory Format

3.3. Designation of Tropical and Subtropical Cyclones.

3.3.1. Numbering of Tropical and Subtropical Depressions. The hurricane centers are responsible for numbering tropical and subtropical depressions in their areas of responsibility. Tropical depressions shall be numbered consecutively beginning each season with the spelled out number "ONE." For ease in differentiation, tropical depression numbers shall include the suffix "E" for Eastern Pacific, "C" for Central Pacific, or "W" for Western Pacific, after the number. In both the Atlantic and Pacific, once the depression has reached tropical storm intensity, it shall be named and the depression number dropped. The depression number will not be used again until the following year. Give tropical cyclones a name in the first advisory after intensifying to 34 knots (39 mph) or greater. In the Western Pacific, WFO Guam will use the JTWC cyclone number for all non-named systems. For Regional Specialized Meteorological Center (RSMC) Tokyo named systems, WFO Guam will use the RSMC Tokyo name with the associated JTWC number in parentheses.

The following rules apply for tropical cyclones passing from one basin to another: Retain the name if a tropical cyclone passes from one basin into another basin as a tropical cyclone; i.e., advisories are continuous. An unnamed tropical depression will also retain its number (e.g. Tropical Depression Six-E remains Tropical Depression Six-E) if it crosses into another area of responsibility. For unnamed tropical depressions moving from west to east across 180°, CPHC will use the associated Joint Typhoon Warning Center's (JTWC) number and indicate JTWC in parentheses following the number. For named systems, CPHC will use the associated (RSMC) Tokyo name and provide the associated JTWC number in parentheses.

Within a basin, if the remnant of a tropical cyclone redevelops into a tropical cyclone, it is assigned its original number or name. If the remnants of a former tropical cyclone regenerate in a new basin, the regenerated tropical cyclone will be given a new designation.

3.3.1.1. Atlantic Basin. Depression numbers, ONE, TWO, THREE, will be assigned by the TPC/NHC after advising the Naval Atlantic Meteorology and Oceanography

Center (NAVLANTMETOCCEN) Norfolk.

3.3.1.2. Pacific East of 140ºW. Depression numbers, with the suffix E, e.g., ONE-E, TWO-E, THREE-E, will be assigned by the TPC/NHC after advising JTWC, Pearl Harbor, HI. The assigned identifier shall be retained even if the depression passes into another warning area.

3.3.1.3. Pacific West of 140ºW and East of 180º. Depression numbers, with suffix C; e.g., ONE-C, TWO-C, THREE-C, will be assigned by the CPHC after advising JTWC.

3.3.1.4. Pacific West of 180º and North of 0º. Depression numbers, with suffix W; e.g., ONE-W, TWO-W, THREE-W, are assigned by JTWC.

3.3.1.5. Subtropical Depressions. A single list of numbers and names will be used for all tropical and subtropical cyclones. Therefore, numbering of subtropical depressions will follow the same procedure as tropical depressions. For example, if the first subtropical depression follows the first tropical depression, the subtropical depression will be given the designation SUBTROPICAL DEPRESSION TWO. If a subtropical depression becomes a subtropical storm, it receives the next available name in the tropical cyclone naming sequence.

3.3.2. Numbering and Naming of Tropical and Subtropical Cyclones.

3.3.2.1. Numbering and Naming Tropical Cyclones. Tropical cyclone centers will number tropical depressions in their areas of responsibility. Number tropical depressions consecutively beginning each season with the spelled out number "ONE." In the north Pacific, for ease in differentiation, tropical depression numbers, assigned by NHC or CPHC, will include the suffix "E" for eastern (east of 140°W longitude) or "C," for central (180° to 140°W longitude) respectively, after the number. In both the Atlantic and Pacific, once the depression reaches tropical storm intensity, name it and drop the depression number. The depression number will not be used again until the following year. Give tropical cyclones a name in the first advisory after intensifying to 34 knots (39 mph) or greater. In the Western Pacific, WFO Guam will use the JTWC cyclone number for all non-named systems. For RSMC Tokyo named systems, WFO Guam will use the RSMC Tokyo name with the associated JTWC number in parentheses.

The following rules apply for tropical cyclones passing from one basin to another: Retain the name if a tropical cyclone passes from one basin into another basin as a tropical cyclone; i.e. advisories are continuous. An unnamed tropical depression will also retain its number (e.g. Tropical Depression Six-E remains Tropical Depression Six-E) if it crosses into another area of responsibility. For unnamed tropical depressions moving from west to east across 180°, CPHC will use the associated Joint Typhoon Warning Center's (JTWC) number and indicate JTWC in parentheses following the number. For named systems, CPHC will use the RSMC Tokyo name and provide the associated JTWC number in parentheses.

Within a basin, if the remnant of a tropical cyclone redevelops into a tropical cyclone, it is assigned its original number or name. If the remnants of a former tropical cyclone regenerate in

a new basin, the regenerated tropical cyclone will be given a new designation.

3.3.2.2. Numbering and Naming Subtropical Storms. A single list of numbers and names will be used for all tropical and subtropical cyclones. Therefore, numbering of subtropical depressions will follow the same procedure as tropical depressions. For example, if the first subtropical depression follows the first tropical depression, the subtropical depression will be given the designation SUBTROPICAL DEPRESSION TWO. If a subtropical depression becomes a subtropical storm, it receives the next available name in the tropical cyclone naming sequence.

3.3.2.3. Numbering Advisories and Tropical/Subtropical Cyclone Discussions. Tropical and subtropical cyclone advisories and discussions in the Atlantic and the Pacific will be numbered similarly. Number scheduled and special advisories and TCDs consecutively beginning with the number 1 (not spelled out) for each new tropical or subtropical cyclone, and continue through the duration of the cyclone. In situations where only TCMs and TCDs are being written (tropical cyclones in the eastern Pacific not threatening land) and at a later time a public advisory is required, the public advisory number will match the corresponding TCM. In both the Atlantic and the Pacific, intermediate advisories and TCDs will retain the advisory number of the scheduled or special advisory they update and append an alphabetic designator (e.g., “HURRICANE ALLISON INTERMEDIATE ADVISORY NUMBER 20A”).

3.4. Transfer of Warning Responsibility.

3.4.1. TPC/NHC to CPHC. When a tropical or subtropical cyclone approaches 140ºW, the coordinated transfer of warning responsibility from TPC/NHC to CPHC will be made and the appropriate advisory issued.

3.4.2. CPHC to JTWC/(RSMC, Tokyo)/WFO Guam. When a tropical or subtropical cyclone crosses 180º from east to west, the coordinated transfer of warning responsibility from CPHC to JTWC will be made and the appropriate advisory issued. At the same time, the CPHC will coordinate with the RSMC, Tokyo and WFO Guam so that they are aware that CPHC will be suspending the issuance of advisories.

3.4.3. JTWC/RSMC, Tokyo to CPHC. When a tropical or subtropical cyclone crosses 180º from west to east, the coordinated transfer of warning responsibility from JTWC to CPHC will be made. JTWC will append the statement, "Next advisory by CPHC-HNL" to their last advisory. At the same time, the CPHC will coordinate with RSMC, Tokyo so that they are aware that CPHC will be assuming the issuance of advisories.

3.5 Alternate Warning Responsibilities.

3.5.1. Transfer to Alternate. In the event of impending or actual operational failure of a hurricane forecast center, tropical warning responsibilities will be transferred to an alternate facility in accordance with existing directives and retained there until resumption of responsibility can be made. Alternate facilities are as follows:

PRIMARY	ALTERNATE
TPC/NHC	National Centers for Environmental Prediction Hydrometeorological Prediction Center (HPC) Camp Springs, MD
CPHC	TPC/NHC
CARCAH	53rd Weather Reconnaissance Squadron (53 WRS)
JTWC	Fleet Numerical Meteorology and Oceanography Center (FLENUMETOCCEN), Monterey, CA
WFO Guam	CPHC

3.5.2. Notification. The NAVLANTMETOCCEN, Norfolk, and JTWC, Pearl Harbor, will be advised by TPC/NHC, CARCAH, and CPHC, as appropriate, of impending or actual transfer of responsibility by the most rapid means available. JTWC will advise CPHC, TPC/NHC, and WFO Guam of impending or actual transfer of JTWC responsibilities. In the event of a CARCAH operational failure, direct communication is authorized between the 53 WRS and the forecast facility. Contact 53 WRS at DSN 597-2409/228-377-2409 or through the Keesler AFB Command Post at DSN 597-4330/208-377-4330 (ask for the 53 WRS).

Table 3-1. Atlantic Tropical Cyclone Names

2008		**2009**		**2010**	
ARTHUR		ANA		ALEX	
BERTHA	BUR-tha	BILL		BONNIE	
CRISTOBAL		CLAUDETTE	claw-DET	COLIN	
DOLLY		DANNY		DANIELLE	dan-YELL
EDOUARD	eh-DWARD	ERIKA	ERR-ree-ka	EARL	
FAY		FRED		FIONA	
GUSTAV		GRACE		GASTON	
HANNA		HENRI	ahn-REE	HERMINE	her-MEEN
IKE		IDA		IGOR	e-GOR
JOSEPHINE	JO-ze-feen	JOAQUIN		JULIA	
KYLE		KATE		KARL	
LAURA		LARRY		LISA	LEE-sa
MARCO		MINDY		MATTHEW	
NANA		NICHOLAS	NIK-o-las	NICOLE	ni-COLE
OMAR		ODETTE	o-DET	OTTO	
PALOMA	pa-LOW-ma	PETER		PAULA	
RENE	re-NAY	ROSE		RICHARD	RICH-erd
SALLY		SAM		SHARY	SHA-ree
TEDDY		TERESA	te-REE-sa	TOMAS	to-MAS
VICKY		VICTOR	VIC-ter	VIRGINIE	vir-JIN-ee
WILFRED		WANDA		WALTER	
2011		**2012**		**2013**	
ARLENE		ALBERTO	al-BAIR-toe	ANDREA	
BRET		BERYL	BER-ril	BARRY	
CINDY		CHRIS		CHANTAL	shan-TAHL
DON		DEBBY		DORIAN	
EMILY		ERNESTO	er-NES-toe	ERIN	AIR-in
FRANKLIN		FLORENCE		FERNAND	
GERT		GORDON		GABRIELLE	ga-bree-EL
HARVEY		HELENE	he-LEEN	HUMBERTO	oom-BAIR-to
IRENE		ISAAC	EYE-zak	INGRID	
JOSE	ho-ZAY	JOYCE		JERRY	
KATIA	ka-TEE-ah	KIRK		KAREN	
LEE		LESLIE		LORENZO	
MARIA	ma-REE-ah	MICHAEL	MIKE-el	MELISSA	
NATE		NADINE	nay-DEEN	NESTOR	
OPHELIA	o-FEEL-ya	OSCAR		OLGA	
PHILIPPE	fe-leep	PATTY		PABLO	PA-blow
RINA		RAFAEL	ra-fa-EL	REBEKAH	
STAN		SANDY		SEBASTIEN	say-BAS-tyan
TAMMY		TONY		TANYA	TAHN-ya
VINCE		VALERIE		VAN	
WHITNEY		WILLIAM		WENDY	

If over 21 tropical cyclones occur in a year, the Greek alphabet will be used following the W-named cyclone.

Table 3-2. Eastern Pacific Tropical Cyclone Names

2008		**2009**		**2010**	
ALMA	AL mah	ANDRES	ahn DRASE	AGATHA	
BORIS		BLANCA	BLAHN kah	BLAS	
CRISTINA		CARLOS		CELIA	
DOUGLAS		DOLORES		DARBY	
ELIDA	ELL ee dah	ENRIQUE	anh REE kay	ESTELLE	
FAUSTO	FOW sto	FELICIA	fa LEE sha	FRANK	
GENEVIEVE		GUILLERMO	gee YER mo	GEORGETTE	
HERNAN	her NAHN	HILDA		HOWARD	
ISELLE	ee SELL	IGNACIO	eeg NAH cio	ISIS	
JULIO	HOO lee o	JIMENA	he MAY na	JAVIER	
KARINA		KEVIN		KAY	
LOWELL		LINDA		LESTER	
MARIE		MARTY		MADELINE	
NORBERT		NORA		NEWTON	
ODILE	oh DEAL	OLAF	OH lahf	ORLENE	
POLO		PATRICIA		PAINE	
RACHEL		RICK		ROSLYN	
SIMON		SANDRA		SEYMOUR	
TRUDY		TERRY		TINA	
VANCE		VIVIAN		VIRGIL	
WINNIE		WALDO		WINIFRED	
XAVIER	ZAY vier	XINA	ZEE nah	XAVIER	
YOLANDA	yo LAHN da	YORK		YOLANDA	yo LAHN da
ZEKE		ZELDA	ZEL dah	ZEKE	
2011		**2012**		**2013**	
ADRIAN		ALETTA	a LET ah	ALVIN	
BEATRIZ	BEE a triz	BUD		BARBARA	
CALVIN		CARLOTTA		COSME	COS may
DORA		DANIEL		DALILA	
EUGENE		EMILIA	ee MILL ya	ERICK	
FERNANDA	fer NAN dah	FABIO	FAH bee o	FLOSSIE	
GREG		GILMA	GIL mah	GIL	
HILARY		HECTOR		HENRIETTE	hen ree ETT
IRWIN		ILEANA	ill ay AH nah	IVO	
JOVA	Ho vah	JOHN		JULIETTE	
KENNETH		KRISTY		KIKO	KEE ko
LIDIA		LANE		LORENA	low RAY na
MAX		MIRIAM		MANUEL	mahn WELL
NORMA		NORMAN		NARDA	
OTIS		OLIVIA		OCTAVE	AHK tave
PILAR		PAUL		PRISCILLA	
RAMON	rah MONE	ROSA		RAYMOND	
SELMA		SERGIO	SIR gee oh	SONIA	SONE yah
TODD		TARA		TICO	TEE koh
VERONICA		VICENTE	vee CEN tay	VELMA	
WILEY		WILLA		WALLIS	
XINA	ZEE nah	XAVIER	ZAY vier	XINA	ZEE nah
YORK		YOLANDA	yo LAHN da	YORK	
ZELDA	ZEL dah	ZEKE		ZELDA	ZEL dah

Table 3-3. Central Pacific Tropical Cyclone Names

COLUMN 1		COLUMN 2	
Name	**Pronunciation**	**Name**	**Pronunciation**
AKONI	ah-KOH-nee	AKA	AH-kah
EMA	EH-mah	EKEKA	eh-KEH-kak
HONE	*HOH-neh*	*HENE*	*HEH-neh*
IONA	*ee-OH-nah*	IOLANA	ee-OH-lah-nah
KELI	KEH-lee	KEONI	keh-ON-nee
LALA	LAH-lah	LINO	LEE-noh
MOKE	MOH-keh	MELE	MEH-leh
NOLO	*NOH-loh*	NONA	NOH-nah
OLANA	*Oh-LAH-nah*	OLIWA	oh-LEE-vah
PENA	*PEH-nah*	*PAMA*	*PAH-mah*
ULANA	*oo-LAH-nah*	UPANA	oo-PAH-nah
WALE	*WAH-leh*	WENE	WEH-neh
COLUMN 3		**COLUMN 4**	
Name	**Pronunciation**	**Name**	**Pronunciation**
ALIKA	ah-LEE-kah	ANA	AH-nah
ELE	EH-leh	ELA	EH-lah
HUKO	HOO-koh	HALOLA	hah-LOH-lah
IOPA	*ee-OH-pah*	IUNE	ee-OO-neh
KIKA	KEE-kah	*KILO*	*KEE-lo*
LANA	LAH-nah	LOKE	LOH-keh
MAKA	MAH-kah	MALIA	mah-LEE-ah
NEKI	NEH-kee	NIALA	nee-AH-lah
OMEKA	*oh-MEH-kah*	*OHO*	*OH-hoh*
PEWA	*PEH-vah*	PALI	PAH-lee
UNALA	*oo-NAH-lah*	ULIKA	oo-LEE-kah
WALI	WAH-lee	WALAKA	wah-LAH-kah

NOTE: Use Column 1 list of names until exhausted before going to Column 2, etc. All letters in the Hawaiian language are pronounced, including double or triple vowels.

Table 3-4. International Tropical Cyclone Names for the Northwest Pacific and South China Sea

Contributor	I	II	III	IV	V
	NAME	NAME	NAME	NAME	NAME
Cambodia	Damrey	Kong-rey	Nakri	Krovanh	Sarika
China	Longwang	Yutu	Fengshen	Dujuan	Haima
DPR Korea	Kirogi	Toraji	Kalmaegi	Maemi	Meari
HK, China	Kai-tak	Man-yi	Fung-wong	Choi-wan	Ma-on
Japan	Tembin	Usagi	Kammuri	Koppu	Tokage
Lao PDR	Bolaven	Pabuk	Phanfone	Ketsana	Nock-ten
Macau	Chanchu	Wutip	Vongfong	Parma	Muifa
Malaysia	Jelawat	Sepat	Nuri	Melor	Merbok
Micronesia	Ewiniar	Fitow	Sinlaku	Nepartak	Nanmadol
Philippines	Bilis	Danas	Hagupit	Lupit	Talas
RO Korea	Kaemi	Nari	Changmi	Sudal	Noru
Thailand	Prapiroon	Wipha	Mekkhala	Nida	Kulap
U.S.A.	Maria	Francisco	Higos	Omais	Roke
Viet Nam	Saomai	Lekima	Bavi	Conson	Sonca
Cambodia	Bopha	Krosa	Maysak	Chanthu	Nesat
China	Wukong	Haiyan	Haishen	Dianmu	Haitang
DPR Korea	Sonamu	Podul	Pongsona	Mindulle	Nalgae
HK, China	Shanshan	Lingling	Yanyan	Tingting	Banyan
Japan	Yagi	Kajiki	Kujira	Kompasu	Washi
Lao PDR	Xangsane	Faxai	Chan-hom	Namtheun	Matsa
Macau	Bebinca	Peipan	Linfa	Malou	Sanvu
Malaysia	Rumbia	Tapah	Nangka	Meranti	Mawar
Micronesia	Soulik	Mitag	Soudelor	Rananim	Guchol
Philippines	Cimaron	Hagibis	Molave	Malakas	Talim
RO Korea	Chebi	Noguri	Koni	Megi	Nabi
Thailand	Durian	Rammasun	Morakot	Chaba	Khanun
U.S.A.	Utor	Matmo	Etau	Aere	Vicente
Viet Nam	Trami	Halong	Vamco	Songda	Saola

NOTE: The official international name list was effective January 1, 2000. Names will be assigned in rotation starting with Damrey for the first tropical cyclone of the year 2000 which is of tropical storm strength or greater. When the last name in column 5 (Saola) is used, the sequence will begin again with the first name in column 1 (Damrey).

3.6. Abbreviated Communications Headings. Abbreviated communications headings are assigned to advisories on tropical and subtropical cyclones and other advisories based on depression numbers or storm name and standard communications procedures. An abbreviated

heading consists of three groups with ONE space between each of the groups. The first group contains a data type indicator (e.g., WT for hurricane), a geographical indicator (e.g. NT for Atlantic Basin), and a number. The second group contains a location identifier of the message originator (e.g., KNHC for TPC/NHC). The third group is a date-time group in UTC. An example of a complete header is: WTNT61 KNHC 180400.

3.6.1. Atlantic Headings (see paragraph 3.6.3 also).

ABNT20 KNHC	Tropical Weather Outlook
ABNT30 KNHC	Tropical Weather Summary (monthly)
WTNT31 KNHC	Tropical Cyclone Public Advisory (Atlantic)
WTNT51 KNHC	Tropical Cyclone Position Estimate
WTNT61 KNHC	Tropical Cyclone Update
WONT41 KNHC	Special Tropical Disturbance Statement
FXUS01 KWBC	1-2 Day Discussion
FXUS02 KWBC	3-7 Day Discussion
FXUS04 KWBC	Precipitation Discussion

3.6.2. Pacific Headings (see paragraph 3.6.3 also).

ABPZ20 KNHC	Tropical Weather Outlook (Eastern Pacific)
ABPZ30 KNHC	Tropical Weather Summary (monthly)
ACPN50 PHFO	Tropical Weather Outlook (Central Pacific)
ACPN60 PHFO	Tropical Weather Summary (monthly)
TXPN40 PHFO	Northern Hemisphere Tropical Cyclone Summary (Fixes)
TXPS40 PHFO	Southern Hemisphere Tropical Cyclone Summary (Fixes)
WTPZ51 KNHC	Tropical Cyclone Position Estimate (Eastern Pacific)
WTPA51 PHFO	Tropical Cyclone Position Estimate (Central Pacific)
WTPQ51 PGUM	Tropical Cyclone Position Estimate (Western Pacific)
WTPZ61 KNHC	Tropical Cyclone Update (Eastern Pacific)
WTPA61 PHFO	Tropical Cyclone Update (Central Pacific)
WOPZ41 KNHC	Special Tropical Disturbance Statement (Eastern Pacific)
ACPA80 PHFO	Special Tropical Disturbance Statement (Central Pacific)

3.6.3. Numbering. Depressions are numbered internally and storms are named internally, but the number in the abbreviated headings does not relate to either the internal number of the depression or the name of the storm. The first cyclone would have 21 and 31 in the abbreviated headings, the second cyclone would have 22 and 32, the sixth cyclone would have 21 and 31, etc. The abbreviated heading would not change when a depression was upgraded to storm status.

WTNT21-25 KNHC	Tropical Cyclone Forecast/Advisory (Atlantic)
WTNT31-35 KNHC	Tropical Cyclone Public Advisory (Atlantic)
WTNT31-35 KWNH	HPC Public Advisory (Atlantic)
WTNT41-45 KNHC	Tropical Cyclone Discussion (Atlantic)

WTNT51-55 KNHC	Tropical Cyclone Position Estimate (Atlantic)
WTNT61-65 KNHC	Tropical Cyclone Update (Atlantic)
WTPZ 21-25 KNHC	Tropical Cyclone Forecast/Advisory (Eastern Pacific)
WTPZ 31-35 KNHC	Tropical Cyclone Public Advisory (Eastern Pacific)
WTPZ41-45 KNHC	Tropical Cyclone Discussion (Eastern Pacific)
WTPZ51-55 KNHC	Tropical Cyclone Position Estimate (Eastern Pacific)
WTPZ61-65 KNHC	Tropical Cyclone Update (Eastern Pacific)
WTPA21-25 PHFO	Tropical Cyclone Forecast/Advisory (Central Pacific)
WTPA31-35 PHFO	Tropical Cyclone Public Advisory (Central Pacific)
WTPA41-45 PHFO	Tropical Cyclone Discussion (Central Pacific)
WTPA51-55 PHFO	Tropical Cyclone Position Estimate (Central Pacific)
WTPA61-65 PHFO	Tropical Cyclone Update (Central Pacific)
WTPQ31-35 PGUM	Tropical Cyclone Public Advisory (Western Pacific)
WTPQ51-55 PGUM	Tropical Cyclone Position Estimate (Western Pacific)

3.7. Hurricane Liaison Team (HLT).

3.7.1. National Weather Service (NWS) Responsibilities. The NWS supports the HLT through use of Tropical Prediction Center (TPC) meteorologists, Weather Forecast Office (WFO) personnel (typically warning coordination meteorologists and service hydrologists), and River Forecast Center (RFC) hydrologists. Eastern and Southern Region Headquarters will maintain a list of their available HLT candidates.

After HLT deactivation, the Hydrometeorological Prediction Center (HPC) will assume the briefing duties provided the remnants of the tropical cyclone remain a threat to inland areas. TPC and HPC will coordinate prior to the transfer. During the inland event HPC will coordinate with the appropriate WFOs and RFCs and when needed, hydrologists from the RFCs will provide hydrological briefings.

3.7.2. Activation. The HLT may be activated when a tropical cyclone in the Atlantic, Gulf of Mexico, Caribbean or eastern Pacific threatens the United States or its territories, and the Director or Deputy Director of TPC deems HLT assistance is required. TPC makes the request for activation by contacting the Federal Emergency Management Agency (FEMA) Operations Center (FOC). Upon FEMA's approval, the FOC will activate the HLT. The TPC Director or Deputy Director will contact the appropriate NWS Regional Director requesting meteorological and/or hydrologic support. NWS personnel should arrive at TPC within 24 hours. The HLT will remain active until the hurricane threat has passed, at which time HLT operations will be terminated by FEMA. However, if the storm moves inland and if significant rainfall is expected, the HLT may remain activated.

If the HLT is deactivated, the Hydrometeorological Prediction Center (HPC) will assume the briefing duties provided the remnants of the tropical cyclone remain a threat to inland areas. TPC and HPC will coordinate prior to the transfer. During the inland event, HPC will coordinate with the appropriate WFOs and RFCs and, when needed, hydrologists from the RFCs will provide hydrological briefings.

3.7.3. Training. Completing NWS/FEMA's distance learning training module, Community Hurricane Preparedness, is required by HLT members. The module can be taken via the Internet at: http://meted.ucar.edu/hurrican/chp/index.htm. Other training opportunities are strongly encouraged. They are: FEMA's "Introduction to Hurricane Preparedness" conducted at TPC for emergency mangers and NWS personnel, and FEMA's annual HLT training session held at TPC.

3.7.4. Meteorologic Duties. The HLT meteorologist will:

- Establish and maintain contact with the impacted WFOs, RFCs, and the HPC.
- Facilitate participation of the impacted NWS offices in conference calls, briefings, and in preparation and distribution of graphics.
- Provide meteorological interpretations on National Hurricane Center advisories (NHC), WFO hurricane local statements, HURREVAC products, and storm surge forecasts for federal, state and local agencies on request.
- Provide storm briefings via video/audio teleconferences for federal, state and local organizations.
- Respond to meteorology-related incoming calls from federal, state, and local emergency managers, and as appropriate, refer meteorologic inquires to the local WFO.

3.7.5. Hydrologic Duties. The HLT hydrologist will:

- Establish and maintain contact with the impacted local WFOs, RFCs, and the HPC.
- Facilitate participation of the impacted NWS offices in conference calls, briefings, and in preparation and distribution of graphics.
- Provide hydrologic interpretation on NHC advisories, WFO hurricane local statements, and WFO and RFC hydrologic products for federal, state and local agencies on request.
- Provide technical support for RFC lead during hydrologic portion of video teleconference. In absence of the RFC, lead the hydrologic portion of the video teleconference.
- Respond to hydrology-related incoming calls from federal, state, and local emergency managers and as appropriate, refer hydrologic inquires to the local WFO.