User's Guide for the Tsunami Warning System in the U.S. National Tsunami Warning Center Area-of-Responsibility

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National Oceanic and Atmospheric Administration
National Weather Service

Section 1: Operations Plan Objective and Scope

1.1 Plan Objective

The purpose of the Operations Plan for the National Tsunami Warning Center (NTWC) is to provide warning recipients in the area-of-responsibility (AOR = Canadian coastal regions and the ocean coasts of all U.S. states except Hawaii) a document which summarizes the tsunami warning system, tsunami warning and informational messages, and message dissemination throughout the AOR. Subjects in this plan include:

- Tsunami Warning Center Operations
- Procedures
- Messages
- Dissemination routes
- Primary contacts

1.2 Plan Scope

The scope of this plan is limited to provide an overview of the tsunami warning system within the NTWC AOR, and its procedures, products, dissemination paths, and primary message recipients. For further information on Administrative details of the National Ocean and Atmospheric Administration's (NOAA) tsunami warning system, please refer to the appropriate National Weather Service directives and instructions:

- Tsunami Warning Services - http://www.nws.noaa.gov/directives/sym/pd01007curr.pdf
- Tsunami Warning Center Operations - http://www.nws.noaa.gov/directives/sym/pd01007001curr.pdf

For further information on the Tsunami Warning System in the Pacific, please refer to the User's Guides on the tsunami.gov site.

Section 2: The U.S. National Tsunami Warning Center

2.1 NOAA Tsunami Warning Center Mission

NOAA's tsunami mission is to provide reliable tsunami detection, forecasts, and warnings and to promote community resilience.

The primary operational warning system objectives for carrying out this mission are to rapidly locate, size, and otherwise characterize major earthquakes, determine their tsunamigenic potential, predict tsunami arrival times, predict coastal impact when possible, and disseminate appropriate warning and informational products based on this information.

NOAA operates two tsunami warning centers in the United States: the National Tsunami Warning Center and the Pacific Tsunami Warning Center. The National Tsunami Warning Center area-of-responsibility (AOR) consists of Canadian coastal regions and the ocean coasts of all U.S. States except Hawaii. The Pacific Tsunami Warning Center AOR consists of Hawaii, other U.S. interests in the Pacific Basin, countries participating in the Tsunami Warning System in the Pacific, and coasts in the Caribbean Sea.

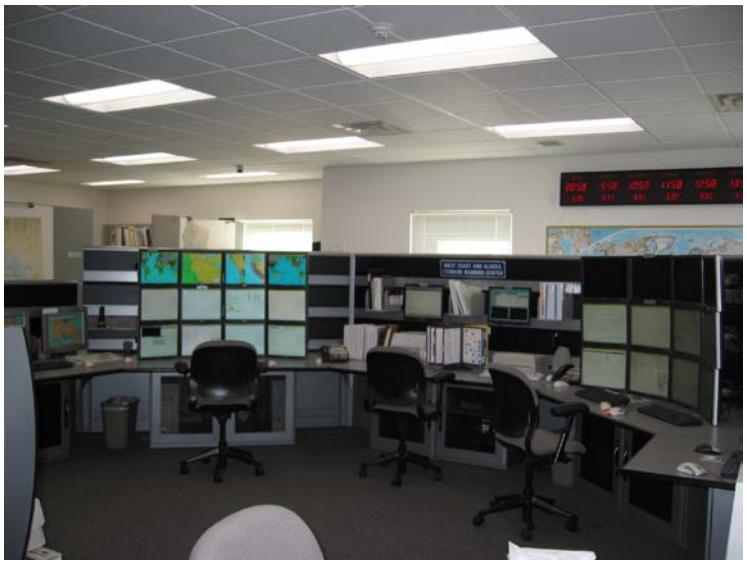
2.2 Overview of National Tsunami Warning Center Operations

Background
The U.S. National Tsunami Warning Center (NTWC) is operated by the Alaska Region of the National Weather Service and is located in Palmer, Alaska. The Center collaborates with the Pacific Tsunami Warning Center to provide tsunami warning service, and mutual backup, to United States coastal regions and many other countries throughout the world.

To accomplish its mission of providing accurate and timely tsunami bulletins to its AOR, the Center detects, locates, sizes, and analyzes earthquakes throughout the world. Earthquakes that activate the center's alarm system initiate an earthquake and tsunami investigation which includes the following four basic steps: automatic locating and characterizing the earthquake; earthquake analysis and review; sea level data analysis and tsunami forecasting; and disseminating information to the appropriate emergency management officials.

In addition to its basic functions, the Center actively pursues developmental projects which enhance tsunami warning operations, and supports community preparedness activities intended to increase public awareness of the tsunami hazard.

The NTWC operates 24 hours every day with two watchstanders on duty.



Observational Networks
Tsunami bulletins are initially issued based solely on seismic data. Data from approximately 1000 seismic stations are recorded at the Center. Seismic networks which provide the data are operated and funded by many different agencies, including the United States Geological Survey (USGS), the Global Seismic Network, NOAA, various universities throughout the country, and foreign governments. Access to data is provided through dedicated circuits, private satellite networks, and the internet.

Once a significant earthquake has occurred, the nearest sea level gages are monitored to confirm the existence or nonexistence of a tsunami, and its degree of severity. If a tsunami has been generated, the sea level data are critical for use in calibrating forecast models. The Center has access to approximately 1000 tide gage sites and 50 deep ocean tsunami detectors (DARTs). Many of these sites are maintained by NOAA's National Ocean Survey (NOS). In addition to the NOS sites, other international agencies provide sea level information to the Center. The NTWC also operates several gages in Alaska.

Procedures
The Center's initial response is issued very quickly and is based on seismic analysis and well-defined, preset criteria (Section 3). Whether a Tsunami Warning, Watch, Advisory, or Information Statement is issued is based on these criteria and the initial seismic analysis. Following the first message, the tsunami is analyzed using observed sea level data, forecast models, historic data, and further seismic processing. Based on this analysis, supplemental messages are issued as necessary. Areas with forecasts of a rise 1m or greater are generally put in a tsunami Warning; those with forecasts 0.3m to 1m in an Advisory, and for those less than 0.3m, Warning, Watch, and/or Advisory are cancelled. Historic events have shown that tsunamis can cause damage due to strong currents when amplitudes reach 0.5m or greater.

Products
Primary recipients of tsunami messages (discussed further in Section 4 with examples in Section 7) are coastal state/province departments of emergency services, the Federal

Emergency Management Agency, National Weather Service offices, Canada's Atlantic Storm Prediction Center, the U.S. Coast Guard, and the Dept. of Defense. While these agencies are considered primary, the bulletins are available through a variety of means, discussed further in Section 5, to local emergency managers and the general public. NTWC primary contacts are listed in Section 6.

The Center's goal is to issue tsunami warnings within five minutes of an earthquake. Since the Center has implemented 24x7 on-site operations, average response time has dropped to three minutes for events with the AOR.

Community Preparedness

The ability of any warning system to successfully save lives and reduce property damage depends upon getting the information to the public and getting them to respond to the emergency. To help attain this goal, the National Weather Service has implemented a program known as TsunamiReady which sets forth guidelines for communities to improve tsunami preparedness. This program was started in 2000 and was based on the National Weather Service StormReady program. The TsunamiReady program's purpose is to recognize communities which have taken the steps necessary to be as prepared as possible for a tsunami. This requires the communities to follow a set of guidelines. The guidelines show that the community can receive and disseminate warnings, have a tsunami hazard plan in place, have posted evacuation routes, designated safe zones, and have worked to enhance tsunami awareness throughout their community. As of April, 2017, 197 communities and counties along the U.S. state and territory coasts are recognized as TsunamiReady.

Section 3: Procedures

Summary

NTWC procedures are organized by the source's geographic region and magnitude. The basic procedures for the Pacific and Atlantic basins are summarized in the bar charts in Figure 1 and Figure 2, respectively. The actions shown in Figures 1 and 2 indicate the first bulletin (and in many cases the only bulletin) to be issued. Follow up actions are dictated by tsunami observations and forecast models. Supplemental warning, watch or advisory bulletins for events within the AOR are issued every 30 to 120 minutes. Occasionally a follow-up message may be necessary for a Tsunami Information Statement (e.g., when a small tsunami was recorded or where the statement must be upgraded to an alert). More detailed information can be found at http://www.nws.noaa.gov/directives/sym/pd01007001curr.pdf.

Breakpoints

Warning, Watch, and Advisory extent are set based on distance from epicenter, tsunami travel time, or pre-computed threat estimates, and are listed in the messages as extending from X to Y (except for special cases like the Bering Sea or Gulf of Saint Lawrence). Breakpoints are normally based on NWS zone boundaries. The Atlantic breakpoints are listed below.

Brownsville, TX	Jupiter Sound, FL	Stonington, ME
Baffin Bay, TX	Flagler Beach, FL	US/Canada border
Port O'Connor, TX	Altamaha Sound, GA	Charlesville, NS
High Island, TX	South Santee River, SC	Chezzetcook Inlet, NS
Shell Island, LA	Surf City, NC	Meat Cove, NS
MS/AL Border	Duck, NC	Cape Ray, NL
Destin, FL	New Point Comfort VA	La Manche, NL
Suwannee River, FL	Cape Henlopen, DE	Strait of Belle Isle, NL
Bonita Beach, FL	Sandy Hook, NJ	Cape Chidley, NL
Flamingo, FL	Watch Hill, RI	
Ocean Reef, FL	Mass./NH Border	

The Pacific breakpoints are listed below.

Attu, AK	Salisbury Sound, AK	Humboldt/Del Norte Line, CA
Amchitka Pass, AK	Cape Decision, AK	Cape Mendocino, CA
Samalga Pass, AK	BC/Alaska Border	Mendo/Hum County Line, CA
Unimak Pass, AK	N. Tip Vancouver Is., BC	Gualala River, CA
Chignik Bay, AK	Washington-BC Border	Davenport, CA
Kennedy Entrance, AK	Washington-OR Border	Ragged Point, CA
Hinchinbrook Ent., AK	Cascade Head, OR	Point Conception, CA
Cape Suckling, AK	Douglas/Lane Cty. Line	Rincon Point, CA
Cape Fairweather, AK	Oregon-California Border	San Onofre State Beach, CA
		California-Mexico Border

Figure 1-Procedures Chart – Pacific Basin

Figure 2-Procedures Chart – Atlantic Basin

Section 4: Messages

4.1 Message Definitions

NTWC issues tsunami warnings, advisories, watches, and information statements. Each has a distinct meaning relating to local emergency response. In summary:

Warning	->	Inundating wave possible	->	Full evacuation suggested
Advisory	->	Strong currents likely	->	Stay away from the shore
Watch	->	Danger level not yet known	->	Stay alert for more info
Information	->	Minor waves at most	->	No action suggested

Based on seismic data analysis or forecasted amplitude (dependent on whether the Center has obtained sea level data), NTWC will issue the appropriate message. Warnings and Advisories suggest that action be taken. Watches are issued to provide an early alert for areas that are distant from the wave front, but may have danger. Once the danger level is determined, the watch is upgraded to a warning or advisory, or canceled. The full definition of each message is given below:

Tsunami Warning - A tsunami warning is issued when a tsunami with the potential to generate widespread inundation is imminent, expected, or occurring. Warnings alert the public that dangerous coastal flooding accompanied by powerful currents is possible and may continue for several hours after initial arrival. Warnings alert emergency management officials to take action for the entire tsunami hazard zone. Appropriate actions to be taken by local officials may include the evacuation of low-lying coastal areas, and the repositioning of ships to deep waters when there is time to safely do so. Warnings may be updated, adjusted geographically, downgraded, or canceled. To provide the earliest possible alert, initial warnings are normally based only on seismic information.

Tsunami Advisory - A tsunami advisory is issued when a tsunami with the potential to generate strong currents or waves dangerous to those in or very near the water is imminent, expected, or occurring. The threat may continue for several hours after initial arrival, but significant inundation is not expected for areas under an advisory. Appropriate actions to be taken by local officials may include closing beaches, evacuating harbors and marinas, and the repositioning of ships to deep waters when there is time to safely do so. Advisories are normally updated to continue the advisory, expand/contract affected areas, upgrade to a warning, or cancel the advisory.

Tsunami Watch - A tsunami watch is issued to alert emergency management officials and the public of an event which may later impact the watch area. The watch area may be upgraded to a warning or advisory - or canceled - based on updated information and analysis. Therefore, emergency management officials and the public should prepare to take action. Watches are normally issued based on seismic information without confirmation that a destructive tsunami is underway.

Tsunami Information Statement - A tsunami information statement is issued to inform that an earthquake has occurred, or that a tsunami warning, watch or advisory has been issued for another section of the ocean. In most cases, information statements are issued to indicate there is no threat of a destructive basin wide tsunami and to prevent unnecessary evacuations

as the earthquake may have been felt in coastal areas. Information statements may indicate for distant regions that a large event is being evaluated and could be upgraded to a warning, advisory, or watch.

For tsunami warnings, advisories, and watches, the Center issues three messages. One type, WEPA41 (Pacific) or WEXX20 (Atlantic), are segmented messages which are designed for automated systems. This type of message includes NWS universal generic codes (UGCs) and valid time event code (VTEC). The other, WEAK51/61 (Pacific) or WEXX30/40 (Atlantic), are intended for public consumption.

The NTWC also issues monthly communication tests over its primary dissemination paths. Each month a Pacific AOR and an Atlantic AOR test are conducted. As tsunamis are uncommon events, this testing is critical to ensure robust message dissemination.

4.2 Message Identifiers

The NTWC tsunami messages are National Weather Service products. NWS products are described by both a World Meteorological Organization (WMO) Header and an AWIPS ID. The following table describes the products.

WMO Header	**NWS AWIPS ID**	**Explanation**
WEPA41 PAAQ	TSUWCA	Segmented Tsunami Warnings, Watches, and Advisories AK, BC, and US West Coast
WEAK51 PAAQ	TSUAK1	Public Tsunami Warnings, Watches, and Advisories AK, BC, and US West Coast
WEAK61 PAAQ	TSUSPN	Spanish Public Tsunami Warnings, Watches, and Advisories AK, BC, and US West Coast
WEAK53 PAAQ	TIBAK1	Tsunami Information Statements AK, BC, and US West Coast
WEAK63 PAAQ	TIBSPN	Spanish Tsunami Information Statements AK, BC, and US West Coast
WEXX20 PAAQ	TSUAT1	Segmented Tsunami Warnings, Watches, and Advisories US East, Gulf, and Canadian Maritime Provinces
WEXX30 PAAQ	TSUATE	Public Tsunami Warnings, Watches, and Advisories US East, Gulf, and Canadian Maritime Provinces
WEXX40 PAAQ	TSUSPA	Spanish Public Tsunami Warnings, Watches, and Advisories US East, Gulf, and Canadian Maritime Provinces
WEXX32 PAAQ	TIBATE	Tsunami Information Statements US East, Gulf, and Canadian Maritime Provinces
WEXX42 PAAQ	TIBSPA	Spanish Tsunami Information Statements US East, Gulf, and Canadian Maritime Provinces

PTWC messages are also generated at NTWC when backup services are necessary.

Section 5: Message Dissemination Routes

5.1 Overview of Product Dissemination Paths

Summary of Message Dissemination Methods at the National Tsunami Warning Center

Service	Owner or Operating Agency	Primary user audience
* Line276/277	NWS	NWS Offices via AWIPS, NWS Telecommunications Gateway to EMWIN, Family of Services, Global telecommunications system, NOAA Weather Wire, Wireless Emergency Alert, and other NWS communication systems.
NAWAS	FEMA	Emergency management agencies nationwide and Canada.
AKWAS	Alaska DHS&EM/FEMA	Emergency management offices in State of Alaska
Hurricane Hotline	NWS	East/Gulf coast WFOs
Satellite Phone Backup	NTWC & PTWC	Tsunami Warning Centers (emergency backup communications)
*EIDS	USGS	Emergency management officials.
*INTERNET (web site, email, RSS, social media, and cell phone text messaging)	Public	International and domestic government agencies, academic institutions and the public in general
Telephone	Public	A Primary and Secondary phone list is maintained

The table above summarizes message output devices used at the Center. An asterisk (*) in the table indicates messages are transmitted directly from the operational software. Figure 3 shows the same basic information in a graphical format.

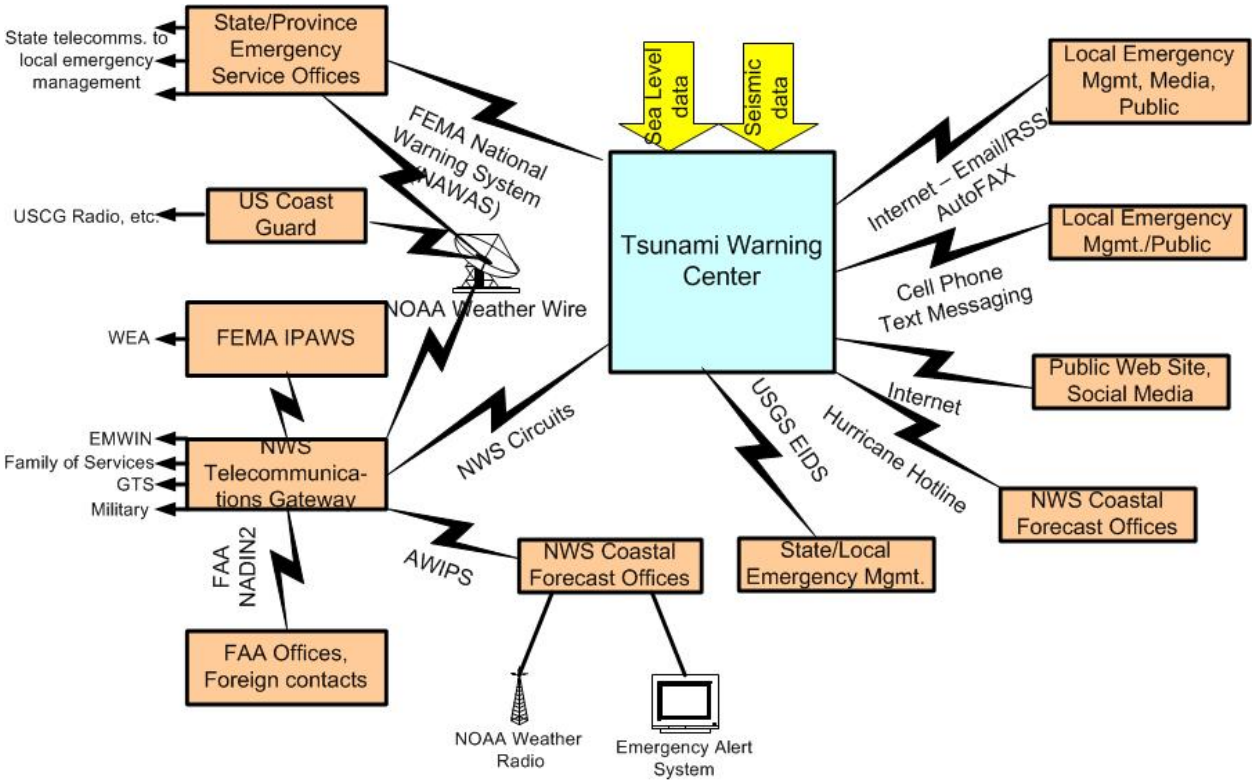


Figure 3 - NTWC message communications

Line 276/277 – These are the circuits between the NWS Telecommunication Gateway (NWSTG) in Silver Spring MD and the NTWC. NTWC transmits and receives messages to and from Gateway. From the Gateway, a multitude of communication services such as the Emergency Managers Weather Information Network (EMWIN), Family of Services, NADIN2, NOAA Weather Wire, and the Global Telecommunications System are reached.

NADIN2 - The FAA NADIN2 **A**eronautical **F**ixed **T**elecommunications **N**etwork is a world-wide communications system for the exchange of messages and/or digital data between stations primarily for the safety of air navigation and other air services. Messages over this media must be specifically addressed to recipients. Collective addresses are used to transmit tsunami messages to the Alaska Weather Service Offices, Weather Forecast Offices, Flight Service Stations, and Federal Aviation Administration regional Operation Centers nationwide. **NTWC messages are forwarded to NADIN2 through the NWSTG.**

NOAA Weather Wire - The NOAA Weather Wire (NWWS) is a satellite broadcast service maintained by the NWS to disseminate weather products domestically. Users of the NWW system consist of state and provincial emergency management agencies, and the U.S. Coast Guard. **NTWC messages are forwarded to NWWS through the NWSTG.**

NAWAS - The **NA**ational **WA**rning **S**ystem is a nationwide dedicated voice telephone system connecting selected defense, National Weather Service, emergency

management, and Coast Guard agencies. The circuit is supported by the Federal Emergency Management Agency (FEMA). Control over transmissions on the circuit is maintained by the FEMA Operations Center or the FEMA Alternate Operations Center.

AKWAS - The **A**las**K**a **WA**rning **S**ystem is a statewide dedicated voice telephone system connecting Alaska Division of Homeland Security and Emergency Management (DHS&EM), National Guard, Law Enforcement and Weather Service Offices. The circuit is supported by the FEMA and the Alaska DHS&EM. Control over transmissions on the circuit is maintained by the State Warning Point at Fort Richardson, Alaska.

Hurricane Hotline – The Hurricane Hotline is operated by the National Weather Service and connects East/Gulf coast Weather Forecast Offices through a dedicated circuit similar to the NAWAS.

Satellite Phone – This phone system is for emergency communications between the two tsunami warning centers and other primary message recipients. It is intended for use when other normal communications systems have failed.

EIDS – Earthquake Information Distribution System - An earthquake information dissemination tool operated by the United States Geological Survey. The internet is used to transmit earthquake information to USGS servers where it is disseminated to various web sites and agencies.

Internet –Group email lists (for emergency managers) are maintained. Shortened cell phone pager messages are also transmitted to emergency managers. A public web site is maintained at http://ntwc.arh.noaa.gov/ where current event messages and maps are posted. RSS feeds, XML/CAP feeds, and connections to social media are also available through this site.

Telephone – Primary and Secondary telephone lists are maintained. A short call down list is notified after events.

5.2 Overview of Product Retrieval Methods

NTWC products are issued and can be retrieved by several different methods. Many communities have developed local methods for disseminating the message; such as, sirens, automatic phone calls, local CB radio, AHAB Radio, etc. Contact your local emergency management for dissemination methods within your community.

National Weather Service Systems

- NOAA Weather Wire Service
- NOAA Weather Radio (NWR)
- EMWIN®
- National Weather Service Forecast Offices
- Email/cell phone text messaging

- Social Media
- NTWC Web Page
- RSS feed

State and Provincial Dissemination Systems

Federal Communications Commission
- Emergency Alert System

Federal Emergency Management Agency Systems
- Wireless Emergency Alert

United States Coast Guard
- US Coast Guard Radio

Section 6: Primary Contact List

State	Agency	Primary Comms	Street	City	Zip
AK	USAF - Elmendorf Command Center	Email/Phone	Q Street	Elmendorf AFB	99506-2830
	USAF - Shemya - Eareckson Air Station Airport - ICC	Email/Phone	P.O. Box 6901	Shemya	99506-6901
	SWP - Alaska	NWW/NAWAS	P.O. Box 5750	Ft. Richardson	99505
	WFO - Anchorage	AWIPS	6930 Sand Lake Rd	Anchorage	99502-1845
	AK State Troopers, HQ - Fairbanks	AKWAS	1979 Peger Rd	Fairbanks	99709-5257
	NWS - AK Regional HQ	Phone	222 W. 7th Ave., Rm 23	Anchorage	99513-7575
	WFO - Juneau, AK	AWIPS	8500 Mendenhall Loop Rd.	Juneau	99801
	WFO - Fairbanks, AK	AWIPS	P.O. Box 757345	Fairbanks	99775-7345
	USCG - 17th District	NWW/NAWAS	P.O. Box 25517	Juneau	99802-5517
AL	WFO - Mobile	AWIPS	8400 Airport Blvd., Bldg 11	Mobile	36608
	SWP - Alabama	NWW/NAWAS	P.O. Drawer 2160	Clanton	35046-2160
BC	MARPAC - Maritime Forces Pacific Operations Center	NAWAS	Bldg 77, Box 17000, Stn Forces	Victoria	V9A 7N2
	PEP - Emergency Coordination Center	NWW/NAWAS	P.O. Box 9201, Stn Provential Gov.	Victoria	V8W 9J1
BE	Bermuda Weather Office	AFTN	Bldg. 1574, Southside	St. Davids	DD01
BVI	Dept. of Disaster Management	FAX	#3 Wailing Rd., Road Town	Tortola	VG1110
CA	WFO - Monterey	AWIPS	21 Grace Hopper Ave., Stop 5	Monterey	93943-5505
	FNMOC - Fleet Numeric, Navy/DMS Interface, Monterey	NOAAPORT	7 Grace Hopper Ave.	Monterey	93943-0027
	USCG - 11th District, Alameda, CA	NWW/NAWAS	Coast Guard Island	Alameda	94501-5100
	FEMA - Region IX	NAWAS	1111 Broadway, Suite 1200	Oakland	94607-4052
	SWP - California	NWW/NAWAS	3650 Schriever Ave.	Mather	95655
	USCG - CAMSPAC, Pt. Reyes, CA	NWW	17000 Sir Francis Drake Blvd.	Pt. Reyes Station	94956-0560
	WFO - San Diego	AWIPS	11440 W. Bernardo Court, Suite 230	San Diego	92127
	WFO - Oxnard	AWIPS	520 North Elevar St.	Oxnard	93030
	WFO - Eureka	AWIPS	300 Starfare Dr.	Eureka	95501
CO	National Earthquake Information Center - USGS	Phone	1711 Illinois St.	Golden	80401
CT	SWP - Connecticut	NWW/NAWAS	1111 Country Club Rd.	Middletown	06106-5042
DC	State Department - Emergency Operations Center	NAWAS/Email	2201 C St. NW	Washington	20520
	SWP - District of Columbia	NWW/NAWAS	2720 Martin Luther King Jr. Ave., SE, 2nd Floor	Washington	20032
DE	SWP - Delaware	NWW/NAWAS	165 Brick Store Landing Rd.	Smyma	19977
FL	WFO - Melbourne	AWIPS	421 Croton Rd.	Melbourne	32935
	WFO - Key West	AWIPS	1315 White St.	Key West	33040
	WFO - Jacksonville	AWIPS	13701 Fang Dr.	Jacksonville	32218
	WFO - Tallahassee	AWIPS	Love Bldg, FL. St. University, 4th Fl.	Tallahassee	32306-4509
	WFO - Tampa	AWIPS	2525 14th Ave. S.E.	Ruskin	33570
	USCG - 7th District, Miami, FL	NWW/NAWAS	909 SE 1st Ave.	Miami	33131
	SWP - Florida	NWW/NAWAS	2555 Shumard Oak Blvd.	Tallahassee	32399-2100
	WFO - Miami	AWIPS	11691 SW 17th St.	Miami	33165
GA	SWP - Georgia	NWW/NAWAS	P.O. Box 18055	Atlanta	30316
	FEMA Alternate Ops Center	NAWAS	434 S. Pine Tree Blvd.	Thomasville	31792
HI	Hawaii Civil Defense	Phone/NWW/ NAWAS	3949 Diamond Head Rd.	Honolulu	96816-4495
	USN Joint Typhoon Warning Center	Email	425 Luapele Rd.	Pearl Harbor	96860-3104
	Pacific Tsunami Warning Center	All Systems	91-270 Fort Weaver Rd.	Ewa Beach	96706-2928
LA	SWP - Louisiana	NWW/NAWAS	7667 Independence Blvd.	Baton Rouge	70806
	WFO - New Orleans	AWIPS	62300 Airport Rd.	Slidell	70460-5243
	WFO - Lake Charles	AWIPS	500 Airport Blvd.	Lake Charles	70607
	USCG - 8th District, New Orleans	NWW/NAWAS	500 Poydras St.	New Orleans	70130-3310
MA	SWP - Massachusetts	NWW/NAWAS	400 Worcester	Framingham	1702
	WFO - Taunton	AWIPS	445 Myles Stardish Blvd.	Taunton	2780

State	Agency	Primary Comms	Street	City	Zip
MD	SWP - Maryland	NWW/NAWAS	5401 Rue Saint Lo Dr.	Reisterstown	21136
	NGA - National Geospatial Intelligence Agency	Email	4600 Sangamore Rd.	Bethesda	20816
	CO-Ops' CORMS - National Ocean Survey	Email	1325 E. West Hwy, Rm 6390	Silver Spring	20910
	NWS - HQ - Metwatch Desk	Email	1326 E. West Hwy.	Silver Spring	20910
ME	WFO - Gray	AWIPS	1 Weather Lane, Route 231	Gray	04039
	WFO - Caribou	AWIPS	810 Main Street	Caribou	04736
	SWP - Maine	NWW/NAWAS	45 Commerce Dr.	Augusta	04333
MS	SWP - Mississippi	NWW/NAWAS	P.O. Box 5644	Pearl	39208
	DART Buoys - Data Management Analysis Center - NDBC	Email/Phone	Bldg. 1007	Stennis Space Center	39529
NC	SWP - North Carolina	NWW/NAWAS	4008 District Drive	Raleigh	27607
	WFO - Wilmington	AWIPS	2015 Gardner Dr.	Wilmington	28405
NH	SWP - New Hampshire	NWW/NAWAS	110 Smokey Bear Blvd.	Concord	03301
NJ	WFO - Mount Holly	AWIPS	732 Woodlane Rd.	Mount Holly	08060-9615
	SWP - New Jersey	NWW/NAWAS	P.O. Box 7068	Trenton	08628
NS	Atlantic Storm Prediction Centre - Nova Scotia	GTS/Email	45 Alderney Dr.	Dartmouth	B2Y 2N6
NY	WFO - Albany	AWIPS	251 Fuller Rd., Suite 8300	Albany	12203-3640
	SWP - New York	NWW/NAWAS	1220 Washington Ave., Suite 101, Bldg 22	Albany	12226-2251
ON	Govt of Canada - Ops Ctr Public Safety & Em Prep Canada	NAWAS	122 Banks St.	Ottawa	K1A 0W6
OR	WFO - Portland	AWIPS	5241 NE 122nd Ave.	Portland	97230-1089
	WFO - Medford	AWIPS	4003 Cirrus Dr.	Medford	97504-4198
	SWP - Oregon	NWW/NAWAS	3225 Sate St.	Salem	97309
PA	SWP - Pennsylvania	NWW/NAWAS	2605 Interstate Dr.	Harrisburg	17110-9364
	WFO - Pittsburg	AWIPS	192 Shafer Rd.	Moon Township	15108
PR	Puerto Rico Seismic Network	Email/Phone	Call Box 9000	Majaguez	00681-9000
	SWP - Puerto Rico	NWW/NAWAS	P.O. Box 9066597	San Juan	00906
	WFO - San Juan	AWIPS	4000 Carretera 190	Carolina	00979
RI	SWP - Rhode Island	NWW/NAWAS	311 Danielson Pike	North Scituate	02857
SC	SWP - South Carolina	NWW/NAWAS	2779 Fish Hatchery Rd.	West Columbia	29172
	WFO - Charleston	AWIPS	5777 S. Aviation Ave.	North Charleston	29406-6162
TX	WFO - Houston	AWIPS	1353 FM 646, Suite 202	Dickinson	77539
	WFO - Corpus Christi	AWIPS	300 Pinson Dr.	Corpus Christi	78406
	WFO - Brownsville	AWIPS	20 S. Vermillion Rd.	Brownsville	78521
	SWP - Texas	NWW/NAWAS	5805 N. Lamar Blvd.	Austin	78752
VA	USN - NAVLANTMETOC - Norfolk	AWIPS/Phone	9141 3rd Ave.	Norfolk	23511
	WFO - Wakefield	AWIPS	10009 General Mahone Hwy.	Wakefield	23888
	FEMA Ops Center - Berryville	NAWAS	19844 Blue Ridge Mountain Rd.	Berryville	22611
	USCG - CAMSLANT - Chesapeake	NWW	4720 Douglas Munro Rd.	Chesapeake	23322-2598
	SWP - Virginia	NWW/NAWAS	10501 Trade Court	Richamond	23236
VI	SWP - U.S. Virgin Islands	NWW/EMWIN	8221 Nisky	St. Thomas	00802
	SWP - U.S. Virgin Islands	NWW/EMWIN	18 Cliston Hill	St. Croix	00851
WA	SWP - Washington	NWW/NAWAS	WA Military Dept. Emergency Management Div., Bldg 20, MSTA-20	Camp Murray	98430-5112
	USCG - 13th District Seattle, WA	NWW/NAWAS	915 2nd Ave.	Seattle	98174-1067
	FEMA MERS Ops Center - Region 10 - Bothell	NAWAS	200 228th St. SW	Bothell	98021-8627
	WFO - Seattle	AWIPS	7600 Sand Point Way NE	Seattle	98115-6349

Section 7: Message Examples

See the NTWC web site at http://ntwc.arh.noaa.gov/?page=product_list for message examples.