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**THE STATE OF FLORIDA EMERGENCY  
RESPONSE TEAM SEVERE WEATHER  
EVENTS ANNEX**

**To The State of Florida Comprehensive Emergency Management Plan**

## SEVERE WEATHER EVENTS ANNEX

### Introduction

The State of Florida is vulnerable to numerous severe weather incidents which may result in tornadoes, drought, floods, and freezes. The vulnerable geography and environment of the state combined with the volatile subtropical climate create continuous threats from these severe weather events.

### Description of Hazards

- **Flooding:** Flooding results from prolonged, heavy rainfall associated with tropical and non-tropical storm systems. Florida's flat terrain and natural water-prone ecosystems promote the pooling of water and inhibit drainage. Small streams and rivers may flood as a result of prolonged rainfall. In the southern regions of the state, drainage is maintained by a complex man-made system of canals and water control systems. Flooding may occur as a result of failure of these water control systems, including the Herbert Hoover Dike surrounding Lake Okeechobee. Tropical cyclones increase the risk level due to storm surge which not only floods the immediate coastal regions but also promotes inland flooding in all tidal water bodies.

A tsunami is an unusually high wave created by an underwater earthquake or volcano. It is, therefore, not related to severe weather; however, the impacts are similar to those of the coastal storm surge.

- **Drought:** A drought is a period of prolonged, abnormally dry weather creating a lack of water which causes a serious hydrologic imbalance in the affected area. Long-term lack of rainfall can endanger Florida's agricultural industry and water supply. A prolonged drought may decrease the water table, contribute to an increased occurrence of sinkholes, and promote saltwater intrusion of the aquifers which supply much of the state's drinking water, and increase the threat of wildfires.
- **Freeze:** Freezes in Florida create a threat to the agricultural industry and homeless populations. The state's winter-season vegetable growers historically face a high risk of freeze damage from cold temperatures. Vulnerable crops include citrus and sugarcane crops and commercial foliage (tropical plants, trees, and shrubs). Florida accounts for about one-third of fresh-market supplies of warm-season vegetables during the late fall to early spring period. Therefore, a freeze in Florida can cause substantial disruption in the Nation's supply of vegetables.
- **Tornadoes:** A tornado is a violently rotating column of air extending from a thunderstorm to the ground. Tornadoes may appear nearly transparent until dust and debris are picked up or a cloud forms within the funnel. The average forward speed is 30 mph but may vary from nearly stationary to 70 mph while the maximum winds rotating around the tornado can reach more than 200 mph. Tornadoes can accompany tropical storms and hurricanes as they move onto land. Waterspouts are tornadoes which form over warm water, typically during the summer months. They can move onshore and cause damage to coastal areas.

## Risk Classification

- **Flooding:** Based on the type of flood hazard, there are numerous risk classification systems for flood zone identification, river/stream/canal flooding, and dike breach. The National Flood Insurance Program has developed a flood zone identification system for properties within the flood hazard areas. A series of maps are developed for each community detailing the flood hazard areas. This classification system, however, may not provide sufficient operational-based information to support real time risk decision making. If factors such as amount of rainfall, degree of ground saturation, degree of permeable soil, and amount of vegetation can be determined, then these can be correlated to give short-term flood predictions. The National Weather Service (NWS) issues river forecasts and flood warnings for the public safety and in the protection of agricultural interests. The U.S. Geological Survey (USGS) is the principal source of data on river depth and flow. Within the State of Florida, the Department of Environmental Protection and the regional Water Management Districts monitor water supply and flood potential within their regions. The United States Army Corps of Engineers, in coordination with the South Florida Water Management District, monitors and classifies risk associated with the Herbert Hoover Dike. Storm surge may be evaluated and classified in terms of the size, intensity, and movement of the tropical cyclone; the shape of the coastline; nearshore underwater topography; and the state of the astronomical tides. The Sea Lake and Overland Surge from Hurricanes (SLOSH) model, developed in conjunction with the Regional Hurricane Evacuation Studies, provides surge flood inundation maps. This detailed information supports local protective action decision making for vulnerable populations in coastal areas. A tsunami is created by an underwater earthquake and currently does not have a distinct risk classification system. Hazards associated with flooding can be divided into primary hazards that occur due to contact with water, secondary effects that occur because of the flooding, such as disruption of services, health impacts such as famine and disease, and tertiary effects such as changes in the coast line.
- **Drought:** The severity of a drought depends upon the degree of moisture deficiency, the duration, and the size of the affected area. Droughts may be classified using numerous methodologies, including the U.S. Drought Monitor, Crop Moisture Index, and/or the Keetch Byram Drought Index. The U.S. Drought Monitor utilizes a numerical scale, D0-D4, to summarize general drought areas by intensity on a national scale. D1 is the least intense while D4 is the most intense. Within the State of Florida, the Department of Environmental Protection and the regional Water Management Districts monitor water supply and flood potential within their regions. On the federal level of government, numerous agencies participate in drought monitoring, including the U.S. Department of Agriculture (Joint Agricultural Weather Facility and National Water and Climate Center), the National Weather Service's Climate Prediction Center, National Climatic Data Center, and the National Drought Mitigation Center.
- **Freeze:** When temperatures reach below freezing or wind chill is expected to create a freezing sensation, people, plants, pets, and property in the State of Florida are at risk. In the southern regions of Florida, temperatures and/or wind chill below forty-five degrees may be sufficient to activate local government protective actions. In addition to the actual temperature, when the wind blows, a wind chill (the temperature that it feels like) is experienced on exposed skin.

- Tornadoes:** Between 1950 and August 2009, the National Climatic Data Center confirmed the touchdown of 3,033 tornadoes in Florida, ranking the state 4th in the United States with an average of 55 per year. Florida's period of significant tornadic activity occurs from January through April. There is also an increased threat of tornadic activity during October and November as fall cold fronts move through the state from the northwest. Tornadoes that strike Florida are generally in the category of EF-0 to EF-3 on the Enhanced Fujita scale, with winds between 65 and 165 miles per hour. Florida's tornado climatology demonstrates that strong to violent tornadoes are just as likely to occur during the overnight hours as they are during daylight. This makes tornadoes in Florida more dangerous because most people are asleep and are unaware of weather warnings relayed by commercial radio or television networks. Recent tornado outbreaks in the past have caused significant fatalities, including storms that killed 42 people in Central Florida in February, 1998 and 21 people in Lake, Volusia, and Sumter counties in February, 2007.

SCALE	WINDS (MPH)	TYPICAL DAMAGE
EF-0	65 - 85	Gale Tornado
EF-1	86 - 110	Moderate Tornado
EF-2	111-135	Significant Tornado
EF-3	136 - 165	Severe Tornado
EF-4	166 - 200	Devastating Tornado
EF-5	200+	Incredible Tornado

### **Notification and Warning**

Notification and warning for all hazards is conducted in compliance with the State Comprehensive Emergency Management Plan and applicable operational procedures. Below are hazard specific characteristics which may impact the all-hazard notification process:

It is the responsibility of the National Weather Service Forecast Offices to monitor weather conditions 24 hours a day, seven days a week and notify the State Watch Office and county warning points of impending severe weather threats. Hazardous Weather Outlooks are issued daily by local National Weather Service Forecast Offices to advise storm spotters and emergency managers of potentially hazardous weather and other hazards. Watches and warnings may be issued for Tornadoes, Freezes, and Floods. Warnings for tsunami may be issued with limited warning time due to the limited ability to predict earthquakes.

The National Weather Service and the Storm Prediction Center monitor tornado threats within the State of Florida. Convective Outlooks are issued to outline areas where severe thunderstorms may develop and qualifies the degree of risk (i.e. SLIGHT, MODERATE, and HIGH risk areas). Tornadoes may also appear with limited warning time even though conditions favorable for tornadic development can be predicted. Because violent tornadoes can occur and have occurred during both daytime and nighttime hours in Florida, public warning of no-notice events at nighttime may be less effective for sleeping populations.

Droughts are monitored by numerous federal and state agencies over a prolonged period of time. The National Weather Service Forecast Offices, in conjunction with other National Oceanic and Atmospheric Administration agencies, may issue statements associated with drought conditions.

Freeze warnings and watches are issued in the State of Florida when temperatures are expected to reach 32 degrees Fahrenheit or lower for an extended period of time. Hard Freeze Warnings may also be issued. There are no set national criteria for such warnings as individual National Weather Service Forecast Offices establish their own criteria for their respective areas of responsibility. Typically, Hard Freeze Warnings are issues in the southernmost United States, including Florida, when temperatures are expected to reach 26 degrees or lower for several hours.

### **Protective Action Decision Making**

Under Florida Statutes Chapter 252, it is the responsibility of each Board of County Commissioners to declare a local state of emergency for severe weather threatening their jurisdiction and to order necessary protective actions. The Governor of the State of Florida may also declare a state of emergency throughout the state when severe weather conditions warrant.

- **Flood:** In response to storm surge and tsunamis, the local government may evacuate coastal populations vulnerable to flood inundations, populations along tidal water bodies, and other vulnerable populations that reside in unsafe structures or have special needs. Insufficient warning time may significantly impact tsunami evacuations. In response to inland flood conditions, local jurisdictions may also choose to evacuate residents in flood prone areas. However, it is important to note that many inland areas which flood in the State of Florida are not located in pre-identified flood hazard areas. Flooding may be caused by improper stormwater runoff and drainage in all areas of the state. Sufficient warning time should be available for non-tropical inland flood events. The major threat from inland flooding is posed by the inability to judge water depth in urbanized and rural areas, endangering motorists and pedestrians.
- **Drought:** In response to drought conditions, local officials may ban open burning within their local jurisdiction while the Florida Division of Forestry may ban open burning on forest lands. The regional Water Management Districts may issue water restrictions in response to drought conditions.
- **Freeze:** Hazardous freeze conditions may require local governments to activate cold weather shelters for homeless populations.
- **Tornadoes:** While warning time may be insufficient, the threat of tornadoes may cause local governments to recommend persons in mobile/manufactured homes and other unsafe structures relocate to a sturdier shelter prior to the arrival of a tornado or tornadic conditions.

### **Concept of Operations**

Response operations will be conducted in accordance with the State of Florida Comprehensive Emergency Management Plan with the following severe weather components:

- In advance of flood conditions, drought conditions, and freeze conditions, ample warning time may be available to activate appropriate response and recovery protocols. However, it may not be necessary to fully activate the State Emergency Operations Center for these conditions, unless lives and property are immediately threatened.

Tornado and tsunami incidents may not provide sufficient warning to activate response and recovery resources in advance of the incident. Under these conditions, the State Watch Office, in close coordination with local county warning points, will closely monitor threatening conditions. The state may activate resources, if necessary, as conditions warrant.

### **Additional References**

The following annexes and plans provide detailed information regarding preparedness, response, and recovery from severe weather incidents within the State of Florida:

- State of Florida Comprehensive Emergency Management Plan (CEMP)
- State of Florida Hazard Mitigation Plan
- The State of Florida Emergency Operations Procedures for the State Watch Office
- Regional Evacuation Guidelines (REVAC)
- Statewide Regional Evacuation Studies