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IA 3 – Flood (including Dam/Levee Failure)

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| IA 3 Tasked Agencies | |
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| Primary Agencies | Oregon Emergency Management |
| Supporting Agencies | Department of Geology and Mineral Industries Oregon Department of Transportation Building Codes Division Water Resources Department Oregon Health Division Oregon Military Department Department of Administrative Services Department of Environmental Quality |
| Adjunct Agencies | American Red Cross The Salvation Army Civil Air Patrol Oregon Voluntary Organizations Active in Disaster (OrVOAD) |

1 Purpose

- The purpose of this annex is to provide a framework for the coordination of state resources to help ensure the safety of life and property following a major flood event.
- This annex identifies the major response and recovery activities undertaken by the listed state and adjunct agencies in response to a flood event.
- More specific information on floods as a hazard in Oregon can be found in the Natural Hazards Mitigation Plan located at:
<http://opdr.uoregon.edu/stateplan/part3>

2 Policies

- Activation
 - Procedures in this annex will be implemented as outlined in the Oregon Emergency Operations Plan, Basic Plan.
 - Procedures in this annex may be automatically implemented under the following conditions by appropriate OEM managers:
 - ≡ Severe Weather watches or warnings issued by the National Weather Service that could bring flooding.
 - ≡ When reports come in of a dam failure or threat of failure. (Dam observers will be activated when a predetermined level in streams and rain gauges is

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reached. Emergency warning and evacuation procedures are prescribed in the appropriate dam emergency plans and local plans.)

≡ During a flooding incident

≡ As directed by OEM Director

3 Situation and Assumptions

■ Considerations

- All counties in Oregon can be affected by flooding.
- There may be little or no advanced warning that flooding is eminent.
- Flooding is the disaster that occurs most frequently and causes the greatest amount in aggregate dollar losses in Oregon.

■ Planning Assumptions

- This plan assumes a hazardous flooding event has occurred or is occurring.
- Information pertaining to weather changes or systems that could result in flooding will continue to be available.
- Local resources may be rendered useless or severely degraded as the result of a flood.
- Public utilities and private infrastructure (such as power, water, sewer, natural gas networks, phone lines and towers) may be damaged and unusable during a flood.
- Roads, bridges and highways may become impassible during and following a flood event.
- Large numbers of flood evacuees requiring mass care are possible.
- Flood-related hazmat spills are common and pose an eminent threat to public safety.
- Widespread contamination of potable water supplies may occur as a result of flooding.
- Waste water and/or sewer system breaches by flood waters will create toxic environmental and public health hazards.
- Debris removal will be required to facilitate response and recovery efforts.

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- Recovery of pets and livestock may be required. Additionally, retrieval and disposal of animal carcasses may be required to ensure both public and animal health.
- Public safety resources (including personnel) may suffer damage, injury or death causing a shortage of resources to assist with response and recovery efforts.
- Health care facilities may be impacted by damage, potentially limiting the number of hospital beds and supplies that are available immediately following a severe flood.
- The number of health care professionals available may also be limited in the aftermath of a flood because some professionals may be isolated from their work places, as well as among the dead and injured.
- The first few hours following a flood are critical in saving the lives of people trapped in vehicles, trees, atop structures, etc. Therefore, the use of local resources during the initial response period will be essential until State and Federal support is available.
- It may be several hours before personnel and equipment can be mobilized and initial teams deployed to affected areas. Therefore, State and local resources will be relied upon heavily in the period immediately following the flood.
- Following a flood, the affected area may be isolated from surrounding areas. Therefore, planning and coordination among communities in the affected area is essential for effective emergency response.

4 Concept of Operations

- In accordance with the Emergency Operations Plan for the State of Oregon, the Emergency Coordination Center (ECC) may be fully activated.
- Emergency responsibilities assigned to State agencies for flood response parallel those other disaster operations. All agencies will utilize the Incident Command System and National Incident Management System structure to exercise command and control during incident operations.
- Oregon Emergency Management will have the lead on coordination of resources requested from local officials.

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- Requested equipment, materials, supplies and personnel will be secured through State resources and/or mutual aid agreements, or purchasing.
- State supporting agencies will respond to the ECC as required to provide response and recovery resources to local governments upon assignment from the ECC Operations Officer.
- Emergency operations will begin with the occurrence of a damaging flood and continue until no longer required.
- Operations and missions required as a result of a flood will be carried out during the response and recovery phases.

- The Response Phase

The Response Phase occurs prior to, or in the event of a dam failure immediately after, from the onset of the flood and lasts until lifeline systems are at least partially restored. During this phase, functions which are critical to lifesaving, protection of the populace, meeting basic human needs, securing critical infrastructure, and safeguarding State records are performed.

- The Recovery Phase

There are usually no clear distinctions between when the Response Phase ends and the Recovery Phase begins. There is typically a time period after the flood in which both phases are in effect simultaneously. The Recovery Phase begins a few days after the flood and can last two years or longer.

During this phase, the Federal government provides disaster relief upon Presidential Disaster Declaration. Functions during this phase include Federal relief under The Stafford Act (PL 93-288) for public and individual assistance, establishment of Disaster Assistance Centers, establishment of temporary housing facilities, and federal disaster loans and grants.

- Long-term Recovery includes restoration of affected areas to their pre-flood condition. Includes: federal disaster loans and grants, and potential mitigation projects.

5 Roles and Responsibilities

5.1 Primary Agency: Oregon Emergency Management

- Activation and setup of the ECC in accordance with the state Emergency Operations Plan (EOP);

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- Determine the nature and scope of the disaster/emergency and provide ongoing assessment of identifiable resources needed;
- Establish and maintain contact with FEMA Region X, State Support and Adjunct agencies;
- Establish and maintain contact with county emergency managers or other local officials;
- Coordinate an integrated State effort to provide assistance to the affected area(s);
- Provide situation reports to the Governor's Advisory Council or designated representatives;
- Present coordinated and accurate information to the public via the OEMs Public Information Officer (PIO);
- Coordinating the acquisition and distribution of resources to support response.
- Coordinate with the Federal government on supplemental disaster assistance necessary to preserve life and property, and on recovery assistance.
- Activating, if necessary, the Emergency Management Assistance Compact (EMAC) for interstate assistance.

5.2 Supporting Agencies

- Oregon Department of Transportation (ODOT)
- Building Codes Division, DCBS
- Water Resources Division (WRD)
- Department of Human Services / Public Health (DHS)
- Oregon Military Department (OMD)
- Department of Administrative Services (DAS)
- Department of Environmental Quality (DEQ)

5.3 Adjunct Agencies

- American Red Cross (ARC)
- The Salvation Army
- Civil Air Patrol

- Oregon Voluntary Organizations Active in Disaster (ORVOAD)

NOTE: Responsibility details for State agencies can be found in the Roles & Responsibilities (ESF) section of the updated State of Oregon Emergency Operations Plan (EOP).

6 Hazard Specific Information – Flood

6.1 Definition

A flood is an overbank flow of rivers and streams or a shoreline inundation along lakes and coasts. Floods are the most common and widespread of all natural hazards in Oregon. Flooding typically results from large-scale weather systems generating prolonged rainfall or on-shore winds. Other sources of flooding include locally intense thunderstorms, snowmelt, ice jams, and dam failures. Depending on its speed of onset and areas affected, several types of flood can be identified.

Floods are a common and widespread natural hazard in Oregon. The National Flood Insurance Program reports that 256 communities in Oregon are prone to flooding, including all 36 counties. Flooding typically results from large-scale weather systems generating prolonged rainfall and from “rain on snow” events that cause large amounts of snowmelt.

In Oregon, these conditions are most common from October through April when storms from the Pacific Ocean bring intense rainfall. Flooding can be aggravated when streams are altered by human activity, such as through channelization of streams or loss of wetlands. Many types of flood hazards exist in Oregon, including riverine floods, flash floods (resulting from locally intense thunderstorms, ice jams and dam failures), coastal floods, shallow area and urban flooding and playa flooding. Flood hazards can cause severe property damage and loss of life.

6.1.1 Flash Flood

Flash floods can result in raging waters in matter of minutes. Even very small streams that may appear harmless in dry weather can flood. Flash floods, which are characterized by rapid on-set and high velocity waters, carry large amounts of debris.

Several factors contribute to flash flooding. The two key elements are rainfall intensity and duration. Topography, soil conditions, and ground cover also play an important role. Flash floods occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Most flash flooding is caused by slow-moving thunderstorms, thunderstorms repeatedly moving over the same area, or heavy rains.

Occasionally, floating debris or ice can accumulate at a natural or man-made obstruction and restrict the flow of water. Water held back by the ice jam or

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debris dam can cause flooding upstream. Subsequent flash flooding can occur downstream if the obstruction should suddenly release.

6.1.2 River Flood

Flooding along rivers is a natural and inevitable part of life. Some floods occur seasonally when winter or spring rains, coupled with melting snows, fill river basins with too much water, too quickly. Torrential rains can also produce river flooding. Flooding is a longer term event and may last a week or more.

6.1.3 Coastal Flood

Winds generated from tropical storms or intense offshore low pressure systems can drive ocean water inland and cause significant flooding. Escape routes can be cut off and blocked by high water. Coastal flooding can also be produced by sea waves called tsunamis, sometimes referred to as tidal waves. These waves are produced by earthquakes or volcanic activity.

6.1.4 Urban Flood

As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization increases runoff 2 to 6 times over what would occur on natural terrain. During periods of urban flooding, streets can become swift moving rivers, while basements fill with water.

6.2 Effects

Floods are dangerous, life-threatening, and destructive. They can roll boulders, tear out trees, destroy buildings and bridges, and scour out new channels. Rapidly rising water can reach heights of 30 feet or more. Furthermore, flash flood-producing rains can also trigger catastrophic mud slides. A timely warning that these deadly, sudden floods are coming may not always be possible.

In addition to causing loss of life and property, floods can also have complex economic, social, and political impacts. Some of them result from the uneven distribution of risk of losses between public and private interests. Reduction of public expenditures in providing relief from private losses is one of the goals of the National Flood Insurance Program. This program is an analytically and politically interesting effort to intervene in the market to improve individual purchase of insurance.

The floods experienced in the past have heightened the awareness of the devastation and strife that flooding will impose upon society and the environment. They have also made us keenly aware that extreme events will continue to occur. Furthermore, structural modifications to the riverine environment and flood proofing of flood prone areas are not always viable solutions. Therefore, as society continues to experience population growth and people choose to live by the water, we have an ever increasing need to educate the public on flood-related hazards.

6.3 Territory at Risk

Oregon has 255 flood prone communities, i.e., counties and incorporated cities that are subject to inundation from a 100-year flood. There is a 1% chance in any given year that a flood of this magnitude will occur. Flood prone communities must adopt policies and ordinances that address this situation. They are also eligible to participate in the National Flood Insurance Program (NFIP). The maps below illustrate the Oregon watershed basins and subbasins.

6.4 Predictability

The National Weather Service (NWS) of the National Oceanic and Atmospheric Administration is the Federal agency in charge of weather forecasts and warnings for the Nation. NWS is also charged by law with the responsibility to issue forecasts and warnings of floods. Although many cities, counties, or other local flood-management agencies are involved in the operation of local flood-warning networks, the NWS, through its nationwide hydrologic-forecasting mandate, is the principal agency that uses nonstructural methods to decrease flood damage.

6.5 National Flood Insurance Program (NFIP)

The NFIP provides low cost flood insurance to residents of participating communities -- insurance that would otherwise be unavailable. This is an important function. For example, anyone wanting to erect a residential or business structure in an area subject to a 100-year flood, and finance the construction through a federal-backed lending institution, must purchase flood insurance for the lifetime of the mortgage. Also, federal disaster relief funds are limited and do not offer the coverage provided by low-cost flood insurance. The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program.

7 Hazard Specific Information – Dam/Levee Failure

7.1 Definition

A dam failure is a collapse or failure of an impoundment that causes downstream flooding. While a dam is a barrier constructed for controlling the flow of water in a waterway, a levee is an embankment raised to prevent a river from overflowing.

7.2 Frequency

The geological history of the Pacific Northwest provides significant evidence of catastrophic flooding which resulted from breaches of natural dams. In recent history, there are over 50 manmade dams on record in Oregon that have failed either partially or completely, within the last 100 years. The probability that any given dam will fail is fairly remote. The chances of failure are increased by seismic activity in or near the actual structure.

7.3 Territory at Risk

The primary areas affected include the regions immediately downstream the dams. However some dams that hold large amounts of water can affect extensive areas, some of which are highly populated. With the large number of dams in Oregon, most of them located not far from populated areas, a large majority of Oregon's population is at some risk from the failure of a dam. The immediate threat to any community can be greatly increased by the nature of the breach. In a full breach, an entire community could be inundated, while a partial outflow could result in flooding only in the drainage basin and main floodplain.

Because Oregon is a recreational state with many tourist facilities located in and around many of the state's dams, a greater population could be at risk from a failure than is reflected in city population figures. Some of the prime summer recreation facilities are located in river basins where outflows from a dam failure would be constricted in narrow canyons and, therefore, be most devastating to those facilities and communities within the canyons or near their downstream openings.

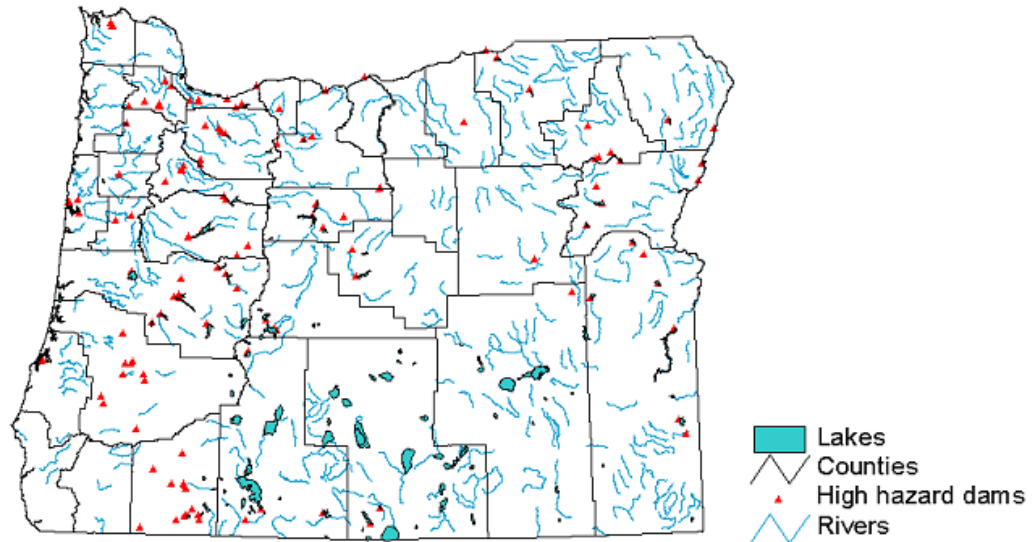
Following is a map that shows the location of all the dams in Oregon classified by U.S. Army Corps of Engineers as having a high hazard potential. In addition, some communities in Oregon are subject to a potential hazard caused by a failure of dams located outside Oregon, but close to the border.

7.4 Effects

A dam failure can result in loss of life and extensive property or natural resource damage for miles downstream from the dam. Failure of a dam does not always occur during flood events. It can result from misoperation, lack or improper maintenance or repair, vandalism, etc. Such failures are usually catastrophic because they occur unexpectedly with little or no time for evacuation.

Figure 2 Location of High Hazard Dams in Oregon

Oregon Dams - High Hazards



7.5 Predictability

Dam failures are usually easy to predict when the breach is caused by unfriendly weather conditions. The probability of a dam failing can be greatly reduced by following a regular schedule of inspections and maintenance to the structure.

8 Supporting Documents

None at this time.

9 Appendices

None at this time.

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