Chapter 4 - Flood Warning and Operations in the Skagit River Basin

4.0 Introduction

Although Skagit River floods can happen at any time, they are most common from November to February. Skagit County has developed a flood warning system to prepare for and respond to flood events. The program is designed to warn residents and agencies of an impending flood so that they can make preparations before flooding occurs. The flood warning system involves river forecasting conducted by the National Weather Service (NWS) and local river monitoring conducted by Skagit County Public Works Surface Water Management Division (SWM). When a flood occurs, a coordinated response effort involving multiple jurisdictions and agencies is carried out at Skagit County's Department of Emergency Management's (DEM) Emergency Operations Center (EOC). This chapter describes the current flood warning system and how it operates in the Skagit River. (Snohomish, 2003)

4.1 The Mechanics of Flood Warning

4.1.1 Weather

The NWS is the agency responsible for issuing warnings about potential floods. The information used to develop flood warnings is gathered using data collected from the United States Geological Survey (USGS) telemetric gauge network and from regional weather conditions and patterns. These data are integrated into a hydrologic computer model at the NWS's River Forecast Center in Portland, Oregon. Rainfall reports, soil saturation information, snow depth information, and temperature readings may also be included as variables in the computer model. Depending on the results of the model and the severity of weather conditions, the NWS issues a flood watch, flood warning, or flood statement. The NWS also issues river forecasts, which may resemble warning statements or contain detailed stage information, such as the predicted time a river will crest. (Snohomish, 2003)

As knowledge about weather patterns and conditions has developed, the probability of accurately predicting a flood has increased. Recent studies of El Nino and global atmospheric circulation patterns have given weather researchers the ability to identify large-scale weather features that typically lead to flooding (such as rain-on-snow events). Thus, early recognition of threatening weather patterns on a regional scale, combined with statistical data collected from river gauges, provides a relatively long lead-time to prepare for a flood event. (Snohomish, 2003)

Local conditions, however, vary greatly and may not always be included in the NWS's hydrologic models. As a result, Snohomish County conducts its own river monitoring before and during a flood event to supplement NWS's flood statements with information about local conditions that may affect flooding. (Snohomish, 2003)

4.1.2 Gauges

Two types of river gauges are used to monitor rivers. They include automated and manual gauges. Automated gauges employ telemetric or radio transmissions to measure specific conditions in the river. These transmissions are sent to a computer center based in SWM. Manual gauges, or staff gauges, are large wooden rulers, graduated in feet and tenths, which are observed manually for water level. (Snohomish, 2003)

4.2 Planning - Flood Awareness Week

Prior to flood season, staff from SWM, Public Work Roads Maintenance, and Public Involvement and Environmental (PI/E), Planning and Development Services (PDS), and the DEM, and the Corps hold meetings to discuss locations along the Skagit River that are expected to be particularly vulnerable to flooding in the upcoming season. The meetings also provide a chance for these agencies to review the response procedure and coordination process that is implemented during a flood event at the EOC.

In addition to these meetings, County staff conducts site visits to obtain pre-flood information on each site and to determine what emergency actions to take should they be required. In addition, PI/E staff take pictures of these sites prior to the flood to assist in post-flood repairs should it be required. These areas are monitored closely during a flood if they are accessible, but most assessments are conducted following the flood event because of safety issues.

Because floods cross jurisdictional boundaries, the EOC serves as the central location to coordinate flood operations during an event in unincorporated Snohomish County and communities in north and east county.

References:

Snohomish County, State of Washington (2003). Draft Public Review Stillaguamish River Comprehensive Flood Hazard Management Plan. Snohomish County, WA.