



## High Marks for Accuracy: Tracking Flood Levels in Lewis County

### Full Mitigation Best Practice Story

#### *Lewis County, Washington*

**Lewis County, WA** - When a community is subjected to flooding, quickly marking floodwater heights becomes critically important. Capturing highly perishable flood elevation information has significant benefit for flood hazard mapping and long-term community planning. Too often, due to competing response and recovery needs, the task of collecting water height data is overlooked or delayed. When such markings are lost whether due to the passage of time, the rebuilding process, or subsequent rain events, the advantages afforded by their collection are significantly reduced.



Lewis County, Washington has a long history of damaging floods originating from three major rivers (the Chehalis, Cowlitz, and Nisqually) as well as numerous tributaries, including the Newaukum and Skookumchuck Rivers.

“Past floods have really taught us a lesson,” said Martin Roy, a senior engineer and surveyor for the Lewis County Department of Public Works. “When there is a significant delay in gathering data, my crews are seriously hampered trying to find accurate high water marks as many of them are often washed away, removed, or cleaned up by the time we get there.”

On December 1st, 2007 Lewis County was again inundated by a flood of record proportions. This time, the Chehalis River overflowed its banks and poured huge amounts of water into the streets and structures of several Lewis County communities. Water levels were recorded as high as nearly ten feet above the Chehalis’ normal flood stage in some areas.

Having learned the lesson from delays in previous floods, Martin Roy and his team did not hesitate to act.

“The flood occurred on a Monday,” said Mr. Roy. “On Tuesday afternoon, as the water was still receding, we were out marking peak water elevations.”

The procedure to capture water elevation data is initially simple. A series of points are marked throughout an impacted community. These can take the form of marks made on walls, nails driven into telephone poles, and other similar methods of indicating how high the water actually reached. At each point, a Global Positioning Satellite (GPS) reading is taken and a description of the area and marking is noted.

“You need to blanket an area with a lot of markings,” said Mr. Roy. “You scatter them thoroughly throughout the community so that if you lose some over time, you won’t be completely out of luck.”

After durable markings are placed and catalogued, surveyors can return at a later date to determine the elevation of the high water marks using precise instruments.

Previously, high water mark collection in Lewis County was funded by matching grants provided by the Washington Department of Ecology’s Flood Control Assistance Account Program (FCAAP), resulting from a channel migration study. This year the Department of Ecology is assisting directly in the high water marks study with the contribution of equipment and personnel.

In addition to the water mark tracking in Lewis County, the Cities of Chehalis and Centralia are conducting a similar study in their communities. The combined data will result in a much more detailed and accurate understanding of the December 1st floods.

“We’re teaming up with the Cities, the State’s Department of Ecology, and the Federal Emergency Management Agency (FEMA) to complete the collection of elevations,” said Matt Hyatt, Lewis County’s Geographic Information System (GIS) Manager. “Our GIS Division is acting as the central location for collecting and distributing the maps and information that will aid in the planning effort. Once all the elevations have been surveyed by the different agencies, we’ll compile them into a single map, which will demonstrate the extent and depth of the inundation area, and assist analysis by the flood engineers and specialists to better understand the exact nature of this event.”

Having such data improves the quality and accuracy of flood hazard mapping, flood insurance studies, and flood risk analysis. Greater detail in high water mark tracking assists in the approval and success of grant applications and helps with prioritization of elevation and acquisition projects.

“The more accurate the data is, the more uses it has,” said Mr. Roy. “Ultimately, the real beneficiaries of the process are the people who live here. We’re serving the citizens of our community by providing them with information that will help them build their homes safer and stronger. We’re getting them data that will help them get insurance, so they can get a mortgage.”

Understanding the risks posed by future flooding can only begin by understanding flood events that have already occurred. High water mark collection assists a community in documenting damage sustained in a flood, and provides vital knowledge needed to avoid future damage to homes and businesses. More importantly, a better understanding of flood hazards may save lives.

#### Activity/Project Location

Geographical Area: **Single County (County-wide)**

FEMA Region: **Region X**

State: **Washington**

County: **Lewis County**

#### Key Activity/Project Information

Sector: **Public**

Hazard Type: **Flooding**

Activity/Project Type: **Cooperative Technical Partner Activity; Flood Study Map Rollout/ Map Modernization; HAZUS-MH**

Activity/Project Start Date: **12/2007**

Activity/Project End Date: **Ongoing**

Funding Source: **Cooperating Technical Partners (CTP); State sources**

Funding Recipient: **Local Government**

#### Activity/Project Economic Analysis

Cost: **Amount Not Available**

#### Activity/Project Disaster Information

Mitigation Resulted From Federal Disaster? **Unknown**

Value Tested By Disaster? **Unknown**

Repetitive Loss Property? **Unknown**

## Reference URLs

Reference URL 1: <http://www.floodsmart.gov>

Reference URL 2: <http://www.gis.com/>

## Main Points

- Capturing highly perishable flood elevation information has significant benefit for flood hazard mapping and long-term community planning.
- On December 1st, 2007 Lewis County was inundated by a flood of record proportions. Having learned the lesson from delays in previous floods, Martin Roy and his team did not hesitate to act to mark peak water elevations.
- The procedure to capture water elevation data is initially simple. A series of points are marked throughout an impacted community.
- At each point, a Global Positioning Satellite (GPS) reading is taken and a description of the area and marking is noted.
- After durable markings are placed and catalogued, surveyors can return at a later date to determine the elevation of the high water marks using precise instruments.
- High water mark collection assists a community in documenting damage sustained in a flood, and provides vital knowledge needed to avoid future damage to homes and businesses. In addition, it helps save lives.



Matt Hyatt and Martin Roy



Map displaying high water marks



Martin Roy indicates one of the high water marks made on a building