

## Flooding and Change on the Willamette River

### The Willamette River

Like many rivers of the northwest the Willamette River once had a very different appearance. It was wild river and as it passed through Eugene took the form of braided channels and a wide floodplain. Further to the north through Portland it consolidated into a single meandering trench. Flooding was a regular occurrence and has been happening consistently for the last 150 years (Sinclair 2005) though today it not as severe due to the control by dams. During the winter and spring months the river surged over its banks and filled the floodplain, the low lying area around the river channel where the excess water flows during times of flood. Floods deposit soils and create habitat for riparian vegetation and other creatures that live in the riverside environment. Flooding also moves gravel around and can uproot trees, which create beneficial environments for aquatic life. The action of the river also created new channels and thousands of small islands around which it flowed (Sinclair 2005).

### Altering the River

The rich and fertile land along the flood plain was also very attractive to Euro-American settlers arriving in Oregon. The plains adjacent to the river were quickly converted into agricultural and grazing lands. Before 1850 almost all (95%) of the population of Oregon was concentrated in the Willamette Valley (Sinclair, 2005). The river banks became more and more populated and soon human activities began to alter the landscape of the river. Farms thrived along the river because of the readily available soil and water resources. The river banks were also a preferred spot for industrial operations because they are a convenient source of water and an easy place to dump waste products. Not only were the physical characteristics surrounding the river altered but also the

quality of the water was decreased as new industries began a trend of uncontrolled dumping into the river. It was not until the late 1930's that action was taken by the local government to control the pollution and water quality of the river (Robbins 2002).

As human activity and settlement grew the braided channels of the river were forced into a single channel. The channel was formed through a process of building dams, removing the riparian vegetation and hardening the river banks, redirecting the water from side channels into a main channel and, dredging to deepen the channel. This single channel made it easier to control the river (Sinclair 2005).

The flooding of the river also needed to be controlled. The desirability of living on the fertile floodplains resulted in humans investing physical capital along the banks in houses, farms, and factories. The floodplain is also however the natural area where floodwaters course to create the ideal soil conditions for growing crops (Sinclair 2005). Though beneficial, floods prove harmful to the human populations and their establishments.

## Flooding

New cities tended to be situated beside the river and mostly near the confluences of major rivers. Oregon's largest city, Portland, was built along the northern most part of the Willamette at its confluence with the Columbia and Clackamas Rivers. Salem, Oregon's state capital was also built on the Willamette. Continuing south, Corvallis lies where the Willamette meets the Marys and the Calapooia rivers. Finally, Eugene is placed where the Willamette is formed by the confluence of its Coast fork and Middle fork tributaries and meets the McKenzie River (Sinclair, 2005).

The advantages of living close to the river also come with disadvantages caused by flooding. After an especially disastrous flood in 1861 and 1980, which inundated at least 320,000 acres, it was decided that the river needed to be controlled. In the upper Willamette basin an extensive dam system was constructed around the Eugene area to control the flows of the tributaries of the Willamette. The Army Corp of Engineers built 11 dams on tributaries of the Willamette between 1941 and 1969 (Sinclair, 2005).

Cougar Dam was constructed on the south fork of the McKenzie about 41 miles east of Eugene. Lookout Point dam was built on the Middle fork of the Willamette about 20 miles to the southeast of Eugene. The Cottage Grove dam was built north of Cottage Grove the Coast fork of the Willamette while a branch off the Coast Fork called the Row River supports the Dorena dam. To the northwest of Eugene Fern Ridge dam is on the Long Tom River (Robinson, 1965).

The construction of the dams was approved by congress in the 1930s as part of a flood control project under the Army Corps of Engineers' Willamette Basin Project. The role of a dam is to create full reservoirs for irrigation and recreation in the summer months and to empty those lakes in the winter. This provides a holding area for storm water to prevent flooding. When flood conditions do occur on the Willamette the dams hold back excess water that would have contributed to the severity of the flood when the crest or high point of the flood has passed (Robinson, 1965).

Although the dams control minor floods, the floods in 1964 and 1996 were two large floods that reached historic levels. Although these two floods didn't quite reach the total magnitude of the floods from the natural river of the past, they were termed "floods of the century" (Sinclair, 2005).

The Christmas Flood of 1964

The weather in the Pacific Northwest is fairly predictable and mild. However, once in a while certain weather conditions appear that are conducive to producing events that are difficult to predict and prepare for such as flooding, windstorms, or wildfires. In 1964 such an event occurred when the Willamette River as well as many other rivers in the northwest flooded their banks. December in Oregon is expected to be rainy and the rivers are often full. The temperature and precipitation levels in December of 1964 the occurred in just the right order to produce one of the top ten weather events in Oregon for the 20 th century. Central Oregon was recorded at receiving two-thirds of the yearly rainfall in just one week. In Eugene, rainfall for December was 30% above normal levels with a record setting 20.99 inches for the month (National Weather Service, 2006).

Fred Wilbur, a local river enthusiast, was living in the Goshen area east of Eugene near the Willamette River. He recalls the weather patterns that caused the flood conditions, "It was one of those Christmas time floods where there had been a lot of snow and rain and then it warmed up. And the snow melt from the upper areas came down."

The beginning of December had been mild, with normal rainfall and temperatures. The trouble began mid-month when a large movement of cold air from the Arctic covered the northwest causing record low temperatures. As a storm moved in a few days later and snow began to fall, Oregonians were hopeful for a white Christmas. On the next day, the 19 th of December, temperatures began to rise and the rain started falling. Following several straight days of rain and higher temperatures, the snow that had fallen a few days before as well as the snow pack from the mountains began to melt. The melting snow and continual downpour filled up the drainages and streams and headed toward the main tributaries of the Willamette (Hatton 1999).

On December 21<sup>st</sup> the water levels on the River in Eugene were still normal, while outside towns such as Junction City, Harrisburg, and Triangle Lake were experiencing some surface flooding on the riverbanks. By the 22<sup>nd</sup> the river at Eugene had risen three feet and dams above Eugene had stopped discharging water and switched to storing it (Robinson 1965). Eventually the Dorena dam above Cottage Grove could no longer hold in its reservoir. Water eight feet deep surged over the dam and toward the town. Families around the region had been evacuated to higher ground (Hatton 1999). Governor Hatfield declared the state of Oregon as a disaster emergency area (Robinson 1965).

Fred Wilbur and his family experienced the Christmas flood first hand. Fred has been around rivers since he was a kid, growing up along the Columbia River. He has been living in the Eugene area since the 1950s. In the summer of 1959 Fred guided a boat down the Willamette River with two teenagers and got an intimate look at beauty of the river landscape and the influences of human activity, in pollution and industrial activity.

Fred describes watching water from the river exceed further and further from its banks toward his house, "I could see this water creeping across the pasture just slowly working our way. I said to my wife, 'Get everything - there's no way we're going to save the stuff, just put everything up as high as you can'".

Fred had heard from the local news services that there might be some flooding but was not sure if it would actually reach his house. He thought it is best to be prepared for the worst. "I went into the garage and jacked up the freezer as high as I could and turned off all the power and did the best that we could," recalls Fred of his preparation. He then moved his car to higher ground up the street from his house. He remembers that in the short amount of time that as he was getting ready "the water was lapping over the top of my boots." In about one hour the water had already traveled a few hundred feet to his house.

"As the water was creeping across the pasture I had forgotten that we had a little Rhode Island Red chicken", he told me. Fred fondly remembers Henny Penny, one of his children's pets, that had been forgotten about in his haste to prepare for floodwaters. He had used a doghouse to make a chicken coop with a bar across the inside for Henny Penny to stay out of the cold. "I went out and the house is floating around in the backyard and here was Henny Penny hanging on for dear life." Fred took her to the garage and put her up in the rafters high enough to stay out of the water. "I just put a lot of feed up there and she rode out the storm". Henny Penny stayed high and dry in the garage for a little over a week.

The damages from the flood were some of the worst in state history. Many families were left homeless after their houses were damaged beyond repair. Fred and his family were lucky to escape with little damage to their house and belongings except for perhaps one frightened chicken. "One of the houses was low enough so that it was flooded but all the rest of us were just high enough. My house was just the doorstep high just about two or three inches higher than the flood water. When it finally broke over the road at the far end that released the pressure and so it went over the road instead of backing up any further into the house. This one poor fellow had a mess in his house, but the rest of us survived..."

The rain continued off and on for the next few days and the dams were used to try and manage the overload of water. By the 27<sup>th</sup> of December the flood past its peak and the water returned to below flood levels. Though the water level of the Willamette River might have gone down to more normal levels, for many people the worst part of the flood was yet to come: reconciling with the damages brought with the high waters. The final damage reports assessed that 17 people died during the flood and over 700 families in Lane County suffered damages to property (Robinson, 1965).

The water was expected to remain high for quite some time as the Corps of Engineers made efforts to empty the full reservoirs behind the dams in preparation for other potential flooding. Authorities from the Corps of Engineers said that normally if the river begins to flood excess water could be held in the reservoirs until the river is back within its banks. But this year the unusual combination of melting snow and rainfall was more than the dams could handle and the reservoirs filled up. The Corps of Engineers estimated that without the dams the peak level would have been 15 feet higher; enough to cause even more families like Fred's to have severe damage (Robinson, 1965). As people choose to live near the river today and in years to come they must accept that the chance that another unusual weather pattern will come to the region and produce another "flood of the century". We have altered the river landscape dramatically so it will fit with our needs; we much acknowledge the river ecosystem had needs as well. Flooding is a natural process that historically helped to create a flourishing habitat for plants, animals and eventually for humans too. Though our impacts are permanent, we can still work to reduce or impacts by learning about and restoring natural river ecosystems. Learning and experiencing the natural places around us can help to encourage a sense of appreciation for all the river had done for us.