

Introduction

Flooding in King County occurs primarily when large wet and warm weather systems occur in the Cascade Mountains and after snow packs have accumulated. The combination of melting snow runoff and added precipitation can fill rivers within hours but usually build over one to three days. For this reason most flooding occurs in the winter months.

Rainfall in geographic King County varies widely from city to city and area to area. The City of Seattle has an average of 37 inches annually,^{1,2} while Enumclaw has an annual average of 55 inches^{3,4} and Snoqualmie/North Bend has 62 inches^{5,6} of precipitation. The majority of this precipitation occurs as rain in the lowlands between October and early May with substantial snow packs in the Cascades during the same time frames.

High Probability Low Impact	High Probability Moderate Impact	High Probability High Impact
Moderate Probability Low Impact	Moderate Probability Moderate Impact	Moderate Probability High Impact
Low Probability Low Impact	Low Probability Moderate Impact	Low Probability High Impact

Flooding Probability vs. Flooding Impacts

Hazard Identification

King County has several low-lying areas that are susceptible to flooding on an annual basis to varying degrees. Neal Road, Southeast Reinig Road and Northeast Walker Road may flood at Phase II on the Snoqualmie River while at Flood Phase III water covers the lower Mill Creek basin roadways. Cities that have experienced significant river flood impacts include Auburn, Kent, Issaquah, Carnation, Duvall, Renton, Bothell, Snoqualmie and North Bend.

Table 5-4 shows there is a buildup of snow pack in December through March with a rapid melt-off of that snow pack while spring rains continue. Heavy rains in November and December, when accompanied by fluctuating temperatures, can trigger events similar to spring melts. Thanksgiving weekend has often been noted as the beginning of flood season in King County.

Flooding events in King County are described in Flood Phases for individual river systems.⁸

- Flood Phase I:** Rivers running bank full
- Flood Phase II:** Some minor flooding and water over roadways
- Flood Phase III:** Some homes inaccessible, roadways overtopped, water velocities may be dangerous with some debris
- Flood Phase IV:** Homes in low-lying areas flooding with significant damage and threat to life and safety

Month	Average Snowfall ⁷	Average Snow Pack ⁷	Average Rainfall ^{5,6}
January	107	70	8.4
February	81	91	6.3
March	78	96	6.0
April	27	76	4.4
May	5	32	3.4
June	Nil	2	3.0
July	Nil	0	1.4
August	Nil	0	1.5
September	Nil	0	3.0
October	6.7	0	5.6
November	44	10	8.9
December	92	37	9.1

Note: Measurements for snow was taken at Snoqualmie Pass and rain taken at the City of Snoqualmie.

Major Rivers that are susceptible to flooding inhabited communities and roadways are (in cubic feet per second – cfs).⁸

River System	Phase I	Phase II	Phase III	Phase IV
Snoqualmie River – Sum of the Forks	6,000 cfs	12,000 cfs	20,000 cfs	38,000 cfs
Cedar River	1,000 cfs	2,800 cfs	3,500 cfs	4,200 cfs
Tolt River	1,500 cfs	2,500 cfs	4,500 cfs	7,000 cfs
Green River	5,000 cfs	7,000 cfs	9,000 cfs	12,000 cfs
White River	2,500 cfs	6,000 cfs	8,000 cfs	12,000 cfs
Issaquah Creek	200 cfs	500 cfs	800 cfs	1,000 cfs

Some systems have reported historic flood peaks: Raging River flood peak - 6,220 cfs in November 1990 and Skykomish River flood peak -102,000 cfs November 1990.

History of Events

King County Duty Officer reports since 1996 document the following flooding events occurring within King County:

- 1996, October - Snoqualmie Phase III
- 1997, January – Tolt and Snoqualmie Phase II
- 1997, March/April – Tolt and Snoqualmie Phase II
- 1997, October – Tolt Phase III, Snoqualmie Phase II
- 1997, November – Snoqualmie Phase III
- 1997, December – Snoqualmie and Tolt Phase II
- 1998, Flood watches January – March
- 1998, November – Snoqualmie, Tolt and Skykomish Phase II
- 1998, December – White River Phase III
- 1999, June – Phase II
- 1999, November – Tolt Phase III
- 1999, November – Snoqualmie & White River Phase II
- 1999, November – Snoqualmie Phase III, Tolt Phase IV
- 2000, October – Green River Phase III
- 2000, December – Snoqualmie Phase III
- 2002, January – Tolt and Snoqualmie Phase II-IV
- 2002, April – Tolt Phase II
- 2003, January – Snoqualmie and Tolt Phase III
- 2003, March – Tolt and Snoqualmie Phase III
- 2003, October – Snoqualmie Phase IV, Tolt Phase IV

Not all flooding incidents are eligible to receive federal assistance for public agencies. For this reason alone, mitigation efforts to minimize the impacts of flooding in King County can save a considerable amount of public moneys needed to repair damages from modest-sized events. The following list of presidential disaster declarations were associated with listed King County flooding events listed above.

Often, Small Business Administration (SBA) loans are available to individuals and businesses that qualify without a presidential declaration of disaster.

No.	Dates	KC Public Damages (FEMA Approved)
185	December 1964	Figures not available
328	February 1972	Figures not available
492	December 1975	Figures not available
545	December 1977	Figures not available
612	December 1979	Figures not available
757	January 1986	Figures not available
784	November 1986	Figures not available
852	January 1990	\$4.9 Million
883	November 1990	\$5.6 Million
896	December 1990	\$1.4 Million
1079	Nov-Dec 1995	\$5.2 Million
1100	Jan-Feb 1996	\$7.4 Million
1172	Spring 1997	\$647,005

Hazard Impacts

Flooding impacts to the community include injuries to citizens and public safety officials, damage to property, lost revenue and economic damages, an increased demand on public safety and infrastructure related services. The King County Emergency Operations Center (EOC) activates for flooding events of Phase III level or greater to coordinate resources, information, and response activities.

Response activities include unanticipated overtime for EOC activations, evacuations, sheltering of displaced people, rerouting traffic destined for impassible roads, bridge and road damage repairs, and rescue or medical missions related to motorists and isolated families. The Cities of Duvall and Carnation have been isolated as an entire community. Private property damages to homes and vehicles as well as land erosion, river channel changes, agricultural damages and livestock losses result in significant rural economic impacts to local residents.

Past Mitigation Efforts

King County Department of Natural Resources and Parks (KCDNR&P), King County Water and Land Resources Division (KCW&LRD) is nationally known for its work on flooding mitigation. In 1978 unincorporated King County entered the National Flood Insurance Program (NFIP).⁹ The NFIP, administered by FEMA, enables residents in participant communities to purchase discounted flood insurance. The amount of discount each community receives is contingent upon its Community Rating System (CRS) rating corresponding to the extent of

its floodplain management efforts.¹⁰ For its extensive services in this respect – the implementation of programs such as buyouts for properties experiencing repeated flooding, maintenance of levees along pertinent rivers, and annual public meetings with affected communities, the County has earned a Class 4 rating, making it the highest rated community of any county in the nation. The result of this has been a 30 percent annual savings to flood insurance policy holders in unincorporated King County.¹¹

Flooding Endnotes:

¹ GoNorthwest Travel Guide, www.gonorthwest.co

² Seattle's Convention and Visitors Bureau, www.seeseattle.org

³ Key to the City, www.pe.net

⁴ Enumclaw Area Chamber of Commerce, <http://chamber.enumclaw.wa.us>

⁵ Western Region Climate Center, www.wrcc.dri.edu

⁶ Sno valley Chamber of Commerce, www.snovalley.org

⁷ Climate Summary, <http://www.wrcc.dri.edu/summary/climsmwa.html>

⁸ King County Dept of Natural Resources and Parks, brochure - Flood Warning Information, <http://dnr.metrokc.gov/flood>

⁹ FEMA Federal Insurance Administration, <http://www.fema.gov/cis/wa.pdf>

¹⁰ FEMA – Flood Insurance, <http://www.fema.gov/nfip/intnfip.shtm>

¹¹ KC Department of Development and Environmental Services - News Release, http://www.metrokc.gov/ddes/press/press_floodrecog.htm