



**FLOOD  
DEFENDERS**

# Flooding Cheat Sheet

Our glossary of flooding  
related terms



# Everything you need to know about flooding.

## **Acre-foot (acre-ft)**

The volume of water required to cover 1 acre of land (43,560 square feet) to a depth of 1 foot. Equal to 325,851 gallons or 1,233 cubic meters.



Bypass Channel Flood Control in California

## **Armor**

Surfacing of channel bed, banks, or embankment slope to resist erosion.

## **Aqueduct**

a pipe, conduit, or channel designed to transport water from a remote source, usually by gravity.

## **Backfill**

The placement of fill material within a specified depression, hole or excavation pit below the surrounding adjacent ground level, as a means of improving flood water conveyance, or to restore the land to the natural contours existing prior to excavation.

## **Base Flow**

That part of the stream discharge (flow) that is not attributable to direct runoff from precipitation, storms, or melting snow; it is usually sustained by groundwater.

## **Base Flood Elevation**

A base flood elevation (BFE) is the height of the base flood, usually in feet, above the ground surface.

## **Basin**

A specific area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. Also known as a watershed.

## **Berm**

A horizontal ledge cut into or at the top or bottom of an earth bank or cutting, to ensure the safety of a long slope.

## **Bypass Channel**

The construction of a new channel in order to convey stormwater runoff around an area. Usually required due to right-of-way considerations or to avoid environmentally sensitive areas.

## **Catch Basin**

A chamber or well, usually built at the curb line of a street, for the admission of surface water to a storm sewer or sub-drain.

## **Crest**

The highest value of the stage or discharge attained by a flood; synonymous with Flood Peak, thus peak stage or peak discharge.

### **Conveyance**

The movement of stormwater runoff into the receiving water, like a river or bay.

### **Culvert**

A hydraulically short pipe which moves surface water runoff through a roadway embankment or through some other type of flow obstruction.

### **Deposit**

Something dropped or left behind by moving water, as sand or mud.

### **Disaster Area**

When a disaster is beyond the capabilities of state and local government to respond, the Governor must make a formal request to the President to declare the affected region a "disaster area." When the presidential declaration is enacted, federal assistance is made available to public and certain non-profit entities, as well as to individuals who were adversely affected by the disaster. The assistance is available in many forms, including monetary, temporary housing, crisis counseling and even legal assistance. For more on the Disaster Declaration process, go to: [www.fema.gov/rrr/dec\\_guid.shtm](http://www.fema.gov/rrr/dec_guid.shtm).

### **Discharge**

The volume of water that passes a given location within a given period of time. Usually expressed in cubic feet per second.

### **Drainage well**

A well installed to drain surface water, storm water, or treated waste water into underground locations.

### **Dredging / Silt Removal**

The removal or channeling of underwater materials. Flooding often deposits large amounts of silt (sand and mud) in bodies of water that are essential to flood control; dredging can be needed to maintain or restore the flood capacity.



### **Elevation Certificate**

The Elevation Certificate is an important administrative tool of the National Flood Insurance Program (NFIP). It is to be used to provide elevation information necessary to ensure compliance with community floodplain management ordinances, to determine the proper insurance premium rate, and to support a request for a Letter of Map Amendment or Revision (LOMA or LOMR-F).

### **Embankment**

A man-made earth structure constructed for the purpose of impounding water.

### **Encroachment**

The result of placing a building, fence, berm or other structure in a floodplain in a manner that obstructs or increases the depth (or velocity) of flow of stormwater.

## **Erosion**

the process in which a material is worn away by a stream of liquid (water) or air, often due to the presence of abrasive particles in the stream. Erosion of soils affect how well the land and plants can affect future flooding events.

## **Evapotranspiration**

Water removed by evaporation from the land and transpiration from plants.

## **Fill**

An earth embankment, i.e., a levee, highway, building foundation, or other raised area. The purpose of a fill may be to confine streamflow, raise ground surfaces above the waterline, or simplify transportation. All fills on flood plains create obstructions to some degree.



## **Flash Flood**

A flood which follows within a few (usually less than six) hours of heavy or excessive rainfall, dam or levee failure, or the sudden release of water impounded by an ice jam.

## **Floodplain**

a strip of relatively flat and normally dry land alongside a stream, river, or lake that is covered by water during a flood. There are often multiple floodplains at various levels, depending on the severity of the flood.

## **Flood stage**

The elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.

## **Flood Insurance**

The insurance coverage provided through the National Flood Insurance Program (NFIP).

## **Flood Insurance Rate Map (FIRM)**

FIRMs typically identify the elevation of the one percent annual chance/100-year flood and the areas that would be inundated by that level of flooding; they are used to determine flood insurance rates and for floodplain management.

## **Floodway**

The channel of a watercourse and portion of the adjacent floodplain that is needed to convey the base or 100-year flood event without increasing flood levels by more than one foot and without increasing velocities of flood water. Alternatively, a floodway is defined as the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without increasing the flood heights by more than 1.0 foot.

## **Flux**

The process or difference in the amount of flow, in or out.

## **Freeboard**

A Freeboard is a margin of safety beyond the estimated height of a flood to account for wave action and unanticipated factors that could make the flood level higher than estimated. For example, some flood-prone cities will require a certain number of inches or feet of “freeboard” between the 500-year flood elevation and the lowest inhabited floor of homes built in floodplains.

## **Groundwater**

Water that is located under the surface of the soil.

## **Gray Infrastructure**

A term that encompasses man-made infrastructure designed to manage stormwater and mitigate flooding. Can include pipes, storm sewers, ditches, detention ponds, conveyance channels and pumps, among other solutions.

## **Green Infrastructure**

Uses the natural environment and existing channels to manage stormwater

and control flooding. Green solutions can range from passive solutions like removing development from the riparian buffer (stream edges) to allow the stream to spread to its natural floodplain. It also includes more engineered solutions like planting rain gardens in urban areas, planting mangroves, or using wetlands and plantings to clean water instead of a water treatment plant.

## **Hydrology**

The scientific analysis of rainfall and runoff, its properties, phenomena and distribution; as well as water dynamics below the ground and in the atmosphere.

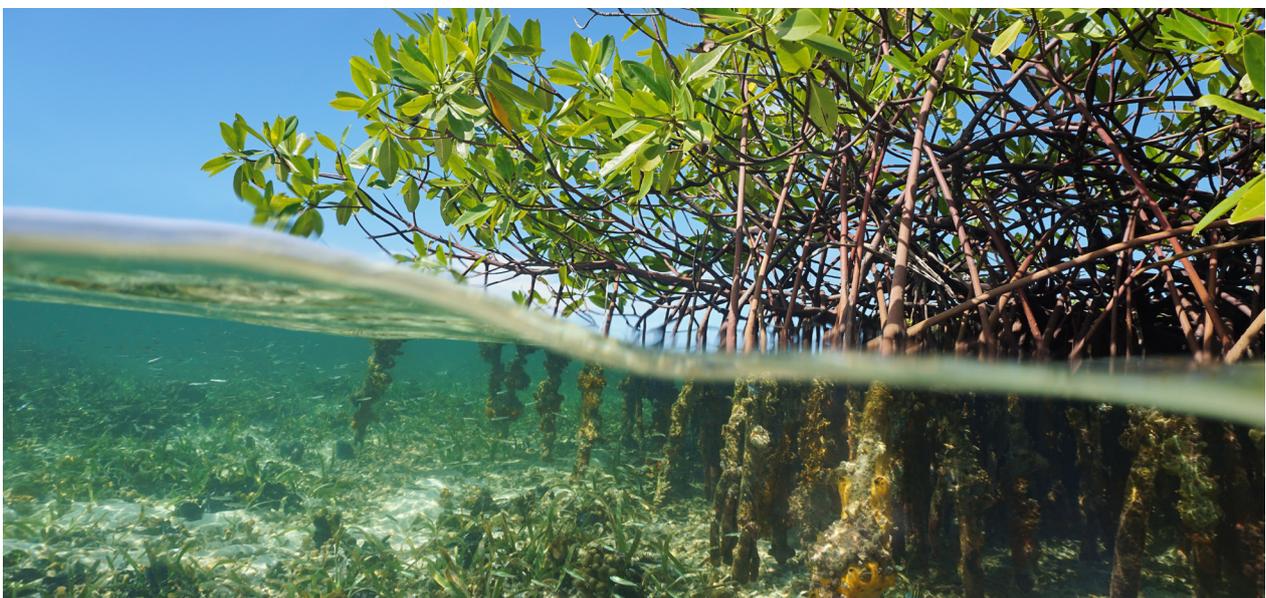
## **Hydrograph**

A graph relating stage, flow, velocity, or other characteristics of water with respect to time.

## **Hydrologic properties**

Properties of a rock or soil that describe the capacity to hold and deliver water, such as porosity (how porous), specific retention (how much it can hold), and permeability (how easy it is to get in).

Mangroves are used to protect shorelines from damaging storm and hurricane winds, waves, floods and erosion.





Florida, Lakeport, canal, Lake Okeechobee levee Herbert Hoover dike, aerial view. Getty Images

### **Infiltration**

The downward entry of water into the soil or rock, soil or rock letting water down below the surface. Not always absorption, but sometimes.

### **Impervious Surface**

Any developed area where buildings or pavement prevents water from seeping into the soil. Stormwater runoff from increased impervious surface areas in cities is a major source of urban flooding as water flows and pools quickly where it cannot be infiltrated into the soil.

### **IDF Curve**

Intensity-Duration-Frequency; an IDF Curve is a line that connects the intensity of rainfall with how long it lasts and how frequently it occurs (see Return Period). Hydrologists and flood control engineers rely on IDF curves to forecast flooding and design drainage systems for the amount of water expected in the IDF curve.

### **Levee**

a natural or manmade earthen barrier along the edge of a stream, lake, or river. Land alongside rivers can be protected from flooding by levees.

### **LOMA (Letter of Map Amendment)**

An official amendment of a current Flood Insurance Rate Map (FIRM) accepted by FEMA for a property or a structure. The LOMA verifies that the structure or portions of the property have been removed from a designated-floodplain area.

### **LOMR (Letter of Map Revision)**

An official revision of a current Flood Insurance Rate Map (FIRM) accepted by FEMA, which reflects changes in mapped areas for flood zones, floodplain areas, floodways and flood elevations.

### **Low Flow Channel/Low Water Channel**

A channel within a larger channel which typically carries low and/or normal flows.

### **Marsh**

a primarily grassy area where water covers the ground most of the time. A marsh may be prone to flooding during wet seasons.

### **Rain Gardens**

Green infrastructure designed to reduce the amount of rainfall that becomes runoff by capturing in a garden that slows water runoff, and soaks into the soil.



St. Paul, MN. public Rain Gardens. Getty Images

### **Reach**

any length of a stream or river. The term is often used by hydrologists when they're referring to a small section of a stream or river rather than its entire length.

### **Repetitive Loss Property**

Homes that have received more than \$1,000 of flood insured damage two or more times in the last ten years will appear on the National Flood Insurance Program (NFIP) repetitive loss database and receive higher priority for certain types of buyout.

### **Retention**

Infrastructure designed to hold excess water and prevent it from overloading downstream until after a flood threat has passed. Can range from a simple pond to this structure in Japan.

### **Return Period**

Also known as a recurrence interval in hydrology, this is the time anticipated to pass between recurrences of similar events. Stormwater and flood control infrastructure is designed to accommodate events of a



A large sinkhole in La Habra, CA. Getty images

given return period; for example, the pipes that carry stormwater underground are often designed to accommodate storms of a two-year return period, meaning a storm that would generally occur once every two years. The 100 year flood is a large, less likely flood with a return period of 1 for every 100 years, according to the historical average.

### **Riparian water rights**

the rights of an owner whose land that touches a river. They differ from state to state and often depend on whether the water is a river, lake, or ocean. Specifically, persons who own land adjacent to a stream have the right to make reasonable use of the stream.

### **River Forecast Center (RFC)**

A division of the National Weather Service which provides river forecasts for rivers within its area of responsibility. There are 13 RFCs in the United States. Their areas are demarked by hydrologic boundaries and watersheds rather than political boundaries.

### **Seepage**

The slow movement of water through small cracks, pores, Interstices, etc., of a material into or out of a body of surface or subsurface water.

### **Sinkhole**

a depression in the Earth's surface caused by dissolving of underlying limestone, salt, or gypsum. Drainage is provided through underground channels that may be enlarged by the collapse of a cavern roof.

### **Substantially Damaged Property**

Flood damage to a structure where the cost to repair equals or exceeds 50% of the value of the structure, excluding the land value.

### **Storm Sewers**

In order to remove excess stormwater from roads, underground sewers can be used to drain stormwater runoff below the streets; older cities sometimes have combined sanitary and storm sewer systems which can create complicated challenges in overflow and backflow situations.

### **Stormwater Pumps**

Stormwater from flash flooding cannot always be drained naturally, stormwater pumps may be needed to remove stormwater from low lying areas, or places with poor drainage.

### **Thalweg**

The line of maximum depth in a stream. The thalweg is the part that has the maximum velocity and causes cutbanks and channel migration.

### **The 100-Year Flood**

This would be an unlikely flood expected once every 100 years, but statistically speaking, this means there's a 1% chance of it happening every year, and the size and severity can increase with changes in conditions and climate.

Federal legislation of the 1970s made federal flood insurance available to property owners in areas that would be expected to flood during such a flood -- the area known as the 100-Year Floodplain. As a result, 100-Year Floodplain designations heavily influence U.S. development decisions and the economics of flooding. (provide link)

### **Watercourse**

Any minor or major lake, river, creek, stream, wash, arroyo, channel or other topographic feature on or over which waters flow at least periodically. Watercourse includes specifically designated areas in which substantial flood damage may occur.

### **Watercourse Master Plan (WCMP)**

A hydraulic plan for a watercourse that examines the cumulative impacts of existing development and future encroachment in the floodplain and future development in the watershed on potential flood damages, and establishes technical criteria for subsequent development so as to minimize potential flood damages for all flood events up to and including the one hundred-year flood.

### **Waters of the U.S. (WOTUS)**

All waters which are currently used, were used in the past, or may be navigable to use in interstate or foreign commerce. These streams are federally governed even when operating within a state.

### **Water year**

a continuous 12-month period selected to present data relative to hydrologic or meteorological phenomena during which a complete annual hydrologic cycle normally occurs. The water year used by the U.S. Geological Survey runs from October 1 through September 30, and is designated by the year in which it ends.

### **Weir**

A structure typically constructed to control the timing and amount of stormwater flowing into an adjacent detention basin. As the stormwater level in the channel increases, water flows into the basin over the weir. The lower a weir, the sooner



CONWAY, SC People use boats to rescue valuables from a home inundated by floodwaters caused by Hurricane Florence near the Waccamaw River. South Carolina has endured three, "100 year" floods in five years. Getty images.

the rising stormwater enters the basin. The longer a weir, the greater the flow of stormwater entering the basin.

### **Zone A (unnumbered)**

Zone A is a Special Flood Hazard Area identified by FEMA that is subject to inundation from a 100-year flood event. Because detailed hydraulic analyses have not been performed, no base flood elevation or depths are shown. Mandatory flood insurance requirements apply.

### **Zone AE and A1-30**

Special Flood Hazard Areas subject to inundation by the 100-year flood determined by a Flood Insurance Study (FIS). Base flood elevations are shown within these zones and mandatory flood insurance requirements apply. (Zone AE is used on newer maps in place of Zones A1-30.)



### **Zone AH**

Special Flood Hazard Areas subject to inundation by 100-year shallow flooding (usually areas of ponding) with average depths between one and three feet. Base flood elevations derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance requirements apply.

### **Zone AO**

Special Flood Hazard Areas subject to inundation by 100-year shallow flooding, usually resulting from sheet flow on sloping terrain, with average depths between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown within this zone. Mandatory flood insurance requirements apply.

### **Zone B, C and X**

Areas that have been identified in a community flood insurance study as having moderate or minimal hazard from flooding. Buildings or other improvements in these zones could be flooded by severe, concentrated rainfall, in the absence of adequate drainage systems. Flood insurance is available in participating communities, but it is not required in these zones. (Zone X is used on newer maps in place of Zones B and C.)

### **Zone D**

Unstudied areas where flood hazards are undetermined but where flooding is possible. No mandatory flood insurance requirements apply, but coverage is available in participating communities.