

FDG2 glossary

Accretion	Process by which particles carried by the flow of water or by the wind are deposited and accumulate (opposite is erosion)
Adaptable design	Design of flood management measures that allows for future increases to the standard of service that the works provide, or to facilitate future strengthening or heightening of a flood defence in response to, for example, climate change A good example is a floodwall that has its foundations designed to support a higher wall, so that heightening the defence in the future is not compromised by an inadequate foundation. Adaptable design is a means of allowing for an uncertain future without excessive expense in the present.
Adaptive management	An approach to managing systems with inherent uncertainties that involves learning from the system's responses to intervention, then using that learning to improve future management
AEP, annual exceedance probability	Probability of exceeding a specified flow or level in any year (inverse of the return period for an annual maximum series)
Afflux	The rise in water level above the normal surface of water in a channel that is caused by a partial obstruction, such as a bridge or culvert The afflux may also be described as the maximum change in water level that would occur, at a particular flow, if the structure were to be removed.
Air entrainment	The incorporation of air bubbles into moving water, typically as a result of high turbulence or the water surface being disturbed by wave action, for example in a hydraulic jump
Air-regulated siphon	Siphon in which the discharge is automatically regulated to match the approaching flow, without appreciable change in upstream water level, by the admission of air at the siphon inlet
AMAX, Annual maximum series	Series of data giving the largest value of river flow (or level) in each year of record
AMIN, Annual minimum series	Series of data giving the smallest value of river flow in each year of record Generally defined for averages of flow over a given duration, for example the series of minimum values of the 7-day running mean flow is the 7-day AMIN or AMIN(7) series.
Anchor	An object beneath the ground which is designed to provide restraint against upward or forward movement
Annual exceedance probability, AEP	Probability of exceeding a specified flow or level in any year (inverse of the return period for an annual maximum series)
Arterial drainage	Primary land drainage channels designed to achieve rapid transfer of water to rivers
Asset	In flood defence, any man-made or natural feature – such as a raised defence, retaining structure, channel, pumping station or culvert – that performs a flood defence or land drainage function Includes components owned by the Environment Agency or another body, whether or not flood defence is the primary function or is incidental to some other purpose, and components which may be detrimental to flood defence objectives.

Asset management	<p>Systematic and coordinated activities through which an organisation manages its assets and asset systems for the purpose of achieving its strategic aims</p> <p>This includes the performance of the assets and the associated risks and expenditures throughout their lifecycles, and carries an implication that the management is undertaken in an optimal and sustainable manner.</p>
Assessment	The process of understanding the state, structural competence or performance of an existing asset or asset system in order to inform the planning of future interventions
Attenuation	The reduction in the peak discharge of a flood which may occur as the flood passes downriver, including the effects of any flood storage ponds and reservoirs
Backwater	A 'dead-end' channel, which is typically a remnant of a previous route of a meandering watercourse
Backwater effect	<p>The influence, in subcritical flow, which flow conditions in one locality have on the flow conditions (in particular the water level) upstream</p> <p>The backwater effect (sometimes shortened to 'backwater') is most commonly associated with a weir – or, in flood conditions, a bridge or culvert – where the rise in water level extends some distance upstream of the structure. The backwater length defines the extent of influence of the weir in the channel upstream.</p>
Bagwork	<p>A form of revetment constructed from dry-filled bags of a weak sand-cement mix</p> <p>The bags are either hessian or plastic and are part-filled with the sand-cement mix. They are then placed on the soil surface to form a revetment, with staggered joints, and tamped into place. The sand-cement mix hardens over time and the bag material ages to give a more natural appearance. Can also be used to form low retaining walls.</p>
Bar deposit	Layer of sediment deposited within a river channel
Baseflow	That part of the flow in a watercourse that emerges from groundwater storage
Bedload	That part of the sediment load in a channel which travels by rolling, sliding or bouncing along the bed
Berm	Horizontal ledge formed in the side slope of an embankment or cutting
Blockwork	The use of blocks of concrete or stone to form a revetment
Bridleway	A track along which the public have a right to walk, cycle or ride horses
Bryophyte	<p>Group of non-vascular plants which include mosses, liverworts, and hornworts</p> <p>Vascular plants are those containing vessels that circulate fluids.</p>
Carbon sequestration	<p>The absorption and storage of carbon from the atmosphere</p> <p>Carbon sequestration can refer to natural processes that absorb CO₂ such as photosynthesis by plants. It also refers to artificial processes that capture CO₂, for example from an industrial plant or power station, and store it in a well-sealed geological reservoir, preventing it from being released to the atmosphere.</p>
Catchment, catchment area	The land (and its area) which drains (normally naturally) to a given point on a river, drainage system or other body of water
Catchment flood management plan, CFMP	A large-scale strategic planning framework setting out policies for the integrated management of fluvial flood risks to people and the developed and natural environment in a sustainable manner
Cavitation	Formation and implosive collapse of water vapour bubbles in flowing water as a result of a sharp drop in pressure, which may cause erosion of the surfaces containing the flow

CFMP, catchment flood management plan	A large-scale strategic planning framework setting out policies for the integrated management of fluvial flood risks to people and the developed and natural environment in a sustainable manner
Coarse fish	Those types of freshwater fish that are not considered to be 'game' fish Technically, coarse fish include all freshwater fish that spawn in freshwater, except for lamprey and those species possessing an adipose fin.
Coir roll	Roll of coconut or other biodegradable fibre, often pre-planted, used to promote the establishment of riverside vegetation that resists erosion Coir rolls are often placed in front of reed to provide protection while they become established.
Competent authority	A national agency responsible for the control or regulation of a particular aspect of legislation
Control structure	Device constructed across a channel or between water bodies or water passages, used to control the discharge passing the device and/or the water level on either side of the device
Conveyance	For a channel, function of the flow area, shape and roughness of a channel, which can be used as a constant in a formula relating discharge capacity to channel gradient
Coping, coping stone, capstone	Stone or other material forming a distinct top to a floodwall (or other structure)
Courant number	A parameter used in numerical modelling of hydraulic systems to assess suitable timesteps and distance steps
Crest	Top surface of a weir or other control structure over which water passes, highest part of floodbank
Critical depth	Flow depth in a channel when critical flow occurs
Critical-depth flume	Control structure in which critical flow occurs due to a contraction in flow width, used for discharge measurement
Critical flow	Water flow at which the specific energy is a minimum for a given discharge
Critical velocity	Mean velocity in a cross section when critical flow occurs
Crump weir	Triangular profile weir crest, named after the inventor, used for discharge measurement
Culvert	Covered channel or large pipe to convey water below ground level, for instance under a road, railway or urban area, or beneath a building or other structure
Cutoff	That part of a floodwall, floodbank or other flood defence works, generally extending vertically below the general foundation level, which prevents or reduces the quantity of seepage passing through the foundation
Cyprinid	Freshwater fishes of the carp and minnow family, typically having soft fins, toothless jaws and cycloid scales
De-culverting	The removal of a culvert to restore a watercourse to its natural state (also referred to as 'daylighting')
Delivery plan	A document that describes the proposals for implementing a project (that may involve construction work and/or operational procedures)
Design flood	Magnitude of the flood adopted for the design of the whole or part of a flood defence system, usually defined in relation to the severity of the flood in terms of its return period
Desilting	Removal of accumulated sediment from the bed of a channel, generally as a maintenance activity Also referred to as dredging, although this term is more commonly reserved for major works rather than routine maintenance.

Deterministic	A method of process of calculation that adopts precise single values (without random variation) for the input variables, and gives a single defined result
Dewatering	The process of handling and/or reducing significant flows of water (especially groundwater) into an area where construction work is being undertaken
Discharge	The volume of water that passes through a channel cross section in unit time, normally expressed at cubic metres per second (m ³ /s) in fluvial design (often more simply referred to as 'flow')
Dredging	Underwater excavation, usually including removal of the excavated material
Drowned flow	Flow through or over a hydraulic structure (such as a flume or weir) that is influenced by the downstream water level (see also 'modular flow')
Easement	A legally enforceable provision allowing access for one party across another party's land (often required for access by the Environment Agency to flood defences built on land not owned by them)
Embankment	An artificial, usually earthen, structure, constructed to prevent or control flooding, or for various other purposes including carrying roads and railways
Energy dissipator	Device constructed in a water passage to reduce substantially the kinetic energy of fast-flowing water and protect the downstream bed and banks against scour
Energy gradient	The gradient of the energy line In uniform open-channel flow, the energy (or hydraulic) gradient is the same as the gradient of the water surface and the channel bed.
Energy level	The sum of the potential and kinetic energies of the flow at a location in a channel, expressed in terms of depth (strictly 'hydraulic head') and velocity head respectively
Energy line, energy grade line	An imaginary line joining the energy levels along a channel
Environmental impact assessment, EIA	Detailed studies that predict the effects of a development project on the environment and provide plans for mitigation of the adverse impacts
Environmental statement, ES	A written statement that may be required to detail the effect that a proposed large new development will have on its surrounding area
Erosion	Process by which particles are removed by the action of wind, flowing water or waves (opposite is accretion)
Faggot, fascine	A bundle of woody stems used to provide temporary erosion protection to a channel bank
Failure mechanism, failure mode	One of any number of ways in which an asset may fail to meet a particular performance requirement, target or threshold
Fascine mattress	Bundles of brushwood bound together to form a mat to protect the bed or bank of a channel against erosion The mattress is often floated into position and weighted down with stones.
Fendering	The provision of fenders (bumpers) to protect river works from boat impact, and to allow boats to moor safely alongside a quay wall or other structure
Fetch	The area of water over which the action of the wind generates waves at a particular locality; the length of the water body upwind of the locality
Fishpass	Structure to enable fish to gain access past a weir, dam or other structure in a river that would otherwise be impassable There are a number of approaches to the design of fishpasses, which are mostly variations on the themes of steps, slopes and lifts.
Floodbank	Flood embankment

Flood defence works	Works to prevent or alleviate flooding, including works designed to convey and contain water and to resist erosion due to the action of waves and currents
Flood defence system	A collection of flood defence works for a river catchment and/or estuary and/or coastal region, in which the individual components (or assets) depend on each other for their overall effectiveness
Flood embankment, floodbank	Embankment, usually earthen, built to prevent or control the extent of flooding
Flood risk management	The activity of understanding the probability and consequences of flooding, and seeking to modify these factors to manage flood risk to people, property and the environment in line with agreed policy objectives Policy objectives are set out in CFMPs or SAMPs and generally aim to reduce or avoid increasing the risk of flooding to people and property. They can involve taking action to increase the frequency of flooding in less populated areas.
Floodplain	Area of land bordering a river which is partly or wholly covered with water during floods
Floodplain connectivity	The manner in which the floodplain is connected to the river and parts of the floodplain are connected to each other It is often reduced through enlarging or dredging rivers for flood protection, by embankments, or through natural processes of channel deepening and incision.
Floodwall	Wall, of any form of construction, built to prevent or control the extent of flooding
Flow control structure	See 'control structure'
Flow duration curve	Graph showing the proportion of time during which discharges are equalled or exceeded
Flume	(1) Hydraulic structure used for flow measurement
	(2) Relatively small and steep channel designed to carry supercritical flow
Fluvial	Relating to a river
Fluvial geomorphology	The branch of geomorphology that describes the characteristics of river systems and examines the processes sustaining them
Free flow, modular flow	State of flow over crest of weir or other control structure in which the upstream water level depends on the discharge but is independent of the water level downstream of the structure
Free surface	The unconfined upper surface of the water in a channel at which the pressure on the water is equal to the atmospheric pressure Free-surface flow (or sometimes 'free flow') is flow in a culvert or other enclosed channel in which the water surface is not in contact with the soffit of the structure.
Freeboard	The height of the top of a bank, floodwall or other flood defence structure, above the design water level (normally the water level that would occur disregarding any effects from wave action) Freeboard can be seen as a safety margin that makes allowance for uncertainties.
Friction gradient, friction slope	The gradient of the energy line (preferred term is 'energy gradient')
Froude number	Dimensionless parameter representing the ratio between the inertia and gravity forces in a fluid, taking the value of unity for critical flow

Function (of an asset)	The purpose that an asset fulfils for those who benefit from or use it and the environment in which it exists An asset normally has a primary function of flood defence or land drainage, plus some secondary functions, such as ecological, access or amenity.
Functional life	Period of time during which the primary functions of an asset are fulfilled
Gabion, gabion apron, gabion mattress	Cuboid or tubular container made of wire or plastic mesh and filled with stones, used to form a retaining wall or provide protection against scour Also available in the form of a mattress in thicknesses up to 500mm for use as a revetment or apron.
Gaugings	As a noun, flow measurement readings (including depths, velocities, discharges and combinations thereof)
Geogrid	A mesh-like material, commonly manufactured from polymers, designed to act in conjunction with granular material (soil, gravel, crushed stone) to form a load-bearing surface or to add strength to a soil mass
Geomorphology	The scientific study of the evolution and configuration of landforms
Geophysics	Quantitative physical methods – especially seismic, electromagnetic and radioactive – for exploring beneath the Earth's surface
Geophysical survey	Survey methods that produce images of features (such as archaeological) that are hidden below the ground surface Techniques most commonly applied to archaeological geophysical surveys are magnetometers, electrical resistance meters, ground-penetrating radar and electromagnetic conductivity meters.
Geotextile	Permeable synthetic fabric used in conjunction with soil for the function of filtration, separation, drainage, reinforcement or erosion protection
Ground anchor	Device capable of transmitting an applied tensile load to a load-bearing stratum of ground Often used to enhance the stability of a retaining wall or foundation structure.
Ground investigation	Exploration of the ground to obtain information for the design and construction requirements for a new structure or for the assessment of the stability and performance of an existing structure
Groundwater	Water contained in the interstices of soil and rock, above and below the water table
Growth curve	In flood hydrology, a dimensionless curve that expresses the ratio between the magnitude of the index flood flow (QMED) and the flow for another return period or exceedance probability, such as 100-year (1% AEP) flow
Groyne	An engineering structure projecting into the river from the bank, generally one of a series spaced at regular intervals, designed to protect the bank from erosion, or to maintain navigation depth in the main channel Groynes are also used in the coastal environment to stabilise beach erosion.
Habitats Directive	An EU directive that promotes the maintenance of biodiversity and conservation status and requires protection for those habitats and species of European importance (see also Chapter 4)
Hard engineering	A collective term for man-made structures – typically involving steel, masonry and concrete – that control or disrupt natural processes (see also 'soft engineering')
Hazard	A situation (physical event, phenomenon or human activity) with the potential to result in harm A hazard does not necessarily lead to harm – it can be managed.

Head	(1) Hydraulic head, either in terms of the water level or the energy level, depending on the context
	(2) Upstream side of a navigation lock or other structure
Headcutting	The process whereby a river or stream erodes its bed, with the erosion ('regression') gradually progressing upstream
Headloss	The fall in the energy level between the headwater and tailwater level at a flow control structure
Headwater	The water surface elevation at the upstream side of a hydraulic structure
Hydraulic gradient	The gradient of the energy line (preferred term is 'energy gradient') In uniform open-channel flow, the energy (or hydraulic) gradient also equals the gradient of the water surface and the channel bed. Note that the term 'hydraulic gradient' is used by some authors to mean the water surface gradient.
Hydraulic head	Hydraulic pressure measured in units of length (pressure divided by water density)
Hydraulic jump	Abrupt rise in water level, accompanied by surface disturbance and air entrainment, when flow changes from supercritical to subcritical, with associated dissipation of energy
Hydraulic load, hydraulic force	The product of the hydraulic pressures and the areas over which they apply
Hydraulic pressure	The pressure exerted by water (whether at rest or moving) on a surface or structure Hydraulic pressure has the units of force per unit area and is calculated for water at rest as the product of the depth of water and its density. The pressure can differ for water in motion.
Hydraulic roughness	A measure of the resistance to flow in a channel, representing the irregularity of the bed and banks, vegetation growth, and other factors that act to impede flow (see also Manning's 'n')
Hydrograph	Graph that shows the variation with time of water level or discharge in a river, channel or other water body
Hydromorphology	The scientific study of the physical characteristics of a water body including the shape and its content
Hydrostatic force	The force exerted by water at rest (see also 'hydraulic load')
Hydrostatic pressure	The pressure exerted by water at rest (see also 'hydraulic pressure')
Intervention	A planned activity designed to effect an improvement in an existing natural or engineered system (particularly with asset management)
Inverted siphon	A conduit that passes under an obstruction by the formation of a U-shaped profile, similar to a siphon but the other way up (hence the term) There is no siphonic action with an inverted siphon, so the term is a misnomer, but the term is in common usage, and there is no universally accepted alternative, although 'hydraulic underpass' is sometimes used.
Joint filler	Flexible material used to fill the gap in a purpose-made joint to accommodate movement between two parts of a structure The material is designed to accommodate movement at the joint without damage to the structure. Normally used in conjunction with a joint sealer.
Joint sealer	A sealant used to seal the outer edges of a joint in a structure Commonly used in floodwalls provide a water-resistant seal to protect the joint filler and reduce seepage. Note that joint sealer is not designed to make a wall watertight; this is achieved with a waterstop.
Kinetic energy	The energy that a flow of water possesses by virtue of its mass and velocity

Laminar flow	<p>Fluid flow in which layers of fluid move smoothly past each other and forces due to viscosity are significant in comparison with forces due to inertia</p> <p>In laminar flow, all the fluid particles proceed along parallel paths and a thin filament of dye will remain as such without diffusion. Laminar flow is associated with low velocities and viscous fluids.</p> <p>In pipeline and open-channel hydraulics, the velocities, scale and roughness are nearly always sufficiently large to ensure that the flow is turbulent.</p>
Lateral connectivity	Connections between a watercourse and the adjacent habitats
Leptospirosis	<p>A bacterial disease passed from animals (most commonly rats) to humans via infected urine</p> <p>Infection with leptospire can cause no symptoms at all, a mild flu-like illness, or a more severe illness called Weil's disease, with jaundice and kidney failure. Symptoms usually develop 7–12 days after initial infection with leptospire, though rarely the incubation period can be as short as two to three days or as long as 30 days.</p>
LiDAR	<u>L</u> ight <u>D</u> etection and <u>R</u> anging – a technology that employs an airborne scanning laser rangefinder to produce a topographic survey and image of ground features
Lifecycle	<p>(1) In flood defence etc, the life of an asset from its construction through to disposal</p> <p>(2) In ecology, the entire life and reproductive cycle of a plant, fish or animal from seed or conception to death</p>
Linear defences	<p>Flood defences that run parallel to a watercourse</p> <p>Linear defences are typically floodwalls and flood embankments or a combination of the two. They constrain flood flows to the existing river corridor and allow more water to pass down the river without spilling out onto the river's floodplain.</p>
Longitudinal connectivity	Linear connections between different sections of its watercourse from its source to the estuary
Macrophyte	<p>Large vascular aquatic plants that grow in shallow water along the shorelines of lakes or in the slow-moving reaches of rivers</p> <p>Vascular plants are those containing vessels that circulate fluids.</p>
Main river	That part of a river (which may include any related flood relief channels and any structure or appliance for controlling or regulating the flow of water in, into or out of the main river) which is so designated on maps approved by Department for Environment, Food & Rural Affairs in England and by the Welsh Assembly Government
Maintenance	Work that sustains the desired condition and intended performance of an asset
Manning's 'n'	A coefficient used in hydraulic calculations to represent the resistance to water flow that is presented by the roughness, irregularities and vegetation growth on the channel bed and banks (see also 'hydraulic roughness')
Mean annual flood	<p>The arithmetic mean of the series (AMAX) that comprises the maximum flood flows in each water year, defined as QBAR in the <i>Flood estimation handbook</i></p> <p>The mean annual flood is commonly assumed to be the order of flow with most significance in terms of channel-forming. See also 'median annual flood'.</p>
Median annual flood	The flood that has an annual exceedance probability of 50% (return period 2 years), defined as QMED in the <i>Flood estimation handbook</i>
Metadata	Summary information or characteristics of a set of data

Migratory fish	Fish species that migrate over a range of timescales and distances during their lifecycle, sometimes involving freshwater to seawater or <i>vice versa</i> (for example Atlantic salmon and eel)
Modular flow, free flow	State of flow over crest of weir or other control structure in which the upstream water level depends on the discharge but is independent of the water level downstream of the structure
Naturalisation	(1) The spreading of foreign or cultivated plants/animals into the wild where they multiply and become established (2) In hydrology, the process by which an actual flow record is manipulated to remove those human influences that are quantifiable, such as consumptive abstraction and effluent discharges
Normal depth	The water depth when 'normal flow' occurs
Normal flow	The flow in an open channel at which the slopes of the water surface, energy line and channel bottom are the same (see also 'uniform flow')
Offline habitat	Habitat that is joined to the main stem of a watercourse for some or all of the time, but does not routinely experience the main discharge of the watercourse
Offshore mooring, offshore lay-by	Mooring structure not encroaching onto a riverbank, usually supported by piles driven into the riverbed
Onshore mooring, onshore lay-by	Mooring structure integral with the riverbank, typically a concreted path constructed on top of steel sheetpiling bank protection
Open-stone asphalt	A flexible revetment material constructed from crushed rock and asphalt in a mix that retains some porosity whilst providing a continuous revetment that is resistant to light wave attack
Outfall	Structure through which water is discharged into a channel or other body of water
Overtopping	The passage of water over a component such as a floodbank or seawall, due to high water levels or wave action Overtopping does not necessarily represent 'failure' of a flood defence to perform its function.
Pathway	Route that enables a hazard to propagate from a 'source' to a 'receptor', as in the 'source-pathway-receptor' concept A pathway must exist in order for a hazard to be realised. Pathways can be constrained in order to mitigate the risks.
Peaks-over-threshold, POT series	Series of data giving all the events when the river flow (or level) exceeds a specified threshold
Performance	The creation or achievement of something that can be valued against some stated initial aim or objective, and also the degree to which a process succeeds when evaluated against some stated aim or objective
Performance-based	Performance-based design takes account of the mechanisms that can cause failure of the assets to perform as intended This is relevant to the design of various forms of flood defence assets and also for the water conveyance function of watercourses and other channels. It is also relevant for other functions, such as navigation, and for issues such as improving aquatic habitat.
Physiography	The scientific study of physical features of the earth's surface
Piping	The loss of integrity and strength of soil caused by water seepage (at a hydraulic gradient greater than unity) that results in movement of the soil particles Quicksand is a visible consequence of piping caused by an upward flow of seepage water.

Planform	The form of a river or stream when viewed from above – for example, the term ‘meandering’ is a description of a sinuous planform
Portage	Structure to enable canoes and other small craft to be carried between stretches of river, usually between upstream and downstream of weirs and locks, without having to use the lock
POT, peaks-over-threshold series	Series of data giving all the events when the river flow (or level) exceeds a specified threshold
Potential energy	The energy stored in the water due to its elevation
QMED	Median of the annual maximum flow series – the flow that has an annual exceedance probability of 50% or a return period of two years
Rapid drawdown	Sudden drop in external water level that can impair the stability of a dam or flood embankment (the strength of the embankment is reduced due to the transfer of load from the soil matrix to the water contained in the interstices)
Rating curve	Graph showing the relationship between discharge and depth or water elevation in a channel or over a weir or other control structure
RBMP, river basin management plan	Describes the main issues to be addressed under the Water Framework Directive for each river basin district and highlights some key actions proposed for dealing with them The annexes to the document give more detail on the conditions in the river basin district, the actions proposed and the mechanisms that can be used to implement these actions.
Receptor	The entity (such as a person, property or habitat) that may be harmed by an event at a source that reaches it via a pathway, as in the ‘source–pathway–receptor’ concept The vulnerability of a receptor can be reduced by increasing its resilience.
Regrading	Reprofiling the bed of a channel to a lower level or more even gradient (for example, to increase flow capacity or improve land drainage)
Regression	Lowering the bed of a watercourse by erosion (the opposite of ‘accretion’)
Reinforced grass	Grass surface which has been artificially augmented (for example using a geotextile) to increase its resistance to erosion
Reliability	The probability that a flood defence asset will not fail during a given period of time Conventionally understood as the performance of flood or coastal defences as described by process-based models. In the context of a risk assessment that definition is extended to the probability that the flood or coastal defence does not fail (the complement of the probability of failure), where failure is defined using a limit-state function with conventional process-based models representing the strength and loading models.
Residual risk	The risk that remains after risk management and mitigation
Resilience	In asset management, the ability of an asset or asset system to resist the damaging effect of extreme loading Resilience measures can, for example, help to achieve design standards beyond the standard of protection.
Return period	Average interval of time between events that equal or exceed a particular magnitude The use of the term ‘return period’ to express the probability of a flood is now often discouraged, as it can lead to confusion in the minds of the public. ‘Annual exceedance probability’ (AEP) is now the generally preferred means of expressing probability, 1% AEP being equivalent to a return period of 100 years.
Revetment	Works to protect the bed or banks of a channel against erosion, typically constructed from stone or concrete blocks

Riffle	Part of a watercourse where the bed gradient is steep, with the flow relatively swift and shallow, with a rough surface (also know as 'rapids' or a 'rapid')
Riparian	Along the banks of a watercourse Riparian zones support riparian vegetation and are of environmental importance, providing diverse habitats and supporting a range of ecological communities.
Riparian owner	Owner of land adjoining a watercourse
Riprap	A layer of graded quarried stone placed in a random fashion as protection against currents or waves; also referred to as dumped stone or dumped rock
Risk	Risk can be considered as having two components: <ul style="list-style-type: none"> ▪ the probability that an event will occur ▪ the consequence to receptors associated with that event Risk = probability × consequence
Risk register	A formal record of all the anticipated risks that could have an adverse impact on a project The register should evaluate the likelihood (probability) of each risk and describe the consequences of it happening. The risk register should assign responsibility for management of the risk with an indication of whether the risk is accepted, or what steps should be taken to reduce or eliminate the risk or to mitigate its consequences.
River basin management plan, RBMP	Describes the main issues to be addressed under the Water Framework Directive for each river basin district and highlights some key actions proposed for dealing with them The annexes to the document give more detail on the conditions in the river basin district, the actions proposed and the mechanisms that can be used to implement these actions.
River continuity	The passage of river flows (of water and sediment) in a longitudinal (downstream) direction Continuity can be disrupted by natural barriers such as waterfalls or by engineering structures such as dams or weirs.
River typology	The scientific study of types of rivers
Running sand	Sand that exhibits flow characteristics similar to a liquid due to lack of confinement or water flow (most notably a problem in foundation excavations below the water-table)
Runoff	Overland flow produced by rainfall
Runup	The upper level reached by a wave on a structure, relative to the stillwater level
System asset management plan, SAMP	Long-term investment plan for a flood defence system that identifies the investment needed and the benefits provided
Salmonid	Fish belonging to or characteristic of the family Salmonidae, which includes the salmon, trout and whitefish These species are typically soft-finned and inhabit cold and temperate waters.
Synthetic aperture radar, SAR	Radar-based application in remote sensing and mapping using aircraft to produce a digital elevation model of the ground surface topography
Schematisation	The representation of the river system in a hydraulic model
Scour	Erosion of the bed or banks of a watercourse by the action of moving water, typically associated with the presence of a feature such as bridge pier or abutment that constricts the flow

Scour pool	An area of deep water caused by localised erosion, often associated with turbulent flow patterns caused by an upstream source or flow constriction
SEA, strategic environmental assessment	A long-term (usually 50 years or more) documented plan for river or coastal management, including all necessary work to meet defined flood and coastal defence objectives for the target area SEA is a legally enforced assessment procedure required by the European Council Directive 2001/42/EC (known as the SEA Directive). An SEA takes place in advance of an environmental impact assessment (EIA) and the findings are used to inform the EIA process. It is usually more detailed and covers a smaller area than a catchment flood management plan (CFMP).
Security screen	A screen comprising closely-spaced bars, designed to prevent unauthorised or accidental access to a conduit or other hydraulic structure and thereby reduce the risk of someone coming to harm
Sediment	Material ranging from clay to gravel (or even larger) that is transported in flowing water and that settles or tends to settle in areas where the flow slows down
Sedimentation, silting	The deposition of sediment in the bed of a channel or within a hydraulic structure
Sheetpiling	Row of interlocking piles driven side by side into the ground to retain earth, protect a channel bank or reduce seepage Steel is the most commonly used material for sheetpiling because of its strength, but other materials are also used, including plastic.
Shoal	Depositional landform within or extending into a body of water, typically composed of sand, silt, small pebbles or a combination of these
Sideweir	Weir installed at the side of a channel and designed to convey flow out of the channel, in which the predominant direction of the approaching flow is parallel to the weir crest
Silting, sedimentation	The deposition of sediment in the bed of a channel or within a hydraulic structure
Siphon	A short flow conduit, part of which lies above the hydraulic grade line, whose discharge characteristics depend on the expulsion of air and the occurrence of subatmospheric pressures (see also air-regulated siphon)
Site investigation	The investigation of all matters of a technical, environmental and legal character that have to be taken into account in assessing the suitability of a site for a particular purpose
Slipway	Structure consisting of a sloping way down to the water for launching boats
Sluice, sluice gate	Rectangular gate that moves vertically between guides
Soft engineering	The use of ecological and geomorphological principles and practices (for example to reduce erosion and stabilise channel banks), while enhancing habitat, improving aesthetics and reducing capital costs
Source–pathway–receptor or concept	How a hazard propagates from its source, via a pathway, to a receptor For example, in the event of heavy rainfall (the source) floodwater may escape from a river and propagate across the floodplain (both elements of the pathway) to inundate a housing development (the receptor) that may suffer material damage.
Specific energy	Sum of the depth of water and the velocity head The total energy per unit weight of fluid, at any cross section of a channel, measured above the channel bottom.
Spiling	A woven retaining structure for a channel bank Willow osiers are woven between stakes to form a fence-like retaining wall which will sprout and grow with time, thereby stabilising the bank.
Spillway	Structure for the discharge of excess water from a reservoir or channel

Stakeholder	An individual or group with an interest in, or having an influence over, the success of a proposed project or other course of action
Standard of protection	In flood risk management, the annual probability of the design flood level being reached or exceeded From the receptor's viewpoint, the definition is different, being the annual probability of a flood overtopping or breaching a flood defence asset and causing harm to the receptor.
Standard of service	The performance of an asset at a specific point in time
Stillwater level	Level that a water surface would assume if all wind and wave action were absent, at normal atmospheric pressure
Stilling basin	Structure for dissipating energy of flow, comprising a basin in which a hydraulic jump, flow impact or other form of energy dissipation occurs
Stone apron	Stones – typically placed downstream of a hydraulic structure – designed to dissipate energy and reduce erosion of the bed
Stoplogs	Timber or metal beams spanning horizontally between grooves in piers or abutments of a control structure, used to isolate part of the structure or related reach for maintenance, or to raise the elevation of water retained
Strategic environmental assessment, SEA	A long-term (usually 50 years or more) documented plan for river or coastal management, including all necessary work to meet defined flood and coastal defence objectives for the target area SEA is a legally enforced assessment procedure required by the European Council Directive 2001/42/EC (known as the SEA Directive). An SEA takes place in advance of an environmental impact assessment (EIA) and the findings are used to inform the EIA process. It is usually more detailed and covers a smaller area than a catchment flood management plan (CFMP).
Strategy plan	A documented strategy which is developed from a strategic study into a problem and describes the course of action which has been determined to implement the preferred option
Subcritical flow	Flow in a channel at less than critical velocity, at which the Froude number is less than unity
Substrate	The material underlying or supporting a structure or another layer of material
Supercritical flow	Flow in a channel at greater than critical velocity, at which the Froude number is greater than unity
Surcharge, surcharged	Flow conditions in an enclosed water conduit (pipe or culvert) in which the water pressure is higher than atmospheric, resulting in water levels at the inlet, outlet or access shafts higher than the soffit level of the conduit (in contrast to 'free surface flow')
Suspended sediment load, suspended load	Sediment that travels at almost the same velocity as the water that transports it and is prevented from settling by the effects of flow turbulence
Sustainability	The concept of development that meets the needs of the present without compromising the ability of future generations to meet their own needs
System asset management plan, SAMP	Long-term investment plan for a flood defence system that identifies the investment needed and the benefits provided
Systems approach	An approach to flood management that looks at the complete flooding system or defence system insofar as it can be affected by, or may have an impact on, any intervention
Tail	Downstream side of a navigation lock or other structure
Tailwater	The water surface elevation at the downstream side of a hydraulic structure
Tie rod	A rod, generally steel and often threaded, carrying tension between two parts of a structure, for example between sheetpiles and an anchor block

Transverse bar	Sediment bar oriented across a watercourse perpendicular to the general direction of flow
Trash screen, weed screen	A screen comprising closely-spaced bars placed upstream of a hydraulic structure to prevent waterborne debris from progressing downstream where it might otherwise cause a problem (for example by blocking a culvert or damaging pumps)
Tree screen	A series of large poles placed within a channel to prevent large tree branches and trunks from moving down the river in normal and flood flows By stopping them upstream of vulnerable sites such as bridges and culverts it reduces the risk of blockages occurring that can lead to additional flooding. Tree screens, like trash screens, need to be cleared out regularly to prevent them from causing a blockage.
Turbulent eddies	A series of vortexes that are shed from obstacles in the flow Such features can result in locally increased current velocities, initiating scour. Larger eddies tend to travel further and cause greater scour.
Turbulent flow	Fluid flow that is unsteady, in which the velocity at a point is not constant and the inertial forces predominate over forces due to viscosity In turbulent flow, the progression of the fluid particles is irregular and individual particles are subjected to fluctuating transverse and longitudinal velocities. If dye is injected, it rapidly diffuses through the flow. It should be noted that turbulent flow occurs in almost all practical conditions involving open-channel flow. Laminar flow almost never occurs, even when the flow appears to be tranquil.
Uncertainty	Lack of precision that is due to (i) natural variability and (ii) knowledge uncertainty Uncertainty arises principally from lack of knowledge or of our ability to measure or to calculate, which give rise to potential differences between the assessment of some factor and its 'true' value.
Uniform flow	Flow in which the depth and velocity remain constant with respect to distance along the channel Uniform flow is possible only in a channel whose cross section does not vary along its length.
Uplift, uplift pressure	The hydrostatic pressure on the underside of a foundation (of, for example, a floodwall) which can act to destabilise the structure
Velocity head	Measure of the kinetic energy of flowing water, represented as the vertical height to which water would rise in a pitot tube
Value engineering	Systematic method to improve the value of goods and services by using a detailed examination of the functions that have to be provided
Vortex	A revolving mass of fluid, such as a whirlpool
Washland	Low land adjacent to a river or other channel used for the temporary storage of floodwater, often developed for that use by the erection of bunds and control structures
Water day	The period over which water flows are conventionally measured, from 09:00 GMT to 09:00 GMT
Water Framework Directive, WFD	European Community Directive (2000/60/EC) on integrated river basin management The WFD sets out environmental objectives for water status based on: ecological and chemical parameters; common monitoring and assessment strategies; arrangements for river basin administration and planning; and a programme of measures in order to meet the objectives.

Water year	<p>1st October to 30th September</p> <p>For flood frequency and other statistical analyses of river flows, it is normal practice to divide the overall period of record into water years, rather than into calendar years.</p>
Watercourse	Defined natural or man-made channel for the conveyance of drainage flows and floods by gravity
Watershed	<p>In usual British English usage, the boundary between catchments</p> <p>In American usage (including in the expression 'watershed management') it is a synonym for 'catchment'.</p>
Waterstop, waterbar	A strip of material, normally plastic or rubber, used to seal the gap or crack between two structures, or between parts of a structure that are cast separately
Weed screen, trash screen	A screen comprising closely-spaced bars placed upstream of a hydraulic structure to prevent waterborne debris from progressing downstream where it might otherwise cause a problem (for example by blocking a culvert or damaging pumps)
Weir	Structure over which water may flow, used to control the upstream water level in a channel or other body of water, and/or to measure the discharge
Wetland	<p>Transitional habitat between dry land and deep water</p> <p>Wetlands include marshes, swamps, peatlands (including bogs and fens), flood meadows, river and stream margins.</p>
WFD, Water Framework Directive	<p>European Community Directive (2000/60/EC) on integrated river basin management</p> <p>The WFD sets out environmental objectives for water status based on: ecological and chemical parameters; common monitoring and assessment strategies; arrangements for river basin administration and planning; and a programme of measures in order to meet the objectives.</p>