



Glossary

A

Acceptable risk

The acceptability of a risk depending on scientific data, social, economic, and political factors, and the perceived benefits or threat arising from exposure to an agent ([IPCS/OECD 2004](#)). Also, the likelihood of suffering disease or injury that will be tolerated by an individual, group, or society ([USEPA 2019e](#)).

Aggregate risk

Risk resulting from a combined risk aggregate exposure (multipathway exposure) to a single agent. The combined risk from aggregate exposures to multiple agents or stressors is called cumulative risk. A stressor is any physical, chemical, or biological entity that can induce an adverse response ([USEPA 2003](#)).

Anthropogenic background

Natural and human-made substances that are present in the environment as a result of human activities but not specifically related to the substances of concern at the site ([USEPA 2018a](#)). Anthropogenic background is differentiated from naturally occurring background as the latter are substances present in the environment in forms that have not been influenced by human activity.

Aquatic biota

Creatures of all genera and species that reside in, on, or near an aquatic environment.

Audience

Specific members of the broader public who are impacted by the risk. These may include technically trained academics, residents, business owners, elected officials, students, parents, etc.

B

Bioavailability

The individual physical, chemical, and biological interactions that determine the exposure of plants and animals to chemicals associated with soils and sediments ([ITRC 2018](#)). Bioavailability is the portion of the total quantity of a chemical present in a medium (air, soil, water, diet) that is absorbed by a living organism ([Klassen 2013](#)) and reaches the central (blood) compartment, whether exposure occurs via the gastrointestinal tract, skin, or lungs ([NEPI 2000](#)).

C

Carcinogen

A substance or agent that produces or incites cancerous growth.

Conceptual site model (CSM)

A representation of the site that summarizes and helps project planners visualize and understand available information. The CSM is the primary planning and decision-making tool used to identify the key issues and the data necessary to transition a project from characterization through post-remedy. It documents current site conditions and serves to conceptualize the relationships among chemicals in environmental media, sources, and receptors through consideration of potential or actual migration and exposure pathways ([ITRC 2019](#)).

Cumulative risk

The combined risks to human health from the environment from multiple agents or stressors. The combined risks from aggregate exposures (combined exposure of an individual (or defined population) to a single chemical via relevant exposure routes, exposure pathways, and exposure media) to multiple chemicals.

Cyanobacteria

Sometimes incorrectly referred to as blue-green algae, cyanobacteria are frequently found in freshwater systems. Some produce cyanotoxins. The release of these toxins in an algal bloom into the surrounding water produces harmful effects, including health effects ([USEPA 2019d](#)).

D

1,4-Dioxane

A clear volatile liquid used primarily as a solvent. It is subject to federal and state regulations. [USEPA \(2013\)](#) has found

that 1,4-dioxane is a likely human carcinogen. Several federal government agencies have identified or regulated 1,4-dioxane as a hazardous substance since the early 1980s. However, 1,4-dioxane became an environmental contaminant of emerging concern only in the early 2000s after EPA reassessed the toxicity of 1,4-dioxane and began developing cleanup guidelines for various media. In 2008, EPA included 1,4-dioxane in the Safe Drinking Water Act Candidate Contaminant List ([USEPA 2008](#), [2009](#), [2017](#))

E

Emerging chemicals

Chemicals in the environment and biota that have been identified by chemists and toxicologists through improved detection and may pose a human health risk.

Emerging concern

An issue that is the subject of intensive investigation. The available information is increasing, so our understanding about hazard, exposure, and risk is emerging and evolving.

Emerging contaminant or concern

Pollutants that have been detected in the environment and may cause ecological or human health impacts, and typically are not regulated under current environmental laws. Refers to many different kinds of chemicals, including medicines, personal care or household cleaning products, lawn care and agricultural products, among others.

Emerging environmental concern

An environmental issue that is the subject of intensive investigation. The available information is increasing, so our understanding and information of hazard, exposure, and risk is emerging and evolving.

Emerging issues

A variety of concerns that encompass the spectrum of contaminants, their behavior, and techniques to manage them, including regulatory limitations.

Environmental professional

A practitioner in the environmental remediation or risk management discipline, with a focus on environmental hazards of concern. Can include scientists, engineers, geologists, community outreach specialists, regulatory representatives, researchers, and technical liaisons.

Excess lifetime cancer risk

The additional or extra risk of developing cancer due to exposure to a toxic substance incurred over the lifetime of an individual ([US DOE 2020](#))

Exposure pathway

The physical course or path that a chemical or pollutant takes from the source, via air, soil, water, and food to humans, animals, and the environment ([USEPA 2003](#)). Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route.

Exposure route

The way a chemical or pollutant enters an organism after contact, for example, by ingestion, inhalation, or dermal absorption.

Exposure scenario

Exposures and risks are defined by the exposure scenario of interest and describe exposed populations' activities that may affect exposure and the duration (time frame) over which exposure may occur. Exposure scenario is a set of facts, data, assumptions, and professional judgment about how an exposure occurs or does not occur. An exposure scenario includes the (1) chemicals in environmental media and their sources; (2) exposed populations (or receptors); (3) migration of chemicals in environmental media from sources to receptors; and (4) routes of exposure (ingestion, dermal contact, inhalation). ([ITRC 2015](#); [USEPA 2020](#))

H

Harmful cyanobacterial blooms (HCBs)

Algal blooms with the potential to harm human health or aquatic ecosystems are also referred to as harmful algal blooms or HABs. Cyanobacterial HABs or HCBs that produce toxins are emerging environmental concerns and can harm people, animals, aquatic ecosystems, the economy, drinking water supplies, property values, and recreational activities, including swimming and commercial and recreational fishing. See definition of cyanobacteria above ([USEPA 2019d](#)).

Hazard

A condition or physical situation with a potential for an undesirable consequence, such as harm to life or limb ([ITRC 2005](#)). For a single chemical in environmental medium, the hazard is estimated by a hazard level (hazard quotient, HQ). The hazard level represents the ratio of an exposure level by a chemical (e.g., maximum concentration) to a toxicity reference value (RfV), generally a noncancer RfV (e.g., oral reference dose or inhalation reference concentration), or a screening value selected for the risk assessment for that substance (e.g., lowest-observed-adverse-effect level [LOAEL] or no-observed-adverse-effect-level [NOAEL]). If the exposure level is higher than the toxicity value (HQ>1), then there is the potential for risk to the receptor. The hazard level for a group of multiple contaminants is estimated using a hazard index.

Health risk

Risk in which an adverse event or substance affects human health ([ITRC 2005](#)).

Human health risk analysis

Analysis to determine the effects of chemical contamination on human health to understand whether current or future chemical exposures will pose a health risk to a broad population such as a city or community ([ITRC 2011](#)).

Human health risk assessment (HHRA)

The process of characterizing the nature and magnitude of health risks to humans from exposure to chemicals and other stressors that may be present in the environment ([USEPA 2012](#)).

Individual susceptibility

The marked variability in the manner in which individuals will respond to a given exposure to a toxic agent ([US DOE 2020](#)).

Interested parties

Responsible parties, state regulators, and owners and operators of contaminated site who have a vested interest or are impacted in some way by a situation or issue.

L

LC50

The concentration of a material in an environmental medium that causes 50% mortality of a group of test organisms after a certain period of exposure. This measurement end point is most often used in acute laboratory toxicity tests. For example, in fish LC50 is the acute fish toxicity expressed as the concentration in water that kills 50% of a test batch of fish within a continuous period of exposure (hours).

Liaison

An individual or go-between who is a link between groups of people and serves as a conduit for communication of information.

M

Maximum contaminant level (MCL)

The maximum amount of a chemical that is allowed before a health effect occurs. MCLs are drinking water standards established under the Safe Drinking Water Act. "MCLs are set at levels that are protective of human health and are set as close to MCLGs as is feasible taking into account available treatment technologies and the costs to large public water systems." Consistent with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP), MCLs typically are relevant and appropriate when establishing remediation objectives for contaminated groundwater that is or may be used as drinking water ([USEPA 1988](#)).

Maximum contaminant level goals (MCLG)

Strictly health-based levels established under the Safe Drinking Water Act that do not take cost or feasibility into account. As health goals, MCLGs are established at levels at which no known or anticipated adverse effects on the health of persons occur and which allow an adequate margin of safety ([USEPA 1988](#)).

Mitigation

Corrective actions taken to minimize or reduce harm that has been caused to the environment.

Mitigation strategies

Techniques that are employed to reduce negative impact to the environment.

N

Noncancer health effect

Health impacts from exposure to a chemical or substance that does not result in a cancer outcome but can cause other health impacts such as neurological damage.

P

Per- and polyfluoroalkyl substances (PFAS)

A family of chemicals largely characterized as having a molecule that has a non-fluorine atom (typically hydrogen or oxygen) attached to at least one, but not all, carbon atoms, while at least two of the remaining carbon atoms in the carbon chain tail are fully fluorinated ([ITRC 2020](#)).

Perceptions

Interpretation of a circumstance or event not necessarily based on facts, but rather based on fears, preconceived notions, or other unfounded beliefs.

Perfluorinated chemical

A subset of PFAS. These chemicals have carbon chain atoms that are totally fluorinated. Examples are perfluorooctanoate (PFOA) and perfluorooctane sulfonate (PFOS) ([Buck et al. 2011](#)).

Petroleum hydrocarbons

Any mixture of hydrocarbons found in crude oil. There are several hundred of these compounds, but not all occur in any one sample.

Public

A people as a whole; a populace having common interests.

Public health

“The science and art of preventing disease, prolonging life and promoting health through the organized efforts and informed choices of society, organizations, public and private, communities and individuals.” – CEA Winslow ([CDC 2018](#)). Public health is concerned with threats to health based on population health analysis. Public health incorporates the interdisciplinary approaches of epidemiology, biostatistics and health services, environmental health, community health, behavioral health, health economics, public policy, insurance medicine and occupational health (occupational medicine).

R

Receptor

An individual, plant, or animal that has the potential to be exposed to a contaminant in the environment media ([ITRC 2019](#)).

Regulatory agencies

Agencies are part of the executive branch of state and federal governments that are tasked with and have authority to execute the law through regulations and statutes. Regulations usually must be authorized by a statute and are subordinate to statutes; however, regulations have the same legal force as statutes.

Regulatory framework and variability

The laws and regulations that outline the legal requirements to be met in a particular program such as CERCLA, commonly known as Superfund, Resource Conservation and Recovery Act (RCRA), underground storage tanks (USTs), brownfields, state cleanup programs, etc. Each of these programs outlines requirements and guidance.

Remedial action

Those actions consistent with permanent remedy taken instead of, or in addition to, removal action in the event of a release or threatened release of a hazardous substance into the environment to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health and welfare or the environment (40 CFR 300.50).

Remediation

The act or process of abating, cleaning up, containing, or removing a substance (usually hazardous or infectious) from an environment.

Responsible parties

Owners and operators responsible for environmental contamination.

Risk

The potential for realization of unwanted, adverse consequences to human life, health, property, or the environment. Estimation of risk is usually based on the expected value of the conditional probability of the event occurring multiplied by the consequence of the event, given that it has occurred ([ITRC 2005](#)).

Risk amplification or social amplification of risk

Distortion of the seriousness of a risk caused by public concern about the risk and/or about an activity contributing to the risk ([DHS 2010](#); [USEPA 2018b](#)).

Risk analysis

The scientific process of defining and analyzing the dangers to human health and ecology as well as other risks associated with a site of contamination or remediation project. Once they are quantified, it is easy to compare with existing action levels, and appropriate actions can be conducted to manage the risk ([ITRC 2011](#)).

Risk assessment

An organized process used to describe and estimate the likelihood of adverse health outcomes from environmental exposures to chemicals. The four steps are hazard identification, dose-response assessment, exposure assessment, and risk characterization ([Presidential/Congressional Commission 1997](#)). Also, the process of defining and analyzing the dangers to human health and ecology as well as other risks associated with a remediation project.

Risk-based corrective action (RBCA)

A streamlined approach through which exposure and risk assessment practices are integrated with traditional components of the corrective action process to ensure that appropriate and cost-effective remedies are selected and that limited resources are allocated properly ([ASTM 2015](#)).

Risk-based criteria

Default or site-specific cleanup values that have been derived from available human health or ecological risk-based data.

Risk-based screening level (RSL)

Risk-based concentrations derived from standardized equations combining exposure information assumptions with USEPA toxicity data. The agency considers them to be protective for humans (including sensitive groups) over a lifetime. They are calculated without site-specific information. They may be recalculated using site-specific data ([USEPA 2019b](#)).

Risk-based standards

Risk-based levels or criteria that are promulgated and enforceable at contaminated sites.

Risk communication

The means by which a communicator establishes dialogues with communities and provides a mechanism for stakeholders to participate in the process of decision making about potential hazards to their person, property, or community. The purpose of risk communication is to give people good information about potential hazards that allows them to make sound choices ([USEPA 2019c](#)).

Risk management

The process that evaluates how to protect public health by deciding whether and how to manage risks. This process requires legal, economic, and behavioral factors, and consideration of human health and welfare effects of each management action and alternatives ([USEPA 2000](#)).

Risk management performance metrics

Quantifies how an action will lead to measurable increased protection for public health and the environment, thus leading to the development of targets or objectives that offer reductions in risk and unsustainable impacts.

Risk perception or perceived risk

Involves the influence of subjective factors on how risks are understood and valued. Characteristics of a hazard and the subjective context of the perceiver (qualitative personal views) are as important as the objective (quantified) risk in influencing an individual's perception of risk ([ITRC 2015](#)).

Route of exposure (aka exposure route)

The way that a human or ecological receptor comes into contact with a chemical. In environmental contexts, the routes are most commonly ingestion (oral), inhalation, or dermal, or for aquatic organisms, direct contact.

S

Site or project-specific characterization

Before cleanup decisions can be made, some level of characterization is necessary to ascertain the nature and extent of contamination at a site and to gather information necessary to support selection and implementation of appropriate remedies. Tools to support good site characterization include conceptual site models, innovative site characterization technologies, tailored data quality objectives, and use of existing information to streamline each investigation ([USEPA 2019e](#)).

Social distrust

A belief that others (for example, individuals, government, business) will not accept their own responsibility and act to alleviate pollution problems.

Social factors

Include level of understanding, primary language, preference in communication mode, accessibility of information and engagement events by specific groups of people.

Social network or group

A collection of people or groups of people who interact with one another and share a certain feeling of unity.

Source control

Refers to a range of actions (e.g., removal, treatment in place, containment) designed to protect human health and the environment by eliminating or minimizing migration of or exposure to significant contamination ([USEPA 2019e](#)).

Stakeholder

A person, group, or organization that is affected, potentially affected, or has any interest in a project or a project's outcome, either directly or indirectly ([Presidential/Congressional Commission 1997](#)).

Stakeholder engagement

The way an organization involves people or organizations who may be affected by its decisions or who can influence how decisions are (or can be) carried out ([FEMA 2019](#)).

Statutes

Laws enacted by the legislative branch of a government; law or body of laws promulgated by a state legislature.

T**Toolkit**

A process to plan and implement a risk communication strategy that starts with goal setting and carries through to implementation and evaluation. The process includes engagement tools and examples, resources, and case studies for emerging environmental issues and concerns.

Toxicity values or toxicity reference value (TRV)

A reference point (generally a dose or concentration) below which exposures are not likely to result in an adverse event/effect given a specific range of time ([ITRC 2018](#)).

U**Uncertainty factors**

In predicting toxicity reference values, uncertainty factors are used to extrapolate toxicological data from animal experiments to humans, interindividual variability, and high-to low-dose exposures and to compensate for a deficiency in knowledge ([Institute of Medicine 2013](#)).

V**Vulnerable populations**

Social groups that experience health disparities as a result of a lack of resources and increased exposure to risk due to their financial circumstances, place of residence, health, age, or personal characteristics. This may also include racial and ethnic minorities, the economically disadvantaged, and those with chronic health conditions.

([CDC 2020](#)) defines vulnerable populations as including anyone who:

- has difficulty communicating
- has difficulty accessing medical care
- may need help maintaining independence
- requires constant supervision
- may need help accessing transportation