



European  
Commission



# Environmental Liability Directive Protecting Europe's Natural Resources

Europe Direct is a service to help you find answers  
to your questions about the European Union.

Freephone number (\*):

00 800 6 7 8 9 10 11

(\*) Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

More information on the European Union is available on the Internet (<http://europa.eu>).

Cataloguing data can be found at the end of this publication.

Luxembourg: Publications Office of the European Union, 2013

ISBN 978-92-79-29753-3

doi: 10.2779/28060

© European Union, 2013

Reproduction is authorised provided the source is acknowledged.

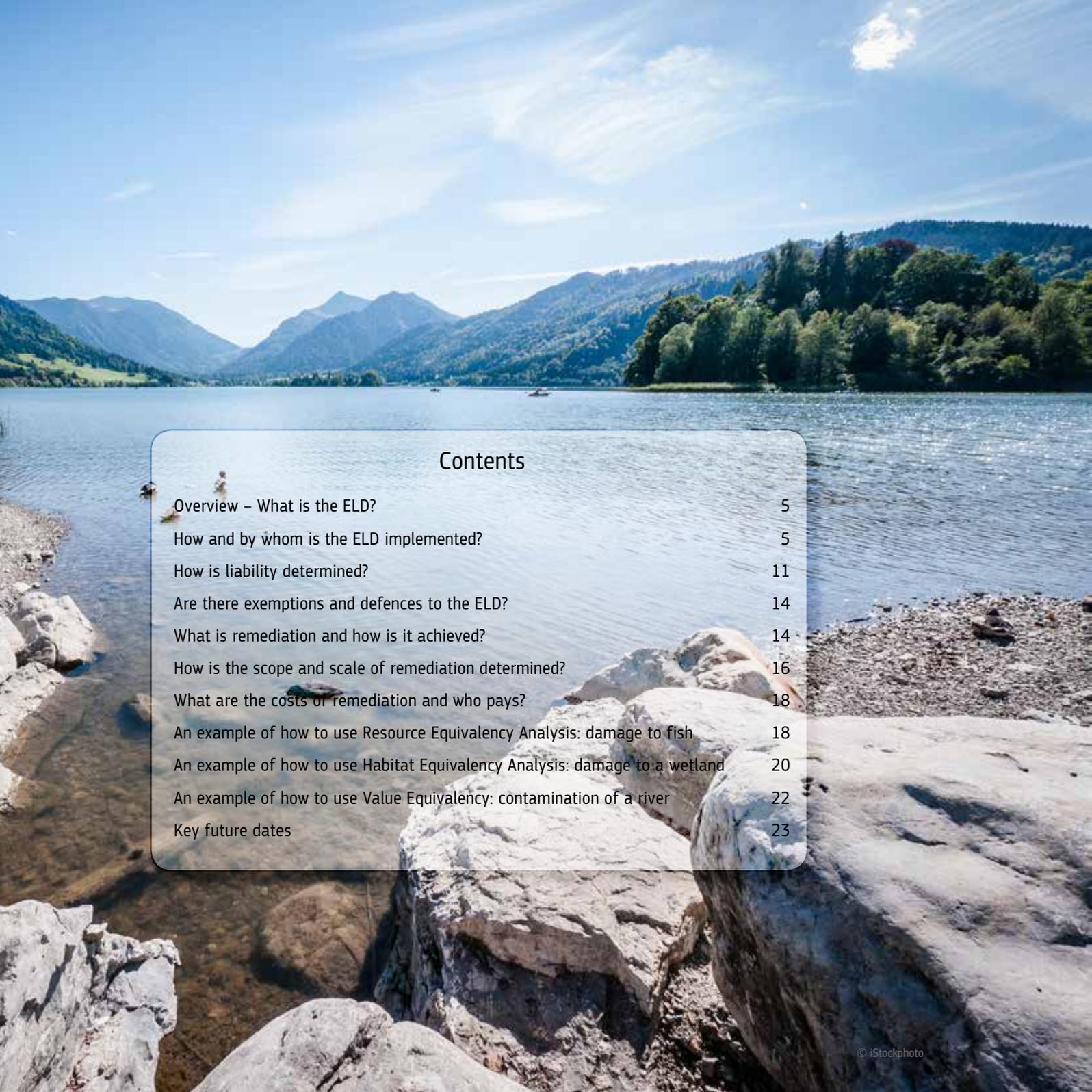
Printed in Luxembourg

PRINTED ON RECYCLED PAPER

Cover : © iStockphoto

# **Environmental Liability Directive**

## **Protecting Europe's Natural Resources**



## Contents

Overview – What is the ELD?	5
How and by whom is the ELD implemented?	5
How is liability determined?	11
Are there exemptions and defences to the ELD?	14
What is remediation and how is it achieved?	14
How is the scope and scale of remediation determined?	16
What are the costs of remediation and who pays?	18
An example of how to use Resource Equivalency Analysis: damage to fish	18
An example of how to use Habitat Equivalency Analysis: damage to a wetland	20
An example of how to use Value Equivalency: contamination of a river	22
Key future dates	23

## Overview – What is the ELD?

The protection of Europe's natural resources (protected species and habitats, water and land), and the ecosystem services they provide, is widely recognised as an important factor in the functioning of a healthy economy and society. Providing incentives and safeguards to avoid damage to the environment through human activities has become a priority in the face of unprecedented pressure on the environment, including major losses of biodiversity, experienced in recent decades. National environmental liability regimes across EU Member States were varied in terms of their coverage of environmental damage and the requirements for remediation.

In 2004, the European Union acted to bring a more uniform regime for the prevention and remediation of environmental damage by adopting Directive 2004/35/CE "on environmental liability with regard to the prevention and remedying of environmental damage". This innovative legislation establishes for the first time in the EU, a comprehensive liability regime for damages to the environment, based on the 'polluter-pays' principle. By making those that have caused environmental damage liable for remediation of damage, the Environmental Liability Directive (ELD) provides a strong incentive to avoid damage occurring in the first place. The ELD also makes those whose activities pose an imminent threat to the environment (defined as sufficient likelihood that damage will occur in the near future) liable for taking preventive action.

The ELD serves to bolster EU legislation designed to maintain natural resources and the services they provide. By linking to the Habitats Directive and Wild Birds Directive, the ELD provides a liability regime to prevent and remedy damage for biodiversity across Europe's nature culminating in its Natura 2000 network of 22 000 sites. The liability regime extends to all water resources in the EU as defined by the Water Framework Directive, as well as all land contamination that risks harming human health.

Member States were required to implement the ELD by 30 April 2007. With implementation complete across the EU by July 2010, the Directive should result in a higher degree of environmental protection throughout Europe.

## How and by whom is the ELD implemented?

The Directive places Competent Authorities in the position of guardians of the environment. It is their duty to identify liable polluters and to ensure that Operators, who caused an imminent threat of, or actual, environmental damage to undertake or finance the required preventive or remedial measures. Competent Authorities and Operators are not legally required but encouraged as best practice to collaborate in order to improve their understanding of operating risks, take the precautionary measures needed to avoid environmental damage and determine the necessary financial securities.

**Competent Authority:** Public body designated by the Member State to implement and enforce the Directive

**Operator:** any natural or legal, private or public person who operates or controls the occupational activity or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of such an activity has been delegated, including the holder of a permit or authorisation for such an activity or the person registering or notifying such an activity.

**Occupational activity:** any economic activity, whether public or private and whether or not carried out for profit

As a safeguard, NGOs and citizens have the right conferred by the ELD to notify the Competent Authority of any environmental damage (or imminent threat) and to challenge the actions or inactions of the Competent Authorities to ensure they are acting in the public interest of preventing and remedying environmental. Other parties, including insurers, lawyers, technical experts (in ecology and science, risk assessment, engineering, remediation, economics and law) also play contributing roles throughout the processes implementing the ELD (See Figure 1).

Figure 1: Implementing the Environmental Liability Directive



Over time the contributions made by these parties acting together should create a common understanding of the costs and benefits of operating in a manner that reduces risks to the environment, incentivising best practices in areas such as environmentally safe technologies and processes and fostering the development of innovative financial instruments to cover potential liability costs. The persons with clearly identified responsibilities in the ELD, and their roles are summarised below.

### Competent Authority

Public body selected by the Member State to implement and enforce the Directive

Member State to implement and enforce the Directive

### PRE-INCIDENT (during normal operation)

- may choose to take or encourage Operators to take measures that will reduce the risk of damage (if not already required, i.e. for Seveso establishments or installations); and
- shall encourage financial security or, when it is mandatory, require financial security.

### ONCE AN IMMINENT THREAT IS DETECTED (notified by Operator or communicated by affected person / NGO or observed on its own)

- the first and second bullet points as under 'damage' below; followed by
- shall require the Operator to take preventive measures if the Operator has not already done so and
- may at any point in time require the Operator to provide information, to take the necessary preventive measures, to follow instructions given to him on necessary preventive measures, or
- take the necessary preventive measures itself if the Operator has failed to do so or is not identifiable.

### ONCE ENVIRONMENTAL DAMAGE IS DETECTED

- work out whether the damage is likely to fall within the scope of the ELD as transposed in the national law;
- if it does, identify liable Operator(s) and establish the applicable standard of liability (strict or fault based);
- require the Operator
  - to provide supplementary information;
  - to take the required necessary 'emergency' remedial actions, i.e. the practical steps to immediately control, contain, remove or otherwise manage the contaminants and/or other damage factors; and
  - to follow instructions on the necessary emergency remedial actions;
- require the operator to take the necessary 'actual' remedial actions (primary, complementary and compensatory remedial measures) in co-operation with him, to identify and assess remedial options, in particular agree on the remedial action plan, and invite interested parties to submit their views);
- take the operators' and interested parties' views into account, adopt specific



	<p>measures and make decision formalising remedy selection (grant the Operator and interested parties the right to be heard before taking the decision);</p> <ul style="list-style-type: none"> <li>▪ notify the decision to the Operator and inform it of the legal remedies available;</li> <li>▪ work with the Operator(s) to make sure the necessary measures are taken in terms of primary, complementary and compensatory remediation as relevant;</li> <li>▪ in case the Competent Authority steps in and carries out remedial measures (if the Operator fails to do, is not identifiable or has a valid defence): claim remediation, assessment, administrative and other appropriate costs from the Operator(s) (allocate costs in case of multi-party liability); and</li> <li>▪ oversee the design, uptake and implementation of the financial security instrument (if mandatory).</li> </ul>
	<p><b>GENERAL IMPLEMENTATION OF THE DIRECTIVE</b></p> <ul style="list-style-type: none"> <li>▪ be involved in the Member State report on the experience gained in the application of the ELD by 30 April 2013 at the latest; and</li> <li>▪ may choose to set up/be involved in a national reporting system and ELD case database.</li> </ul>
<p><b>Operators</b></p> <p>any natural or legal, private or public person who operates or controls the occupational activity, or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of such an activity has been delegated, including the holder of a permit or authorisation for such an activity or the person registering or notifying such an activity.</p>	<p><b>PRE-INCIDENT (during normal operation)</b></p> <ul style="list-style-type: none"> <li>▪ must take all measures required by environmental laws and regulations and the operating permits, including, but not limited to, measures that reduce environmental risks;</li> <li>▪ may choose to put in place measures to further reduce risk of any environmental damage occurring, and</li> <li>▪ may choose to or (where this is mandatory) arrange for financial security as required by required by national law.</li> </ul>
	<p><b>ONCE AN IMMINENT THREAT OR ENVIRONMENTAL DAMAGE IS DETECTED</b></p> <ul style="list-style-type: none"> <li>▪ take immediate steps to prevent damage in case of an imminent threat, and, where appropriate, but in any case if it cannot be dispelled:</li> <li>▪ notify the Competent Authority immediately of all relevant aspects of the situation;</li> <li>▪ follow any instructions of the Competent Authority to prevent damage;</li> <li>▪ in case of damage: take all practicable steps to immediately contain, control, remove or otherwise manage the relevant contaminants and/or other damage factors, and</li> <li>▪ provide supplementary information if required and follow any related instructions by the Competent Authority regarding emergency remediation measures;</li> <li>▪ identify potential remedial measures and co-operate with the Competent Authority in the selection of appropriate remedial or preventive measures (remediation plan);</li> <li>▪ has the right to be heard before any remedial action decision is taken by the Competent Authority;</li> </ul>



	<ul style="list-style-type: none"> <li>▪ take any steps to undertake (or fund) primary, complementary and compensatory environmental measures, pursuant to the remedial action plan and/or as directed by the Competent Authority, in order to return the damaged natural resources to the baseline condition and to take account of any interim damage (loss) until the environment recovers; and</li> <li>▪ bear the relevant costs as required by the ELD.</li> </ul>
<p><b>Financial security providers</b>  <i>Like Insurance / re-insurance companies, banks</i></p>	<p><b>PRE-INCIDENT (during normal operation) (not a duty under ELD but possible role)</b></p> <ul style="list-style-type: none"> <li>▪ respond to requests for adequate financial security;</li> <li>▪ undertake assessments of potential risks;</li> <li>▪ design adequate sustainable financial security instruments in line with relevant principles (e.g. insurance principles), and</li> <li>▪ charge the risk adequate premium by considering e.g. the industrial activity, scope of the financial security, limits provided.</li> </ul> <p><b>ONCE IMMINENT THREAT OR ENVIRONMENTAL DAMAGE IS DETECTED (not a duty under ELD but possible role), the Financial security providers contribute to the</b></p> <ul style="list-style-type: none"> <li>▪ assessment of the environmental damage;</li> <li>▪ determination of the most effective and efficient remediation measure;</li> <li>▪ payment of costs, and</li> <li>▪ management of the remediation of environmental damage in close cooperation with the Competent Authority and the Operator.</li> </ul>
<p><b>Experts</b>  <i>In ecology, other science, risk assessment, engineering, remediation design and implementation, economics, law, other who would help with implementing the ELD</i></p>	<p><b>PRE-INCIDENT (during normal operation) (not a duty under ELD but possible role)</b></p> <ul style="list-style-type: none"> <li>▪ provide technical input relevant to measures to reduce risk of imminent threat of damage.</li> </ul> <p><b>ONCE IMMINENT THREAT OR ENVIRONMENTAL DAMAGE IS DETECTED (not a duty under ELD but possible role)</b></p> <ul style="list-style-type: none"> <li>▪ advise on legal, economic, and all technical aspects relating to environmental damage and remediation thereof;</li> <li>▪ assess, review and oversee (imminent or actual) damage and remediation option selection, design and implementation;</li> <li>▪ assist with related regulatory and liability issues, reporting, and implications for future management approach.</li> </ul>

### Any interested party

*Any natural or legal person (including NGOs) who is affected or likely to be affected by environmental damage or otherwise has a sufficient interest or whose rights have been impaired, as defined under national law*

### ONCE IMMINENT THREAT OR ENVIRONMENTAL DAMAGE IS DETECTED (not a duty but a right)

- may report the imminent threat or environmental damage supported by relevant observations and must provide the relevant information and data supporting the observations submitted to the Competent Authority;
- have the right to request the Competent Authority to take remedial action;
- have the right to obtain the decision by the Competent Authority which must contain information about the legal remedies, and
- have the right to appeal against the decision of the Competent Authority before a court or another independent and impartial public body.

The Directive defines environmental damage as damage to protected species and habitats, damage to surface and ground water and damage to land. An Operator is liable for remediation of damage if the damage is deemed to be significant and if a causal link can be drawn between the Operator's activities and the damage in question. The Directive's prevention obligation is triggered whenever an imminent threat of such damage (defined as sufficient likelihood of environmental damage in the near future) occurs.

The ELD imposes liability only if the Operator's activity caused the environmental damage investigated. While it may be easier to prove liability for a single Operator causing a distinct, point-source pollution incident, the ELD also applies to damage caused by pollution that is widespread and diffuse as long as causality can be established. The Directive applies also to multiple Operators contributing jointly to a single incident or to persistent, environmental damage (see further Raffinerie Méditerranée (ERG) SpA v Ministero dello Sviluppo economico, CJEU 9 March 2010, Case C-378/08, paragraph 58). The national law may set forth specific rules regarding cost allocation in multiple party cases.

Ultimately, the Competent Authority determines the significance of the damage in each case. In general, the significance of environmental damage draws largely on the magnitude and duration of the damage. The notion of natural recovery, the measurability of the damage and the proportionality principle are also relevant considerations.

Annex I of the ELD sets forth the factors that should be taken into account when assessing damage. For example, environmental damage that has a proven effect on human health is considered significant. On the other hand, for protected habitats and species, the following damage situations would not be deemed significant:

- damage that is smaller than normal average (natural) variations for the species or habitats in question; or
- damage that is due to natural variations of the affected resources or resulting from the normal management of the resources as recorded in habitat files or documents setting out the objectives or carried out previously by owners or Operators; or
- damage to species or habitats from which it is known they will recover within a short time and without intervention to the baseline conditions or a status which leads, solely by virtue of the dynamics of the species or habitat concerned, to a condition deemed equivalent or superior to the baseline condition.

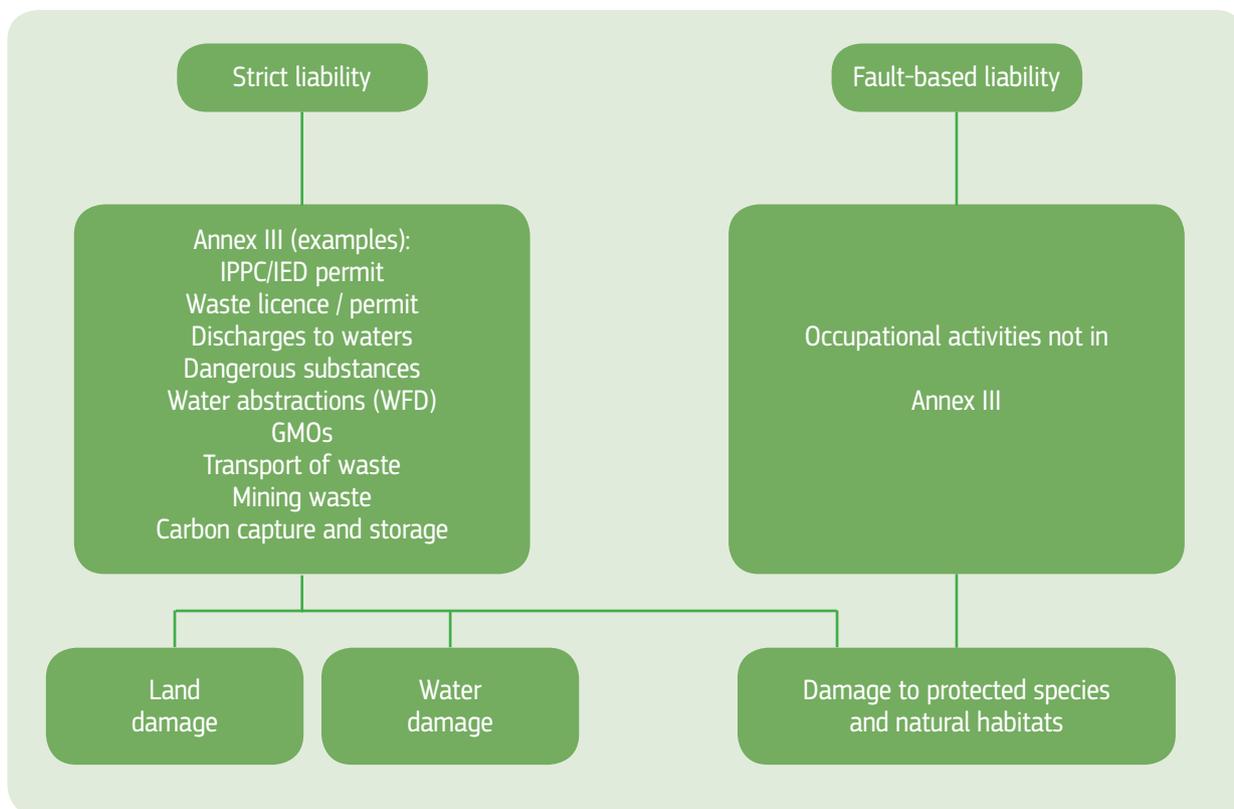
## How is liability determined?

The Directive distinguishes between two types of Operators: those involved in dangerous occupational activities, as listed in Annex III of the ELD, and those involved in all other occupational activities. Each gives rise to a different liability standard (See Figure 2).

For those Operators involved in Annex III activities a strict liability scheme applies. This means that fault need not be established for the Operator to be held liable for damage to land, water and protected habitats and species.

For all other Operators not involved in activities listed in Annex III, a fault-based liability scheme applies. Fault or negligence needs to be established for the Operator to be held liable. In addition, these Operators can be held liable only for damage to protected species and natural habitats.

Figure 2: Types of environmental liability and damage



### **Damage to protected species and natural habitats** means

Any damage that has significant adverse effects on reaching or maintaining the favourable conservation status of such habitats or species. The significance of such effects is to be assessed with reference to the baseline condition, taking account of the criteria set out in Annex I, with the exception of previously identified adverse effects authorised under the nature protection legislation.

### **Damage to water** means

Any damage that significantly adversely affects the ecological, chemical and/or quantitative status and/or ecological potential, as defined in the Water Framework Directive (2000/60/EC), of the waters concerned, with the exception of adverse effects where Article 4(7) of that Directive applies.

### **Land damage** means

Any land contamination that creates a significant risk of human health being adversely affected as a result of the direct or indirect introduction, in, on or under land, of substances, preparations, organisms or micro-organisms.

Some examples of incidents that may cause damage to the resources covered by the ELD.

#### Types of Incidents That May Cause Damage to:

Habitats and Species	Water	Land
<ul style="list-style-type: none"><li>• Direct removal or destruction of protected habitats and species</li><li>• Physical damage, or chemical spills, releases or similar pollution or significant disturbance (including noise and vibration)</li><li>• Microbial pollution to protected habitats and species from, for example, poor agricultural practices</li><li>• Conscious pursuit and killing of protected species (for example through illegal hunting of birds)</li></ul>	<ul style="list-style-type: none"><li>• Abstraction of water that causes a change of quantitative status</li><li>• Discharge from an industrial site storing or a truck or railway tanker carrying chemicals (e.g. due to an accident)</li><li>• Damming of surface water causing significant change in ecological water potential</li><li>• Chemical, petroleum or waste spills from underground and above ground storage, handling and transport facilities resulting in damage to groundwater and surface water (chemical status)</li></ul>	<ul style="list-style-type: none"><li>• A waste incineration plant's smoke purification system failing, resulting in pollution by heavy metals of surface soil in a nearby residential area with heavy metals</li><li>• Accidental chemical release from storage, handling and production areas, and migration of gases to indoor environments and/or migration of chemicals to soil and groundwater</li><li>• Deliberate, unpermitted waste disposal onto or into the ground, resulting in gas (hazardous chemicals) generation and migration to nearby residential properties</li><li>• Decommissioning of a plant resulting in accidental leakage of hazardous substances to soil and groundwater</li></ul>

## Strict Liability

- For activities listed in Annex III of the ELD, including activities and/or discharges that are covered by the following Directives (for more specific list and wording, please consult Annex III):
- Operation of installations pursuant to the Integrated Pollution Prevention and Control (IPPC) Directive 96/61/EC, codified into Directive 2008/1/EC, being replaced by the Industrial Emissions Directive 2010/75/EU (IED)
- Waste management operations pursuant to the Waste Framework Directive 75/442/EEC, codified into Directive 2006/12/EC and recast by Directive 2008/98/EC, Hazardous Waste Directive 91/689/EEC codified into Directive 2006/12/EC and recast by Directive 2008/98/EC, Landfill Directive 1999/31/EC, Waste Incineration Directive (2000/76/EC), integrated into the Industrial Emissions Directive 2010/75/EU. The Waste Framework Directive, or Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives. This Directive repealed Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste (the codified version of Directive 75/442/EEC as amended), Hazardous Waste Directive 91/689/EEC, and the Waste Oils Directive 75/439/EEC. It provides for a general framework of waste management requirements and sets the basic waste management definitions for the EU.
- All discharges to inland surface waters pursuant to the Dangerous Substances Directive (76/464/EEC), codified as Directive 2006/11/EC
- All discharges of substances into groundwater pursuant to the protection of groundwater against dangerous substances Directive 80/68/EEC, replaced by Directive 2006/118/EC
- The discharge or injection of pollutants into surface water or groundwater pursuant to the Water Framework Directive (2000/60/EC)
- Water abstraction and impoundment of water subject to prior authorisation pursuant to the Water Framework Directive (2000/60/EC)
- Manufacture, use, storage, processing, filling, release into the environment and onsite transport of substances, preparations and products as defined by the Dangerous Substances Directive 67/548/EEC, replaced by the CLP Regulation (EC) No 1272/2008, the Dangerous Preparations Directive (1999/45/EC), the Plant Protection Products Directive (91/414/EEC), the Biocides Directive 98/8/EC, being replaced by the Biocides Regulation (EU) No 528/2012
- Transport by road, rail, inland waterways, sea or air of dangerous or polluting goods as defined by the Road Safety Directive (94/55/EC), repealed by Directive 2008/68/EC, by the Rail Safety Directive 96/49/EC, and by Directive 93/75/EC re. vessel traffic, repealed by Directive 2002/59/EC
- Any contained use, including transport, and deliberate release into the environment involving and placing on the market of genetically modified micro-organisms as covered by the GMO related Directives (90/219/EEC and 2001/18/EC)
- Transboundary shipment of waste within, into or out of the European Union (Council Regulation No 259/93, replaced by Regulation (EC) No 1013/2006)
- Directive 2006/21/EC on the management of waste from extractive industries
- Operation of storage sites under Directive 2009/31/EC on the geological storage of carbon dioxide).
- National implementation in Member States may bring a larger group of activities under the strict liability regime.

## Fault-based liability

For any occupational activities other than those listed in Annex III

## Are there exemptions and defences to the ELD?

The ELD does not apply to damage caused by an emission, event or incident that took place before 30 April 2007, or when the activity causing the damage was finished before that date, or to damage if more than 30 years have passed since the emission, event or incident, resulting in the damage, occurred.

- The ELD does not apply in the case of damage or imminent damage resulting from (see Article 4 of ELD):
- an act of armed conflict, hostilities, civil war or insurrection
- a natural phenomenon of exceptional, irresistible and inevitable character
- activities, the main purpose of which is to serve national defence or international security or to protect against natural disasters, or
- activities covered by some International Conventions relating to oil pollution damage at sea, carriage of hazardous substances or dangerous goods by sea, rail or road, and nuclear damage as well as activities covered by the Treaty establishing the European Atomic Energy Community, or
- an activity in the case of diffuse pollution if causality cannot be established between the activity and the damage).

Further, an Operator shall not be held financially liable if he proves that the damage was caused by a third party (provided appropriate safety measures were in place), or if he proves that the damage resulted from compliance with an order or instruction from a public authority.

The Directive allows also for optional defences (i.e. at the discretion of Member States) that may exempt certain cases from financial liability. Operators that have demonstrated that they were not at fault or negligent do not have to bear the remediation costs, if the environmental damage they caused resulted from an emission or event:

- expressly authorised by the regulatory authority (permit defence) when the operator acted fully in accordance with the conditions of the authorisation; or
- not considered likely to cause environmental damage according to the state of scientific and technical knowledge at the time the emission was released or the activity took place (state-of-the-art defence).

## What is remediation and how is it achieved?

The overall goal of the Directive is the full remediation of damaged natural resources and their services to the baseline condition that would have existed if no damage had occurred. For example, if a wetland was damaged, then its full remediation would see the return of the total of pre-existing wetland habitat and species types and their extent or populations and the 'services' the wetland 'resource' provided to the public or to other natural resources including, for example, recreation, water filtration, food provision, visual amenity, storm buffering, or as habitat hosting wetland birds and other species.

Baseline conditions may be determined by using the existing data about the resource and damaged site, data from similar sites

that may have the necessary data or can be observed after the incident (reference sites) or data generated through modelling of the resources and services.

There are three types of remediation measures: primary, compensatory and complementary.

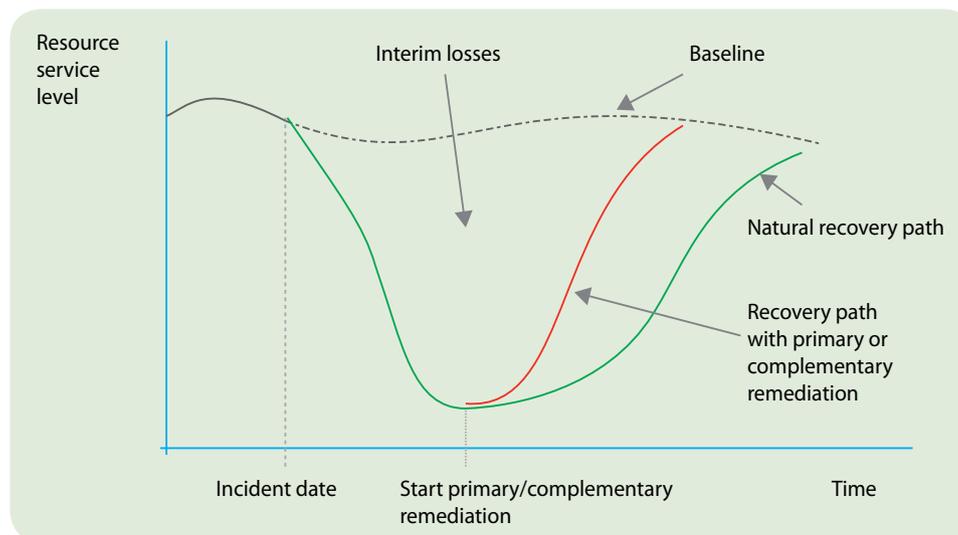
Primary remediation refers to any remedial measure which takes place at the affected site and returns the damaged natural resources and/or impaired services to the baseline condition. Primary remediation at site is the preferred and conceptually most straightforward remediation route to take, but it may not always be possible or practicable.

Where primary remediation does not fully return the damaged site to its baseline condition, the ELD requires complementary remediation measures to be undertaken at another site and/or species that may be the same or sufficiently similar to the damaged site / species, in effect ensuring that a similar level of natural resources or services is achieved across both sites.

The Directive also recognises that full remediation takes time and therefore requires compensation for interim losses, in other words, for environmental resources or services forgone during the recovery period (See Figure 3). This is called compensatory remediation and can also be provided at another site by improving the status of the damaged species or other sufficiently similar species. Alternatively, compensatory remediation can be provided by conducting primary remediation that generates benefits over and above the baseline at the affected site (the excess part being counted as compensatory remediation credit).

For land damage, primary remediation to the extent that the removed, controlled, contained or diminished relevant contaminants no longer pose a significant risk of adversely affecting human health, is the minimum requirement under the ELD (no complementary or compensatory remediation required).

Figure 3: Illustrating baseline, initial damage, interim loss and remediation measures



## How is the scope and scale of remediation determined?

In order to determine and what type of compensatory and complementary remediation, and how much of either, is required, an equivalency analysis is undertaken. Simply put, an equivalency analysis identifies which resources and services can be deemed to be 'sufficiently similar' to the damaged resources and services and quantifies the amount to be remediated (credit) to be equal to the loss due to damage (debit). Depending on which units are used to quantify such debits and credits, the ELD recommends the following equivalency assessment methods (see Annex II of the Directive):

- Resource - to - resource equivalency analysis: where debits and credits can be expressed in terms of resource units (such as numbers of fish or birds or litres of groundwater)
- Service - to - service equivalency or habitat equivalency analysis: where debits and credits can be expressed in terms of similar habitat (such as the area wetland and how much of its services (in %) is lost or gained)

Where these analyses are not possible (either because it is not technically feasible, is undesirable or is excessively expensive), a monetary metric can be chosen to estimate the value of the lost natural resources and/or services and the benefits from remediation, using:

- Value - to - value and value - to - cost equivalency: where debits and credits are expressed in monetary terms (value-to-value). Where it is possible to estimate the monetary value of the damage but not possible to estimate the monetary value of the remediation benefits, it is possible to set the budget (cost) of remediation equal to the value of the damage (value-to-cost). The use of the money as a metric does not imply that financial compensation is required: the ELD's principle remains that damaged resource and services should be remediated.

Equivalency methods are designed to take into account the chemical, physical, biological, and, where relevant, social and economic nature of damage and remediation options. Remediation options are to be evaluated based on criteria such as the effect of the option, the cost of implementing the option, and the likelihood of success. In general, conducting an equivalency analysis will entail five fundamental steps (for all types of analysis) that differ only in the type of units employed:

1. Preliminary evaluation: involves identifying available data, remediation options, appropriate scale of analysis and assessment effort.
2. Determining and quantifying damage (debit): involves determining the causes of damage, selecting the metric(s) for assessing damage including interim losses, determining and quantifying the baseline, understanding the exposure to damage, characteristics of the damaged resources and services, determining the benefits of primary remediation.
3. Determining and quantifying gains from remediation (credit): involves identifying remediation options, selecting the most appropriate and feasible options, based on the criteria set forth in Annex II of the ELD, estimating the remediation benefits using the same metrics as Step 2.
4. Scaling the remediation actions: involves determining the total amount of remediation, estimating the cost of remediation.
5. Monitoring and reporting: involving preparing a remediation plan (objectives, designs, targets) and monitoring its implementation

Key uncertainties, the assumptions that need to be made to address these and sensitivity analysis should be undertaken at each step of the analysis.

Interested readers are referred to the ELD training material for more detail on each step (cf. at the end of this brochure)

After the equivalency analysis is performed and remediation projects are selected and scaled, a remediation plan is prepared that includes project goals, implementation details, engineering plans and designs, and biological plans and designs. The remediation plan also includes procedures and schedules for monitoring the recovery of resources and services following implementation and for evaluating the project's success.

For examples on how to implement equivalency analysis, please see the examples at the end of this brochure.



LIFE06 NAT/BE/000087

Before the restoration of wet dune slacks by removing scrubs and trees and opening dune pools.



LIFE06 NAT/BE/000087 (after)

## What are the costs of remediation and who pays?

In case the Competent Authority carries out preventive and remediation measures, it shall recover its costs from the Operator that caused the damage. Such recoverable costs include:

- costs of environmental assessments carried out to determine the extent of damage and the actions required to repair it;
- any remediation efforts undertaken directly by the authority;
- administrative, legal, and enforcement costs; and
- data collection, monitoring, supervision, other related costs.

The ELD advises that the cost of the selected remediation measures should not be disproportionate. While disproportionality is not defined in the ELD, it is a fundamental principle of EU law and has for instance precedence in the Water Framework Directive. The cost of remediation, in other words the liability of the Operator, is disproportionate if it exceeds the lost value due to the damage (or the environmental benefits obtained through remediation).

The ELD does not prescribe at EU level financial guarantees for operators to cover their potential liability, but requires Member States to encourage the development of financial instruments. In practice, in implementation of the Directive so far:

- insurance has proven to be the most popular instrument to cover environmental liability. The insurance/reinsurance markets (both individual companies as well as pools) are providing coverage for the prevention and restoration of environmental damage based on
  - ELD extensions to general/public liability insurance policies (e.g. Germany, Austria),
  - environmental liability insurance policies (e.g. UK) or
  - insurance pool solutions (e.g. Spain, France, Italy and the Netherlands);
- the second popular instrument according to the Commission report of October 2010 is bank guarantees (Austria, Belgium, Cyprus, Czech Republic, the Netherlands, Poland, Spain, and the UK); and
- other Market Based Instruments (MBIs) such as funds, bonds, etc. are according to the Commission report of October 2010 being discussed in Austria, Belgium, Bulgaria, Cyprus, Poland and Spain.



© iStockphoto

## An example of how to use Resource Equivalency Analysis: damage to fish

This case study is an application of resource equivalency analysis to a release of contaminants into a river that kill fish.

On February 22, 2011, a large winter rainstorm occurred in the K Valley (a hypothetical location), where there is a hard-rock mining tailings impoundment. The rain melted snow that was in the valley and ultimately resulted in a breach in the tailings dam. As a result of that breach, mine tailings flowed into the K River. Although emergency personnel were mobilised to the site of the dam breach within a day, by the time the dam breach was repaired, many thousands of tonnes of mine tailings had entered the K River, flowing at least 10 km downstream.

In the weeks following the tailings dam failure, a preliminary evaluation was undertaken for the incident. During the preliminary evaluation period, a number of different types of information were obtained. Examples of the information include:

- the timing and duration of the incident;
- the concentrations of certain heavy metals (e.g., copper, zinc, and cadmium) and the acidity of the released water;
- descriptions of emergency response actions; and
- information on pre-incident water quality.

To quantify aquatic resource damages, the Competent Authority decided in co-operation with the Operator to use brown trout abundance as the key indicator metric for a resource equivalency analysis. Based on sampling at reference locations and downstream in the K River, baseline brown trout density was concluded to be 10 trout per 100 m<sup>2</sup>. Within the upper 10km of river, the incident eliminated brown trout in year 1 following the incident, with an assumed recovery to baseline in 10 years. Using Resource Equivalency Analysis (REA), the total damage “debit” was calculated to be about 33 000 brown trout-years. This is the additional amount of brown trout that would have been in the K River over time if the incident had not happened.

Based on the results of the preliminary evaluation, the Competent Authority concluded in co-operation with the Operator that compensatory remediation for damage to fish in the river would be necessary.

To address brown trout debit, three options to determine compensatory remediation were considered:

- no action – natural recovery (not selected because the interim loss of 33 000 brown trout-years is deemed to be too high);
- hatchery supplementation (not selected because of concerns regarding genetics, etc.), and
- stream habitat restoration in other tributaries of K River (selected).

Stream habitat restoration was the selected because it would improve carrying capacity for brown trout. Incorporating the types of remediation actions necessary, the time it would take for the full benefits of remediation to occur, and how long the remediation actions would provide benefits, it was estimated that 1 km of stream habitat restoration would provide approximately 7 500 additional brown trout-years of “credit”. Using the 33 000 units of debit, and the 7 500 units of credit for each square kilometre remediated, it was determined that 4.4 km (33 000/7 500) of stream habitat remediation would be necessary as compensatory remediation.

The cost of compensatory remediation was calculated based on the cost of site planning, engineering designs, implementation of stream remediation actions, oversight, monitoring, and project reporting. Overall costs were estimated at approximately €100 000 per km of stream remediated (hypothetical number), for a total compensatory remediation cost of approximately €440 000.

## **An example of how to use Habitat Equivalency Analysis: damage to a wetland**

This case study uses the habitat equivalency analysis to assess the damage and remediation options for a hypothetical incident damaging a hypothetical wetland.

The incident is the release highly acidic water from an industrial facility. The wetland is 10 ha in size. The highly acidic water causes a substantial amount of initial harm such that, based on the amount of plant growth above ground which is considered to be a good indicator of the wetland health, scientists estimate that 75% of all the plant life is initially lost. Over the next 5 years, the wetland is expected to return to the baseline condition. Given the nature of the wetland and an understanding that it will eventually return to baseline conditions, no primary remediation was done.

Based on this information a Habitat Equivalency Analysis (HEA) was done. The initial 75% loss recovered over a 5 year period and generated a debit of 21.6 units. More detail of how this unit is calculated for this case study and the background assumptions can be found in the ELD training handbook.

A compensatory remediation measure is designed based on review of available information, and knowledge of nearby wetlands. It is known that other wetlands exist nearby, but their overall health could be improved if some remediation efforts were done. One specific wetland was identified where removal of exotic plants would increase its overall health as measured by the above-ground surface area covered by natural wetland plant species. It is estimated that plant growth above ground could be increased from 50% to almost 100% when compared to the pre-damaged wetland. Remedial actions would take 2 years to plan and implement, then it would take another 3 years for the plant coverage to improve from 50% to 100%. The benefit, or credit, of improving a hectare of this wetland is calculated as providing 15.5 units of credit over the expected life of the improved wetland.

Therefore, to offset the 21.6 units of damage to the wetland (debit) by remediation a nearby wetland (credit),  $21.6/15.5 = 1.4$  hectare of degraded wetland would need to be improved by removal of exotic plants.

The cost to remediate the 1.4 hectare of wetlands includes the costs of planning and design, permitting, implementation, oversight, operations/maintenance, monitoring, etc. Using a hypothetical cost of approximately €50 000 / hectare the total cost of remediation to offset damages would be  $1.4 \times 50\ 000 = €70\ 000$ .



LIFE99 NAT/A/006054 (before)

Construction of a side channel at the weir 'Eibelsau' and channel with flowing water and vegetation allowing the fish to migrate upstream



LIFE99 NAT/A/006054 (after)

## An example of how to use Value Equivalency: contamination of a river

This case study presents the use of value equivalency analysis (VEA) to scale compensatory remediation to offset damages from a hypothetical contamination of a river. The value equivalency analysis uses money as the metric to measure both the value of the losses (debit) and the benefit of proposed remedial actions (credit) and balances the credits against debits. As with any equivalency analysis, remedial actions should be selected so that they provide the type, quality and quantity of resources and services that are sufficiently similar to those damaged.

In this example, the release of contaminants affected 15 km of river containing locally important fish and bird species that supported high quality biodiversity. The river was also an important location for recreation to many local residents and tourists.

To undertake the VEA, two surveys were conducted to estimate the value lost due to the river contamination, and the value gained through remediation actions. The first survey was designed to estimate the debit associated with the loss of the river habitat and recreation. Based on analysis of the survey responses, it was estimated that individuals value the loss due to the river contamination at €60. The overall debit to the affected population was approximately €15 000 000.

The second survey was designed to estimate the value of the credit that would be provided by different combinations of three possible remediation actions: (1) an off-site compensatory remediation plan consisting of river remediation of available areas in the region; and (2) increases in river recreation access and improvements on nearby uncontaminated rivers. Through analysis of the data, the value provided to the public of the different remediation projects was estimated. Based on the analysis, there were four combinations of the remediation actions that would provide €60 / person or €15 000 000 worth of credit.

The most cost effective of these combinations was one that provided 10 km of river habitat restoration similar to what was contaminated and increased recreation access and improvements to 15 sites along other nearby uncontaminated rivers. The total cost to implement this compensatory remediation program was estimated at €6 000 000.

## Key future dates

The Member States are due to report on the ELD implementation by 30 April 2013 and the response of the European Commission will be available by 30 April 2014.

## Further reading

Environmental Liability Directive – the official text:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:143:0056:0075:en:PDF>

European Commission web page on the Environmental Liability Directive:

<http://ec.europa.eu/environment/legal/liability/index.htm>

European Commission web page on the Habitats Directive:

[http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index\\_en.htm](http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm)

European Commission web page on the Birds Directive:

[http://ec.europa.eu/environment/nature/legislation/birdsdirective/index\\_en.htm](http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm)

European Commission web page on the Water Framework Directive:

[http://ec.europa.eu/environment/water/water-framework/index\\_en.html](http://ec.europa.eu/environment/water/water-framework/index_en.html)

European Commission (2010) Report on the Effectiveness of the Environmental Liability Directive, Brussels, 12.10.2010, COM (2010) 581 final. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0581:FIN:EN:PDF>

Millennium Ecosystem Assessment for ecosystem services: <http://www.unep.org/maweb/en/index.aspx>

The Economics of Ecosystems and Biodiversity (TEEB): <http://www.teebweb.org/>

Insurance Europe

<http://www.insuranceeurope.eu/publications/639/72/Navigating-the-Environmental-Liability-Directive-A-practical-guide-for-insurance-underwriters-and-claims-handlers?cntnt01hideAllFilters=1>

ELD Training Handbooks and Accompanying Slides are available for downloading on the above indicated European Commission web page: <http://ec.europa.eu/environment/legal/liability/index.htm>





Publications Office

doi:10.2779/28060

ISBN 978--92-79-29753-3



Printed on recycled paper that has been awarded the eu eco-label for graphic paper (<http://ec.europa.eu/ecolabel>)

KH-31-13-957-EN-C