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Knowledge
for action

Ecological damage and ecological torts

How does society deal with and remediate damage to water and aquatic environments?

Delphine Loupsans

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The French biodiversity agency

The French biodiversity agency was launched on 1 January 2017 as a public agency that reports to the Ecology ministry. Its mission, in both continental France and the overseas territories, is to improve knowledge of, to protect, manage and raise awareness of terrestrial, aquatic and marine biodiversity.
Four organisations merged to form the agency, namely the Agency for marine protected areas, the Technical workshop for natural areas, the National agency for water and aquatic environments (Onema) and the French national parks.

This document benefited from the scientific and technical expertise accumulated at the National agency for water and aquatic environments and the knowledge produced by the human and social sciences.

It was drafted in the framework of the **"Ecological damage" work group** that contributes to fulfilling the HSS road map of the agency. The work group is particularly active in striving to achieve effective implementation of water law. The group is managed by the "Stakeholders and territories" policy officer and its members include a wide array of stakeholders (environmental inspectors, managers of the Inspections department, experts from job-sector management entities, law professors, experts from the Ecology ministry, representatives from various public agencies and organisations, etc.).
Set up as a group for joint study and the sharing of experience and knowledge in order to enhance the available agency expertise concerning damage to water and aquatic environments and to respond to specific operational needs, the work group addresses issues concerning the description, technicalities and assessment of damage, as well as temporal and territorial factors, all of which are discussed briefly here. This document is the first based on the work done by the group.

This book continues the ***Knowledge for action*** series that makes new research findings and science-advice work available to professionals in the water and aquatic-environment sector (scientists, engineers, managers, instructors, students, etc.).

It is available on the AFB site (www.onema.fr/node/2835) and at the national portal for "Water technical documents".

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How does society deal with and remediate damage to water and aquatic environments?

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With the active participation of the permanent members of the "Ecological damage" work group

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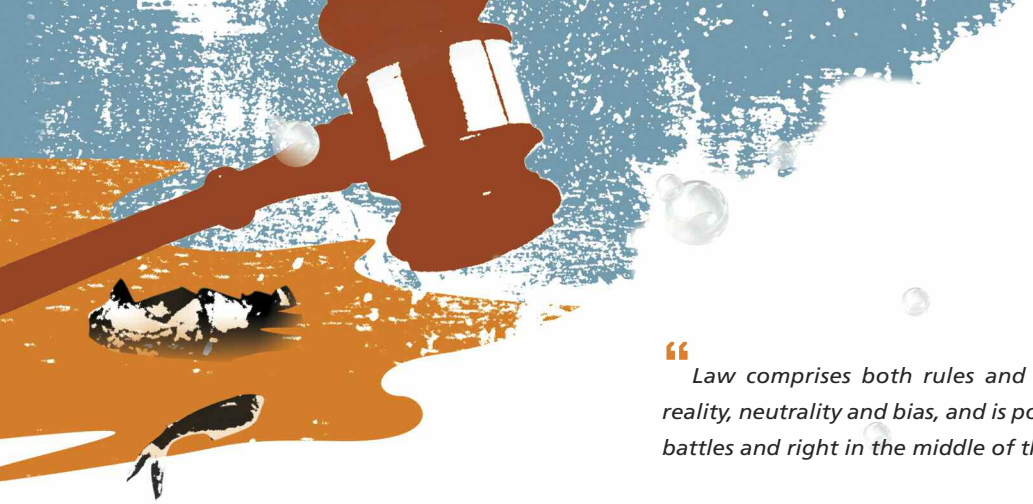

“Law comprises both rules and politics, ideals and harsh reality, neutrality and bias, and is positioned both above social battles and right in the middle of them.” (R. Abel, 1998)

Preface

Ecological damage concerns all environments (terrestrial, aquatic, continental, marine). This book examines primarily the issues concerning water and aquatic environments, however, it should interest all stakeholders working in the field of biodiversity.

Water is a major factor in geopolitics, ecology, law, physics, chemistry, medicine, literature, geography, history, the arts, the economy, etc., in short, water concerns virtually every field of study. How could it be any other way? Yet in spite of its omnipresence, in some cases it is also very rare. Fresh water represents only 2.5% of all the water on the planet and the quantity that is both accessible and available for human activities represents only 0.01% of that total. The many and varied human activities, both public and private (fishing, drinking water, hydropower, irrigation, sanitation, etc.) have evolved over time due to scientific and technical progress and to changes in mentalities.

The law, the product of each society, bears witness to that progress and those changes. It is in fact a reflection of our “social compact”. In addition, those many and varied human activities also explain the emergence of conflicts concerning the use of water that must be settled, where possible by participatory processes, but also by regulations and, where necessary, by the intervention of a judge. Consequently, uses of water must comply with the applicable laws and regulations. The law serves as a means to regulate the use of water.

In addition to conflicts concerning how water resources are shared by users, the environment itself can be directly affected by highly diverse forms of damage and disturbances that all modify the ecosystem. These modifications result in a loss of biodiversity and malfunctions in the ecological system that can cause major damage, notably when they lead to the long-term decline of a species, to virtually irreversible alterations in habitats and, in some cases, to prohibitions concerning water usage (e.g. shutting down of abstractions for drinking water). Such cases are forms of ecological damage due to negative impacts on water and aquatic environments. The consequences may be difficult to counteract or even irreversible. The legal system must, in such cases, protect the environment by calling notably on dissuasive measures (i.e. penalties). However, dealing with ecological damage remains difficult, notably because this work constitutes a legal sector in its own right and it must take into consideration many non-legal factors, e.g. physical-chemical, biological, technical, economic and social aspects.

It is precisely this aspect that this book highlights by calling on the cumulative scientific, technical and multi-disciplinary expertise available at the agency and on the knowledge produced by the human and social sciences. In doing so, it complements the contribution of the earth and life sciences by focussing on the multiple dimensions of the phenomenon and the indispensable participation of numerous stakeholders, with different rights and responsibilities, different work cultures, traditions and concerns, who must learn to work together.

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Abstract

To cover such a complex legal topic and facilitate the task of readers, it was decided to organise the subject in five chapters addressing the five aspects representing the main issues involved in dealing with ecological damage. This division does not mean that the above aspects are not interrelated, but an in-depth discussion on each facilitates the presentation of the issues and serves to guide the reader in a progressive understanding of the topic as a whole. Each chapter reviews the current grey and academic literature on the given topic and highlights the problems encountered by the authorities, while also discussing the progress made and the knowledge acquired in the process.

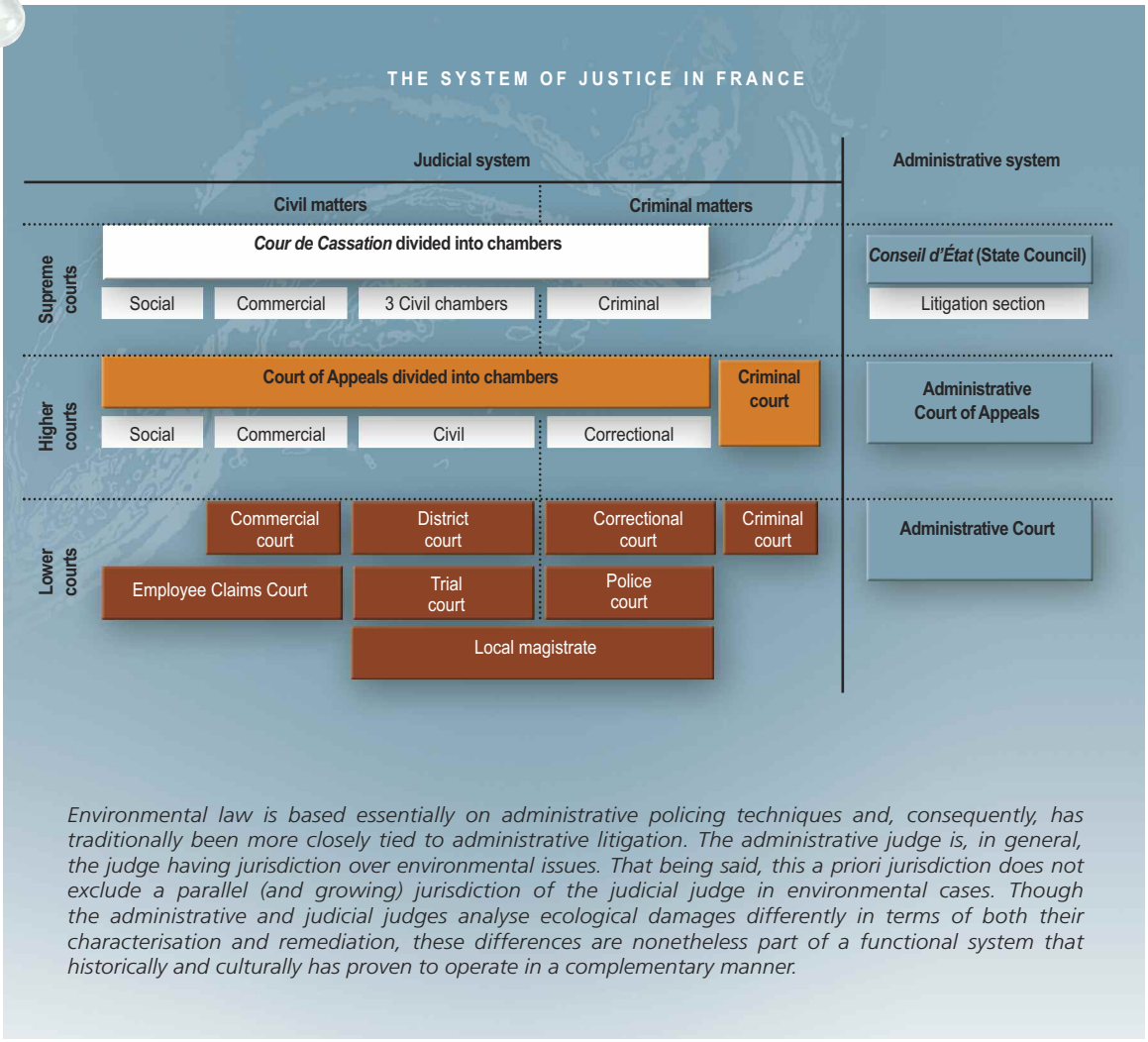
Legal basis and liabilities for damage caused to water and aquatic environments. Issues involved in characterising ecological damage

This first chapter looks at the long-standing decision to adopt an anthropocentric view of damage whereby compensation is accorded only for torts suffered by human beings (material, moral or corporal damages). The discussion shows that though a more ecocentric approach has begun to be accepted in addition to the dominant vision, a number of issues remain that explain why ecological damages do not systematically constitute a tort as defined by the legal system or, more precisely, the legal systems. The chapter stresses the point that the French judiciary approaches ecological damages in **different manners**.

This is due to the fact that France has a dual system of justice, i.e. it in fact has two systems, the administrative and the judicial (see Figure 1) that are increasingly influenced by European law (notably the Court of Justice of the European Union), which has a unitary system and encourages the Member States to institute the polluter-pays principle. The two systems in France each have their own history and culture, and each has developed its specific approach to characterising, assessing and remediating ecological damage.

At the end of the chapter, it will have become clear why environmental damage is not the same thing as ecological damage and why ecological damage does not necessarily result in an ecological tort. These distinctions in the terminology will help the reader in better understanding the legal complexities when dealing with ecological damages, notably by differentiating between the three forms of legal liability (environmental, civil and criminal) potentially involved and the different types of legal procedure (administrative and judicial).

Figure 1



Environmental law is based essentially on administrative policing techniques and, consequently, has traditionally been more closely tied to administrative litigation. The administrative judge is, in general, the judge having jurisdiction over environmental issues. That being said, this a priori jurisdiction does not exclude a parallel (and growing) jurisdiction of the judicial judge in environmental cases. Though the administrative and judicial judges analyse ecological damages differently in terms of both their characterisation and remediation, these differences are nonetheless part of a functional system that historically and culturally has proven to operate in a complementary manner.

The system of justice in France. Two spheres of jurisdiction, two types of judge.

When the legal, scientific and technical sectors work together. Technical aspects involved in dealing with ecological damage

This second chapter explains that the complexity of the law for water and aquatic environments requires that the legal, scientific and technical sectors work together. This collaboration can take place both in formulating the laws and regulations and in their implementation. Effective collaboration is also possible in proving the existence of ecological damage, of a tort and of a liability. One of the most evident barriers in dealing with ecological damage is the fact that judges and jurists in general receive **training** in the human and social sciences which bring into play rationales and a terminology that differ significantly from those used by the earth and life sciences. Similarly, the work and methods employed by jurists are not those of a technician or scientific researcher, a situation which creates different approaches and perceptions to issues. Collaboration between the legal and scientific sectors is far from easy. That being said, it is not impossible and progress has been made. One example is the ministerial circular (23 May 2005) stipulating that a prosecutor be designated specifically for

environmental issues in each office of a State prosecutor or Prosecutor general. Another example is a series of contacts, such as those between Onema* personnel and prosecutors, that contribute to establishing the necessary links. A judge needs proof of the facts on which to base his decision. A judge also needs to understand the situation and to grasp the impact of damage for society.

Assessing damage during a trial. From an assessment of damage to an assessment of remedies

On the basis of the information provided to the reader in the first two chapters, this third chapter presents the framework established for assessments. To that end, the reader is plunged into the heart of judicial procedures in order to highlight the need to clearly distinguish between the different types of assessment activity with which a judge may be confronted at different, but very precise moments in a given procedure. The discussion will make clear that the decision to remediate an ecological tort depends on the independent judgement of the judge. It is always a decision by the court that creates or denies the existence of an ecological tort and determines whether the defendant must remediate the situation according to precise conditions. The assessment is therefore a means, among others, used by the judge during the procedure to justify and inform his decision. Assessments are however a highly complex process that must be undertaken in a methodical manner, step by step, particularly in combined (civil and criminal) cases, the most common situation for damage to water and aquatic environments.

Territorial considerations in the legal situation and how they apply to ecological damage

This fourth chapter highlights the link, not always clearly apparent, between the reaction to ecological damage and the local territory. Different aspects of the link are discussed. The first aspect concerns the unequal exposure of territories to risks of ecological damage. The seconds concerns the differences in reactions of populations in different territories to ecological damage due to their different sensitivities and past history. This aspect raises questions concerning the presence of active forces, notably in the form of non-profit groups. A further consideration deals with the geographic specialisation of courts and jurists, which is gaining momentum, notably with the creation of “zones of competence” and changes of venue for trials that are in some cases desired (or desirable). This chapter makes it clear that all the above factors influence the manner in which ecological damage is perceived and dealt with.

The time factor in handling ecological damage

This fifth and last chapter discusses the impact of time on dealing with ecological damage. First of all, because most of the issues surrounding environmental situations are conditioned by decisions producing effects over the long term. Secondly, because the time horizons in the legal and social spheres are not necessarily those observed in nature. Times (deadlines, etc.) in the legal sphere are set by the participants in that sphere and, measured on the human scale, must not exceed certain limits because the enforcement of laws supposes that there be a timely reaction to offences, however it is also possible to anticipate on future developments, i.e. to devise principles and rules for the long term. This means that some control is required over times in the environmental sphere. But damage is characterised by its great diversity in terms of how it is identified, its degree, effects and duration. Under these conditions, how is it possible to assess damage, all the damage, but only the damage? After a certain lapse of time, it may be difficult to ascertain the full extent of damage, its causes and effects. The chapter explains that the intervention of the system of justice will be all the more effective that it takes place rapidly and selects suitable penalties and remedies.

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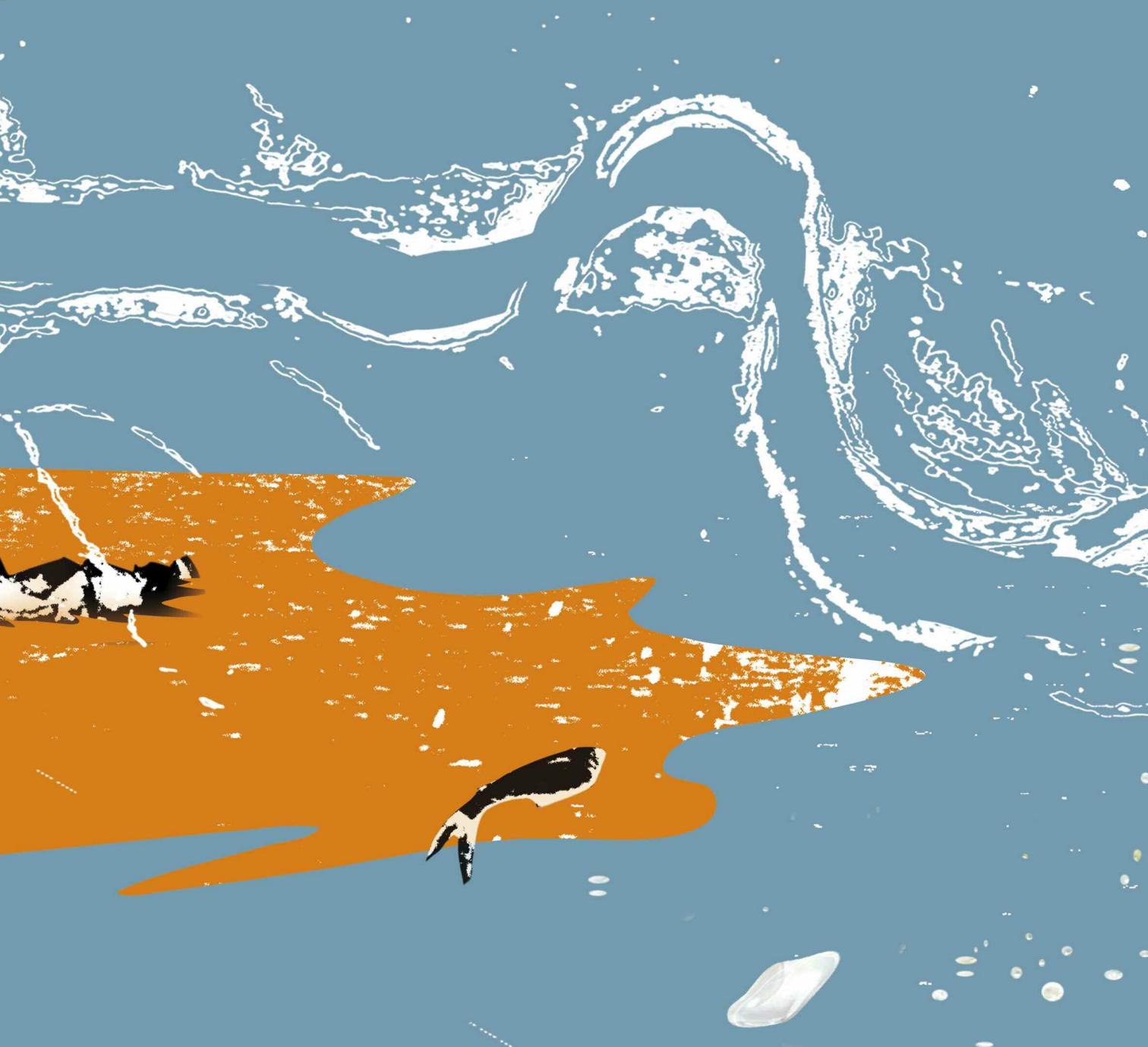

Contents

Introduction

Damage has been inflicted on the environment for a very long time, however the legal system in France addressed the problem only **recently**. But once undertaken, the attention paid has been **constant and dynamic in its evolution**. The 1810 decree-law constituted the first legislative text targeting the effects of unclean and dangerous facilities. Sanitary regulations (drinking water, wastewater, waste) were progressively instituted over the 1800s and 1900s. However, it was the 1964 Water law (18 December 1964) on water distribution and regimes, and on controlling water pollution, that marked the first major step in setting up water legislation.

The 1970s saw the creation of the first Ecology ministry (F. Charvollin, 2003), then the vote of two important laws on 10 and 17 July 1976 concerning environmental protection and on regulated installations. From that point on, environmental law developed seemingly as a symptom of an environmental crisis increasingly highlighted by scientific progress and changes in social perceptions (C. and R. Larrère, 1997). Should that be seen as a coincidence? No, because **it is on the issues surrounding damage that environmental law has developed**, thanks to efforts by national and international judges. The impact of European environmental law, notably in the field of remediating ecological damage, has been enormous (see Directive 2008/99/EC (19 November 2008) on the protection of the environment through criminal law and Directive 2004/35/EC (21 April 2004) on environmental liability with regard to the prevention and remediation of environmental damage).

That being said, from the very first steps taken, the issue of characterising, assessing and remediating ecological damage was (and remains today) a central concern, even though the reality of damage has been scientifically observed and is socially acknowledged (O. Fuchs, 2011).

Ecological damage, i.e. damage inflicted on nature, also called purely ecological damage, raises numerous questions, scientific, political, legal, social, economic, cultural and technical. What type of environment should be protected? Which particular sites should be preserved? According to which criteria? What means should be adopted to counter environmental degradation? How can damage to the environment be remediated? Who may launch legal proceedings? Is there a risk of upsetting the existing legal system and its functioning by acknowledging the existence of purely ecological damage, i.e. a form of damage other than that affecting humans? Is it possible to evaluate purely ecological damage? How can a penalty be adapted to the principles of social justice? Should training for judges and prosecutors be modified? Is there a risk of assigning an overly important role to scientific opinions and thus of reducing the independence of judges? What relationship do humans have and want to have with nature? How can the notion of irreversibility be taken into account when it does not exist in legal doctrine? To the above fundamental questions must be added those arising from the process of identifying, assessing and remediating damage, involving the intervention of a wide array of public and private stakeholders. Who should run the assessment? On the basis of what knowledge?

Who should take action to counter environmental pollution (what is the role of governmental agencies, civil society and of the lobbies)? Who will defend nature for the sake of nature? Are lawyers correctly trained for that purpose? Who should be the judges of environmental litigation? Are specialised courts required?

Clearly, ecological damage raises a number of **hybrid concerns**, at the crossroads between many disciplines that no one person can master simultaneously. Consequently, it brings into play numerous stakeholders with different rights and responsibilities, different work cultures, traditions and concerns that are nonetheless complementary, and who are fully capable of ignoring each other and even of mutually suspecting each other (D. Guihal, 2008).

Measures to control delictual and even criminal behaviour are gravely hindered by this complexity (see Box 1). In spite of the proliferation of regulations (and their lackings), penalties are rare and rarely dissuasive (L. Neyret et al., 2012). This situation is highly prevalent even though the "polluter pays" principle should contribute to raising awareness of risks before damage is done and to improving the implementation of penalties and remedies where the law foresees them. Environmental inspectors, entrusted with the mission of enforcing regulations, are at best virtually invisible and at worst contested and denied any legitimacy in their work. The end result is that **the implementation of water law as a whole is largely negated**. This ineffectiveness of water law is manifested in two, interrelated manners. Either the law is not correctly implemented and the reason should be identified, or the law is not accepted by the concerned citizens and it is the **rule of law** itself that is put into question.

But effective enforcement of water law is indispensable in implementing public policy to protect water resources and the environment. Water law establishes the **legal framework** for public policy and its effective enforcement, i.e. its acceptance by citizens, is the **source of its legitimacy** and recognition. It is the role of the public authorities to determine how the law should be implemented given the precise objectives set, e.g. achieving good ecological status of water. **Assessment of ecological damage is a fundamental factor in its remediation and consequently in the effectiveness of the law**. A failure to deal with ecological damage would signal the incapacity of society, which claims to promote sustainable development, to implement the necessary policies and to adapt to the challenges and necessities of our time.

Box 1

Ecological delinquency

The concept of "ecological delinquency" is fairly recent and was put forward as a social problem for the first time during the first convention of the French society for environmental law in 1976 in Strasbourg. In 1979, it was the central topic of the 17th French criminology convention in Nice. During that meeting, E. du Pontavice noted in his presentation titled "Contribution of foreign experience concerning ecological delinquency" that "though changes may be observed, we must nonetheless conclude that many of our contemporaries are still of the opinion that certain ecological offences are not morally reprehensible". He added "an industrial manager would be surprised and outraged to find himself among the accused, next to a pimp or a thief (...). Judges hold the same widely shared assumptions in that they do not understand the harmfulness of pollution (...) and consequently do not condemn offenders or sentence them to ridiculously low fines".

Today, there has clearly been a change in social perceptions of ecological delinquency such that it is now possible to consider certain types of damage and disturbances as the actions of a new category of delinquents. Above and beyond the new ecological awareness, the change in perceptions has modified how people judge delictual behaviour. The evolution of our societies toward sustainable development is the sign of increased ecological, social, economic and cultural awareness of the need to shift to a new system offering economic viability, social equity and ecological sustainability. The legal system, the backbone of our societies, has created a large number of laws and regulations, even excessively large according to some.

It is therefore not the absence of a legal framework that stands in the way of acknowledging the existence of ecological delinquency and, consequently, ecological damage. Enforcement of the laws and regulations depends on the willpower and the means invested in the effort.

Onema*, in its role as a national agency in implementing water policy and ensuring its effective application, took up this issue in order to coordinate the work to make available its multi-disciplinary technical and scientific expertise and its vast experience in the field.

This document was written with the support of a work group led by the author and bringing together professionals from different fields and with different perspectives (professors of law, scientists active in multiple sectors, environmental inspectors, experts from the agency and beyond, etc.). It also benefited from the knowledge produced by scientists working both within and outside the academic sphere, jurists and managers in charge of protecting and restoring aquatic environments. Finally, it took into account a number of current discussions in order to clarify certain misunderstandings, pave the way for greater awareness and facilitate the spread of information on certain recent advances that continue to drive progress in the field.

This document was structured on the principle of scientific reflexivity in order to provide information and analysis methods to water stakeholders, including Onema itself and now the French biodiversity agency. It constitutes the first step in an ambitious project that will contribute to revealing and analysing the issues involved in dealing with ecological damage, review the progress made and discuss the work that remains to be done.

It is intended primarily for water managers and public and private stakeholders directly involved in implementing water policy.

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Legal basis and liabilities for damage caused to water and aquatic environments

1

Issues involved in characterising ecological damage

Introduction

The sources of the law dealing with damage to water and aquatic environments are both **internal and external** in nature (see Box 2). Applicable laws are the result of international treaty and customary law, European law and national law in the form of the constitution and the legislative and regulatory texts governing the environment in general and water in particular. All of these legal instruments are part of what is called the internal legal system either because they were produced by the French authorities themselves or because they were drafted by supra- or international authorities and subsequently transposed into the French legal system by a French law. All of these sources contribute, as we shall see, to characterising ecological damage because they assist in defining it, specifying it and translating it into legal terms of use in a legal procedure addressing the damage according to the various liability regimes that enable a judge (administrative, civil and/or criminal affairs) to take it into account and remediate it, as the case may be.

Box 2

The hierarchy of norms

Laws have many, diverse origins. They may be international (treaties, etc.), European (directives, regulations, etc.) and national (Constitution, law, regulation, custom, jurisprudence, doctrine, etc.). The hierarchy of norms is the ranking of all applicable laws and regulations making up the legal system of a constitutional State. Its purpose is to settle conflicts between laws given that, in principle, a lower level must comply with a level above it. The hierarchy of norms, derived from the pyramid of Kelsen, consists of superposed layers with additional customary and treaty elements which now form a rather complex assembly (said to be post modern). Put briefly, international law sets a number of rules, but European law determines much more decisively internal French law, itself organised as a hierarchy (Constitution, organic laws, laws, decrees, ministerial rulings and local by-laws), in general with written sources, but also with some non-written sources, said to be customary. Jurisprudence equally plays a fairly significant role in environmental issues, due to the part played by the judge in rendering decisions, assigning liabilities and often interpreting the meaning of the applicable rules.

Sources of water law and its evolution toward integrated management designed to limit actions affecting environments

Environmental law, above and beyond the fundamental principles, is made up of several large subsets based on their own specific principles and characteristics:

- the laws on the protection of the natural patrimony (protection of species and territories);
- the laws on environmental protection (which includes water law);
- the laws on controlling pollution and disturbances (regulated installations, etc.);
- the laws on hazards (natural or technological).

Similar to environmental law, water law has **evolved** considerably over the years, due primarily to **pressures exerted by European and international law** since the 1970s.

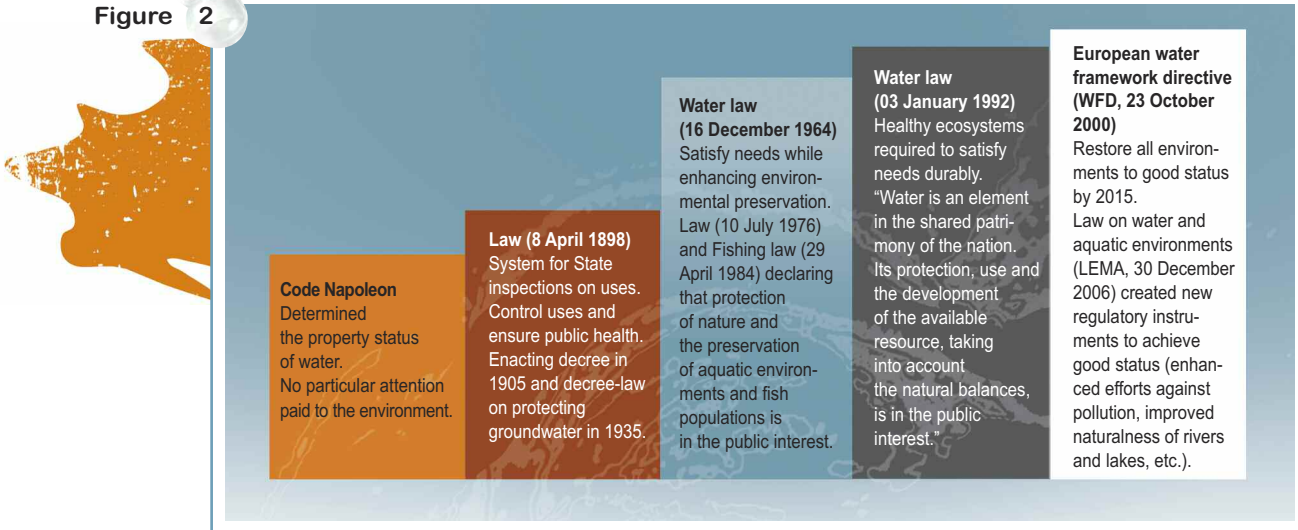
Water law is innovative, but also complex and highly specific. Its main function is to facilitate the management and governance of a vital resource that is subject to multiple uses and potential sources of conflict, and involves both quantitative and qualitative issues (Loupsans & Drobenko, 2015). For all these reasons, **balanced management** of water resources is necessary. This notion was incorporated in French law by article L. 211-1 in the Environmental code (C. Env.), which was drawn from the 1992 Water law (3 January 1992). The priority objectives of this management technique are to satisfy needs in terms of individual and public health, public safety and drinking water for the population. It must also satisfy or reconcile different uses, activities and projects, as well as ensure the preservation of aquatic ecosystems and wetlands, protection against pollution, restoration of water quality and the development and protection of water resources (Art. L. 211-1 C. Env.).

But it quickly became apparent that regulations on water uses and on activities impacting its quality and/or quantity were not sufficient. The shift in French law toward integrated management signals an awareness of the need to widen the scope of public policies.

Integrated management can be defined as a social and political process of coordinating decisions and actions concerning water, the aquatic environments and, more generally, all the various components that make up a hydrological unit and have an impact on water quality and flows. It implies, on the basin or sub-basin scale, maintaining the quantity of water resources, treating water as an economic resource having social value, protecting water quality, preserving aquatic ecosystems and, last but not least, controlling flood risks (Loupsans, 2014). The concept of integrated management was first mentioned during the International conference on water and the environment in Dublin in 1992. It is an element in the **sustainable-development paradigm** (Brundtland report, 1987) that prescribes better integration of the many facets of development while also protecting the natural environment.

Consequently, integrated water management requires public policies and a legal framework that take into account the environmental, social and economic dynamics affecting the resource. Very often, that implies going well beyond solely national issues, to the point that the challenge for national, European and international stakeholders lies in reconciling, in a cooperative framework, these three aspects by drafting principles, rules and procedures suited to the different levels. That is why the European Union (EU) and its predecessor, the European Economic Community (EEC), have since 1972 made an effort to codify laws and regulations in order to protect water resources and environments (Loupsans, 2013). This process led the French legislator, in 1992, to adapt French water law to the European context and to widen the scope of the 1964 law by filling out the basic principles of the policy, by adding planning tools and by **reinforcing inspections on activities impacting the environment**. The European water framework directive (WFD, 2000), transposed into French law in 2004, was a further step in this direction. Then the Law on water and aquatic environments (LEMA, 2006) filled out and reinforced the provisions contained in the 1992 law and created the National agency for water and aquatic environments (Onema) as well as the framework for the missions, notably inspections, that were assigned to the agency (see Figure 2).

Figure 2



The main steps in the development of water law in France.

Box 3

Water pollution and legal problems, Paris, Librairies techniques, 1968, 204 pages

In this book published in 1968, Michel Despax presented the legal problems arising from water pollution and the solutions contained in French and international law. He was the first to explore a field that had long been neglected by jurists, even though the scientific community had for years expressed its concern over the multiple forms of degradation in the natural environment, due to uncontrolled industrial and technical development. This book makes it possible to draw up the list of the legal instruments available at the time to counter a phenomenon whose seriousness is now evident to one and all, and to assess the effectiveness of those instruments or the lack thereof. The book, whose conclusions remain as valid today as they were 50 years ago, made clear that there was no lack of instruments to fight pollution and its consequences. However, as the author demonstrated, they must be put to good use.

The response of the legal system to damage inflicted on nature in order to control behaviour affecting environments

As of 2008, pursuant to the European directive on environmental liability (2004), French law finally acquired a definition of "damage caused to the environment", that was used in the French law on environmental liability (LRE, 2008). This step forward in dealing with damage caused to the environment, though imperfect, took into account the obligations contained, among other sources, in the WFD. It is also fully in line with the dynamic process initiated by the Constitutional charter for the environment, adopted on 28 February 2005 by the two houses of Parliament in joint session (Constitutional law 2005-205 (signed on 1 March 2005) establishing the Charter for the environment, published in the Official journal on 2 March 2005).

With the Charter, **environmental law** and the **right to a healthy environment** acquired constitutional standing. The Charter is now part of the body of constitutional rules and principles, i.e. the preservation of the environment is now on an equal footing with the 1789 Declaration of the Rights of Man and of Citizens and with the economic and social rights. The Charter acknowledges the right of each person to live in an environment that is balanced and healthy, the right to access information held by public authorities and to participate in formulating the public decisions affecting the environment, however it also **imposes obligations on those causing damage to participate in remediating said damage.**

This point was reiterated by the Constitutional Council in its decision on 8 April 2011, when it noted that observance of articles 1 and 2 of the Charter for the environment "is mandatory not only for public and administrative authorities, each in their respective domains, but also for private persons and entities" and that "each must remain vigilant concerning damage to the environment that may be caused by one's activity" and that "legal action seeking redress may be engaged if compliance with that obligation is lacking".

This principle received jurisprudential consecration with the Erika decision in 2012 (Cour de Cass. Crimm., 25 September 2012, decision no. 3439), which stands out as a landmark decision in that it acknowledged the existence of an **ecological tort**. That being said, though this highly publicised event bore witness to significant political, social and legal progress, the very small number of similar decisions means that a number of issues remain undecided. The recent modifications, contained in Law 2016-1087 (8 August 2016) to restore biodiversity, nature and landscapes, should provide some answers due to the insertion of article 1386-19 and the following in the Civil code, given that the legislator has now defined the conditions for the civil remediation of an ecological tort.

Environmental damage or ecological damage?

Law is the product of the social conscience, consequently the knowledge and data provided by the earth and life sciences are not sufficient in characterising damage to nature. Many stakeholders reflect on and participate in characterising damage to nature and specifically that caused to water and aquatic environments, namely jurists, decision-makers, scientists in multiple fields of the human and social sciences and in the earth and life sciences, water managers, non-profits active in environmental protection and human rights, economic players, health professionals, State services and agencies, etc. All of this input, provided by professionals in different fields, each with their work habits, training and experience, contributes to influencing the law and how it is practised. However, the law is also clearly situated historically and socially. It evolves because the opinions of the stakeholders and social perceptions change over time (Honegger, 2014). That explains why, though an anthropocentric vision of damage was long favoured, due notably to the anthropocentrism of liability law which has difficulty with the ecocentric nature of ecological damage (Rebeyrol, 2010), changes in social perceptions led to what Pinatel (1979) gingerly termed "**technical adjustments**" that, fundamentally, consist of reconciling economic and social development with ecological preservation via measures in the administrative, civil and criminal domains.

Today, two schools of thought, the anthropocentric and the ecocentric (Reyberol, 2010; Fuchs, 2011), form the foundation for most of the legal thought and practises involved in characterising damage caused to nature, including that caused to water and aquatic environments.

The **anthropocentric school** focusses on **damage caused to humans**. In this case, the literature speaks of **environmental damage**. This concept is used to describe diverse situations that vary as a function of the territorial scale. For example, internationalists use it for ecological catastrophes or environmental refugees fleeing humanitarian catastrophes caused by grave disturbances to the environment (see Box 4). In French law, the concept is used to describe damage where a legal subject (the human being) has suffered a loss and may request remediation. The damage exists due to the degradation of the environment, e.g. damage to human health, damage to property (buildings, crops, animals, etc.), damage to activities (tourism, recreational activities, etc.). The impact is measured not on the basis of the environment and ecosystem functioning, but on that of the damage directly caused to the human being. In other words, in the framework of this concept, it is the human being who, on the basis of his legal capacity and as the direct victim of damage caused to water and aquatic environments, will request remediation for the damage directly suffered. The environment is taken only indirectly into account.

The ecocentric school focusses on damage inflicted on nature, also called ecological damage or purely ecological damage. This type of damage does not have a legally identified victim because the environment does not have legal standing. This is damage to the non-possessed or non-possessable elements of nature. Most often, this type of damage is conceived as impacting entire systems (ecosystems, the biosphere) or more limited elements (e.g. a species). Roughly speaking and in our field of study, this damage may be divided into three categories depending on the impacted aspects of the aquatic environment:

- damage to the available quantity of water (discharge and regime);
- damage to water quality;
- damage to habitats.

The impact is measured with respect to an objective, a quality standard or a negative trend observed with respect to a situation assessed previously. As we will see later, remediation of ecological damage must overcome the obstacle of identifying a person entitled to request remediation because, in this case, the legal subject (the human being) does not hold any rights over the damaged element(s) of the environment. It is generally a legal entity (the State, non-profits, public agencies, etc.) that is entitled to request remediation for purely ecological damage, given that it is endowed with legal standing and has been assigned the mission of ensuring the integrity of the common good. In such cases, contrary to damage caused to humans, the damage directly impacts the environment.

Environmental damage causing population movements

In 1985, a report by the U.N. environment programme (UNEP) defined “environmental refugees” as “people obliged to leave their habitual homes temporarily or permanently due to an ecological catastrophe that adversely affects their lives or living conditions”. The concept of environmental refugees concerns movements of population **within a country or to another country** following serious environmental damage affecting entire groups of people. Situations involving “environmental refugees", also called “ecological refugees”, “ecorefugees” and “climate refugees” in the scientific literature (Cournil, 2008; Cambrézy, 2013) are **neither isolated nor rare**. Examples are the 200 000 people displaced after the accident in Bhopal, India, the 375 000 after Chernobyl, 100 000 after Seveso in Italy and 1.4 million after hurricane Katrina in New Orleans. Elsewhere, melting ice has forced the migration of Inuits and rises in sea levels have obliged people in the South Pacific to leave their islands. The government of the Maldives recently acquired land in Madagascar in preparing for a massive movement of the population (Betaille, 2009).

This phenomenon is now widespread and taken very seriously by international institutions. For example, the U.N. High Commissioner for Refugees (UNHCR) made clear reference to the phenomenon in 1997 and according to the International organisation for migration (IOM), by 2050, over 2% of the world population will have been displaced due to the climate (2008).

In Europe, the ***Environmental change and forced migration scenarios (Each For)*** European research programme was launched specifically to study the issue of forced migrations (2007-2009). Two objectives were set for the programme. The first objective was to identify and describe the causes of forced migration with respect to environmental degradation and change, and the links between the environmental factors and other economic, social and political phenomena in Europe and in the main countries of out-going migration. The second objective was to draft scenarios for future forced migrations due to climate change. The research team identified 22 countries “at risk” and issued five sets of recommendations including changes to legislation targeting effective recognition of the status of ecological refugees.

To date, **there are no *ad hoc* legal instruments that guarantee assistance or legal protection for ecological refugees** in either the international texts on the environment or in those concerning refugees or foreigners (Kiss, 2004). This difficulty in categorising the victims as “ecological refugees” is due notably to the fact that the phenomenon is the result of several interwoven dynamics, namely those of the ecosystems, economic activities and the social attachment to a given environment (Andrieux, 2009). However, it is also due to the fact that the causes are environmental, but the consequences are humanitarian (Noblet, 2009). This explains why the authorities managing the causes (Ecology ministries, UNEP, environmental directorates, etc.) are not the same as those managing the consequences (ECHO, the EU aid office, OCHA, the UN aid office, UNHCR, etc.).

The difficulty in categorisation is consequently due not only to the multi-sectoral aspect of the phenomenon, but also to the financial implications and the difficulties in assigning responsibilities.

In this document, we will use a concept of ecological damage incorporating elements drawn from both of the dominant schools, the anthropocentric and the ecocentric. We see ecological damage as an impact on the environment and on the functioning of an ecosystem that can constitute a tort for humans and nature. This definition has the advantage of conforming to the actual situation of environmental inspectors in charge of reporting damage to water and aquatic environments, as well as to the diversity of the legal system. One of the duties of environmental inspectors is to inspect water uses. This means that though their general mission is to report and characterise damage, exclusively on the basis of scientific and technical elements, they can also observe and report, notably in court, on impacts on the functions of ecosystems of direct benefit to humans, functions also known as "ecosystem services" (see Figure 3).

The originality of the French approach, compared to a number of foreign legal systems, lies in this hybrid nature (see Box 5). The diversity of the tort charges that can be made following ecological damage is also an indication of the difficulty, according to some, or of the choice, according to others, in deciding in favour of one or the other of the two schools.

Box 5

How do foreign legal systems approach the anthropocentric/ecocentric debate?

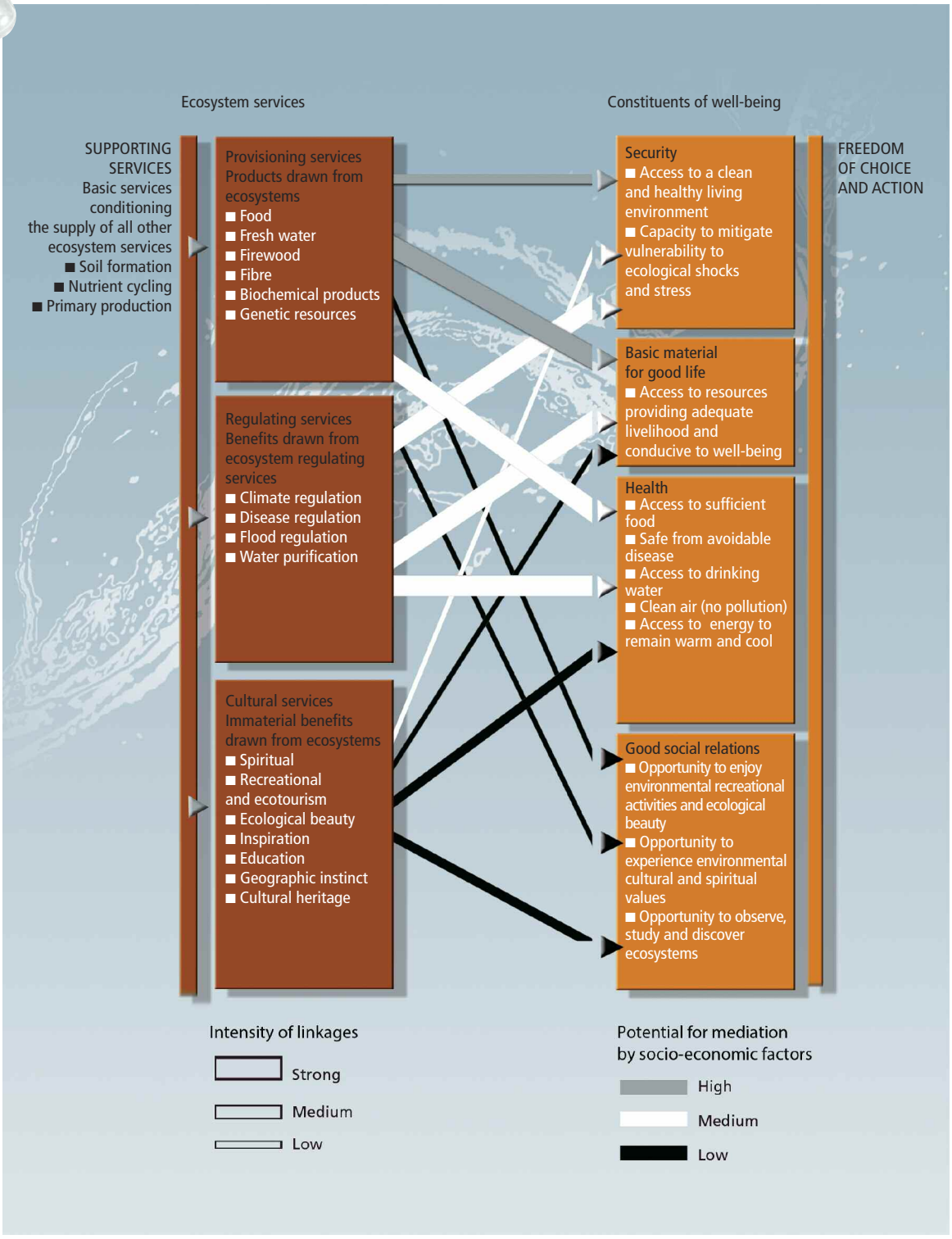
In France, legal doctrine initially opted clearly in favour of the anthropocentric approach, however a number of recent changes have signalled that the French system is today much more a hybrid system. Environmental inspectors experience this situation every day in their work.

Our European and international neighbours are also confronted with this dilemma. But several of them have explicitly decided to adopt one or the other of the two schools of thought.

Germany and Switzerland have adopted a definition of damage that clearly centres on human beings, i.e. the anthropocentric concept. In Germany, the notion of *Umwelteinwirkung* (impact on the environment), anchored in German law by the law on liability in environmental matters (10 December 1990), defines damage as environmental damage, i.e. as a violation against a person or property. The environment is perceived as a vector, a mediator in violations against human life, health or property. Until 2004, Switzerland did not allow remediation of damage against nature. This prohibition has since been lifted, but the topic is still the subject of major controversy (Fuchs, 2011).

Italy and federal law in the U.S. have adopted an ecocentric approach to damage. In Italy, the law dated 18 July 1986 and the position of the Constitutional Court starting in 1987 defined, step by step, a general condition of liability for any person who, due to their own fault, causes damage to nature and determined that the "environment" comprises all natural and cultural resources, i.e. the conservation, rational management and improvement of the natural environment, the existence and conservation of species, etc. The same type of definition may be found in the legislation on polluted soil and the maritime transport of petroleum products in the United States (Fuchs, 2011).

Figure 3



©Millenium ecosystem assessment, Nations-unies, 2006

Ecosystem services are the ecosystem functions that benefit human beings.

It should be noted that the intensity of the links and the potential for mediation differ depending on the ecosystem and regions (Blanchart, de Tourdonnet, 2014).

Are the terms “ecological damage” and “ecological tort” synonymous?

The distinction between damage and a tort is very clear in civil, criminal and administrative liability law and will be discussed in further detail below.

It may be said that **damage is the cause and the tort is the consequence**. Damage is an objectively observable fact. It is what an environmental inspector see, observes and reports, e.g. fish floating on the surface of a lake following chemical pollution, an abnormal colour of the water in a stream affected by chemical pollution, unusually high nitrate concentrations in a river (see below the case of the village of Salsigne).

The tort consists of the consequences (see Table 1). For example, the legal consequences are generated by the chemical pollution of a river, the destruction of wetlands or habitat destruction in a ditch. The loss of a drinking-water abstraction (the tort) due to the excessive level of nitrates in a river (the damage) is another perfect example. Torts are generally assessed on the basis of their impact on humans (moral or material harm, etc.). This is because according to standard liability law, only certain, direct and personal damage may be deemed to be a tort (see Figure 4). It is this principle that has long been and continues to be an obstacle in acknowledging ecological torts. In an oversimplification, it could be said that only nature, having suffered damage, has the legal standing to press charges. In addition, nature would have to prove that it suffered a direct loss (tort), i.e. that it was directly targeted by the illicit act. But things have changed (notably since the Erika incident, see Box 6) and continue to change. It was during the Erika trial that the judicial judge accepted for the first time to qualify ecological damage as the cause of a tort to nature, independently of any torts to humans. Following that decision, the commission presided by Mr. Yves Jegouzo, law professor, submitted a report to the government on the remediation of ecological torts. A number of laws were proposed, however the Biodiversity law (2016-1087, 8 August 2016) was the first to effectively introduce the concept of remediation of ecological torts by creating the article 1386-19 in the Civil code. The article stipulates that “any person causing an ecological tort must remediate it”. The following article states that only ecological torts resulting from “non-negligible damage to the elements or functions of ecosystems or to the collective benefits drawn by humans from the environment” shall be eligible for remediation. The conditions for remediation and the coordination with other administrative and criminal procedures are also laid out. This progress should resolve a number of practical problems and improve remediation of ecological torts.

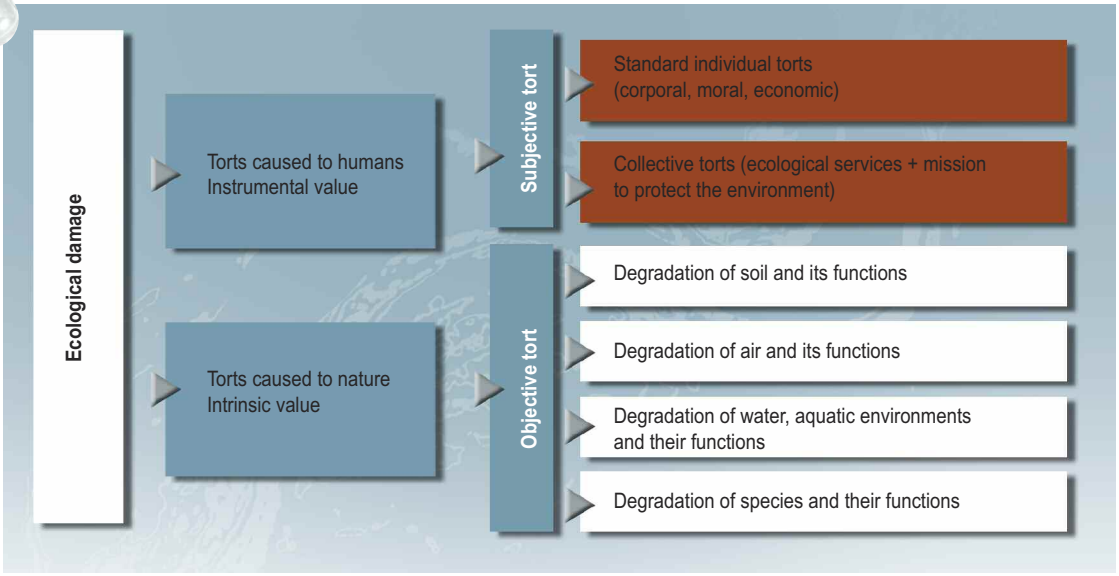
This constitutes a significant advance for liability law.

Table 1 *The various tort charges available to the judge following ecological damage.*

Examples of damage caused to water and aquatic environments	Commercial losses suffered due to pollution	Injury to the brand image of local governments (or) Negation of efforts made by non-profits	Disease contracted due to exposure to hydrocarbons during cleaning work	Disappearance of certain species, harm to biological functions
Torts charges* available to the judge following ecological damage	Deterioration of patrimony i.e. Material and economic tort	Personal injury i.e. Moral tort	Personal injury i.e. Corporal tort	Damage to the environment i.e. Ecological tort

**Tort charges may be levelled separately or jointly as was the case in the Erika trial where material, moral and ecological torts were acknowledged (Paris District Court, 16 January 2008).*

Figure 4



Legal interpretation of environmental deterioration, from damage to the tort charges. A proposed nomenclature (Neyret & Martin, 2012).

Box 6a

The Erika case, the first acknowledgement of an autonomous, ecological tort

On 11 December 1999, the tanker Erika, registered in Malta and transporting several thousand metric tons of heavy fuel oil, suffered structural damage during a storm while it was crossing the Bay of Biscay. The next day, the ship sank in the French exclusive economic zone and part of the fuel oil transported leaked into the ocean, soiling over 400 kilometres of coastline running from the tip of Brittany to the Charente-Maritime department.

Civil suits were initiated by several non-profits, local governments and individuals against the owner of the ship, the charterer, the lessor and the technical and nautical management firm. In its judgement on 16 January 2008, the District Court in Paris found all of the defendants guilty of polluting the French waters and waterways along the Atlantic coast. However, in the civil case, the judges deemed that the International convention on civil liability for oil pollution damage (29 November 1969), modified by the 1992 protocol, was not applicable due to the limitation of liability to the ship owner. The Paris Court of Appeals confirmed on 30 March 2010 the decision concerning the State action and devised a new classification for the various torts. The patrimonial and non-patrimonial torts suffered by legal subjects were considered “subjective torts” and the ecological tort, not suffered by a legal subject but consisting of harm to interests protected by law, was considered an “objective tort” and a “collective tort”. In this manner, the Court of Appeals solved the problem of the absence of any personal harm suffered by damage to nature. The *Cour de Cassation* acknowledged indirectly the concept of an ecological tort as direct or indirect deterioration of the environment, caused by the offence, i.e. an ecological tort independent of the standard torts suffered by the plaintiffs, i.e. the non-profits and local governments (Alexis Deborde, 2013).

Salsigne, a case of ecological damage in southern France (Aude) resulting in different torts

Salsigne is a small village in the Aude department (SW France), near Carcassonne and not far from Toulouse, where work is increasingly rare, but life is agreeable. Fishing is an important activity in the area. Vegetable gardens may be found everywhere. Unfortunately, Salsigne is also the story of pollution observed essentially in the Moulin stream (Le Sindilla), a tributary to the Orbiel (see Figure 5) near the former gold mines of Salsigne that were for many years the main employer in the area. Mining in the area around Salsigne went back centuries. Gold was discovered at the end of the 1800s. A characteristic of the gold ore in Salsigne was its very high content of arsenic. For every ton of gold produced, ten tons of arsenic were produced, which explains the large quantities of arsenic-based by-products that polluted the air, soil and water. Production of arsenic on the Salsigne sites rose to 10 000 tons per year. Pesticide factories set up near by to use the arsenic. In 1996, the last operator entered judicial liquidation. From 1997 to 1999, the Regional environmental directorate (DRIRE) and the Environment and energy-management agency (ADEME) took the initial steps to secure the sites and installations. Starting in 2000, several rehabilitation projects were launched by a number of stakeholders. Tremendous efforts were made, however the overall project was not sufficiently organised with a single manager and a comprehensive strategic plan. Not all the sites were rehabilitated with the same rigorous methods or on the basis of the same financial resources. As a result, even today, certain waste sites that were poorly sealed and incorrectly rehabilitated on unstable terrain, or in contact with groundwater, continue to send a non-negligible amount of residual pollution to the Orbiel.

Upstream of the sites, the river is dry. Just downstream of the bridge, the bottom of the river bed is a goldish orange colour. Less than two metres from the point where the orange colour and the water appears, a colourless flow has been observed which may be the source water in the stream. The water is also goldish orange in colour. The bed itself is clogged with an orange substance. Over a distance of almost 200 metres, the orange colour dominates in the Moulin stream. Further downstream, due to new tributaries, the orange colour fades, but the water in the stream remains a dull grey. This is due to the presence of iron, lead, mercury, cadmium and above all arsenic in high and stable quantities.

Arsenic is known as a highly toxic substance that causes serious digestive disturbances that can lead to death (arsenic was long used as a poison). The lethal dosage is between 70 and 180 milligrams. Other toxic properties have also been observed, notably vascular risks and atherosclerosis in the carotid arteries discovered in 2002. Arsenic is above all carcinogenic and can lead to skin and internal cancers. These different toxic properties led the World health organisation (WHO) in 1993 to lower the guidelines for arsenic in drinking water from 50 to 10 µg per litre. The WHO guideline was incorporated in European law (Directive 98/83/EC adopted by the Council on 3 November 1998) and in French law (Decree 2001-1220 (20 December 2001)) as a maximum permissible value and a quality limit, set at 10 µg/l instead of the 50 µg/l initially set in 1989.

This case of ecological damage has occupied the legal authorities (see Figure 6) and the press (see Figure 7) for a number of years.

Figure 5

a, b, c © Delphine Loupsans - AFB

Chemical pollution.
a) Bed of the Orbiel clogged with an orange substance containing high levels of lead, mercury, cadmium and arsenic.
b) Sign indicating that the water is not potable.
c) Confluence of the Orbiel with the Gresillou, where a chemical reaction occurs turning the water milky white.

Figure 6

a

Ministère de l'Ecologie, du Développement et de l'Aménagement durables

ONEMA
Office national de l'eau et des milieux aquatiques

Service départemental de l'Aude
34, impasse Saffren
11000 - CARCASSONNE
Mél : sd11@onema.fr

04 68 47 52 87 Fax 04 68 25 24 63

BORDEREAU D'ENVOI

Procès-verbal de prélèvement

Code de l'environnement
Livre II Milieux physiques

PROCES-VERBAL NUMERO
20130129-2663-01

DATE DES FAITS : vendredi 11 janvier 2013

LOCALISATION DES FAITS

Cours d'eau : ruisseau du Moulin
Commune : SALLELES-CABARDES
Lieu-dit : le Sirdilla

OBJET DE LA PROCEDURE

cours d'eau de couleur orange

NUMERO D'ORDRE	DESIGNATION DES PIECES
1	Procès-verbal de prélèvement (2 feuillets)
2	Textes législatifs et réglementaires (2 feuillet(s))
3	Prélèvements, mesure de terrain et photos (2 feuillet(s))

DESTINATAIRES

INDICATION ET NOMBRES D'EXEMPLAIRES

- 1 original +1 copie Procureur de la République – TGI Carcassonne
- 1 copie DDTM
- 1 copie archives ONEMA-11

TRANSMIS LE

Cachet et signature du chef de service

b

Association de Pêche et de Pisciculture

Union des Pêcheurs de l'Aude
Société agréée par décision Ministérielle du 4 Février 1942
Bureaux 60, Rue Georges-Clémenceau
11000 CARCASSONNE
Tél: 68.25.76.50

Le 11 OCTOBRE 1990

Le Président de l'Union des Pêcheurs de l'Aude

à Monsieur LE PROCUREUR DE LA REPUBLIQUE . TRIBUNAL DE CARCASSONNE .

MONSIEUR LE PROCUREUR DE LA

Par la présente lettre, j'ai l'honneur de REPUBLIQUE que suite à la pollution sur la rivière Orbiel en date du 27/6/90 et aux vues du rapport d'analyse par le CEMAGREF ainsi que de rapport de la brigade de gendarmerie de Conques s/Orbiel, je porte plainte contre x en tant que Président de l'A.A.P.P.M. Union des Pêcheurs de l'Aude pour soutenir l'action de la société de pêche de Conques qui est affiliée à mon A.A.P.P.M.

De plus, je me réserve le droit de me porter partie-civile par la suite.
Maître POUCHELON avocat de la fédération départementale de pêche aura la charge de défendre les intérêts de mon A.A.P.P.M. et de la société de pêche de Conques s/Orbiel .

De ce fait, je vous prie Monsieur le Procureur de bien vouloir prescrire dès ce jour, toutes enquêtes et mesures nécessaires.

Restant à votre entière disposition si vous le désirez, veuillez agréer Monsieur le Procureur de la République l'expression de mes sentiments très respectueux .

FALANDRY GERARD
Président de l'Union des Pêcheurs de l'Aude

Involvement of the legal authorities.
a) A report filed by Onema, confirming the pollution, in 2013.
b) A complaint lodged by the Aude fishing union in 1990.

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Figure 7

a

La pisciculture est en deuil

Juin 1990

Triste spectacle sur les berges de l'Orbiel depuis avant-hier soir entre Conques et Villalier

Un véritable carnage pour la faune de l'Orbiel... et malheureusement ce n'est pas nouveau...

■ Une fois encore, un cours d'eau audois doit faire face à une cruelle pollution chimique. D'où vient-elle ? Quels sont ses auteurs ? Pour l'instant, personne ne peut répondre. Une seule chose est certaine : près de 90 % des poissons sont bel et bien morts en quelques heures.

Rien d'anormal

dore, dont on ne sait encore d'où il vient, ni sa nature. Il faudra attendre quelques temps pour cela. Mais il est certain qu'il ne pardonne pas. Comme le soulignait, hier, M. Limailhe, président de pêche à Conques,

vienne de là. *«Nous avons vérifié toutes nos données*, explique M. Lallemand, l'un des responsables de l'usine, le directeur s'étant absenté pour la journée. *Après plusieurs analyses nous n'avons rien retrouvé. Nous pouvons donc assurer que nous assurons un suivi régulier tous les jours.»*

morts ont été retrouvés en aval de l'usine de Salsigne. *«Sauf un*, rectifiera un gendarme, *mais il est mort de mort naturelle»*.

Hier soir, beaucoup de pêcheurs qui pêchaient néanmoins certain, c'est que la pollution s'est dissipée jusqu'après Villalier, puisque la Mé-

b

La pollution semble liée à l'usine de Salsigne

20 2 92

Du cyanure dans l'Orbiel

Les poissons meurent. Danger pour l'homme. Les rejets d'eaux industrielle dans la rivière ont été arrêtés, les pompages sont interdits

Dans l'Orbiel pollué, les poissons meurent. Les populations sont inquiètes et les interrogations sont loin d'être levées.

■ Les salariés des Mines et Produits Chimiques de Salsigne avaient pourtant averti les autorités concernées du risque énorme de pollution qui menaçait l'Orbiel. Mieux, ils les avaient invitées à prendre les dispositions nécessaires. En vain ?

C'est la question que l'on est en droit de se poser après la violente pollution dont a été victime la rivière, hier. Au pont de Montplaisir, une fois encore, les poissons flottaient le ventre en l'air. L'alerte a été donnée immédiatement, les services spécialisés de la D.D.A.S.S. de la préfecture, les pompiers et quelques responsables de la fédération de pê-

che arrivaient sur les lieux. Ils y effectuaient les prélèvements nécessaires. Sur place, on avait l'impression que la plupart des personnes tentaient de minimiser la pollution.

Reste que les premières analyses laissaient apparaître une teneur pratiquement nulle en cyanure en amont de l'usine de Salsigne, mais forte en aval (jusqu'à 1 mg/litre d'eau dans la rivière et 3 mg/l dans les bassins de l'usine) et en arsenic. Y a t-il eu infiltration, débordement ou estce simplement une conséquence directe des rejets, autorisés, d'eaux industrielles de l'usine de Salsigne

dans les eaux de la rivière (jusqu'à 120 m3 par heure) ?

Les potagers touchés

Par mesure de sécurité, les rejets étaient immédiatement interdits et stoppés jusqu'à nouvel ordre. L'autre décision prise, importante, était d'arrêter les pompages dans la nappe phréatique de l'Orbiel en aval de l'usine de Salsigne et de l'Aude en aval de l'endroit où l'Orbiel s'y jette.

Reste encore que cette eau a toujours servi à arroser les jardins potagers de la région conquoise, surtout l'été. Hier en fin d'après-midi, on conseillait cependant aux jardiniers de ne pas consommer les légumes

de leurs jardins s'ils avaient été arrosés avec l'eau de l'Orbiel.

Hier, rien n'était fait pour rassurer la population qui ne connaît que trop bien l'état de la rivière et le goût peu agréable de l'eau coudant des robinets dans les chaumières du village.

À Conques où l'on sait qu'un peu plus haut, à la mine de Salsigne, le strict minimum du personnel est maintenu pour assurer la sécurité. Les risques de pollution, plus grave et dangereuse pour l'homme que celle d'hier, sont sans doute multipliés depuis l'arrêt de l'activité des M.P.C.S.

Gérard CATHALA

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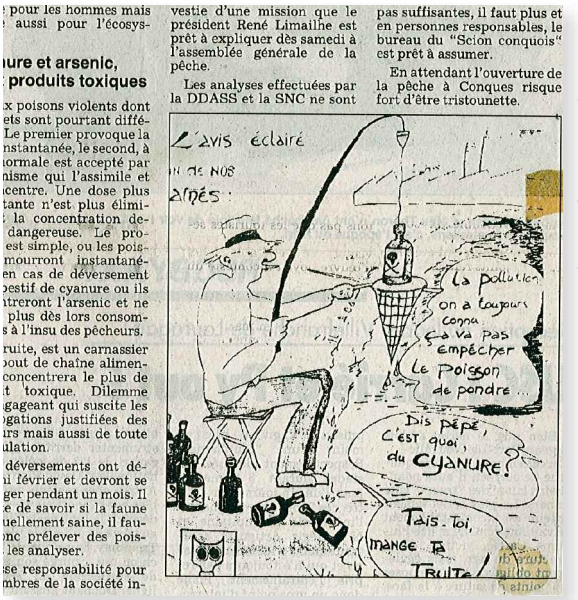

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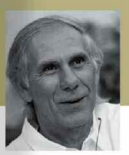
SALSIGNE : D'OR ET DÉJÀ... UNE HISTOIRE SANS FIN ?



Hervé PUJOL,
Ingénieur de recherche UMR 5815 Dynamiques du droit / Unité mixte de CNRS
Université Montpellier 1

Le 8 juillet 2014, le préfet de l'Aude a pris un arrêté portant suspension de la mise sur le marché, à titre gratuit ou onéreux, des légumes racines, des légumes feuilles, des poireaux, du thym et des escargots ramassés dans la vallée de l'Orbiel et aux environs du site industriel de Salsigne, sur le territoire de huit communes. La raison de cette mesure tient au fait que ces produits présentent des concentrations en arsenic et en métaux lourds supérieures aux teneurs *"au-delà desquelles la sécurité des populations ne peut être garantie"*[1][2].

Cette suspension, d'une durée d'un an, n'est pas nouvelle : depuis 1997 et la mise en place d'un plan de surveillance dans la région, elle est systématiquement prorogée alors que les pouvoirs publics ont naguère reconnu qu'il paraissait *"difficile de pérenniser la reconduction régulière d'un arrêté de suspension sans chercher des solutions plus durables"*[3]. Mais, pour l'instant, ainsi que le précise le préfet en se fondant sur les conclusions d'une campagne d'échantillonnage des productions alimentaires de la vallée, *"les concentrations observées ne semblent pas évoluer"*. A cela, rien de vraiment étonnant : le secteur minier de Salsigne figure dans la liste des 28 sites à risques, constitutifs d'une *"menace pour la santé humaine ou l'environnement"*. Cet inventaire a été établi par l'État, en application de l'article 20 de la directive 2006/21/CE du Parlement et du Conseil du 15 mars 2006 relative à la gestion des déchets de l'industrie extractive. Déjà, en 2008, à l'occasion d'une visite sur le site, la Direction générale de l'environnement avait identifié des *"zones de dépôts de déchets mal confinées, mal réhabilitées et instables, ou traversées par des sources [qui] contribuent à maintenir un fond de pollution résiduelle non négligeable dans l'Orbiel"*[3]. Très récemment, les conclusions d'une thèse en géochimie isotopique environnementale, dirigée par le professeur Joël Lancelot[4], ont révélé que 10% seulement de l'arsenic dissous dans les eaux de surface de la rivière sont d'origine naturelle, ce qui démontre, à rebours, toute l'importance de la pollution d'origine anthropique persistant après réhabilitation de la zone.

Telle est la situation à Salsigne, dix ans après la fermeture de la dernière mine d'or de France métropolitaine et la cessation des activités métallurgiques attachées au traitement du minerai. C'est dire si, en dépit des importants travaux de réhabilitation réalisés successivement par l'Agence de l'environnement et de la maîtrise de l'énergie (Ademe) et le Bureau de recherches géologiques et minières (BRGM), le passif environnemental laissé par près de cent vingt ans d'une exploitation souvent chaotique, constitue, aujourd'hui encore, un héritage embarrassant, particulièrement délicat à liquider en termes de dégradation des aménités naturelles, d'impact sanitaire sur la santé des populations locales, et de recours contentieux.

Exemple ou contre-exemple, Salsigne offre de nombreuses pistes de réflexion

C'est à partir de ce constat préoccupant que des chercheurs montpelliérains[5] ont souhaité initier, à l'occasion d'un colloque consacré au site[6], une démarche prospective pluridisciplinaire susceptible de poser de nouveaux cadres d'analyses utiles à une meilleure appréhension des risques environnementaux et sanitaires associés à la poursuite des activités extractives. En effet, l'étude de l'ancien complexe industriel se situe au carrefour des sciences humaines et sociales et des sciences dites "dures". Elle intéresse non seulement les juristes, les historiens, les économistes ou les sociologues mais encore les géochimistes, les écotoxicologues ou les médecins

Press articles.
a) Article in the local press, Midi Libre, June 1990.
b) Article in the local press, Midi Libre, February 1992.
c) Humorous drawing, Midi Libre, March 1996.
d) Article in the technical press, Environnement et Technique, November 2014.

The different liability regimes used to remediate torts arising from damage to water and aquatic environments

In law, a legal liability implies an obligation to answer for the damages before a court and to assume the consequences, whether administrative, civil and/or criminal (Camproux-Duffrène, Labarussias-Comment, 2011). The term "liability regimes" means the legal instruments available to the judge to remediate a tort suffered by nature. As noted above, there are different types of judges and French law has a dual approach, both anthropocentric and ecocentric, to ecological damage. As a result, there are several liability regimes used to remediate the torts caused by damage to nature and, consequently, different manners in handling damage and remediation by the different judges.

Administrative judges rarely acknowledge ecological damage and do not remediate ecological torts

The administrative judge is one of the judges having jurisdiction over environmental issues. Administrative judges apply what is called the **regime of administrative police** and the **regime of environmental liability**, drawn from public law. Consequently, they punish actions or lack of action that do not comply with environmental regulations (contained in the Environmental code, but also in various other codes such as the Urbanism code, the Rural and maritime fishing code, the General code on the property of public entities, etc.) and can also sanction operational interventions of legal entities under public law likely to impact the environment. Administrative liability in environmental matters may also arise from decisions made either by the Court of Justice of the European Union, which indicates how that liability must be implemented (CJEU, 9 March 2010, Raffinerie Méditerranéenne et autres c/Ministères italiens et autres. Affaire C-378/08) or by the European Court of Human Rights (ECHR, 12 July 2005 Affaire Okay et autres c/Turquie req. 36220/97).

To date, administrative judges in France have rarely acknowledged purely ecological damage in the framework of administrative liability. They admit the possibility if specific conditions exist (CAA, 19 December 2013, SCI Sceaux Houdan Quatre Chemins req. 12VE00916), but they have done so only in rare cases such as the Assoc. Club mouche Allier decision on 23 April 2009 (CAA Lyon, 23 April 2009, Assoc. Club mouche saumon Allier: JurisData N° 2009-004038; AJDA 2009, p. 1429).

They do not accept the notion of an ecological tort and refuse to remediate damage unless the conditions establishing liability, notably a causal link, exist. Christian Huglo has spoken of the "traditional refusal of the administrative judge to remediate ecological torts" (Huglo, 2013).

Finally, **administrative judges have never had the opportunity to apply the directive and law on environmental liability** (LRE, Art. L. 161-2 C.). It would appear that in spite of the texts (notably Directive 2004/35), the absence of administrative liability in matters of remediation of ecological torts constitutes an obstacle to instituting compensatory measures (Drobenko, 2016).

The regime of environmental liability established by the LRE means that administrative judges can now take up affairs on the basis of the standard principles of liability in view of remediating, in application of the "polluter pays" principle, damage caused to the environment (Art. L161-1 and following in C. Env.). (See Box 6a.)

Box 6b

An example of coordination between European and French law concerning the remediation of damage to water, species or protected natural habitats

Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage
(Annex II Remediation of damage to water or protected species or natural habitats)
"Remedying of environmental damage, in relation to water or protected species or natural habitats, is achieved through the restoration of the environment to its baseline condition by way of primary, complementary and compensatory remediation (...)".

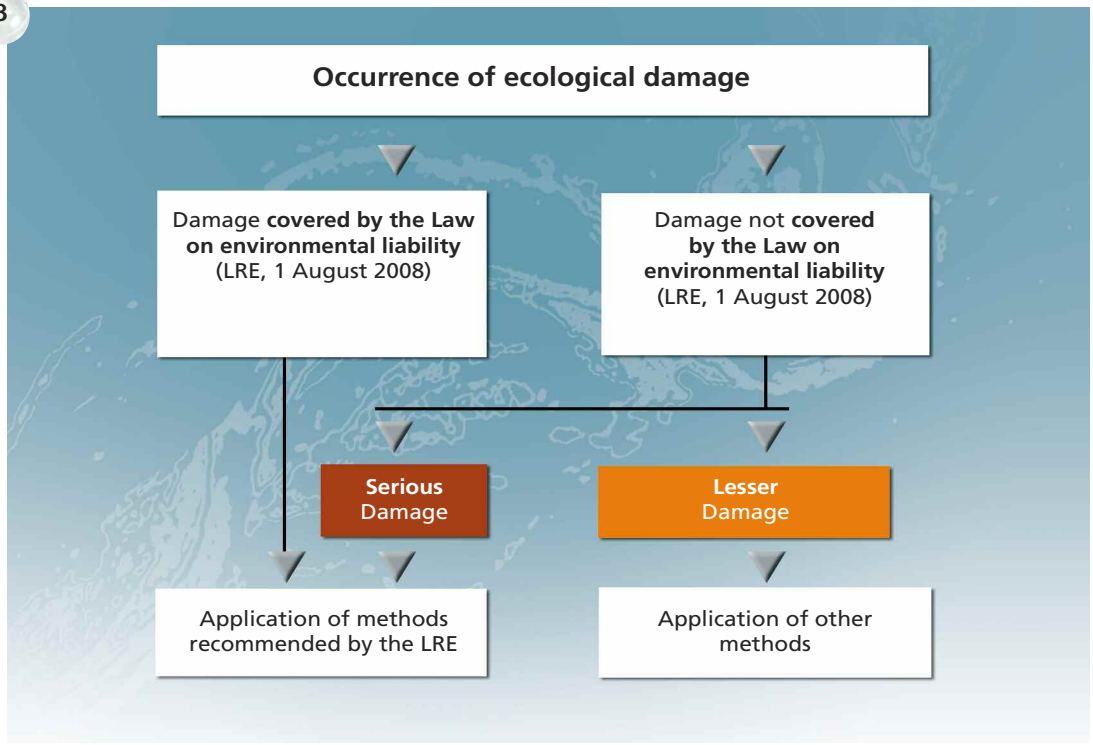
Law 2008-757 (1 August 2008) on environmental liability - Art. 1 (Article L.162-9 in the Environmental code)
"Measures to remediate damage to water, species and habitats mentioned in paragraphs 2 and 3 of section I in article L. 161-1 aim to restore these natural resources and their ecological services to their baseline condition and to eliminate any risk of serious harm to human health. The term "baseline condition" means the condition of the natural resources and ecological services at the time of the damage and that would have continued to exist if the environmental damage had not occurred. The assessment of the baseline condition is based on the best available information."

That being said, application of the law on environmental liability (LRE) raises a number of difficulties. First of all, assessment methods for ecological damages must be developed in order to carry out the remedial measures (compensation in kind) where possible. However, we will see in Chapter 3 that the situation is complicated, but that the discussions continue. Secondly, the coordination with the other liability regimes (civil and criminal) must be improved. Finally, the LRE established a liability regime only for certain damages caused to the environment. The law effectively targets damage impacting the good ecological status of water as defined by the WDF, but it is nonetheless restrictive in that it takes into consideration only damage deemed to be "significant" (see Annex II of the 2004 directive) and measurable (see Figure 8).

As of today, it may be said that **administrative litigation concerning damage to aquatic environments is primarily based on administrative-police measures and on administrative acts** (explicit or tacit decision) concerning verifications on activities, including administrative sanctions against those infringing on the regulations applying to their activities. The related litigation and that concerning liability for public constructions fills out this particular domain. This litigation is characterised by cases concerning the review of legality and by the liability regimes (fault, no-fault, exceptionally for gross negligence).

The same is true when the liability of public entities in the name of which the administrative authorities acted or refrained from acting is at issue. This is a highly common form of litigation in cases concerning water pollution. Finally, the objective may be to prosecute an offender guilty of damaging public land, an offence not covered by the statute of limitations, which requires that the offender restore the land damaged by his action, for example pollution of a sea coast or a release of substances affecting the bed of a state-owned river. In this case, the administrative judge does not sanction the damage caused to nature, but, for example, the non-observance of administrative procedures, illicit occupation of public land or an offence against the interests of the public authorities. This is often the case concerning the upkeep of aquatic environments (CE, 1 March 1965, Consorts Peydessus c/commune de Loudenvielle, N° 61280, Leb p.212) or the prevention of flood risks (CAA Lyon, 13 May 1997, Balusson c/Mutuelle du Mans, Dalloz 1998, p. 11). The prevention of risks (by environmental law, urban-planning law) and the management of public constructions and constructions intended to prevent risks are another sector where the administrative liability of legal persons governed by public law is engaged (CAA Nancy, 26 February 2009, Communauté urbaine de Strasbourg, req. N° 07NC00435).

Figure 8



Assessment methods are proportional to the seriousness of the damage. Source: Hélène Gaubert, CGDD.

Punishment by the criminal-court judge of offenders causing ecological damage

The law on criminal liability, applied by a criminal-court judge, is the branch of law that aims not to remediate the infraction, but to sanction the offender causing damage, including ecological damage when it constitutes a crime. The judge applies the Penal code and takes action to enforce the law in the interest of society. The sentence is intended to be dissuasive and consequently preventive. In this case, the water police no longer acts in the framework of the administrative police, but in that of the judicial police. Environmental inspectors work under the authority of the State prosecutors.

In terms of criminal liability, there must be an offence that results in damage to the environment. In a standard case, the judge pronounces a sentence that may range from a fine to a prison term.

The judge must sentence individually (Law 2014-896 (15 August 2014) on individual penalties and to reinforce the effectiveness of criminal penalties). In applying the penalty system, the judge may proceed immediately with sentencing or delay it, for example to provide the offender with time to remediate the situation and put an end to the offence. This is a common procedure in matters of ecological damage. It is a means, notably for criminal-court judges entrusted with defending the interests of society, to adjust the sentence to the seriousness of the offence and to the social and economic situation of the offender, and to bring the offender and victim together in a criminal procedure aiming to remediate the situation and even to reconcile the parties.

A judge is free to decide to apply a special procedure whereby he issues an injunction, under risk of fine, to restore the damaged area (Art. L173 L 173-5 C. Env.). This procedure is a means to obtain compensation in kind for the ecological damage and to **shift from a punitive procedure to an approach known as reparative or restorative justice.** The ministerial circular (21 April 2015) on criminal policy concerning environmental damage set the guidelines.

Criminal liability is therefore a means to promote ecological considerations as an essential value due to the educative function characterising criminal law (Camproux-Duffrène, Labarussias-Comment, 2011).

Remediation of ecological damage by the civil-court judge

The law on civil liability, applied by a civil-court judge, is the branch of law that determines the remediation of torts caused to a person by damage to their rights, either patrimonial (to which a monetary value can be assigned) or extrapatrimonial (to which a monetary value cannot be assigned). The judge intervenes only once the damage (the cause) has occurred to remediate the tort (consequence) affecting the person who brought the case before the court. The victim is said to sue for damages before a Trial Court or a District Court. All types of damage, including ecological damage, may cause various torts that can be remedied by the justice system (Art. 1240 and following in C. Civ., formerly article 1382). Remediation takes place either in kind (through the return of the environment to its baseline condition or, failing that, compensation in kind), the preferred solution wherever possible, or in the form of financial damages (according to the principle of financial compensation).

In civil law, a return to the baseline condition corresponds to the concept of restoration in ecological terms. This consists of turning the situation back to the baseline condition, i.e. what it was before the damage occurred (Viney, Jourdain, 2001). A return to the baseline condition has been accepted in court decisions because, for example, the *Cour de Cassation* did not refuse the restoration of a stream that had been reworked without authorisation (C. Cass., 14 September 1999, Hello, N° 98-84.345, Dr. Env., 20000, N° 82, p.4).

Compensation in kind is somewhat different and consists of restoring ecosystem functions, most often however on a site other than that which suffered the damage because restoration of the first site is not possible. This frequently raises ecological problems because it is often forgotten that the sites where compensation (see Chapter 3) is to take place are already the result of a compensation in the sense that there are no longer any truly wild lands in France.

Financial compensation consists of paying an amount of money that will supposedly be used to remediate the tort suffered due to the loss caused by the damage. The purpose of civil liability in this case is to indemnify the victim with an amount equivalent to the loss. Financial compensation nonetheless raises considerable problems due to the principle that damages may be used as the recipient sees fit, i.e. the judicial authorities may not check that the money received is in fact used to remediate the damage for which it was awarded.

The civil liability regime enables the civil judge, on the basis of the Civil Code, to compensate the damage that was caused to nature and that it causes to humans (Art 1240 and following in C. Civ.). However, it also very recently made it possible for a third party to initiate legal proceedings on behalf of nature. Article 142-2 in the Environmental Code stipulates that non-profit groups (...) may exercise the rights accorded to plaintiffs in cases dealing with direct or indirect torts to the interests that the group was established to protect.

Conclusion

Two assistant judges at the *Cour de Cassation* usefully noted in 2007 that the judicial system has without any doubt rendered decisions that remediate ecological torts. They added that the decisions took place under conceptual ambiguities that lessened their doctrinal impact.

In 2017, these observations remain perfectly valid. It must be said that major progress has been made. Legislative initiatives, progress in the jurisprudence or simply greater social awareness have all shifted in the direction of improved characterisation of ecological damage and gradually better acknowledgement and remediation of ecological torts through more or less elegant adaptation of the different liability regimes. The insertion of the concept of ecological torts in the Civil Code via the law to restore biodiversity is the latest clear sign of that trend. This gigantic and encouraging effort continues. The news contains reports on that progress nearly every day. Whether the reports concern the passions aroused by the risk of a legal decision being overturned, the raised voices of the non-profits defending those who have no voice or the projects initiated by the Minister of Justice, ecological damage is a topic in the news that is taken seriously into account by the concerned public authorities. However, it would be presumptuous to say that this progress is sufficient.

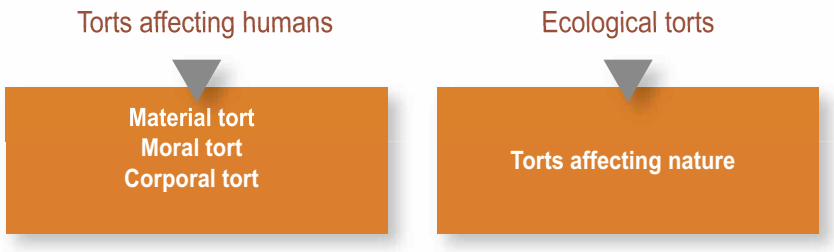
Legal decisions acknowledging ecological damage and granting remediation of the ecological torts caused are few and far between, and do not reflect a consistent legal doctrine. As noted, the administrative, civil and criminal judges have different approaches. And even within a given liability regime, depending on the facts and how they are interpreted by the jurisdictions, different decisions can be rendered in resolving litigation. A number of factors explained this situation. One of those factors is the difficulty that judges have in understanding ecological damage, which is defined using highly technical legal instruments.

Key concept

Ecological damage is an impact on the environment and on the functioning of an ecosystem that can constitute a tort for humans and nature.

Key points in understanding the subject

Ecological damage may result in several types of torts for which the victim or a representative may request remediation.



Key points to remember

There are three different types of judge and three liability regimes used to remediate torts arising from damage to water and aquatic environments.

Environmental liability

To date, administrative judges in France have rarely acknowledged ecological damage in the framework of administrative liability.
They do not acknowledge the existence of ecological torts.
Administrative judges have never had the opportunity to apply the Directive and Law on environmental liability (LRE) and consequently have never examined the concept of ecological damage.

Civil liability

Remediation takes place either in kind (through the return of the environment to its baseline condition or, failing that, compensation in kind), the preferred solution wherever possible, or in the form of financial damages (according to the principle of financial compensation).

Criminal liability

The judge may pronounce a sentence that may range from a fine to a prison term. The sentence represents the repressive function of criminal law.
A judge may also decide to apply a special procedure whereby he issues an injunction, under risk of fine, to restore the damaged area. This procedure is a means to obtain compensation in kind for the ecological damage and to shift from a punitive procedure to an approach known as reparative or restorative justice.

When the legal, scientific and technical sectors work together

2

Technical aspects involved in dealing with ecological damage

Introduction

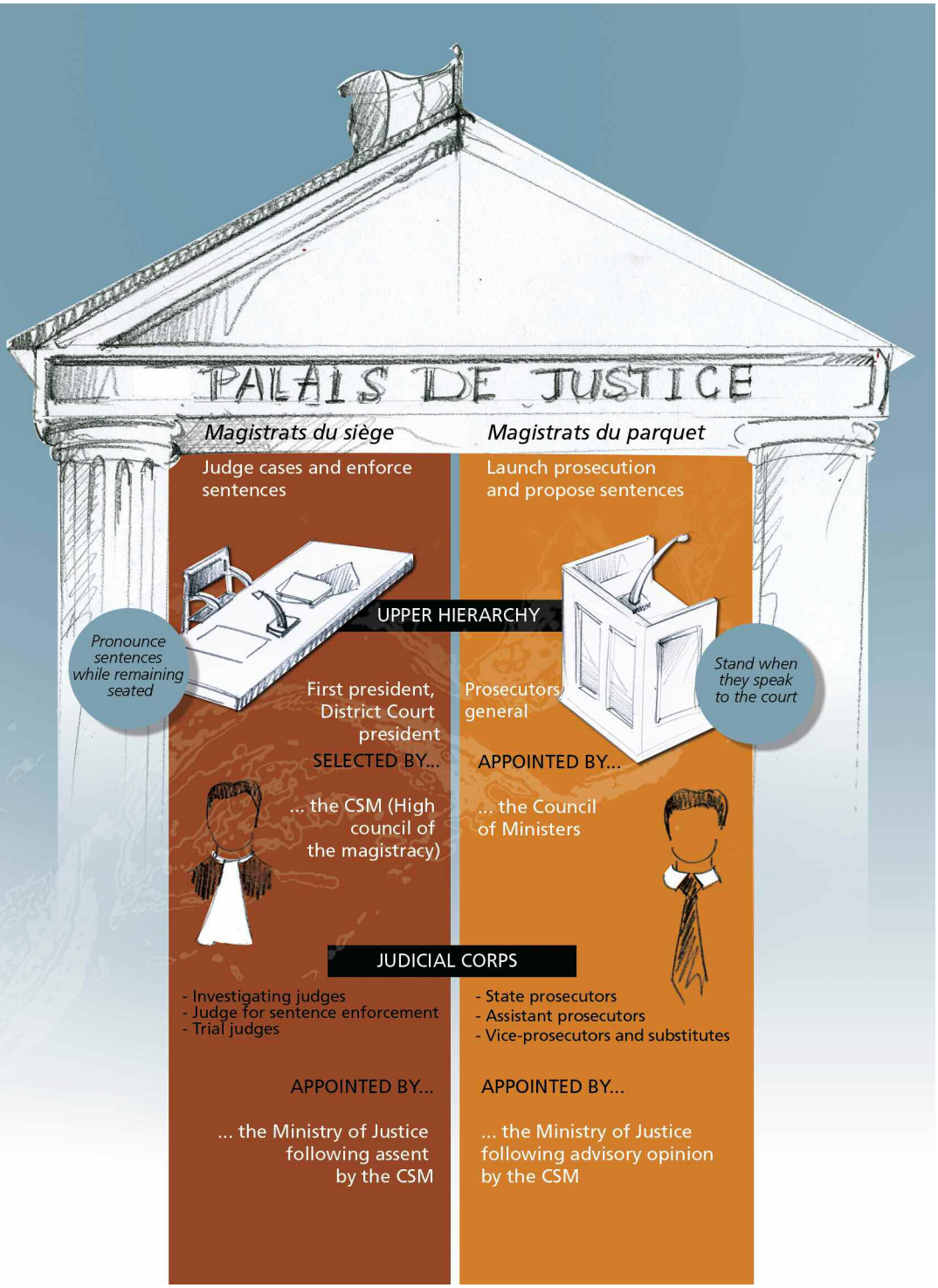
The technicalities inherent in the law on water and aquatic environments means that the legal system must work with the scientific and technical communities, notably when attempting to establish proof of damage, a tort and liability. The *magistrats du siège*, i.e. primarily the civil and criminal judges, whom we will focus on henceforth, are always confronted with the need to justify their legal decisions. Consequently, they attempt to use clear and accepted concepts, facts and methods in order to reinforce their "intimate conviction" and to express this subjective reality that serves to justify their final decision in a manner as eloquent as possible. A judge needs proof of the facts on which to base his decision. A judge also needs to understand the situation and to grasp the ecological, social and economic impacts on society. The above is also true for the *magistrats du parquet*, i.e. the State prosecutors, who need to understand the issues surrounding ecological damage before deciding to prosecute or to close the case without further action. The judges and prosecutors generally have a firm grasp on the social and economic aspects prior to making a decision, but that is not always the case concerning the ecological aspects (see Figure 9 and Box 7). That is why both judges and prosecutors call on scientific and technical experts, often having a wide array of qualifications, at precise moments in a case, according to increasingly well defined conditions for cooperation, as is shown by the guidelines set for prosecutors in the field of environmental damage.

Box 7

What is a magistrate? The *magistrats du siège* and the *magistrats du parquet*

In terms of their statutory position, judges are part of the judicial corps which includes the *magistrats du siège* (judges) and the *magistrats du parquet* (State prosecutors), as well as the magistrates in the central administration of the Ministry of Justice, a fact that is often forgotten. All of them are governed by the provisions of Ordinance 58-1270 (22 December 1958) on the organic law for the judiciary, which refers, for the most part, to the rules governing public services. This means that the *magistrats du siège* and the *magistrats du parquet* all fall under the same judicial status, even though they have radically different roles. The mission of a *magistrat du siège* is to judge impartially and in complete independence. The mission of a *magistrat du parquet* is to enforce public policies. The State prosecutor represents the State before all the jurisdictions that are part of the judicial system (see Figure 9).

Figure 9


PALAIS DE JUSTICE
Magistrats du siège
Magistrats du parquet
Judge cases and enforce sentences
Launch prosecution and propose sentences
Pronounce sentences while remaining seated
Stand when they speak to the court
UPPER HIERARCHY
First president, District Court president
Prosecutors general
SELECTED BY...
APPOINTED BY...
... the CSM (High council of the magistracy)
... the Council of Ministers
JUDICIAL CORPS
- Investigating judges
- Judge for sentence enforcement
- Trial judges
- State prosecutors
- Assistant prosecutors
- Vice-prosecutors and substitutes
APPOINTED BY...
APPOINTED BY...
... the Ministry of Justice following assent by the CSM
... the Ministry of Justice following advisory opinion by the CSM

The role of scientific and technical legal experts in civil and criminal cases

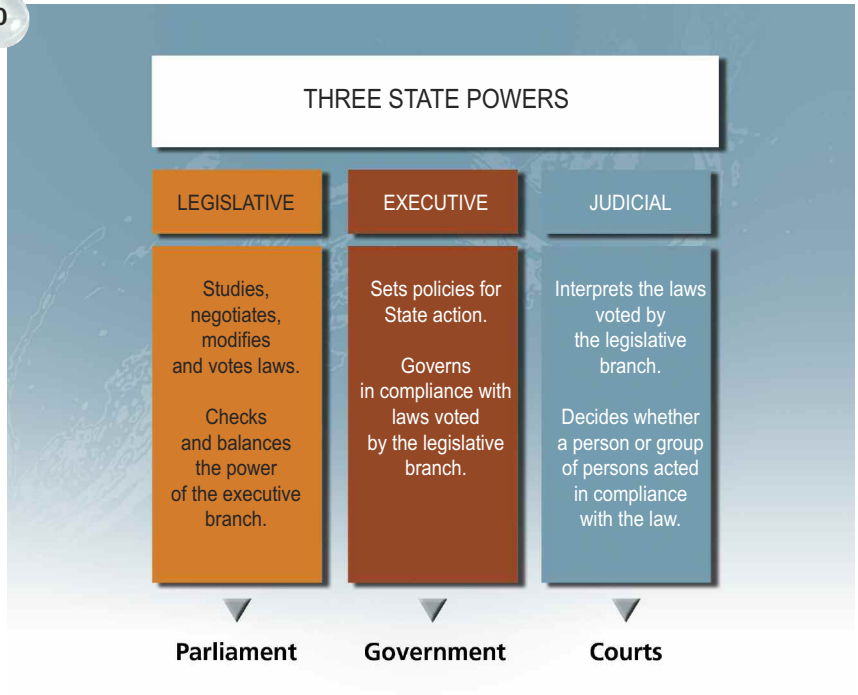
The collaboration between the legal sector and the scientific and technical communities is organised on the basis of **guidelines for methods**, **procedural rules** enabling the various stakeholders to improve their cooperation, and what is called the **expertise procedure**, a term covering multiple activities that, though complementary, differ significantly. When discussing the links between the legal sector and the scientific and technical communities, it is important to note that the use of expert knowledge may intervene a different times that each correspond to various juridico-political situations that it is important to distinguish.

The use of technical and scientific experts during the drafting or the implementation of a law is organised in the framework of a procedure called **expertise in view of a political decision**, i.e. a procedure intended to inform the authorities in charge of making a political decision (legislators, political decision-makers) (Majone, 1996; Muller, 1995; Granjou, 2003). In this framework, the expert, in light of his particular knowledge (not necessarily scientific) based on his experience (not the same as his length of service), is called on by the competent authority to provide information, in a neutral, independent and impartial manner, in view of a decision. This type of expertise is called on during the formulation, modification and implementation of a law, i.e. to inform the executive or legislative powers in view of making a political decision (see Figure 10). It will not be developed here.

On the other hand, the collaboration between the legal sector and the scientific and technical communities may also serve to inform the judicial authorities according to specific conditions when a judge requires assistance in establishing the proof of ecological damage, of a tort and of a liability. In this case, the judge brings into play a procedure called **expertise in view of a legal decision** (see Box 8). The mission of an expert, who may act in a number of roles that will be examined below, is to assist the judge with technical and/or scientific knowledge in a field where scientific certainty is often lacking. For example, how can a causal link be established between pollution in a river and a nearby farm when the pollution has a nonpoint-source making it difficult to assign liability. The expert, **appointed by the judge**, proceeds with tests, observations and analyses that help the judge in his investigative role and consequently in **forming his "intimate conviction"**.

Expertise in view of a legal decision is therefore a means of overcoming the technicality of the law on water and aquatic environments and consequently a **constituent element in environmental litigation** in both the jurisdictional spheres (see Figure 10 and Box 8). As a means of scientific and technical investigation, it is required by judges in view of making a decision and rendering a verdict.

Figure 10



The separation of powers in France.

Box 8

The major texts concerning judicial expertise

General framework

Law 71-498 (29 June 1971) on judicial experts.

Decree 2004-1463 (23 December 2004) on judicial experts.

Expertise in criminal cases

Code of criminal procedure, articles 156 to 169-1.

Expertise in civil cases (decision, operations, opinions, etc.)

Code of civil procedure, articles 263 to 284-1.

Expertise in administrative cases (designation, operations, report, costs, etc.)

Code of administrative procedure, articles R621-1 to R621-14.

Costs and expenses

Code of administrative procedure, articles R761-1 to R761-5.

Differentiating between legal experts, knowledgeable persons and witnesses

During a criminal case, it is the **exclusive right of the judge** to initiate the expertise procedure as a means of scientific and technical investigation. Consequently, no one else is entitled to do so. This is an option available to French judges due to a specific aspect of French litigation procedure, the **inquisitorial system** whereby the judge plays an active role in conducting the legal investigation. In criminal law, for example, an investigating judge may launch the procedure during the investigation. The investigation is a step in the criminal procedure during which the investigating judge undertakes a number of acts to find information (judicial inquiry). In civil and administrative law, the judge may launch the procedure on his own or at the request of a party in the proceedings to consolidate the available information. A judge is never obliged to have recourse to the procedure, however in the field of environmental litigation, it is very common because the technicality of environmental law means the judge must assess highly diverse sets of facts and information (Clément, 2011). This technicality is such that some countries have even set up special courts for environmental matters, e.g. Finland. **It is also the judge who selects the type of expertise**. He can call on scientific and technical experts that are either judicial experts, knowledgeable persons or witnesses.

■ A **judicial expert** is a particular type of expert used in view of a legal decision (Decree 2004-1463 (23 December 2004) on judicial experts. Judicial experts are named in official lists drawn up following a selection procedure based on the person's demonstrated knowledge. The lists operate according to a "recurrent" principle (Cour de Cassation, 2007). The lists put a judge in a position to work with experts who are familiar with the legal sector and understand the *modus operandi*, thus ensuring compliance with procedures and the independence of the judicial power. A judicial expert is therefore a professional (a researcher, a scientist working in a public agency or service, a technician, etc.) who, temporarily, sets aside the standards applicable in his sector and adopts those specific to the legal procedure. The activity as a judicial expert is not a profession. It is a **status** that requires special knowledge and exceptional intellectual honesty. An expert does not act for personal gain, but with the general interest in mind. **According to the *Cour de Cassation,* the expert receives his "status according to the conditions set by law"** (see Box 8).

In addition to judicial experts and to **ensure correct functioning of the system of justice in a highly technical field,** the Ministry of Justice recommends that representatives of the State services and/or the agents who reported on the environmental violations take part in the criminal proceedings. The agents can provide the court with precise information on the context and the relevant issues concerning the regulations, as well as information on the preventive measures taken. They can also supply information that is essential for complementary penalties and suitable remedial measures.

It is precisely to ensure correct functioning of the system of justice that environmental inspectors assist the court. They act either as knowledgeable persons or as witnesses.

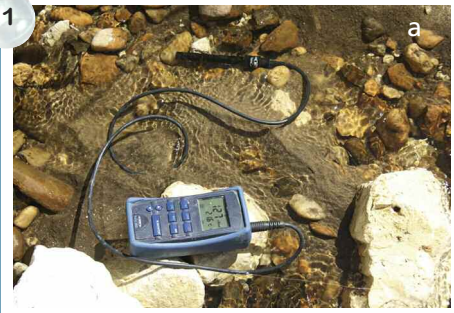
■ A **knowledgeable person** is not a judicial expert. That being said, the person is nonetheless an expert assisting the court prior to its decision. When environmental inspectors are summoned as knowledgeable

persons by prosecutors, they are **simply invited to speak before the court.** Contrary to a witness (see below), an environmental inspector is summoned in his capacity as a **qualified person** (Art. 442-1, CCP). He receives a simple letter containing the **official notice** of the summons. However, this does not mean that he will necessarily speak during the procedure. The prosecutor may wish to have qualified persons in **court**, but he is not required to call on them. Similar to judicial experts, **a knowledgeable person must be fully aware of legal customs and procedures**. A knowledgeable person swears to provide the technical assistance required to fully understand the facts and legal issues, but under no circumstances may he say anything that may in any manner influence the decision on the guilt of the defendants, because that would be sufficient justification to simply annul the trial (see Figure 11).

■ Environmental inspectors may also be called as **witnesses**. In this case, the summons is served by an officer of the judicial police or by a court bailiff. When the inspector is invited to speak, he must swear to say the truth, the whole truth and nothing but the truth prior to beginning. This oath-taking is not a simple detail. It indicates full compliance with the procedural rules of the legal system. In addition, the environmental inspector **may not be in the courtroom** during the initial interrogation of the defendants. This procedure ensures greater objectivity, but is more cumbersome.

In the two latter cases (knowledgeable persons and witnesses), environmental inspectors serve as **persons assisting the court in its work**. They provide the court with non-judicial knowledge, i.e. other means, in addition to judicial techniques, of preparing and justifying the decision of the judge (Dumoulin, 2000). To that end, they reply clearly and simply to the questions in order to enhance the understanding of the judge and assist him in grasping the general context of the public policy that the inspectors participate in enforcing.

Figure 11



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c, Céline Goupil - AFB

Knowledge on environments is essential in the work to preserve and restore them.
a) Check water uses to avoid damage.
b) Efforts against poaching.
c) Produce knowledge on the status of populations and any changes.
d) Report on damage.
e) Monitor the status of an environment.

When does an expert take part in a judicial trial?

An expert may take part in the trial as a judicial expert, a knowledgeable person or a witness, but in all cases he intervenes at a precise step in the procedure.

In the criminal case that we will use here as an example, the prosecutor must justify the accusation by providing proof, obtained during the investigation, concerning the guilt of the defendant being prosecuted for social disorder and the damage inflicted on the general public interest and on social values. An environmental inspector plays an important role in gathering the evidence used in reporting the violation and in providing essential information on, for example, the impact of pollution and the related issues. The conduct of the expert must be faultless to ensure his neutrality and to that end, the prosecutor invites him to intervene at a precise moment in the procedure (see Figure 12).

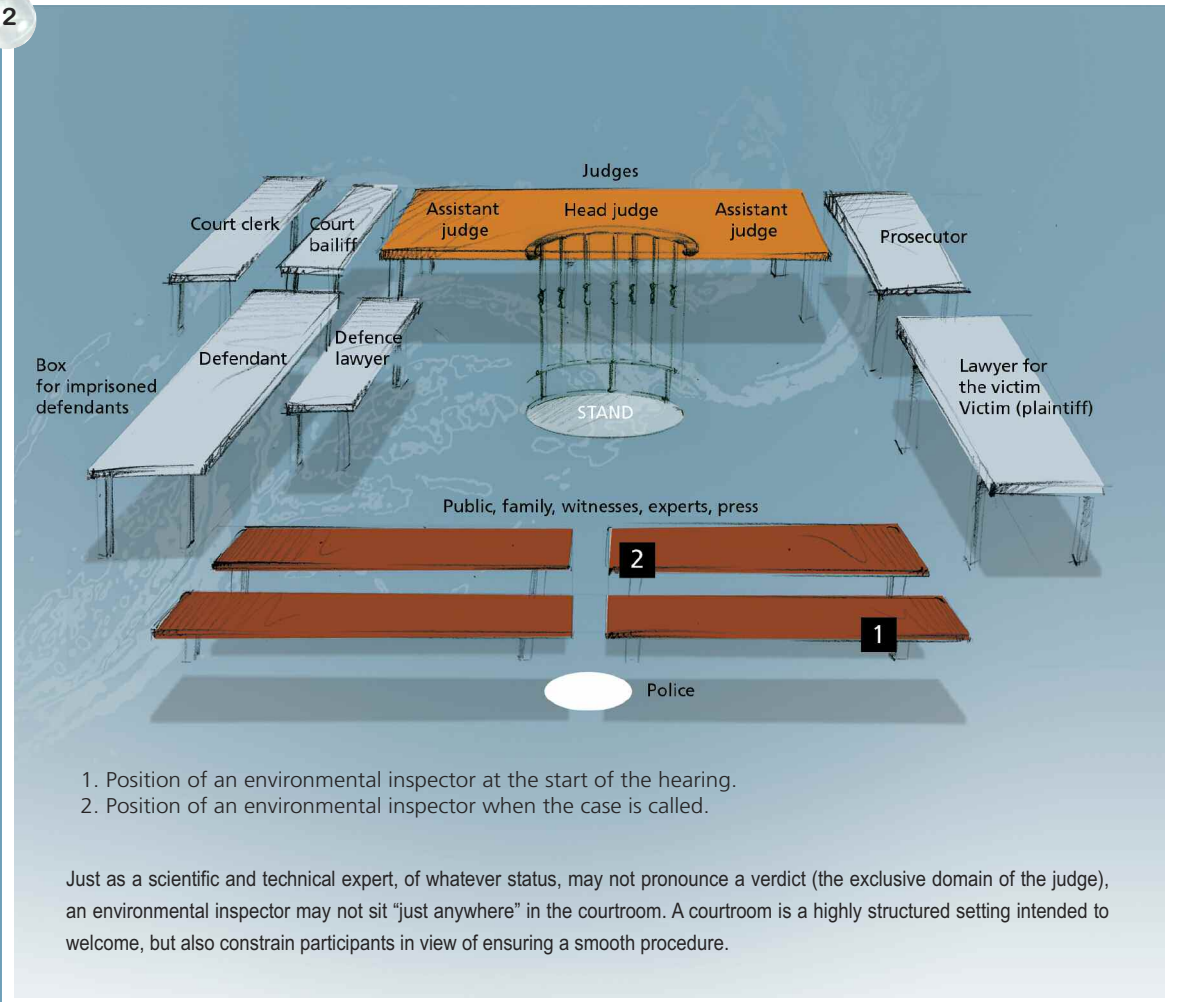
■ A criminal case takes place in three steps, the investigation, the contradictory procedure and the conclusion.

1. The **investigation** is the phase during which the facts are presented to the court. The judge questions the defendant at the stand and may also call the victim(s), if present, and the experts to the stand. This is precisely the moment during the trial that the environmental inspectors intervene, either as knowledgeable persons or as witnesses. At the end of this step, the investigation is said to be closed.

2. The **contradictory procedure** begins with the request for remediation by the victim(s) who may or may not have decided to intervene as a plaintiff in the case in order to receive civil damages. It is also at this point that the judge invites the prosecutor to defend the interests of society. The prosecutor stands to present the accusation. Following that, it is the turn of the defence lawyer to take the floor if the defendant decided to call on the services of a lawyer (not mandatory in criminal cases). Finally, the judge offers the defendant a chance to make comments and provide any further information.

3. During the **conclusion**, the judge sets a date for the verdict, which may be immediate or at some later time.

Figure 12



1. Position of an environmental inspector at the start of the hearing.
2. Position of an environmental inspector when the case is called.

Just as a scientific and technical expert, of whatever status, may not pronounce a verdict (the exclusive domain of the judge), an environmental inspector may not sit "just anywhere" in the courtroom. A courtroom is a highly structured setting intended to welcome, but also constrain participants in view of ensuring a smooth procedure.

The positions of participants in a trial. See P. Boyer - AFB.

Opposite the public, on the bench, are seated the judge(s) who will render the verdict. To one side are the prosecutor(s) representing the State. On the other is the court clerk who holds the minutes of the case (not including the verdict) and notes any significant events during the case. Depending on the layout of the room, the prosecutor and clerk may find themselves on one side or the other.

In the middle of the bench, the head judge organises the hearing, conducts the debates, asks questions and generally decides on how the case should progress. The lawyers, with or without their clients, are seated at tables between the public and the bench. In general, the defendant and his lawyer are seated to one side and the victim (plaintiff) and his lawyer to the other. Environmental inspectors occupy two spots, the first at the start of the hearing and the second when the case is called.

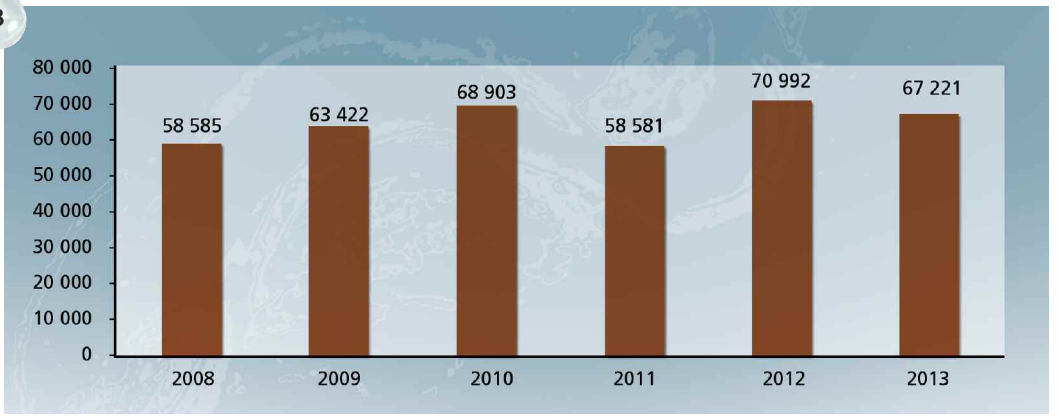
Onema and prosecutors, an example of increasingly well defined conditions for cooperation

It is not always easy for judges and prosecutors to discuss cases with scientific and technical experts. Both judges and prosecutors train in the human and social sciences which bring into play rationales and a terminology that differ significantly from those used by the earth and life sciences (and vice versa). In addition, the theoretical backgrounds and the work methods and environment differ greatly between jurists and scientists, with as a result **different perceptions** of ecological damage. These differing perceptions are due to what are called the **epistemological cultures** of each metier (Haas, 1989; Knorr-Cetina, 1999).

What is more, a judge is involved in a complex procedure that requires the coordination of different variables that cannot depend exclusively on science and its objectivity. For example, the economic situation of the defendant is a factor that the judge takes into account because his verdict must enforce the law, but also be adapted to the perceived social justice. The concept of justice deals essentially with institutions and activities taking into account social justice. It also reflects a philosophical and moral ideal.

As a result, the collaboration between the legal sector and the scientific community is not always easy, fully understood or particularly effective, given the divergent professional cultures and expectations. That is why it is necessary to create common work habits, sites for discussions and institutionalised (or to be institutionalised) behavioural standards. The collaboration between the law, science and technology is growing steadily in step with the increase in the number of offences damaging natural environments and the growing percentage of serious offences (see Figures 13, 14 and 15). The objective now is to make this collaboration more effective in cases of damage to water and aquatic environments, and to the environment in general. A number of measures taken by public authorities all point in this direction.

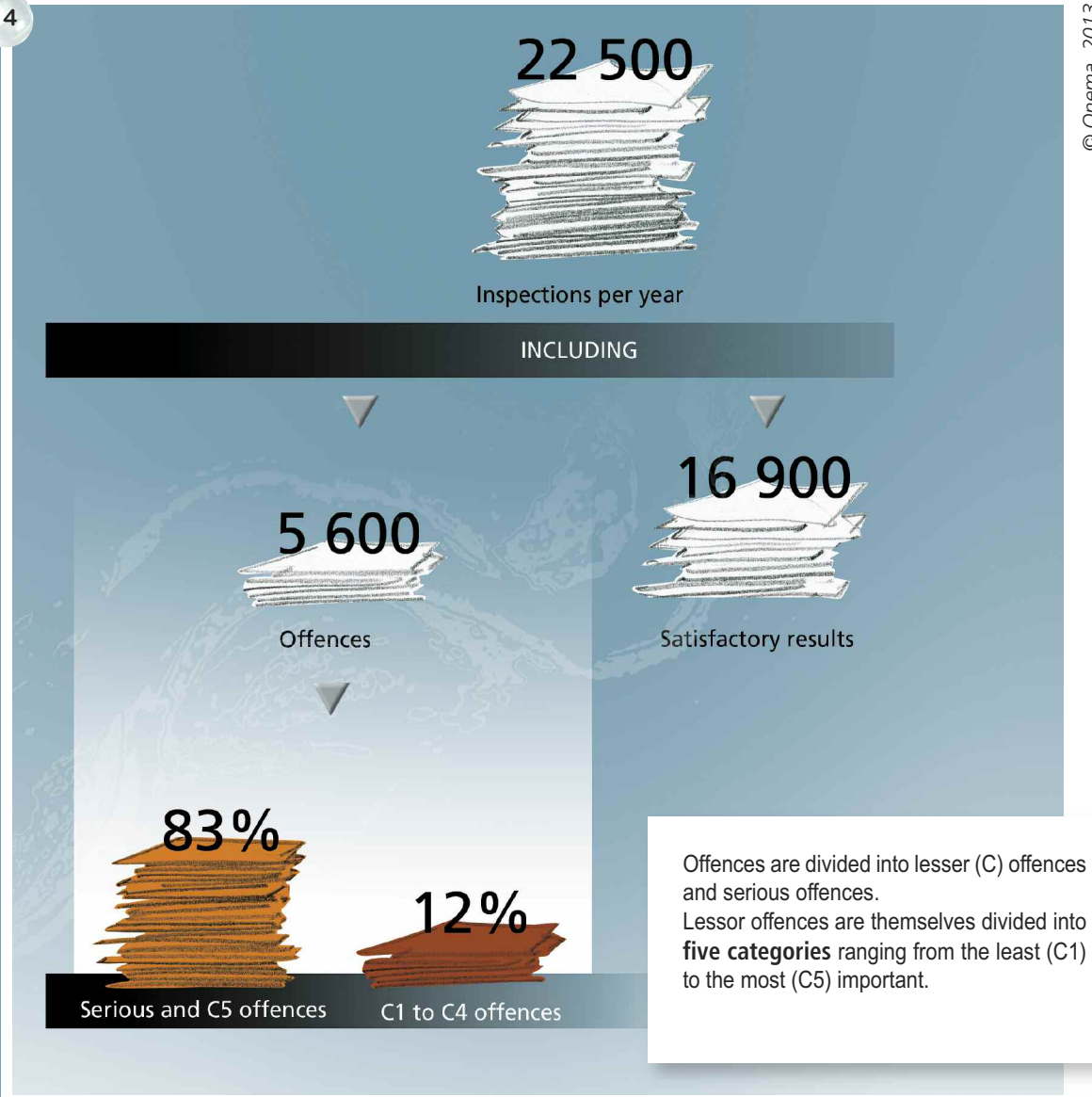
Figure 13



Offences against environmental law reported from 2008 to 2013.

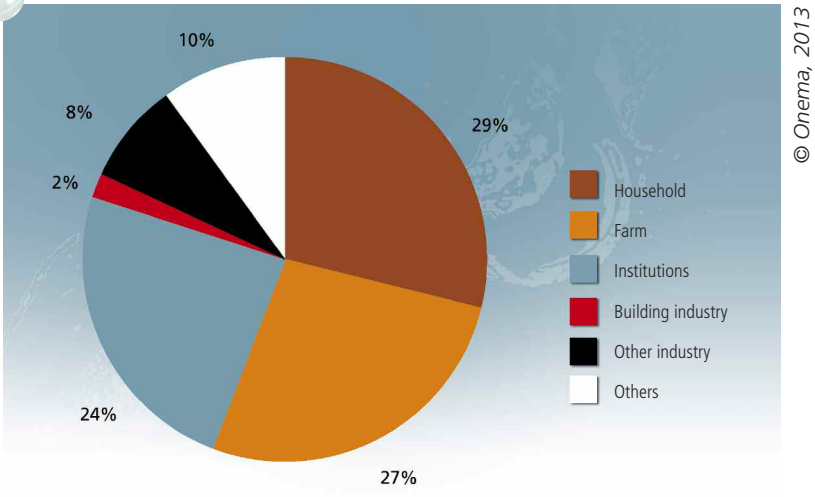
© Onema - DGGN - ONCFS Exploitation ONDRP, 2014 report.

Figure 14



Offences against environmental law reported in 2013 (by Onema). Data from a presentation made during a meeting between Onema (DIR 3) and the Prosecutor's office at the Court of Appeals in Reims.

Figure 15



Distribution of offenders in 2013. Data from a presentation made during a meeting between Onema (DIR 3) and the Prosecutor's office at the Court of Appeals in Reims.

The ministerial circular dated 23 May 2005 (updated on 21 April 2015) required that a prosecutor be designated specifically for environmental issues in each office of a State prosecutor or Prosecutor general. Their role is to personally take action against damage to the environment, notably by organising meetings with the local State services, with the agencies in charge of the water police and with the representatives of the environmental non-profits (see Box 9). It is in this framework that the designated prosecutors follow special technical training courses or participate in sessions to learn to "translate" the opinions drafted by experts and the arguments put forward by highly specialised lawyers. Onema contributes to these efforts with its special training session for prosecutors and the fact that it has appointed special contact persons for prosecutors in its local offices.

Box 9

Special contact persons for prosecutors at Onema

Within each local office at Onema (which became AFB as of 1 January 2017) and, where necessary, with assistance from the head of inspections, an environmental inspector (either the local chief inspector or an inspector acting under his responsibility) ensures the technical coordination with the local prosecutor's office for both investigations and the subsequent legal proceedings. **This important job is one of the driving forces behind the inspection work done by the agency and requires both legal and technical skills.**

The special contact person plays a multi-faceted role.

First of all, he **represents the agency**. In this role, he can, for example, present the agency and its missions, the inspection programme for water and natural environments in general and the inspection programme of his local office.

Secondly, he is active in the **operational management of the judicial police** for his department by collecting the contact information of prosecutors and going to meet them, by setting up communication channels and by ensuring good technical coordination between the Gendarmerie and the national police.

A further mission of the contact person is to **raise the awareness of local stakeholders and jurists concerning the water police, a rather special type of police**. To that end, he attempts notably to understand and transmit the specific needs of prosecutors concerning environmental law in view of effective action within the agency to take those needs into consideration.

Finally, the contact person is a key factor in ensuring smooth cooperation between the legal sector and the agency, for example by monitoring the results of legal proceedings initiated by agency reports, representing the agency during hearings and requesting clarifications from the persons involved concerning certain decisions.

To effectively fulfil all of these missions, the contact person must have mastered all the technical aspects of this multi-faceted role, aspects which range well beyond the necessary **ecological technical knowledge** to include the **legal and political context** in which he operates. The training programme for contact persons set up by the agency provides the necessary information on the operations of the environmental police carried out by agency personnel.

That information includes the following points:

- coming to grips with and implementing the Ordinance on unifying criminal procedures (11 January 2012):
- implementing the latest *Statement of objectives* containing guidelines for reinforced inspections and **more effective collaboration with prosecutors to enhance the efficiency of police work;**
- the 2013 and 2016 reports by the Court of Auditors and the resulting action plans oblige the agency to reinforce its inspection system and fill out the reporting methods by setting up indicators on the departmental level to enhance management, analyse results more closely and measure the effectiveness of the inspection system.

In addition to all the above points are the tensions with the farming sector, the new judgement by the European court against France for non-observance of the Nitrates directive, etc.

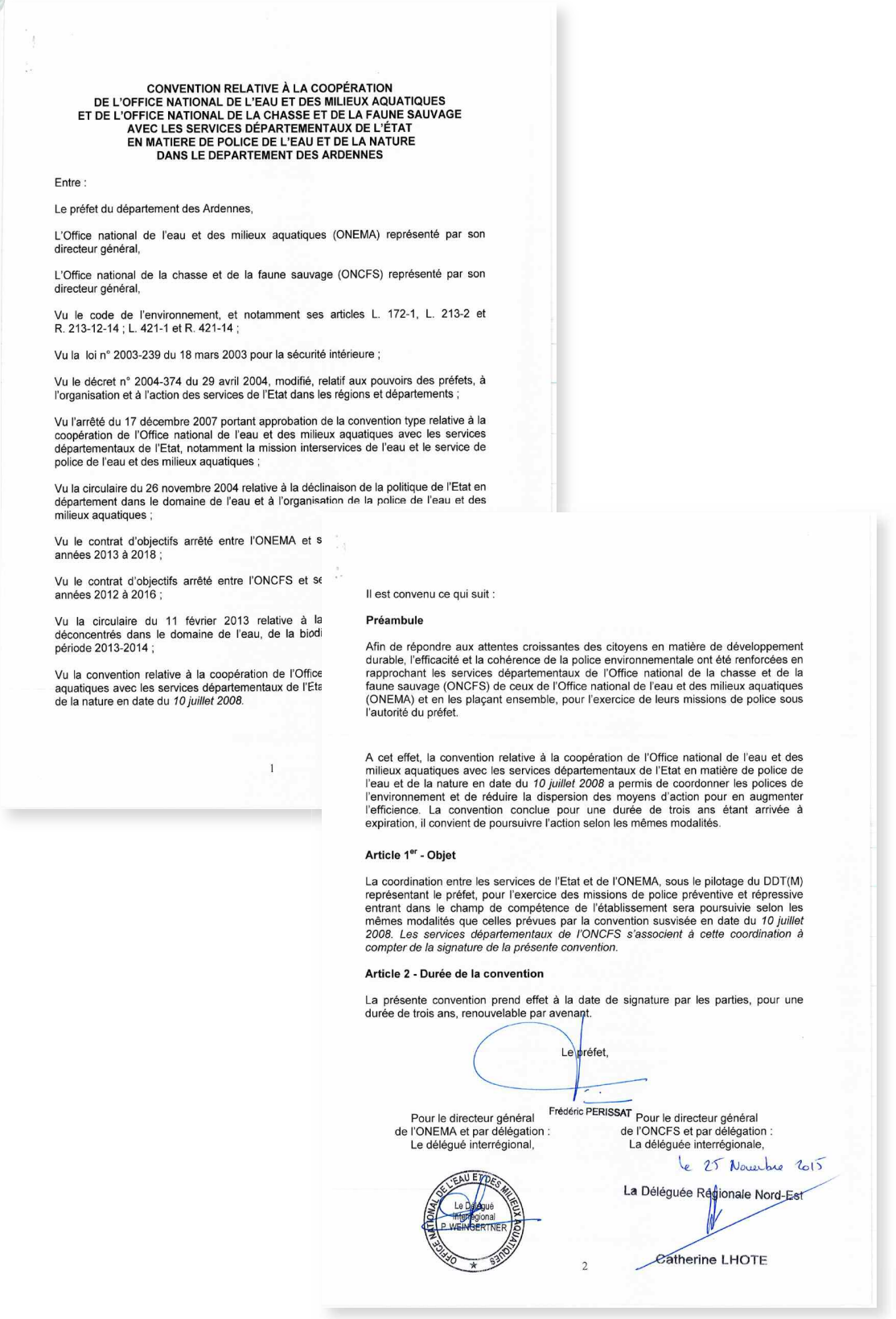
The purpose of the training programme offered by the Inspections and territorial-action department (Onema) for prosecutors is to reinforce the cooperation between the Prosecutors general, prosecutors and the agency. The training programme targets four main objectives:

- improve observance of environmental regulations through enforcement activities that are instructive, effective, proportional to the offence and dissuasive;
- strengthen the operational links between prosecutors and the agency to improve monitoring of legal procedures;
- create common ground concerning environmental criminal policy between the Prosecutors general, prosecutors and the agency;
- set up a common strategy for post-inspection activities and, after analysing the context and work habits, make concrete proposals for improvements in the sequence of operations in processing citations for offences concerning water and aquatic environments.

Along the same lines, on 3 December 2013, a national symposium was held at the Paraclet national training centre on “managing an environmental crime scene”. Some 30 persons attended, including prosecutors, specialised gendarmes and environmental inspectors. The meeting served to present a number of special, technical capabilities of the Central office for offences harming the environment and public health (OCLAESP), of the Criminal research institute and of the National nuclear, radiological, biological and chemical unit, three units of the *Gendarmerie nationale* based in the Paris region and specialised in complex, judicial investigations. All of the above capabilities can be called on by prosecutors and judges. A number of concrete case studies were presented, dealing on the one hand with “crime scenes and waste” (burial of chemical products and asbestos-based waste) and, on the other, with “crime scenes and water” (water pollution). This type of meeting is a typical example of the work undertaken to collaborate with prosecutors.

Finally, the ministerial circular dated 21 April 2015 notes that prosecutors must participate in preparing criminal policies suited to environmental issues in conjunction with the other partners active in the MISENs (Inter-agency water and nature group) where inspection programmes are established (see Figure 16). It also indicates that prosecutors are encouraged to sign agreements with the Prefects and public agencies in order to coordinate the criminal and administrative action required to prevent or sanction ecological damage.

Figure 16



**CONVENTION RELATIVE À LA COOPÉRATION
DE L'OFFICE NATIONAL DE L'EAU ET DES MILIEUX AQUATIQUES
ET DE L'OFFICE NATIONAL DE LA CHASSE ET DE LA FAUNE SAUVAGE
AVEC LES SERVICES DÉPARTEMENTAUX DE L'ÉTAT
EN MATIERE DE POLICE DE L'EAU ET DE LA NATURE
DANS LE DEPARTEMENT DES ARDENNES**

Entre :

Le préfet du département des Ardennes,

L'Office national de l'eau et des milieux aquatiques (ONEMA) représenté par son directeur général,

L'Office national de la chasse et de la faune sauvage (ONCFS) représenté par son directeur général,

Vu le code de l'environnement, et notamment ses articles L. 172-1, L. 213-2 et R. 213-12-14 ; L. 421-1 et R. 421-14 ;

Vu la loi n° 2003-239 du 18 mars 2003 pour la sécurité intérieure ;

Vu le décret n° 2004-374 du 29 avril 2004, modifié, relatif aux pouvoirs des préfets, à l'organisation et à l'action des services de l'Etat dans les régions et départements ;

Vu l'arrêté du 17 décembre 2007 portant approbation de la convention type relative à la coopération de l'Office national de l'eau et des milieux aquatiques avec les services départementaux de l'Etat, notamment la mission interservices de l'eau et le service de police de l'eau et des milieux aquatiques ;

Vu la circulaire du 26 novembre 2004 relative à la déclinaison de la politique de l'Etat en département dans le domaine de l'eau et à l'organisation de la police de l'eau et des milieux aquatiques ;

Vu le contrat d'objectifs arrêté entre l'ONEMA et s
années 2013 à 2018 ;

Vu le contrat d'objectifs arrêté entre l'ONCFS et se
années 2012 à 2016 ;

Vu la circulaire du 11 février 2013 relative à la
déconcentrés dans le domaine de l'eau, de la biodi
période 2013-2014 ;

Vu la convention relative à la coopération de l'Office
aquatiques avec les services départementaux de l'Eta
de la nature en date du *10 juillet 2008*.

1

Il est convenu ce qui suit :

Préambule

Afin de répondre aux attentes croissantes des citoyens en matière de développement durable, l'efficacité et la cohérence de la police environnementale ont été renforcées en rapprochant les services départementaux de l'Office national de la chasse et de la faune sauvage (ONCFS) de ceux de l'Office national de l'eau et des milieux aquatiques (ONEMA) et en les plaçant ensemble, pour l'exercice de leurs missions de police sous l'autorité du préfet.

A cet effet, la convention relative à la coopération de l'Office national de l'eau et des milieux aquatiques avec les services départementaux de l'Etat en matière de police de l'eau et de la nature en date du *10 juillet 2008* a permis de coordonner les polices de l'environnement et de réduire la dispersion des moyens d'action pour en augmenter l'efficience. La convention conclue pour une durée de trois ans étant arrivée à expiration, il convient de poursuivre l'action selon les mêmes modalités.

Article 1er - Objet

La coordination entre les services de l'Etat et de l'ONEMA, sous le pilotage du DDT(M) représentant le préfet, pour l'exercice des missions de police préventive et répressive entrant dans le champ de compétence de l'établissement sera poursuivie selon les mêmes modalités que celles prévues par la convention susvisée en date du *10 juillet 2008. Les services départementaux de l'ONCFS s'associent à cette coordination à compter de la signature de la présente convention.*

Article 2 - Durée de la convention

La présente convention prend effet à la date de signature par les parties, pour une durée de trois ans, renouvelable par avenant.

Le préfet,

Frédéric PERISSAT

Pour le directeur général
de l'ONEMA et par délégation :
Le délégué interrégional,

OFFICE NATIONAL DE L'EAU ET DES MILIEUX AQUATIQUES
Le Délégué
Interrégional
P. WEINGERTNER

Pour le directeur général
de l'ONCFS et par délégation :
La déléguée interrégionale,

le 25 Novembre 2015

La Déléguée Régionale Nord-Est

Catherine LHOTE

2

Inspection programmes and agreements.

Conclusion

Scientific and technical input is a resource available to judges in order to clarify an issue requiring the knowledge of an expert, however the judge alone decides on whether to call on an expert and whether to follow the expert opinion.

This is because the power to judge is drawn from the sovereign functions of the State and is confided to the judge due to his specific knowledge base. However, in some cases, juridical knowledge is not sufficient and, because a judge must first understand before he can come to a decision, scientific and technical knowledge may be used by the judge during the fact-finding investigation.

In cases specifically concerning water and aquatic environments, the available scientific and technical knowledge, though strictly regulated by the applicable legislation, is often called on by judges in the process of preparing their verdict.

It is often on the basis of this information and notably the assessments of the damage done and the tort incurred that a judge will dismiss a case, order compensation in kind or award financial damages.

Key concept

Scientific and technical knowledge is a collaborative tool involving the legal, scientific and technical sectors, called on and used by a judge in preparing a judicial decision. A judge may make use of it in proving the existence of ecological damage, of a tort and of a liability.

It is a constitutive element in environmental litigation in both the jurisdictional spheres.

Key points in understanding the subject

The expert, appointed by the judge, proceeds with tests, observations and analyses that help the judge in his investigative role and in forming his "intimate conviction".

The expert may play different roles in the procedure. But whether the scientific and technical expert takes part in the trial as a judicial expert, a knowledgeable person or a witness, in all cases he intervenes at a precise step in the procedure.

Key points to remember

There are three different roles for three types of expert knowledge in cases involving damage to water and aquatic environments.

Judicial expert

Judicial experts are named in official lists drawn up following a selection procedure based on the person's demonstrated knowledge. The lists put a judge in a position to work with experts who are familiar with the legal sector and understand the *modus operandi*, thus ensuring compliance with procedures and the independence of the judicial power. A judicial expert is therefore a professional who, temporarily, sets aside the standards applicable in his sector and adopts those specific to the legal procedure. He takes part in all court sessions dealing with the case.

Knowledgeable person

A knowledgeable person is not a judicial expert, but simply a person assisting the court. That being said, the person is nonetheless an expert who provides information to the court prior to its decision. He is summoned by the prosecutor in light of his professional qualifications. He receives a simple invitation to speak before the court. He takes part in all court sessions dealing with the case.

Witness

Similar to a knowledgeable person, a witness is not a judicial expert, but simply a person assisting the court. A witness also provides the court with necessary information. However, for a witness, the summons is served by an officer of the judicial police or by a court bailiff. In addition, the witness may not be in the courtroom during the initial interrogation of the defendants.

Assessing damage during a trial. From an assessment of damage to an assessment of remedies

3

Introduction

The decision to remediate an ecological tort depends on the independent judgement of the judge. It is always a decision by the court that creates or denies the existence of an ecological tort and determines whether the defendant must remediate the situation according to precise conditions. An assessment is therefore a means, among others, used by the judge during the procedure to justify and inform his decision (see Chapter 2). That being said, **it is a complex process in which the judge must proceed methodically, step by step** (Camproux Duffrène, 2010).

This is because it is necessary, for an assessment of damage to water and aquatic environments, first to determine what we are talking about. However, the term "assessment" is one of those words that allow for many different interpretations. The definition provided in dictionaries highlights the ambivalence of the term, which can mean both an action, i.e. the determination of a value, and the result of that action, i.e. the quantity or value determined. The verb "to assess" has numerous synonyms, where the most frequent are to evaluate, estimate, weigh, measure, count, gauge, hypothesise, examine, cost, sound, quantify, etc. This long list confirms the malleability of the term and suggests that an assessment may pursue a wide array of objectives. For example, an assessment of damage to aquatic environments may mean the work done to determine the quantity or the value of the damage, where the term value is understood *lato sensu*. The point here is not to precisely define the term, however it is possible to identify a few traits of assessments and to agree, in our context, that **to assess means to translate**.

But who does the translating? In what framework does the translation take place? What is translated? How is it translated? To provide some answers to these questions and to assist in gaining an overview, it is necessary to analyse the judicial procedures, to highlight their meaning, subtleties and objectives. This first step is indispensable in order to draw attention to the fact that **judicial procedures do not form a uniform ensemble**, they comprise multiple aspects that, undertaken separately or in conjunction with each other, follow different procedural paths. These procedural factors mean that the judge must advance in a methodical manner, even step by step for combined cases, a common situation where damage to water and aquatic environments is involved. We will then see that the framework for judicial procedures, within which the judge must operate, structures how an assessment may take place and can place it in a particular light. It will become clear that, though in everyday language the terms "assessment of damage" and "assessment of the tort" are often used synonymously, in the legal sector, these two terms are different. Assessments take place at two complementary, but different times in the procedure, which explains why it should be said that **the assessment of damage takes place before the assessment in view of remediating the tort**.

The different judicial procedures for damage caused to water and aquatic environments

The concept of judicial procedures is vast and, where damage to water and aquatic environments is concerned, requires the existence of a wrongful act justifying remediation. It leads to one of three situations:

- a criminal case alone before a criminal judge;
- a civil case alone before a civil judge;
- a combined civil and criminal case before a criminal judge who will produce both a civil and a criminal judgement.

Each type of case brought before a given judge targets specific priorities, namely punishment of the offender and a dissuasive effect for criminal procedures and remediation of the damage for civil procedures. These two procedures may be conducted separately, however their obvious complementarity led the legislator to provide for a **combined procedure**. This last scenario is the most common for cases involving damage to water and aquatic environments.

A criminal case to qualify and punish the offence that caused the damage

An offence is a constitutive element of a criminal because the act against the law causes damage that entitles society to punish the accused. **That being said, the purpose of a criminal procedure does not consist exclusively of punishment**. Criminal law enforcement is highly dissuasive due to the sanctions imposed and the publicity given to judgements (Drobenko, 2014). The term criminal or public procedure is the means by which a society calls on the judicial authority, acting in the name and in the interest of society, to determine whether the punishable act in fact exists, to prove the guilt of the accused and to impose the sanctions foreseen by the law in order to have the accused acknowledge the act before society and to dissuade him from repeating the act.

Environmental inspectors are authorised by the law to investigate and report environmental offences concerning water and nature, pursuant to the Environmental code and the Code of penal procedure (CPP) (see Boxes 10 and 11). They launch what is called a judicial-police procedure, i.e. they report offences against criminal law, gather evidence and attempt to identify the person(s) that committed the offence.
In this type of procedure, three elements are required to engage the criminal liability of an accused, whether a natural or legal person:

- a legal element, i.e. a legal text prohibiting the offence (Art. 111-3 in the Penal code);
- a material element, i.e. an effective offence;
- a moral element, i.e. a guilty intention (Art. 121-3 in the Penal code).

The judicial-police procedure starts when an environmental inspector, or any other agent authorised to investigate and report offences against the Environmental code, investigates or per chance observes an offence, in compliance with all procedural rules, and ends when the agent sends the citation and any accompanying documents to the State prosecutor.

In this context, the reporting agent, who operates as the judicial police under the authority of the State prosecutor, always keeps in mind that the evidence gathered is intended for the prosecutor who must, when bringing a case, provide sufficiently solid information to convince the judge. In compliance with article 427 in the Code of penal procedure (CPP), a judge may base his decision exclusively on the proof or on the evidence freely debated during the hearing that is brought to his attention. The State prosecutor must therefore provide "sufficient evidence" of guilt on the part of the defendant, who is presumed innocent and benefits from any doubt. For more serious or complex offences, an investigation may be requested by the State prosecutor in order to obtain more information than that provided in the citation (MEEM, 2015).

Box 10

Legislation governing agents active in the judicial police in the field of water, nature and natural sites, contained in the Code of penal procedure (CPP)

Article 12 CPP

"The work of the judicial police is carried out, under the instructions of the State prosecutor, by the officers, civil servants and agents designated in this title."

Article 14 CPP

"Its mission, in compliance with the distinctions laid out in this title, is to report offences against criminal laws, to gather evidence on the offence and to identify the responsible person(s) as long as a criminal procedure (assigned by the prosecutor to an investigating judge, prior to a judgement) has not been opened.
Once a criminal procedure has been opened, the judicial police complies with the requests and executes the orders of the investigating judge(s).

Article 15 CPP

"The judicial police comprises:
1. officers of the judicial police;
2. agents and deputy agents of the judicial police;
3. civil servants and agents to whom certain judicial-police functions are assigned by the law."

Article 28 CPP

"The civil servants and agents of the administrations and public services to whom special laws assign certain judicial-police powers exercise those powers under the conditions and within the limits set by those laws."

Article 40 CPP

"All authorities, public officers and civil servants who, in the execution of their functions, gain knowledge of a crime or misdemeanour must immediately inform the State prosecutor and transmit to the prosecutor all relevant information, citations and other documents."

Legislation governing civil servants and agents assigned certain judicial-police functions by the Environmental code

Article L. 172-1

"I. In addition to judicial-police officers and agents and other public agents specially authorised by the present code, persons authorised to investigate and report offences against the provisions of this code, all enacting documents and the provisions of the Penal code concerning the disposal of waste, refuse, materials and other objects include the civil servants and public agents assigned to the State services in charge of implementing said provisions, to the National agency for hunting and wildlife, to the National agency for water and aquatic environments, to the National parks and to the Agency for marine protected areas. These agents are called environmental inspectors."

"II. To carry out the missions exposed in section I., the authority granted to environmental inspectors is divided into two categories:

1. Authority concerning water and nature, which gives them the right to investigate and report offences contained in Title II, VI and VII in the present book, Chapters I to VII in Title I of Book II, Book III, Book IV and Titles VI and VIII in Book V of the present code and the enacting documents, as well as the offences contained in the Penal code concerning waste, refuse, materials and other objects;

2. Authority concerning regulated installations for environmental protection, which gives them the right to investigate and report offences contained in Titles II, VI and VII in the present book, Book II and Titles I, II, III, IV, V and VII in Book V of the present code and the enacting documents."

"III. Environmental inspectors are commissioned by the administrative authorities and sworn in to investigate and report all or part of the offences mentioned in 1. and 2. of II of this article. The enacting conditions of this article are set by decree taken in the *Conseil d'État*."

The start of a criminal procedure thus depends on the State prosecutor who decides on the outcome of all citations received, on the basis of article 40-1 in the Code of penal procedure (CPP). There are a number of possibilities:

- no procedure following immediate (Art. 40 CPP) or conditional (Art. 41-1 CPP) closing of the case;
- alternatives to criminal charges via mediation (Art. 41-1-5 CPP), penal transaction (Art. 6 CPP) or penal composition (Art. 41-2 and 41-3 CPP) (see Box 12);
- simplified criminal charges via set fines (Art. 529 and R.48-1 CPP), a penal ordinance (Art. 524 CPP) or a summons following admission of criminal liability (Art. 495-7 and following, CPP);
- criminal charges via immediate summary trial (Art. 397 and following, CPP), a summons (Art. 388 and following, CPP) or the opening of a judicial investigation (Art. 80 CPP).

Box 12

Brief description of a penal transaction

A penal transaction is a procedure that puts an end to a criminal case. It avoids bringing criminal charges while providing a solution for the faulty behaviour. The transaction must be accepted by the defendant and approved by the State prosecutor.

A penal transaction is proposed by a departmental or maritime Prefect, prior to being approved by the State prosecutor, whereas all other alternative procedures intended to avoid criminal charges lie exclusively in the domain of the judicial authorities. The State prosecutor is responsible for all criminal procedures in his geographic area. That is why it is necessary to involve the prosecutor in implementing this procedure, jointly, in compliance with the guidelines for criminal policy set by him, and that can be laid down in writing in the agreement signed with the Prefect and the public agencies in charge of inspections. In exercising his power to decide on the usefulness of pressing criminal charges, the prosecutor determines, case by case, whether he approves the proposals for penal transactions, once they have been accepted by the accused, or opposes the proposals, taking into consideration the overall savings provided by the proposals.

The decision to transact or to close the case is not made public.

A transaction does not preclude the civil case.

If the State prosecutor decides to press charges and the criminal procedure is launched, the case is transmitted to the criminal judge who must determine the existence of the offence in order to punish the non-observance of the law by ascertaining a sanctionable act, demonstrating the guilt of the accused and applying the sanctions foreseen by the law. In other words, the role of the criminal judge is to characterise the damage and to assess its impacts in order to pronounce a sentence proportionate to the reprehensible act. The characterisation of the damage is consequently an essential step in the criminal procedure because if there is no damage, there can be no condemnation. **The damage caused by the offence is a constituent element in the criminal procedure.**

The criminal judge may be confronted with the criminal procedure alone, or the plaintiff(s) may also bring the civil procedure seeking remediation before the criminal judge. In which case the judge must manage both the criminal and the civil procedures. That being said, whether the criminal procedure is carried out jointly or not with the civil procedure, the objectives and the steps of the criminal procedure remain the same. A criminal procedure is punitive in nature and sanctions the non-observance of the law in as much as it caused damage. In this sense, it suspends the civil procedure until the criminal procedure is terminated because only an effective tort can be remedied.

A civil procedure to request remediation of a tort

The main objective of a civil procedure is to oblige the defendant to remediate the tort caused. The essential factor here is the remediating effect of the civil liability (see Chapter 1). Contrary to a criminal procedure, which is carried out in the name and the interest of society, a civil procedure is specific to a person entitled to act. It is that person who decides on how to undertake the procedure.

A civil procedure may be conducted independently of a criminal procedure. This manner of proceeding is the most common before the general courts. It opposes a plaintiff and a defendant before a civil court presided by a civil judge.

However, a person entitled to act may also decide to attach the civil procedure to the criminal procedure (Art. 3 CCP). Though combined procedures are simply an option, they are nonetheless the most frequent situation in civil law concerning damage to water and aquatic environments. In this case, it is the adjunction of the civil suit to the criminal procedure that enables the plaintiff to request remediation of the tort caused by the damage resulting from the offence. In other words, the offence triggers both the criminal and the civil procedures. The existence of the offence entitles society to punish the defendant and any directly concerned persons to request remediation. This is a positive factor in that the plaintiff explains before the court the links between the offences and the interests requiring remediation. Even though the criminal law in fact applies (it does not require any justification), the civil proceedings are a chance to clarify the link between the damage and the tort.

Given that an ecological tort infringes not on an individual interest, but on collective interests, the right to take legal action seeking civil liability for the tort in question has been granted to several categories of legal persons, but not, to date, to natural persons. In the field of water and aquatic environments, plaintiffs are essentially certified non-profits for environmental protection (groups formally established for over five years when the reprehensible event occurs and active in the field of water or regulated installations) and the fishing federations (Art. L. 142-2 C. Env.). In addition, these groups may be mandated by natural persons having suffered individual torts caused by a given person and having a common origin (Art. L. 142-3 C. Env.). Recently, class actions1 were made possible for non-profits in the environmental field (Art. L. 142-3-1 established by Law 2016-1547 (18 November 2016, Art. 89).

These suits seeking civil remediation may also be brought by certain public agencies and institutions, such as Onema (now AFB), the Water agencies, Ademe, etc. (Art. L. 132-1 C. Env.). On the basis of the new law to restore biodiversity and the new article 1386-19-2 in the Civil code, “Civil litigation to remediate ecological torts may be undertaken by the State, State prosecutors, the French biodiversity agency, local governments and their constituent units when their territory is concerned, as well as all persons entitled and having a legitimate interest”.

This possibility to take action in favour of aquatic environments is derived from the fact that all legal persons whose main objective (legal or according to their statutes) is environmental protection in a given area, as well as all legal persons whose particular attributes in the environmental field place on them special responsibilities concerning the protection, management and conservation of a territory may request remediation of ecological torts, as defined by article L. 161-1 in the Environmental code, that harm the collective interests that these persons (legally or according to their statutes) are charged with defending before all the relevant jurisdictions.

The request for remediation in a civil procedure may be either:

- a request for compensation in kind, i.e. restoration of the damaged environment or ecological compensation;
- a request for monetary remediation, i.e. a monetary award.

This explains why, concerning damage to water and aquatic environments, the idea of an assessment is instinctively and generally linked to that of the ecological tort and consequently to that of a civil procedure whose objective is to remediate the tort(s). The assessment is thus linked to the choice concerning the type of remediation and to how the remedy is calculated. This instinctive reaction is not erroneous, however it is only partially true because, on paying closer attention to the steps involved in a combined (civil and criminal) procedure, the most frequent situation, it becomes clear that this is not exclusively the case. A particular type of assessment corresponds to each judicial procedure. That is why it is essential to correctly distinguish the assessment of ecological damage and that of ecological torts.

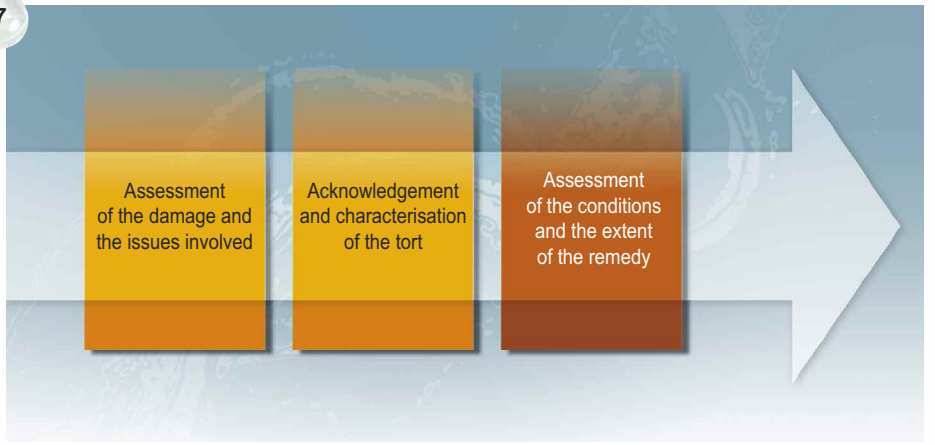
1. It should be noted that the Law (24 May 2016) on modernising the justice system for the 21st century expanded the scope of class actions to the environmental field. However, an environmental class action is not intended to remediate an ecological tort. This new possibility marks a major step forward in remediating damages caused to persons (see Chapter 1), but not those caused to the environment.

Judicial procedures, a framework for assessments of damage caused to water and aquatic environments

During a criminal procedure, the assessment of damages caused to water and aquatic environments enables the judge to characterise the action and to transform the damage (the cause) into a legally recognised offence (the legal consequence). As noted above, this criminal procedure is generally triggered by a citation drawn up by an agent of the judicial police (or equivalent) and the decision of the State prosecutor to press charges. It is at this point in the judicial procedure that the agents may provide any and all factual information that will assist the judge in characterising the offence, in determining liabilities and, to that end, in understanding the issues involved in the damage to the aquatic environments (see Chapter 2). In short, the judge calls on all the available information enabling him to **assess the ecological damage**.

During the civil phase of the procedure, the plaintiffs request remediation for one or more torts and the assessments submitted will enable the judge, first of all, to determine whether the plaintiffs have provided proof of their affirmations and, secondly, to decide on the conditions and the extent of the remedy. It is clear that these two "translations" both participate in the same procedure, however the two operations should not be confused. The assessment of the damage is a step that takes place before the assessment of the means to remediate the tort (see Figure 17).

Figure 17



The different types of assessment during a judicial procedure.

Assess the damage and the issues in order to identify and characterise a tort

An assessment of damages involves determining the impacts of a pollution or any other cause on the environment in order to express the damage in legal terms and determine whether one or more remediable torts exist (see Chapter 1). For the criminal judge, an assessment of damages therefore means gathering all the information required to make a final decision. In short, during this "investigative" phase, the judge assesses the damage to identify and understand the issues involved (see Box 13). It is during this phase that the judicial experts, knowledgeable persons and witnesses discussed in Chapter 2 participate in the procedure. As noted above, their role is the assist the judge in assessing the damage by providing solid, tangible proof of its existence. During this phase of the procedure, the objective is therefore to assess the effective damage done to ecosystems, i.e. to undertake an ecological assessment of the damage.

In this manner, similar to a situation involving the health of a person where the judge calls on medical experts to determine the degree of harm done, in a case involving ecological damage, the judge calls on ecological experts to assess an alteration to an environment, a pollution or destruction.

Box 13

Understanding the issues involved in managing river discharges and the corresponding damage

The objective of the European water framework directive (WFD) and its enacting texts in French law is to restore all aquatic environments to good ecological status. Dams are an obstacle to the restoration of good status.

Since the beginning of human civilisation, men have attempted to manage the flow of rivers using dams and weirs. Today in France, there are at least 75 000 structures blocking rivers and streams, including several hundred that are over 20 metres high.

These structures were built during different periods and for different reasons, notably to control discharges (limit flooding and increase supply during low-flow periods), to establish reserves, produce energy, raise fish, facilitate navigation and, more recently, create recreational areas, etc. However, today, approximately half of all the inventoried structures serve no identifiable purpose.

Dams and weirs disturb river functioning in many different manners. They modify the hydrological regime, disturb ecological conditions both upstream and downstream of the structure, reduce the river's self-cleansing capacity, modify erosion and sediment-transport processes, collect sediment and pollutants, fragment habitats of aquatic species and block the travel of long-distance migratory fish. Finally, they represent a danger if they rupture and can increase flooding risks upstream.

Where applicable, all the above issues should be brought to the attention of the judge.

This first step is crucial because it puts the judge in a position to proceed with the **legal assessment of the tort *stricto sensu***, i.e. an evaluation of the infringed right followed by a check that the right was effectively infringed (Camproux-Duffrène, 2010). Using the information provided by the experts on ecological damage, the judge translates the ecological damage into legal terms, i.e. he checks that the damage represents an infringement on a right having legal standing. Not all damage is reprehensible. Only damage fulfilling the criteria of the various liability regimes is remediable.

In other words, only damage infringing on a legally protected right or interest (see Chapter 1) can produce an effect in law. The absence of a legal basis for damage is consequently an obstacle to remediation. If damage is not recognised as such by the law, the judge cannot take it into account nor assess it, even though the ecosystem has in fact been damaged in ecological terms.

These two phases (first analyse the damage, then express it in legal terms) put the judge in a position to conclude concerning the existence of one or more torts (see Table 1). Once the existence of a tort (ecological or other) is clear, the judge then draws the legal consequences in terms of the remediation during the civil phase (see Box 14 and Figure 18).

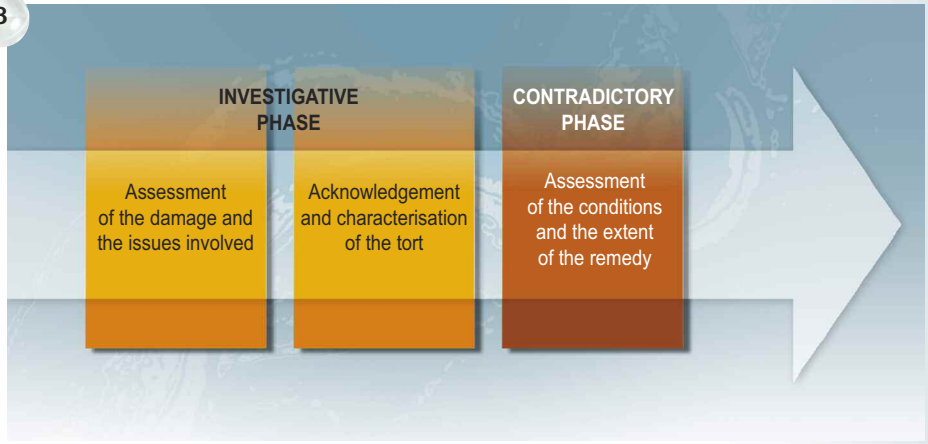
Box 14

From the diagnosis to remediation

In a case involving bodily harm, the medical assessment, carried out by a medical expert, describes and "costs" according to a "medical tariff" all the physiological and psychological aspects of the damage done to the person. The calculation of the damages by the judge aims to set the monetary amount of the financial compensation. The remedy consists of a monetary equivalent for the damages incurred. The medical assessment is the key factor in correct compensation because neither the insurance company, nor a jurist or lawyer, nor the judge can determine whether a given tort has been correctly assessed or whether there exists a link between it and the initial damage (an accident, attack, medical incident, etc.).

The same is true for ecological damage. For example, the ecological assessment by a knowledgeable person serves to describe and evaluate, according to "ecological indicators" the damage done to the environment. The assessment produces a type of diagnosis. And without an in-depth analysis of the damage, optimum remediation is not possible.

Figure 18



From the diagnosis to remediation.

When assessing the damage, the judge can use methods specifically designed for that purpose. There exist only a small number concerning this very specific phase. However, one example that does exist is the V2I method developed by AFB.

The **V2I method** was developed in 2002 by the personnel of the High council on fisheries (CSP, which later became Onema and then AFB) during an initial study on the assessment of ecological damage in rivers. This method is based on the assumption that the ecological damage is equal to the difference between the initial ecological value and the value resulting from the damage (Nihouarn, 2007). In assessing the damage, it brings four parameters into play, used to characterise the natural patrimony (environment and species) and the disturbance (duration and intensity). It focusses on ecological damage to continental aquatic environments (rivers, lakes) and impacting essentially the quality of water and habitats. This method attempts to better assess the non-market aspects of damage to aquatic environments. It was presented during a symposium organised by the *Cour de cassation* (Nihouarn, 2007) and subsequently used by a number of District Courts (see Box 15).

The advantage of this method, developed by personnel continuously confronted with problems concerning the legal interpretation of the offences reported by them, is that it was designed specifically with judges in mind. However, the method is also confronted with a number of limitations, notably the fact that it has been used in only a small number of cases, all concerning rivers and where the judges used and interpreted the method in different manners (see Box 15). That is why Onema launched an effort to consolidate the method for damages noted in rivers and to adapt it for use with other environments, in particular wetlands.

Box 15

The different uses of the V2I method by three District Courts

In assessing ecological damage and the resulting ecological torts, the V2I method was used in conjunction with three legal decisions made by the District Courts in Tours (2008), Albi (2012) and Laval (2013). In all three decisions, using the rationale developed by the method, the judges acknowledged the existence of a purely ecological tort. However, in each of the three cases, the method was understood and used differently by the judges.

In the legal decision rendered by the Tours District Court in 2008, it was deemed necessary to take into account both objective (fish mortality, cleaning of the river, restocking with fish, efforts to inform the public) and more subjective aspects (nostalgia for the landscape and prior fishing conditions, original beauty of the site, the spirit of the area and the history of the people). The factors used to assess the damage and the remediation of the tort were the irreversibility of the situation, the impact on the biomass, the patrimonial value and the “work to remediate the accident” (creation of aprons to oxygenate the water, creation of habitats in deep waters). The impacted surface area was calculated as a function of the length, slope and average width of the river bed where the worst of the pollution took place. The method, designed to estimate the cost of restoration work, was used to calculate the value of the habitat. This value was then adjusted on the basis of the patrimonial value (with respect to brown trout), of the irreversibility coefficient (which also takes into account the need for restocking migration in order to restore, at least partially, the previous state) and the loss of function (on the basis of population numbers of brown trout before and after the pollution event).

In the decision by the Albi District Court in 2012, the compensation for the tort was directly linked to the damage to the aquatic environment and more specifically to the quality of the water and habitats. The calculation took into account the length of the impacted river bed and the aptitude of the environment to return to its baseline condition, i.e. the state prior to the pollution and the loss of function in the aquatic environment. The loss of function is equal to the ratio of the number of species present before the pollution to the number present after the pollution. In addition, in this case, it was judged that the disturbance would continue until the environment had returned to a level of ecological functioning equivalent to that prior to the pollution. The threatened or vulnerable species and the efforts undertaken to protect them and their habitats were thus taken into account. A period of five years was set as the time required for restoration.

Finally, for the decision by the Laval District Court in 2013, the method was interpreted as a means to estimate the cost of the loss of fish species and the cost to restore a deep-water habitat by setting up a specific monitoring procedure. In order to produce a cost in monetary terms for remediation of the ecological tort, the ecological damage was assessed by using the method to evaluate separate reaches of the river impacted by the pollution. The remedied tort was derived from the assessment of the ecological damage taking into account the initial value of the environment per reach of impacted river, the reversibility coefficient of the aquatic environment, the patrimonial coefficient per fish species and the loss of function calculated on the basis of the loss of fish following the pollution.

Remediation conditions and extent in compensating a tort

Remediation of the tort(s) raises the issue of the remediation conditions (a financial indemnity or compensation in kind through restoration of the impacted environment or ecological compensation) and its extent (the degree of remediation).

During the civil procedure before the civil judge or before the criminal judge, in the case of a combined procedure (where the criminal judge takes on the role of the civil judge once the verdict has been pronounced in the criminal procedure), the proceedings initiated by the plaintiffs launch the "**contradictory phase**". The civil judge must determine the remediation conditions and extent. It is primarily at this point in the procedure that the judge can undertake a monetary or non-monetary assessment of the remediation using the existing methods.

In French law, the judge alone may decide which type of remediation is the most suitable, whatever type of remediation was in fact requested. He may decide in favour of compensation in kind or prefer to grant financial damages, even if the plaintiffs sought compensation in kind. In some cases, financial damages are the only possible solution. This occurs when compensation in kind is impossible, for example when there is a legal obstacle, the damage is irreversible, the cost of restoration is excessive, compensation in kind would be ineffective or if no technical solution exists (Jourdain, 2006).

■ Compensation in kind

Where possible, **compensation in kind** is favoured because it is, in theory, the best means of remediating an ecological tort (see Box 16 and Figure 19). The ministerial circular dated 21 April 2015 confirmed this position by making compensation in kind the systematic first option for prosecutors. The Biodiversity law also deals extensively with this issue and encourages compensation in kind wherever possible.

Compensation in kind

In the upper section of the Drac River, years of sand and gravel mining, combined with the creation of transverse structures, resulted in the complete disappearance of rocks and pebbles in the river. In the process, the soft, underlying rock was rapidly eroded and the water level dropped significantly, undercutting the water table and destabilising the banks. The resulting situation threatened the human uses of the river (supply of drinking water, use of the banks and nearby land, recreational uses, etc.) and gravely impacted the aquatic living communities. The restoration work consisted of injecting stones into the river bed, in order to halt the down-cutting, while widening the bed.

Figure 19

The damage and the compensation in kind of the tort.
a) Gravel mining, b) restoration of the Drac by reloading the bed with sediment.

This option is favoured above all for **technical reasons**. Compensation in kind consists *stricto sensu* of measures targeting the restoration of the destroyed or degraded environment and its ecological functions (Didier, 2013) (see Box 16). The objective is to restore the environment and the living conditions of the threatened species in order to ensure their survival, restock the areas impacted by pollution and to inject resources equivalent to those destroyed (sediment, etc.). In some cases, compensation may consist of the purchase, at some other place, of land in order to reconstitute natural resources or to create a nature reserve in replacement of the destroyed site. Compensation in this case is in the form of a substitution.

This option is also favoured for **social reasons**. Only compensation in kind can effectively restore the natural environment to its original state because it is clear that the payment of financial damages cannot guarantee that the funds will be devoted to actual restoration work (Mabile, 2015). However, in order to produce a legally effective and socially acceptable result, remediation must achieve its objective, which is to remediate the damage done to the natural environment. This objective in turn targets sustainable development and protects the interests of future generations.

The problem is that **compensation in kind is not always possible.**

A legal obstacle may make it impossible. This is the case for activities that, even though they cause damage, have received administrative authorisation or for buildings and structures created on the basis of a building permit. Due to the separation of powers, the judicial judge may not decide on measures to restore or to cease activities if they run counter to an administrative authorisation, though special considerations may apply, e.g. drought conditions for regulated installations. The same is true when the irreversible nature of the damage makes an attempt at restoration pointless.

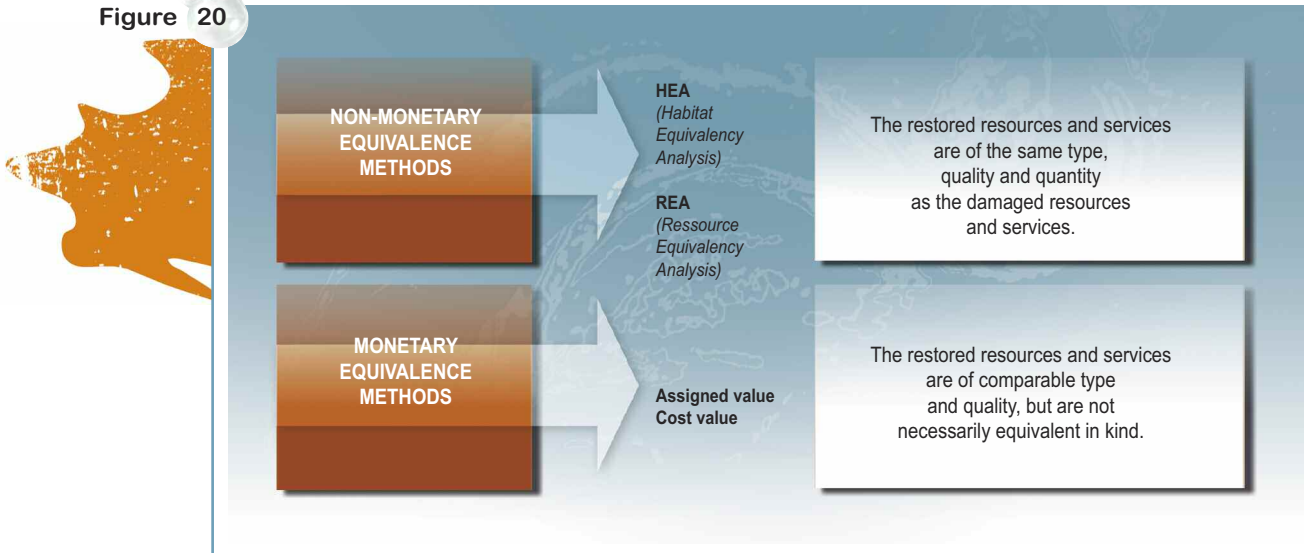
An irreversible situation means it is effectively impossible to return to the *status quo ante*. In terms of ecological damage, it means that the damage is definitive, not remediable and consequently not restorable. When irreversible damage has occurred, e.g. the disappearance of a species, there may be no solutions other than the payment of financial damages.

In social terms, case histories have shown that measures to restore or to safeguard the environment are often decided and funded only if the cost is deemed "reasonable" (Fipol work group, Hay *et al*., 2008; Grenelle de la mer, 2010; Symposium on the protection of nature through criminal law, 2015). The case of the ship Zoe Colocotroni, though somewhat dated, illustrates this aspect of reasonable cost in restoration measures. The court decided that value of the calculated damage caused to a mangrove, a forest along the coast, by an oil spill, had to remain within the limits of a "reasonable cost" to restore the mangrove or to return it to its baseline condition, or to a state as close as possible "without grossly disproportionate expense". A few years later, the analysis had not changed, but the acknowledgement of ecological torts and their compensation in kind, encouraged by the Biodiversity law, had made possible a different outcome.

Finally, on the technical level, it should not be forgotten that there are cases where we simply do not have the technical means to restore the environment. There are other situations where the notion of compensation in kind is not applicable. For example, in cases of acute (as distinguished from chronic) pollution that has destroyed all the aquatic animal species in the area, there is no means to remediate the situation, no technique available. The only solution is to wait until natural recolonisation has produced its effects, even though the damage is considerable and remediation is required. This is a frequent situation. In such cases, financial damages are the only possible solution.

In assessing compensation in kind, two assessment methods are available. On the one hand, assessment methods based on the principle of equivalence of ecological functions, i.e. on non-monetary methods. On the other, assessment methods based on value approaches that also call on the equivalence principle, but produce a monetary equivalence (see Figure 20) (CGDD, 2009).

Figure 20



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Equivalence methods.

The equivalence methods for ecological functions are assessment methods specifically designed for compensation in kind, where the fundamental concept is to take into account the damaged natural environment as a whole. These methods are based on three fundamental assumptions, namely the fungibility of the initial and restored resources and services, the constant value of resources and services over time and the homogeneity of individual preferences. The most well known methods are Habitat Equivalency Analysis (HEA) and Resource Equivalency Analysis (REA) (Bas and Gaubert 2010; Lipton J.L., 2007; Gaubert and Hubert, 2012).

The value-based methods take into account the losses of well-being perceived by society. They are of use when the data required for non-monetary equivalence methods are not available. They are based on individual preferences.

■ Payment of financial damages

The payment of financial damages (see Box 17 and Figure 21) aims to fulfil above all the remedial function, but also the punitive and preventive functions of civil liability. The objective is to assign a monetary value in euros to the degradation of a good or service. The assessment consists of determining a value expressed in monetary units. There are essentially two types of method, depending on whether the objective is to determine the cost of restoring the degraded environment or the loss of well-being following the degradation.

■ The purpose of monetary methods based on an assessment of the costs to restore and maintain the ecological potential is to determine the costs incurred by the damage to an ecosystem by measuring what its restoration would cost. An example is the "Léger method" (1910), which was updated in 1970 by the High council on fisheries (CSP, which later became Onema and then AFB) and received the name "Léger-Huet-Arrignon" method. The method devised in 1970 set legal precedent and is still applied by the French courts. It is based on an assessment of the theoretical productivity (the "biogenic capacity") of the river. It quantifies the loss of fish biomass following a disturbance and determines to restocking costs (Arrignon, 1971).

■ The monetary methods based on an assessment of the loss of collective well-being are used to evaluate the damage affecting non-market values (contingent-valuation method, joint-evaluation method, etc.) or the damage impacting uses linked to commercial activities (travel-cost method, hedonic-pricing method, etc.) (CGDD, 2012).

Box 17

Payment of financial damages

Financial damages, i.e. the payment of a sum of money, are supposed to be equivalent to the tort. In this case, the financial damages are the only compensation awarded for the damage. This type of remedy is necessary when compensation in kind is impossible or insufficient, which is often the case in cases involving damage to water and aquatic environments.

Figure 21

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The damage and the payment of financial damages. a) Landfill along the Boivre River, b) money awarded to the plaintiff.

A number of objections have been made to the concept of financial damages.

First of all, in French law, the **principle that funds may be used as the recipient sees fit** means that it is not possible to ensure that they are applied to the purpose for which they were awarded. A non-profit for environmental protection that receives a sum of money following damage to fish populations may use the funds to replant trees in a forest. In addition, during the Erika case, several entities authorised to launch legal procedures did so and received financial damages, which raised the issue of the cumulative damages not corresponding to the principle of **complete remediation**. In the case of administrative authorities, the question arose as to which entity was best positioned to sue, the local town, the public board for inter-municipal cooperation (EPCI), the department or the region. That is a problem in cases involving ecological damage where there is a legitimate need to check the uses to which funds are put in order to avoid their misuse. This led to the request that the Biodiversity law require that any funds awarded be devoted to the restoration and reconstitution of the environment (if possible), or to measures designed to prevent ecological damage in the future. This requirement would run contrary to the principle concerning the free use of funds awarded to entities authorised to initiate a civil procedure on behalf of nature, a principle that is generally applicable in tort law, however a number of legal commentators are of the opinion that an exception is warranted here due to the specific nature of ecological damage (Jegouzo report, 2013). The free use of funds awarded is justified in the case of human victims, but does not bear the same weight in the presence of damage impacting nature and must give way to the need to ensure to the greatest extent possible the preservation and/or restoration of the environment. What is more, in that the funds are intended to remediate a collective, ecological interest, it is important to make sure that they do not serve a personal interest. This explains why it has been proposed that the recipients of funds, i.e. non-profits and public entities, be required to use to funds for ecological purposes.

A second objection deals with the principle of monetary assessment of ecological damages itself. A central point is the absence of a means to determine the value of nature “in and of itself”. In addition, given the lack of a market value for environmental goods and of reliable economic reference points, a monetary assessment is particularly difficult. For many years, this difficulty in making an assessment impacted the concept of financial damages itself. The lack of market values and of economic reference points makes the monetary expression of ecological damage difficult, however these factors are subjected to other criticisms as well. They are accused of promoting an economic approach to the valuation of natural elements whose ecological value is not taken into account. Most of the legal decisions that refer implicitly or explicitly to one or the other of these methods take into account essentially the economic and/or commercial consequences of damage to the environment. The damage done to biodiversity, to the regenerative capacity of nature and to the ecological patrimony is largely ignored. What is more, all of these methods make clear the difficulty of addressing ecological damage without making any reference to human interests. Even when the economic consequences are not the main consideration, the assessment never succeeds in fully freeing itself from the preoccupation with human interests and always expresses, to a more or less greater degree, the sentimental, cultural or tourism value that humans assign to the damaged resource. That being said, these methods, for all their lackings and approximations, are essential for environmental protection.

Conclusion

Assessments, whether monetary or non-monetary, are, generally speaking and independently of the ecological issues, useful means of expressing value that have been acknowledged by the State administrations and jurists for a number of years for evaluating both the damage incurred and remediation of torts. However, these assessments must be used with caution in light of certain approaches to nature, deemed overly “utilitarian” and “anthropocentric”. In addition, as noted above, in the specific field of ecological damage, an in-depth understanding and accurate legal characterisation of the assessed items are necessary prerequisites in defining assessment processes that are consistent with the on-going changes in legal procedures and in optimising the effectiveness of existing assessment methods.

The above does not imply a parallel development in the administrative jurisdictions which to date have not yet acknowledged the existence of ecological torts. The European directive 2004/35 theoretically applies to all jurisdictions, however the administrative jurisdictions refuse to implement it (CAA Nancy, 19 Dec. 2013, ASPAS; Drobenko, 2016) and changes in the administrative code of justice will probably be required to change that. It may be said that the Erika accident was indeed the turning point for changes in the Civil code.

SUMMARY of chapter 3

Assessing damage during a trial. From an assessment of damage to an assessment of remedies.

Key concept

It is always a decision by the court that creates or denies the existence of an ecological tort and determines whether the defendant must remediate the situation according to precise conditions. The assessment is therefore a means, among others, used by the judicial judge during the civil procedure to justify and inform his decision. The same is true when the judge must characterise an offence and, to that end, understand the issues involved in the damage, during the criminal procedure. In both cases, the assessment serves to translate the situation in legal terms.

Key points in understanding the subject

Though in everyday language the terms “assessment of damage” and “assessment of the tort” are often used synonymously, in the legal sector, these two terms correspond to different acts that, though complementary, are not the same. The two assessments take place at different times, i.e. during the criminal procedure to evaluate the damage and during the civil procedure to evaluate the tort(s). In short, the assessment of the damage is a step that takes place before the assessment of the means to remediate the tort.

Key points to remember

There are two types of procedure in the judicial sphere, criminal and civil. These procedures target different objectives that are complementary, namely punitive and dissuasive objectives for the criminal procedure and remedial objectives for the civil. In cases involving damage caused to water and aquatic environments, the two procedures are often combined.

However, combined procedures should not obscure the different steps in a case and the resulting different types of assessment that the judges (criminal and civil) may use.

An assessment of damage involves determining its impacts on the environment in order to express the damage in legal terms and determine whether one or more remediable torts exist. An assessment of a tort, on the other hand, consists of determining the remediation conditions (monetary or in kind) and extent. Judicial procedures constitute a framework for assessments on damage caused to water and aquatic environments. Assessment methods must necessarily take this framework into account in order to remain not only useful, but useable and used.

Territorial considerations in the legal situation and how they apply to ecological damage

4

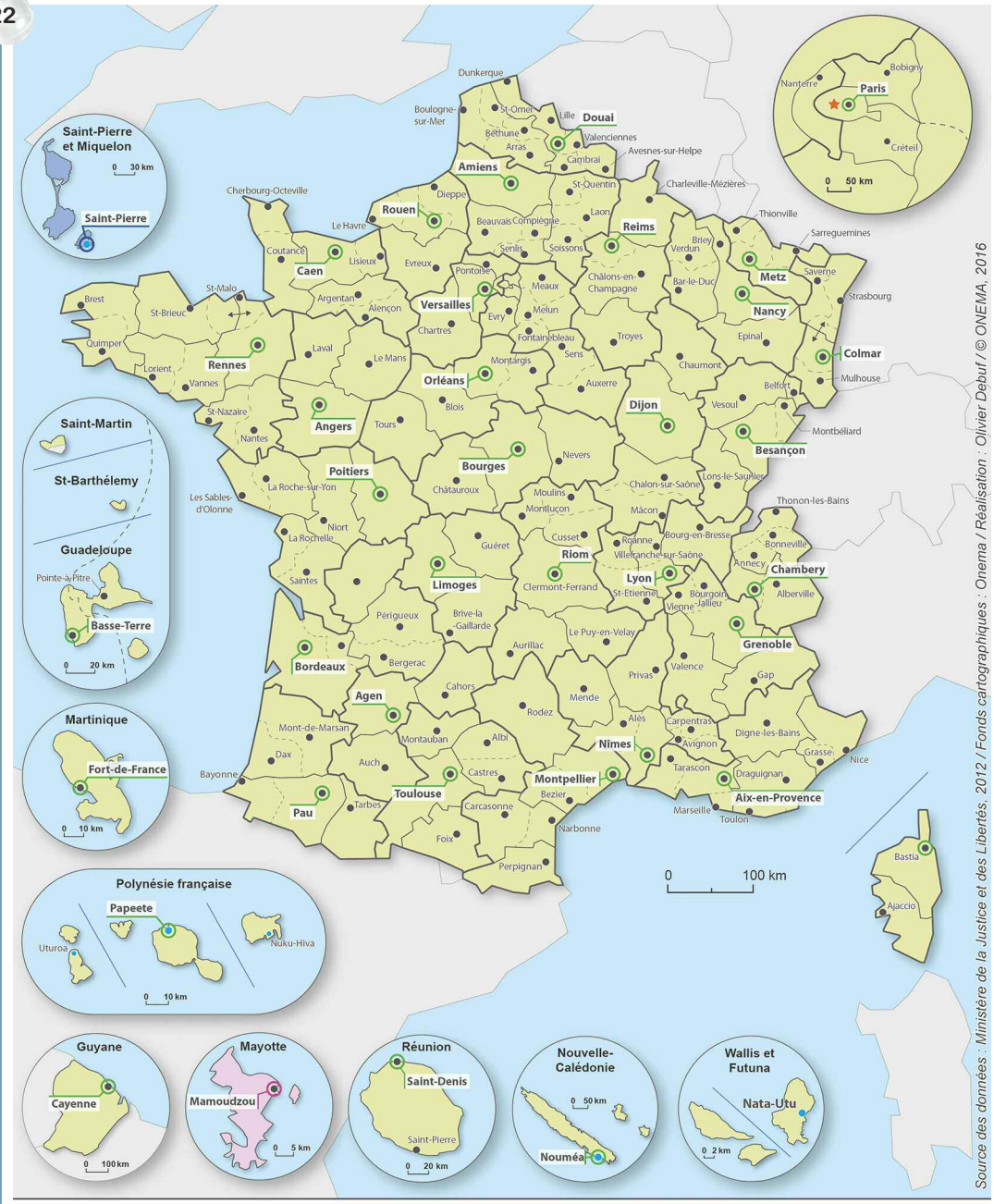
Introduction

The concepts of law and territory are closely intertwined. The **legal territory,** understood here to mean the national territory in which the law applies, determines de limits within which a legal, political and administrative organisation functions. The territory, as a defined and defining area, is one of the necessary conditions for the existence and the implementation of the law. From this point of view, implementation of the law also depends on setting the limits for the activities of each jurisdiction (administrative and judicial). The term "judicial map" (see Figure 22) corresponds to another aspect of the links between law and territory, namely the geographic distribution of the jurisdictions over the national territory. This means that if ecological damage occurs, the cognizant jurisdiction is, unless special provisions apply, notably concerning certain specialised jurisdictions, that in which the defendant has his domicile. This principle of **territorial law**, i.e. the geographic distribution of jurisdictions, an element in the prescriptive organisation of the territory, concerns the areas and districts in which the law applies, but not the primary elements in the production of the law (Morand Deviller, 2006). However, the territories are also areas in which occasionally different methods of applying the law are implemented (Commaille, 2000; Kirat, Lefranc, 2004). This is due to the fact that there is not one, but several territories (Moine, 2006) in that the term "territory" is a multi-faceted concept covering several territorial dimensions, all making up a given territory, namely a material dimension corresponding to the **geographic territory** (the physical space), an organisational dimension corresponding to the **structural territory** (political, administrative, economic, etc.) and an identity dimension corresponding to the **perceived territory experienced** by the people living there (see Figure 23).

It is necessary to keep in mind that when ecological damage occurs, it is in fact all of these territorial dimensions that are impacted and will determine how the damage is (or is not) taken into account. This phenomenon corresponds to what is called the **territorialisation of law**, i.e. the influence that these various aspects of territories have on the application of the law in a given area (Faure, 2004; Auby, 2006; Woehrling, 2013). Consequently, though the law is said to apply uniformly over the national territory (principle of territorial law), its actual application is nonetheless influenced by the characteristics of the various territories (concept of territorialisation). It should be noted in particular that water law organises the country according to the major river basins and sub-basins whose borders often do not correspond to administrative limits and judicial jurisdictions.

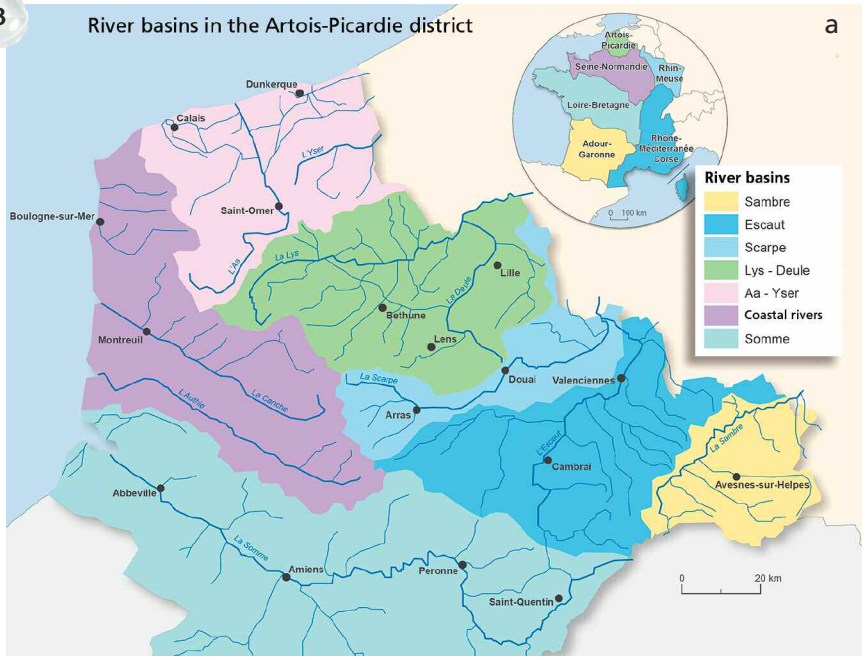
The concept of territorialisation for ecological damage raises two important points. First of all, different territories are exposed to different levels of risk (factors of risk and vulnerability) for ecological damage. Secondly, not only are territories more or less exposed, but their capacity to react to damage differs in terms of the availability of information (access, processing, expertise) and of the awareness and dynamism of the stakeholders in a given territory concerning the legal processing of the problem (sentiment of belonging to the territory, presence of non-profits, etc.).

Figure 22



Distribution of Trial and District Courts in France.

Figure 23



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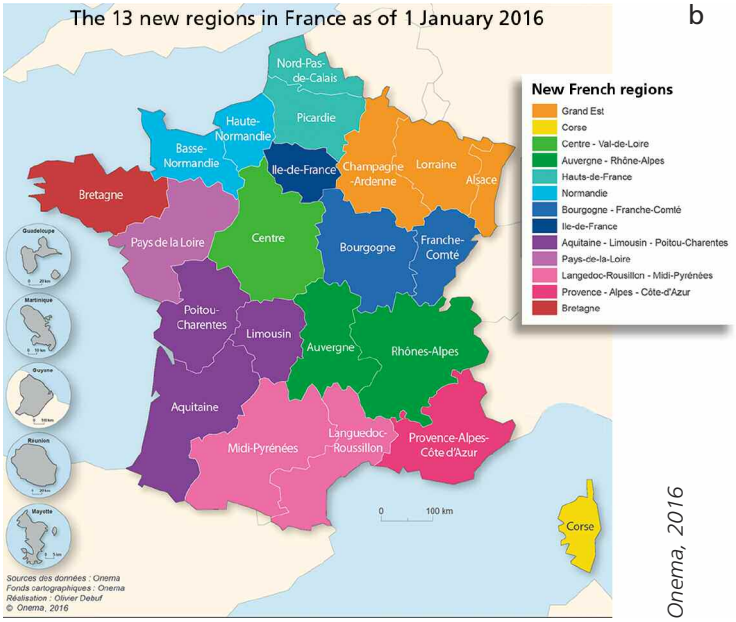

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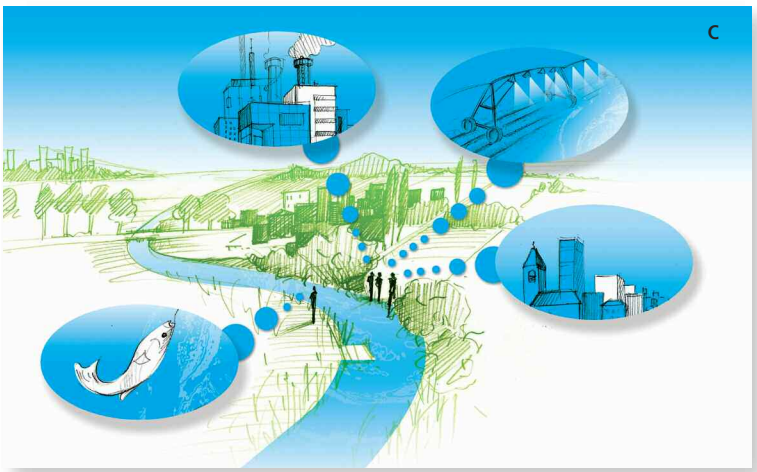

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Three different dimensions of territories concerned by ecological damage:
a) the geographic territory;
b) the structural territory;
c) the perceived territory.

Different levels of territorial exposure to ecological damage

It is a simple fact that different territories are exposed to different levels of risk (Melot, 2008).

A risk may be defined as a danger, as a "possibility, probability of a status, of an event seen as negative or as a form of damage" (Defossez, 2011).

An attempt to measure the exposure of a territory to a risk of ecological damage must therefore take into account two, non-exclusive factors:

- territorial exposure to factors of risk created by humans;
- the vulnerability of the population and structures in a territory (their capacity to adapt, their resilience).

The **factors of risk** consist of the type of event, the probability of its occurrence and its frequency, its intensity and duration.

The **vulnerabilities** correspond to the tendency of a person, object or territory to suffer from or to resist damage in the course of an event (EauFrance).

In the case at hand, it is the combination of the factors of risk created by humans (presence of industries, farms, highly urbanised areas, etc.) and the sensitivity of environments that determines whether a territory is more or less exposed to a **risk of ecological damage** (Leone, Vinet, 2006) that is more or less severe (MEDDE, 2008).

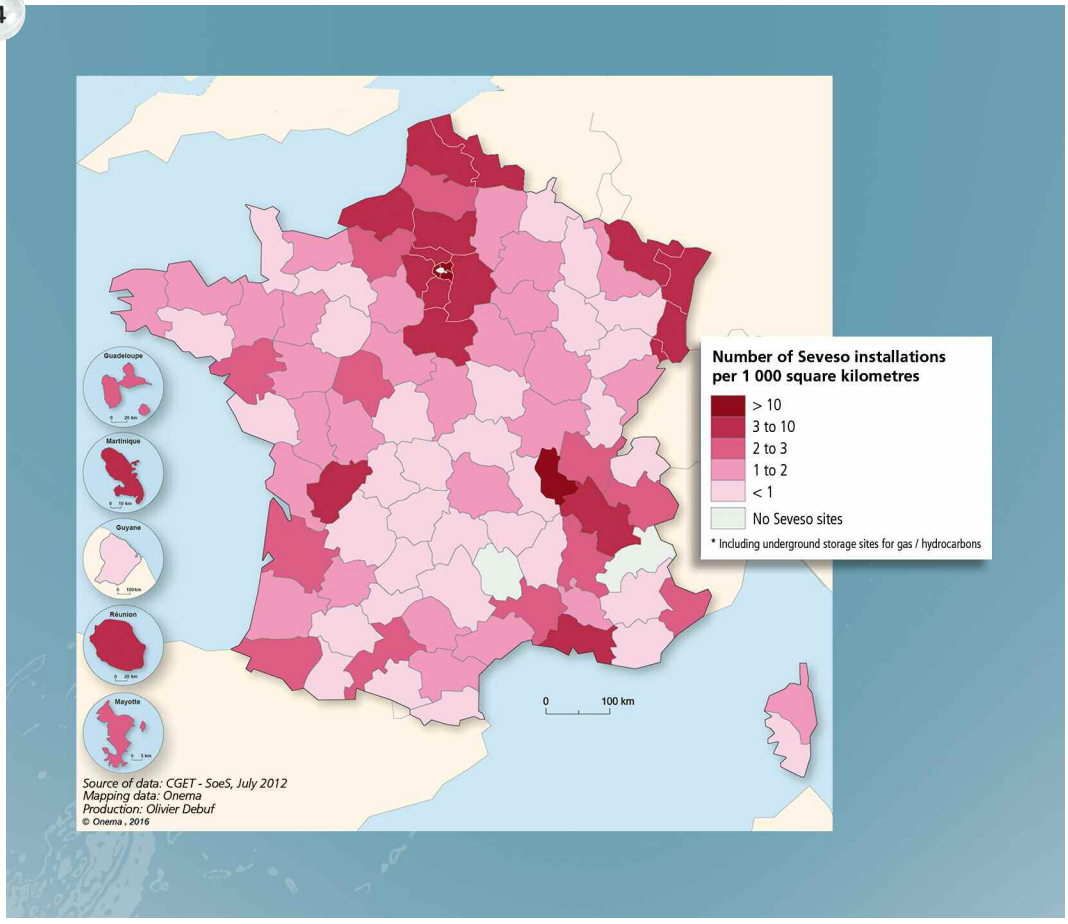
Levels of territorial exposure to factors of risk

Differences in the human and natural situations can increase or decrease the factors of risk confronting territories (see Figures 24 and 25). The physical (i.e. material) characteristics of the territories making up the country (mountains, etc.), as well as the distribution of water, the concentration of industrial and farming activities, the susceptibility of areas to drought all constitute factors that modify the exposure of different territories to ecological damage.

These differences can be made particularly clear when presented on a map. The maps below present simplified, yet illustrative images of what is understood as the degree of territorial exposure to differences in the factors of risk created by humans (see Figure 24).

This type of image makes clear the differences in the exposure of administrative territories (the French departments) to each type of risk factor, but can also be used to combine other layers of data.

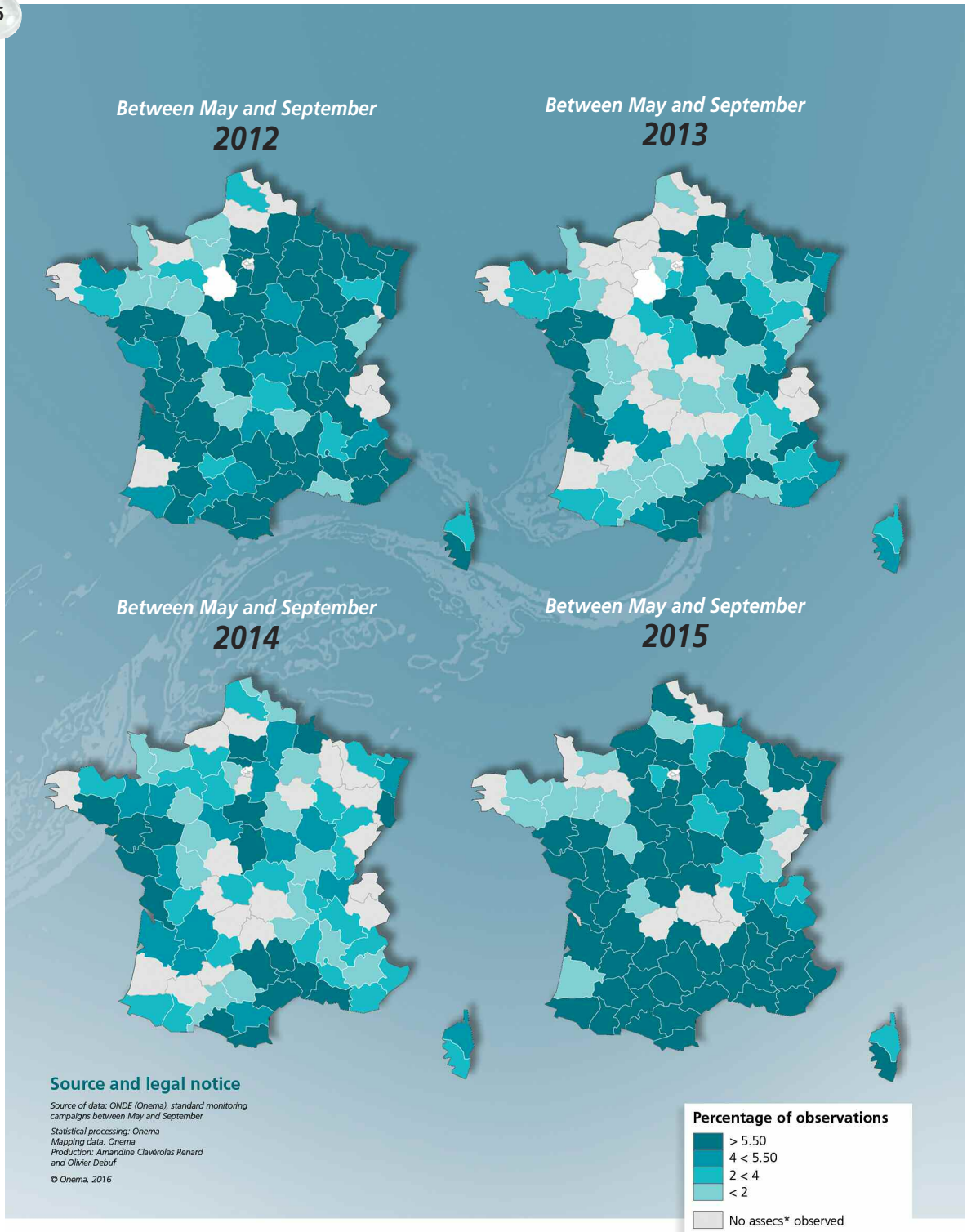
Figure 24



Different levels of exposure to factors of risk created by humans, for example the number of regulated Seveso installations in each French department in 2012.

Seveso installations are the industrial sites likely, in the event of an accident, to produce the greatest damage. A total of 1 097 Seveso installations have been inventoried in France. The map shows that they are unevenly distributed throughout France and that a majority are located in departments with high population densities. The map also makes clear that over 50% of the high-risk installations may be found in only one quarter of the departments. Three departments in the Île-de-France region around Paris have the highest densities of Seveso installations.

Figure 25



Differences in the more or less long-term exposure of territories to natural factors of risk, the example of river "assecs", i.e. rivers running dry, from 2012 to 2015.*

The four maps below illustrate the degree of exposure to assecs. They show over a period of four years that though some areas are exposed to an assec from time to time, others are confronted regularly with the problem. That is the case in the Pyrénées-Orientales, Hérault, Haut-Rhin and Maine-et-Loire departments, among others. The repetition of events over more or less long periods of time is a factor in the degree of exposure of each territory.

** An "assec" is the result of human activities that increase the pressures weighing on the available water resources (groundwater and surface waters) and that can reinforce hydrological regimes (e.g. Mediterranean rivers with severe low-flow levels in the summer) or the hydrogeological functioning of the environment (infiltrations in karstic areas, the slowing or halt of outflows). An "assec" is not a natural situation caused exclusively by the normal, cyclical functioning of the hydrographic system.*

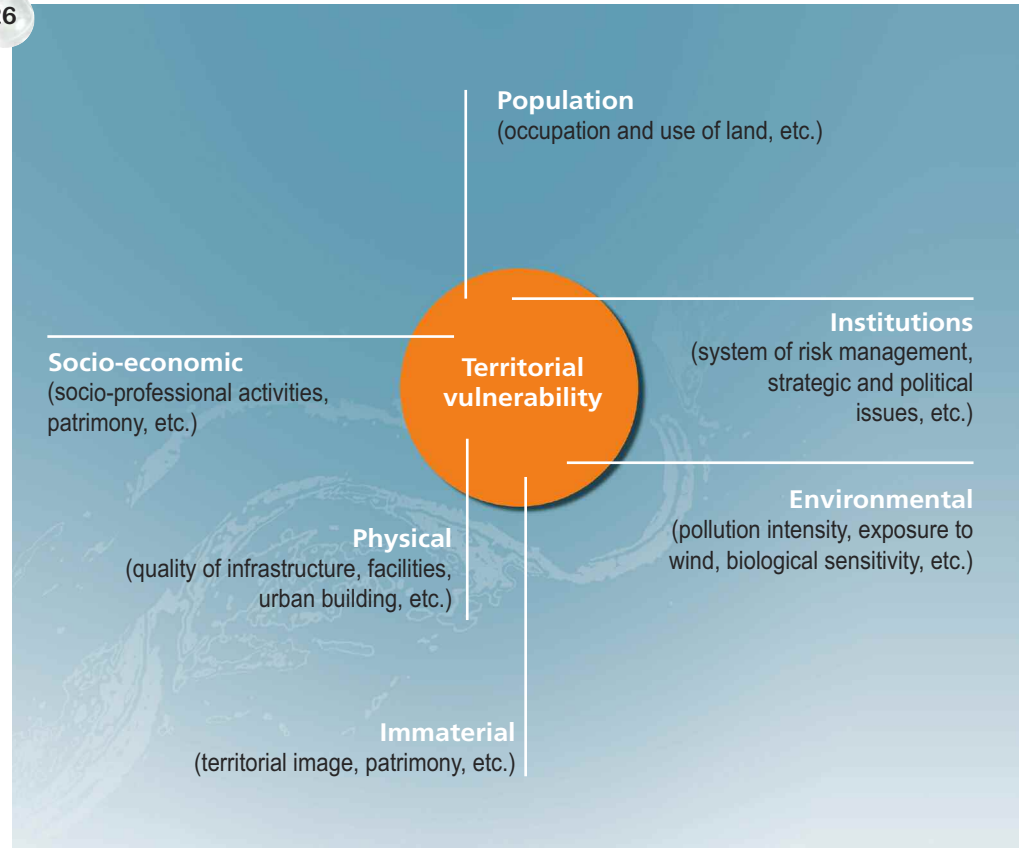
Levels of territorial vulnerability to ecological damage

The vulnerability of a territory is measured by the potential for damage or malfunctions of various elements (goods, activities, functions, systems) making up a given territory and society (Leone & Vinet, 2005). In other words and generally speaking, the factors of risk determine the degree and severity of damage and the vulnerability is the propensity of the territory to suffer from the damage. This aspect more directly concerns the organisational characteristics of the territory because its structure and organisation will necessarily influence its **capacity to resist, to adapt and to prove resilient**.

Societies organise or fail to organise, depending on their desires and possibilities, in order to reduce their vulnerabilities. This is what is called the capacity of society to prepare for adverse events (Hewitt, 1983). The vulnerability of a given territory is measured using various factors that all express thresholds of fragility.

There are many factors of vulnerability (see Figure 26).

Figure 26



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Exposure to a risk of ecological damage.

The factors of vulnerability are the following:

- **physical factors:** the quality and concentration of infrastructure (all communication channels), facilities and urban building given the materials used, the construction techniques and the resulting habitat. This includes public buildings, as well as industrial constructions, SMEs and the technical networks (Kelman & Spence, 2002), etc.;
- **immaterial factors:** the image of a city or region for tourism, the patrimonial or sentimental value of objects listed as part of the world cultural and natural heritage, etc.;
- **environmental factors:** the distribution of resources, their availability over time, exposure to waves and currents, the biological sensitivity of the territory (diversity, biomass, abundance, resilience), etc.;
- **institutional factors:** the risk-management system, the degree and fields of competence of organisations, the quality of communication on the national, regional and local levels in informing on malfunctions (Thouret and d'Ercole, 1994).

This category also includes the technico-administrative factors and the strategic and political issues likely to hinder the rational management of risks (lack of prevention programmes, of preparation and studies of risks during urban planning, preventive projects blocked by social pressures, etc.) (Gilbert, 1999; Gilbert & Bourdeaux, 1999);

- **socio-economic factors**: the distribution of activities over the territory and its economic dynamism, the proximity with active urban centres, economic links between different sectors of activity, the quality of threat perception, the gradual loss and deformation of memories over time (Garry and Veyret), awareness of the means of protection, the dissemination of information between stakeholders (Velasquez *et al.*). In addition, threats are not simply perceived and experienced in terms of their effects, they must also compete with other economic and social constraints and thus find themselves "put into perspective";
- **population factors**: the manner in which the land is occupied and used may contribute to risks.

Different territories have different capabilities in terms of limiting risks. For example, the Economic, social and environmental council (2014) noted that the least affluent socio-professional categories had the most difficulty in resisting events affecting directly or indirectly their patrimony, living conditions and social networks. The lack of savings means they are less capable of compensating their losses and some small companies or individual entrepreneurs may suffer. The Social affairs, Health and Ecology ministries acknowledged in January 2014 that the links between the social situation, the territory, environment, life style and health are crucial, and that a great deal remained to be done to align the approaches, make use of the existing tools in characterising inequalities and progress toward environmental justice, in all territories throughout the country (see Figure 27). It should be noted that land prices and insurance premiums are excellent indicators not only of human vulnerability, but also of the capacity of populations to resist (see Box 18).

Figure 27

Environmental inequalities are a topic of intense study by national institutions.
a) An analysis of environmental and social inequalities in the regional territories (by the Social affairs and Ecology ministries, 2014), b) An analysis of environmental and social inequalities on the national level (Economic, social and environmental council, 2014).

Land prices, an indicator of population exposure to ecological damages

Land prices are lower in areas exposed to high environmental pressures and as a result less affluent families are overly exposed to environmental disturbances. Sensitive urban zones (ZUS) are an example clearly showing how environmental inequalities are linked to social conditions. Studies by the Interministerial city directorate (DIV) indicate that ZUSs are much more exposed to environmental risks due to industrial activities than other territories. Their residents represent two-thirds of the total French population that is exposed to industrial risks (CEDD, 2013).

In addition, given that there is a high correlation between incomes and land prices, this indicator provides information on the adaptive capacity of low-income populations (raising of houses, purchase of bottled water, etc.) in as much as it constitutes one of the decisive factors in **environmental inequalities**, which are in turn important factors in **territorial inequalities**.

Numerous factors, including energy insecurity, pollution and effluents, industrial risks (Seveso sites), poor-quality homes and noise, segment territories into exposed and protected populations and are synergistically reinforcing (land prices are lower in areas exposed to risks, acoustic and thermal insulation are expensive).

On the other hand, the socio-economic segmentation is less clear in terms of soil, water and air quality, which can adversely affect more affluent areas. Major ecological issues affect all territorial levels. For example climate change, access to water, loss of biodiversity worldwide, whereas on local levels, the issues concern energy insecurity and unhealthy housing.

Under these conditions, the intervention of the public authorities is essential (urban planning, transport, housing, etc.) and environmental inequalities play an increasingly central role in public policies. That is why it is important to integrate territorial considerations in the objectives and policies of the Grenelle environmental agreements. The objectives and policies must take into account the environmental issues, local-development issues and social issues in order to reduce inequalities because the poorest segment of the population most likely does not have means to adapt to coming changes. Energy inequality is a crucial issue and represents a major challenge.

Some statistics

- In Fulton County (Georgia, United States), two comparable office buildings were located 2 miles and 0.5 miles from a contaminated site (determined by the toxicity and quantity of the pollutant). The building farther from the polluted site sold for a price 36% higher than the nearer building.
- In Douai (France), the average price of houses drops 7.5% in each successive street farther from the Scarpe River. A view of the river increases the average price of a house by 21.5% compared to neighbouring houses.

(Source: Regional environmental directorate in Alsace)

Vulnerability therefore includes the exposure of the population to risks, the effectiveness of measures to prevent, avoid and reduce the risks of damage, and the resilience of a society, i.e. its capacity to recover functional conditions following damage (Thouret & Leone, 2003). It is therefore important for threatened individuals and groups to create large and reliable networks of acquaintances, to acquire a minimum level of education, to remain mobile, to maintain access to available resources, etc. The social response to vulnerabilities depends on the type of society. In modern societies, the response to a crisis is generally organised and brings into play an effective technical and technological system (measurement, detection, transmission devices) as well as excellent emergency logistics, however these systems are very expensive.

Territorial inequalities in the risk management of ecological damage

As noted above, the risk of ecological damage, similar to all other risks, results from the combination of exposure to factors of risk and the capacity of society to manage the situation. However, ecological damage is different in that, contrary to other types of damage, it cannot always be situated.

■ Different reactions to effects in the directly affected territory and trans-territorial impacts

Damage always affects the immediate territory first. It is the **site of the damage**. However, most of the time, an ecological tort is essentially **collective and trans-territorial** in nature.

The **tort is collective** in that it affects not only the directly impacted territory, i.e. the damaged territory, but it is often perceived to harm the interests of society as a whole, as both a drop in its current well-being and a loss to its shared patrimony. This is because the very existence of humans, an animal species, is conditioned by the status of their environment and requires a minimal level of biological quality in the surrounding ecosystems. It is with this in mind that the law on environmental liability (1 August 2008) made it possible for local governments and their groupings, when their territory has been impacted by environmental damage, to sue as plaintiffs if they have suffered a direct or indirect tort. A new article L. 142-4 was inserted in the Environmental code: “Local governments and their groupings may exercise the rights granted to plaintiffs concerning events constituting a direct or indirect tort in their territories and an offence against the legislative provisions concerning the protection of nature and the environment, and/or the provisions in the corresponding enacting texts.”

In some cases, the **tort is trans-territorial** given that environmental problems often comprise a significant spatial element. It is possible to identify the cases where pollutants released to the environment or the removal of resources from one spot will have adverse consequences on other places. For example, that is the case of water running off fields that causes flooding in a town downstream or the pumping of water from a body of groundwater that results in a river several kilometres distant running dry.

Nonpoint-source pollution in continental waters is another good example. It can arrive from the entire surface area of a territory and the pollutants are transmitted indirectly to the aquatic environments via the soil. Control over this type of pollution is particularly difficult due to the fact that it does not have a single source, but has a number of causes involving an array of stakeholders. It may be possible to manage a highly local (point source) emission of a pollutant before the aquatic environments are contaminated, but it is not possible to block the pollutant or to process it when the source is spread over the entire territory. Nonpoint-source pollution disturbs the ecosystem and the quality of human life, biologically due to eutrophication and a loss of biodiversity, and in socio-economic terms due to the cost of treating water (increase in its price, etc.) and the negative effects on tourism (green algae, etc.).

In the case of pollutants transported by water, it is essential to determine the physical area that must be treated to control the environmental problems, but that is not always easy. It is relatively easy to identify the catchment basin supplying a surface river, however it can be very difficult to determine the surface area supplying a deep body of groundwater. Once the physical area has been identified, it is necessary to determine the applicable territorial borders. The source of problems is often the farm land made up of the fields farmed by a given farmer. The areas often suffering most of the disturbances and damage are public (towns and departments) or private (residential) land. These different areas (source and sink) are often managed separately, with the exception of a few rules imposed by the public authorities (zoning laws, abstraction protection perimeters, etc.), and in general there is not a single manager for the areas in question. Consequently integrated policies are not common, but would be required to solve the problems at hand (Martin, 2000).

When ecological damage occurs, the long-term effects (see Chapter 5) and the impacts beyond the directly affected area are rarely taken into account. However, the consequences of an event can rapidly spread well beyond the initial point of impact in a "domino effect". That is why a number of scientists prefer the notion of a "zone" or of a scale/echelon of impact rather than administrative territories when discussing the spatial dimensions of damage (Beucher *et al.*, 2008). The causal links cannot all be taken into account within the limited framework of the spatial units envisioned here. "We must look farther, from a higher vantage point, and we must also look closer " (Lacoste, 2001).

■ Management of one vulnerability can cause other, occasionally distant, vulnerabilities

Protection against the risks of damage, including ecological damage, can in some cases generate other (possibly ecological) damages.

In order to reduce physical damage and the loss of human life, it has been deemed necessary to continuously improve risk-management techniques and make them more effective. This is notably due to urban development in zones of high risk, creating increasing needs for protection, called the "escalation effect" (Parker, 1995). This term is used to describe a situation where protective systems in the form of large structures are created in high-risk areas, which then undergo further urban development precisely because of the protective structures. In a circular "domino effect", the feeling of safety leads to further urban development.

In another example, flood-control systems have a positive effect on the flow of flood waters, however they also have clearly negative effects on the hydro-geomorphological functioning of rivers and on aquatic ecosystems (Bravard *et al.*, 1993; Peiry *et al.*, 2000) and on the dynamics of coastlines (Provansal *et al.*, 2003; Maillet, 2005). Resizing and rectification of rivers and the maintenance and reworking of river banks are all measures that aim to increase the discharge of the river during flooding and to lower the water level. During resizing or rectification, the river bed is widened or deepened. Meanders are cut, i.e. the overall length of the riverbed is shortened. This work increases the hydraulic gradient, which in turn increases the flow velocity. However, these measures can also have highly adverse effects. The deepening of the bed may produce favourable effects over the short term in the reaches where the work took place, but it can also simply result in the flood waters travelling faster downstream and worsening flood conditions in lower sections of the river (Bravard & Petts, 1993). Other negative effects have been observed, such as the undermining of bridge pilings or of dike foundations (Gout, 1993, quoted in Pottier, 1998).

The complex functioning of rivers requires that they be studied as a whole. Limited action on a single reach of a river, for example in a single town, often simply transfers the problem downstream or from one bank to the other. Unfortunately, work on an entire river is not possible due to the number of land owners along the river and the cost. This situation is also the result of social changes.

Different levels of territorial reaction to ecological damage

Environmental conflicts (Torre, 2010) are signals informing on contemporary dynamics in territories. They influence and are the result of both the territorial organisation (how the territory is structured) and the perceived territory, i.e. the notion of identity and the feeling of belonging.

Adapting the legal system in favour of the environment

If we limit the discussion strictly to the legal domain, the study of the territorialisation of law deals, within the boundaries set by the unitary form of our political system, with the capacity of a territory to influence the nature and even the content of the law. This desire to produce a spatially differentiated system is the result more of an enhanced acknowledgement of territories by the law over a number of years than a political position envisioning a breakdown of the national unity (Gallo, 2013). However, territorialisation of the law is not a one-way street where each territory configures and adapts the law to its needs. On the contrary, it is the result of a two-way movement. In one sense, the legal system creates new legal spaces and, in the other, new legal tools arise in the new territories, that the legal system must subsequently qualify, formalise, organise and assign effective legal status. The law concerning water and aquatic environments is a forerunner in this field in that the organisation along river basin and sub-basin lines is in itself a form of territorialisation of the law suited to the local ecosystems and their issues.

Remediation of ecological torts implies acknowledging the existence of legal pluralism above and beyond the pluralism of social modes of organisation. This supposes that the purpose of the legal system is to serve the environment and not simply humans (Lafargue, 2007). To that end, the following two points are required.

■ It is necessary to accept more diverse types of damage by expanding the right to initiate procedures and the categories of persons (legal and natural) having that right. Efforts to increase pressures on those destroying the environment imply augmenting the possibility to take action, opening the doors to courts more widely and adapting the basic rules by allowing the law to become more diverse through territorialisation. That would be a means to go beyond the current “all or nothing” situation because beneficiaries of the right to initiate procedures would become the guardians of their territory for themselves and for society as a whole. Nature would be protected, even though it is a “common” good, due to the protective feeling that the inhabitants of a territory have with respect to their environment. To illustrate this point, during environmental catastrophes,

whether natural (e.g. Katrina devastating New Orleans in 2005) or industrial in origin (e.g. Seveso in 1976), the normal feelings of closeness on the part of people with their environment suddenly collapse. That is a very specific type of damage caused by the catastrophe and it requires a new understanding of what has been "damaged".

Sociological analysis contributes to this new understanding and would indicate that the need for acknowledgement of the specificity of this damage and the demand that it be repaired may confront us with the limits inherent in a simple rationale of compensation, even if it is ecological. This is notably the case of sociological work highlighting the importance of **environmental care**, i.e. the efforts, in a protective approach, to take care of an environment that would seem to be the only way to restore a feeling of connectedness with a severely damaged environment.

■ The second point concerns the need to reconcile what are sometimes seen as environmental constraints with the socio-cultural identities in a given territory. An identity is above all "an image of self (...), produced by an individual and their subjectivity" (Staszak, 2004). For Pierre Tap, it is "all the perceptions and feelings that a person develops concerning him or her self" (Tap, 1986). A personal identity is what makes it possible, over time, to remain the same person, to live as one's self, in a given society and culture, in a relationship with others. A personal identity is therefore the result of a constant and voluntary effort to manage continuity in one's life and maintain consistency in an ever changing person (Beaurain, 2008). At the same time, though individuality implies a difference with others, it also proclaims its belonging to categories, to groups, as well as to places. This observation clearly raises the question of locally reconciling the many uses of environmental resources in conjunction with the socio-cultural habits of a territory and the shared representations of nature in view of protecting the environment.

Territorialisation of environmental law is therefore an issue lying at the heart of efforts to improve prescriptive procedures and the effectiveness of the law, and is a central factor in perceptions of social justice. Its implementation targets a double objective, namely to ensure the effectiveness of public policy and territorial equity. It is becoming increasingly clear that the territorialisation of law has become the prime legal instrument in implementing policies targeting social cohesion and the reduction of territorial inequalities (Hommage, 2002). However, in the environmental field, there remain two problems, namely access to data and their effective use, on the one hand, and access to procedural equity, on the other.

Differences in terms of access to information and of the potential of territorial stakeholders to take action

The sharing of information and data among territorial stakeholders contributes to a form of territorial intelligence that is useful in avoiding and reacting to ecological damage in the territory. When the information and data are shared beyond the territorial borders, they constitute significant feedback for others. In addition, certain territories have less potential for launching litigation due to differences in terms of their "local legal cultures" (Church, 1985).

■ Territorial differences in terms of access to data

Environmental issues involve an array of factors that, to be understood, require access to diverse data. But the diversity of organisations that collect statistical data and the lack of a single organisation to gather and clarify the data mean that the information is very difficult to use in an integrated manner by the stakeholders of a territory. On the socio-economic level, the National statistics institute (INSEE) plays an important role in centralising information.

Environmental data, on the other hand, are scattered between the Environment and energy-management agency (ADEME), the Regional environmental directorates (DIREN), the Departmental territorial directorates (DDT), each town, etc. (Roussel, Schmitt, 2009). There is no single source for a given time span and territorial level. The data, which often lack a common temporal and spatial basis, are not suitable for comparison purposes in geographic information systems (GIS), on relevant scales, without taking significant precautionary measures

(Jerrett, 2009; Carrega, 2005). This heterogeneity reflects an approach to the environment often based on sectoral and administrative parameters.

In spite of the Arrhus convention and the Inspire directive, the required data are difficult to collect not because people retain the information, but because it is scattered among many organisations. The lack of information can also be a factor in causing and worsening environmental conflicts. In Brittany, in the "affairs" concerning the coast, aquaculture projects met with opposition from the non-profit *Environnement et Patrimoine* in Ploubazlanec and from the *Comité de défense des sites* in Moëlan sur Mer.

Insufficient sharing of data and information within an administrative territory is an obstacle to understanding the issues involved in a case of damage and the same is true between territories. As noted above, certain types of damage to the environment produce trans-territorial effects that can require the sharing of information in order to fully grasp the issues. The sharing of information can also serve for comparisons and feedback of use to people confronted with situations similar to other events in the past.

■ Territorial differences in terms of the potential of territorial stakeholders to take action

Environmental litigation is initiated not only by the traditional actors in representative democracies (elected officials, civil servants), but also by a second category, namely the non-profit groups active in environmental protection, in which citizens participate voluntarily. Whether in attempts to prevent damage to the environment or to remediate ecological damage, the courts are often called on by non-profits, that now take action to ensure the enforcement of the law (Charbonneau, 2004). Increasing press coverage of ecological damage has had an effect on the results of litigation initiated by non-profits against decision-makers and the persons responsible for the damage. The development of the information and communication technologies (ICT) has become an indispensable factor in the suits brought by non-profits. A case highlighted by the press exists in the social sphere, meaning the procedure will go beyond the purely technical and professional aspects. That being said, not all territories are equal in that they do not have the same level of experience in these issues. This territorial experience (or lack thereof) will necessarily impact the manner in which ecological damage is managed in the territory for two reasons.

■ The organisational means in different territories are not the same. For example, some territories do not have any environmental-protection groups. However, close contacts with jurists or with those familiar with the legal sector are also a positive factor in the reactivity of stakeholders in a territory. This phenomenon is what Bruno Latour called "the experience of the law" (Latour, 2002). This experience makes it possible to establish the links between a particular case and previous cases, as well as with the body of law involved. It is clear that this process requires the capacity to reformulate, redefine and translate a particular situation, which in turn requires mastery of the legal jargon, techniques and practices.

■ The role of the courts is to propose a single, legitimate interpretation or qualification of a situation, thus breaking the continuity between the legal interpretations and the other interpretations that existed before the case was submitted (Azuela, 2008). The experience with the law transforms its role in the understanding of stakeholders and in a territory. By entering into contact with jurists, the mobilised groups learn the importance of legal procedures which would often seem to outweigh the arguments in terms of social justice that they attempt to put forward, but occasionally fail to see acknowledged precisely because of the procedures. Numerous studies have shown that there are clear differences between territories in terms of the suits filed before the judicial and administrative jurisdictions. These differences exist and have been measured between the various departments (Kirat, Lefranc, 2004). It is possible to analyse these differences in a number of ways that are not exclusive of each other. First of all, it is possible to measure the number of judgements in a territory that confirm the existence of ecological damage and take steps to remediate the consequences. It is also possible to study the types of damage that result in litigation in a territory. Similarly, one can assess the sensitivities of each jurisdiction in a given territory. Finally, studies can look at the type of stakeholders and the types of action undertaken that define the active forces in a territory and determine their capacity to take action against ecological damage.

Issues involved in territorial specialisation in environmental litigation

The issue of judicial specialisation in environmental litigation is directly related to that concerning the **links between ecological damage and the territory**. It can be analysed on three levels, 1) the **specialisation of prosecutors**, 2) the specialisation of "judgement groups", also called judgement chambers, and 3) the **specialisation of the jurisdictions themselves**. Only the first and third situations will be discussed here in light of the recent direction taken by the French legal system following the ministerial circular in 2015. They represent two types of specialisation that can be useful in judging complex cases requiring specialised legal knowledge, however they do not necessarily produce the same effects.

In the first situation, it is the role of the specialised prosecutor, appointed to deal specifically with environmental cases, to facilitate the relations with and between the local stakeholders and to clarify the local (i.e. territorialised) issues in view of establishing a suitable criminal policy. In the third situation, the objective would be to have a few specialised courts, spread evenly around the country, capable of completely and competently handling technical issues (Jégouzo report, 2013). In addition, this form of territorial specialisation could facilitate, where necessary, the geographic transfer of cases that, as is occasionally the situation with ecological issues, involve local, political aspects that justify the transfer to a distant jurisdiction. By offering the possibility of geographic transfers, specialisation would have the advantage of avoiding the risk of local disturbances likely to hinder procedures.

Specialisation of prosecutors to promote criminal policy adapted to local issues

As noted in the ministerial circular from 2015 (see Figure 28), the adaptation of criminal policy to environmental issues requires close collaboration between the Prosecutor generals and prosecutors. **The circular reiterates that the appointment of specialised prosecutors is recommended in each office.**

Figure 28

The main points in the circular from the Justice ministry, dated 22 April 2015.

The objective is to facilitate the relations and coordination with the concerned administrations and agencies, and encourage the study of the policy results on the local level. The specialised prosecutor in the Prosecutor general's office must organise regular meetings with the specialised prosecutors in the local offices (see Box 19) in order to coordinate their work and draw up reports on the results. Training courses, addressing local litigation issues, can also be set up by the specialised prosecutor in the Prosecutor general's office. Among his other missions, he must see that a single contact person is appointed in each of the specialised agencies.

The circular also recommends reinforced collaboration between the legal system and the local State services and the agencies in charge of the environmental police. The objective is to identify the main, local (territorial) issues and to structure the criminal policy accordingly. To that end, it is essential that the prosecutors participate in the inter-agency water and nature groups that set up the environmental inspection programmes. The signing of agreements with the prefects and the concerned public agencies is also encouraged in order to better coordinate criminal and administrative policies. The prosecutors should also identify the non-profits certified for environmental protection in their territory and establish contacts for discussions and to gain knowledge on local issues and any damage affecting the environment (see Box 20).

Interview of Jean-Philippe Rivaud, deputy Prosecutor general at the Prosecutor general's office, Court of Appeals in Amiens, in charge of environmental and public-health issues

Since 2007, you have made active efforts in the Picardie region to raise the awareness of prosecutors concerning environmental law and its effective enforcement.

In each office, an "environmental" prosecutor in charge of this specialised sector has been appointed. Each year, we organise a regional conference for public action on an environmental topic. In 2012, the meeting was devoted to the protection of aquatic environments. The idea is to bring together the prosecutors from the seven offices with Onema and the State services (regional environmental directorate, departmental territorial directorates) in charge of the water police, in order to facilitate discussions and better understand the issues at hand through specific examples from the region, as well as the national and global issues concerning the protection of water resources. These meetings serve to create closer ties between the prosecutors and the members of the administrative police. We also set up special sessions at the Court of Appeals for environmental cases to ensure that decisions are rendered within three months following the judgements of the lower courts. These sessions mobilise the efforts of the prosecutors and facilitate the participation of the environmental police agents who provide technical clarifications and information on how the damage can be remediated. Finally, we have established a solid partnership with the regional environmental directorate and with the Onema regional office.

What are the results of this policy?

We note a real increase in the awareness of the prosecutors in the Picardie region, their knowledge of environmental protection has improved. Over the past year, the number of judgements in new cases of environmental damage has increased significantly. Legal efforts have increased, heavier sentences have been handed down and the decisions are published. Momentum has been created, prosecutors have polished their techniques (though a great deal remains to be done), judges are more receptive and administrative services have encouraged police forces to launch criminal procedures, which has significantly motivated the people who report the offences.

Enforcement of environmental criminal law remains difficult.

The situation varies greatly from one region to another, but on the whole, few regions have set up organised and coordinated policies. Environmental issues are not central concerns for judges and prosecutors, contrary to physical violence which represents a large number of cases, or driving offences. In addition, they lack any basic training on environmental offences. Their ignorance of the main legal principles in environmental law is due to the fact that the legal texts are scattered among some 15 legal codes and to the exceptional technicalities involved. As a result, work on a water-pollution case is much more complex than, for instance, a case of child abuse.

What is required to make further progress?

Given the complexity and technicalities of water law, it is essential that Onema personnel provide more contextual information on the offence, highlight the links with regional environmental issues and clearly present the consequences when preparing their reports for legal proceedings. More generally, it is essential that the concept of ecological torts be included in the Civil code and that a chapter on environmental offences and crimes be included in the Penal code. Another option would be to create specialised prosecutors as is the case in Spain and Sweden, or to expand the number of specialised hearings for environmental litigation. Finally, it is important that we encourage cooperation between judges and prosecutors on the European level to handle international environmental cases. The European network of prosecutors for the environment was recently launched. It is chaired by a British colleague and I am a founding member.

(Interview carried out by Onema in January 2013)

200 prosecutors specialised in the environment met in Paris in December 2015

For the first time, almost 200 prosecutors specialised in environmental litigation were invited by the Minister of Justice to meet on 2 December 2015 in Paris (see Figure 29) in order to discuss the major guidelines for judicial procedures in the environmental field.

The objective of the meeting was to bring together the main components of the judicial police and the environmental prosecutors in order to encourage implementation of the ministerial circular (21 April 2015) on criminal policy in the environmental field.

The Prosecutor general for the Court of Appeals in Paris, Catherine Champrenault, opened the meeting with remarks concerning the highly collaborative nature of environmental litigation. She complimented all the public services in charge of inspections for their work and noted the high degree of complexity in environmental cases and the increase in European requirements.

She also suggested putting more thought into preventive measures and strengthening the partnerships with the public services in charge of inspections, with specific mention of the policy of judicial warnings set up by the prosecutor's office in Evry, in conjunction with Onema.

The director of criminal affairs and pardons, Robert Gelli, insisted on the need to coordinate the various participants in the field and to share information on results and on the current situation. He stressed the importance of developing "operational groups", each led by the local prosecutor and comprising all the local stakeholders in environmental affairs and the representatives of the police and *Gendarmerie*, in order notably to analyse the environmental issues in a given area or department, and subsequently establish territorial strategies.

Figure 29

© C. Montagne / DICOM - Justice

200 prosecutors met in Paris to discuss damage to the natural environment.

Specialisation of jurisdictions by creating "zones of attribution"

In the environmental field, this type of specialised unit currently exists exclusively for marine pollution by ships. However, following the law (4 March 2002) that enabled the creation of specialised health and environmental units by the Paris and Marseille District Courts, it is clear that this approach could be expanded to include other forms of damage. It has been presented as a means of solving certain problems observed during actual procedures.

First of all, the specialisation of jurisdictions could serve to clear out the backlog of cases and thus contribute to reinforcing the effectiveness of environmental law in general and water law in particular (Jegouzo report, 2013). In theory, cases are sent rapidly to the courts, but the actual lead times are very long (6 to 18 months between the initial citation and a judgement) due to the congestion of the legal system that must process many different types of cases. The average time required to prepare a hearing is half a day, occasionally less. Prosecutors may be tempted to simply close the least serious cases.

Secondly, specialisation is presented as a means to solve the problems concerning the complexity and technicality of water law (see Chapter 2, page 34). In this case, the specialisation of jurisdictions could be interpreted as the specialisation of judges (a topic not addressed by the circular in 2015), i.e. an increase in expertise in technical sectors due to more regular processing of such cases. The study of environmental cases takes time that jurists do not have, as well as a major intellectual effort to gain knowledge in a field in which they cannot be certain that they will be assigned cases.

The two immediate, positive effects of the specialisation of jurisdictions would therefore be more rapid and effective execution of legal procedures, with as a consequence considerable savings of time and money for the parties involved and for the legal system itself.

In addition, as noted above, press coverage of cases is clearly a positive factor for the non-profits and stakeholders whose mission is to defend nature. However, press coverage can also elicit the expression of strong feelings in a territory and lead to conflictual situations that put a territory under pressure. Territorial specialisation can facilitate, where necessary, the **geographic transfer of environmental cases** that, as is occasionally the situation with ecological issues, similar to other fields, involve local, political aspects that justify the transfer to a distant jurisdiction. By offering the possibility of geographic transfers, specialisation would have the advantage of avoiding the risk of local disturbances likely to hinder procedures.

However, it is clear that water law and environmental law as a whole permeate virtually all legal fields (public health, real estate, etc.) (see Box 21). This cross-cutting feature means that a comprehensive and consistent approach is required. But the specialisation of jurisdictions could lead to a partitioning of environmental issues, which could in turn raise other problems.

That is why, though the issue of the specialisation of jurisdictions is still debated, for the time being the French legal system has come down in favour of the specialisation of individual jurists within the normal jurisdictions.

An overview of water law

The main function of water law is to facilitate the management and governance of a vital resource that is subject to multiple uses and potential sources of conflict. It reflects the evolution of our societies in that the law acts to both regulate and protect.

Knowledge of and proficiency in water law are therefore critical issues for all the stakeholders in charge of implementing water policies. In that water law is based on a comprehensive and consistent approach, it is also an important issue for all those working in fields impacted by water law.

That being said, water law is a complex topic that is difficult for both professionals and laypersons in the water field, a factor that adversely affects its effectiveness. That is why Onema put together for the concerned stakeholders an informative document (see Figure 30) designed as an "operational tool" that explains in clear and accessible terms the objectives, means and issues involved in the main European and national texts targeting the restoration of good water status.

Figure 30

European and national legislation in the WFD context (Onema, 2015).

Conclusion

Law is the product of a political process within a given territory. It is also what enables the political and administrative authorities in that territory to wield their authority.

Territories are also areas in which the procedures of applying the law are implemented.

Depending on the local characteristics, the territory applies the law through the prism of its material, structural and identity traits that protect it more or less from the disparities likely to be observed in the implementation of the law. The fundamental cause of the disparities is often, on the one hand, the absence of “distributive equity” because environmental risks are not evenly spread and, on the other, the absence of “procedural equity” because the stakeholders in territories do not all have the same opportunities to influence decisions impacting their immediate environment (CGDD, 2013).

In a country based on the rule of law such as France, respect for the law by one and all must be reaffirmed as a fundamental principle and it is precisely the capability of the public authorities to see that the law is respected and, if necessary, sanctioned that ensures the effective rule of law.

The specialisation of prosecutors, which already existed in some territories prior to the 2015 circular, but was strongly recommended by it, is certainly one means to solve some of the problems at hand.

SUMMARY of chapter 4

Territorial considerations in the legal situation and how they apply to ecological damage

Key concept

The territorialisation of the law is the impact that the characteristics of a given territory have on the application of the law in that territory. One consequence of this phenomenon is that the manner in which ecological damage is approached in territories can differ.

Key points in understanding the subject

The issue of judicial specialisation in environmental litigation is directly related to that concerning the links between ecological damage and the territory. Two aspects of judicial specialisation are discussed. The first concerns the manner in which local issues can be taken into account through specialisation of the prosecutors. The second concerns the creation of "zones of attribution" which, in addition to potentially relieving the congestion of the legal system, could be a partial solution for the problem concerning the complexity and the technicality of the law.

Key points to remember

The concept of territorialisation for ecological damage raises two important points.

First of all, different territories are exposed to different levels of risk (factors of risk and vulnerability) for ecological damage.
Secondly, not only are territories more or less exposed, but their capacity to react to damage differs in terms of the availability of information and of the awareness and dynamism of the stakeholders in a given territory concerning the legal processing of the problem.

spécialisation judiciaire
territorialisation
réaction
complexité et technicité
enjeux locaux
zones de compétences
risque

The time factor in managing ecological damage

5

Introduction

As noted by Mr. Chemiller-Gendreau, “in a complex world, it is difficult to isolate a precise act from the causal sequence in which it is inserted, consisting of causes in the past and consequences in the future” (1995). Ecological damage is certainly one of the precise acts that raises the issue of time because **time spans in the legal system are a social phenomenon that do not necessarily coincide with the progression of nature**. Time in the legal sphere corresponds to human activities and not to nature and its processes.

In law, the notion of time is critically important. It intervenes in both the process of acquiring rights and in that of the extinction of those rights. By setting terms and limits, the legislator attempted, on the one hand, to protect the accused and ensure the equity of contradictory debates, and on the other, to avoid the disappearance of evidence. In law, time is necessarily short, as measured on the human scale, because the existence of laws implies decisions and sanctions. Beyond a certain time, legal action is no longer desirable because the evidence fades, causal links become less clear and the responsible person eventually dies. The law is governed by strict time criteria and legal procedures initiated beyond certain limits are forbidden by the statute of limitations (Remond-Gouilloud, 1992).

Environmental law is thus confronted with a true challenge. Ecological damage may occur instantly or over a period of years, i.e. it may become evident very suddenly or very gradually. For this reason, the time required by damage to become manifest does not necessarily coincide, on the one hand, with the legal requirements in terms of solid scientific and technical proof, and on the other, with the statute of limitations voted by the legislator. For example, a reference point in time is essential in order to characterise the ecosystem status prior to the disturbance, however, it is not always easy to know just how far back in time it is necessary to go. Similarly, gradual damage, i.e. damage that is slow and progressive, can take years and repeated events to manifest itself. In addition, the perception of gradual damage is often the result of new knowledge, for example concerning pollutants, and it is difficult, in the legal sense (i.e. assigning liabilities, etc.), to determine the consequences for aquatic environments at a given point in time.

The time span during which legal action may be taken corresponds to that between the manifestation of the damage and the limits set by the legal statute of limitations. On the one hand, factual reports of damage in the field are the trigger for legal action. On the other, the situation concerning knowledge and legislation at a given moment determines both the framework and the effective conditions of the legal action (non-retroactivity of the law, statute of limitations, etc.). Environmental law is therefore inevitably confronted with a conflict between times in human affairs and in the natural world, which explains why it attempts to adjust its procedures in an effort to reconcile the temporal discrepancies.

To that end, the legal system has developed a number of specific concepts and integrated others in order to adapt common law to the specificities of environmental law and the unique aspects of ecological damage. As discussed below, the notion of irreversibility is a perfect example (Makowiak, 2011) and it is not the only one. The concepts of remediation, restoration, common patrimony, future generations and sustainable development are other examples. The legal system has also succeeded in integrating time factors in its techniques designed to avoid and remediate ecological damage. This is because the concepts of conservation and remediation are effectively linked to the past, present and future.

Different time factors in the manifestation and effects of ecological damage

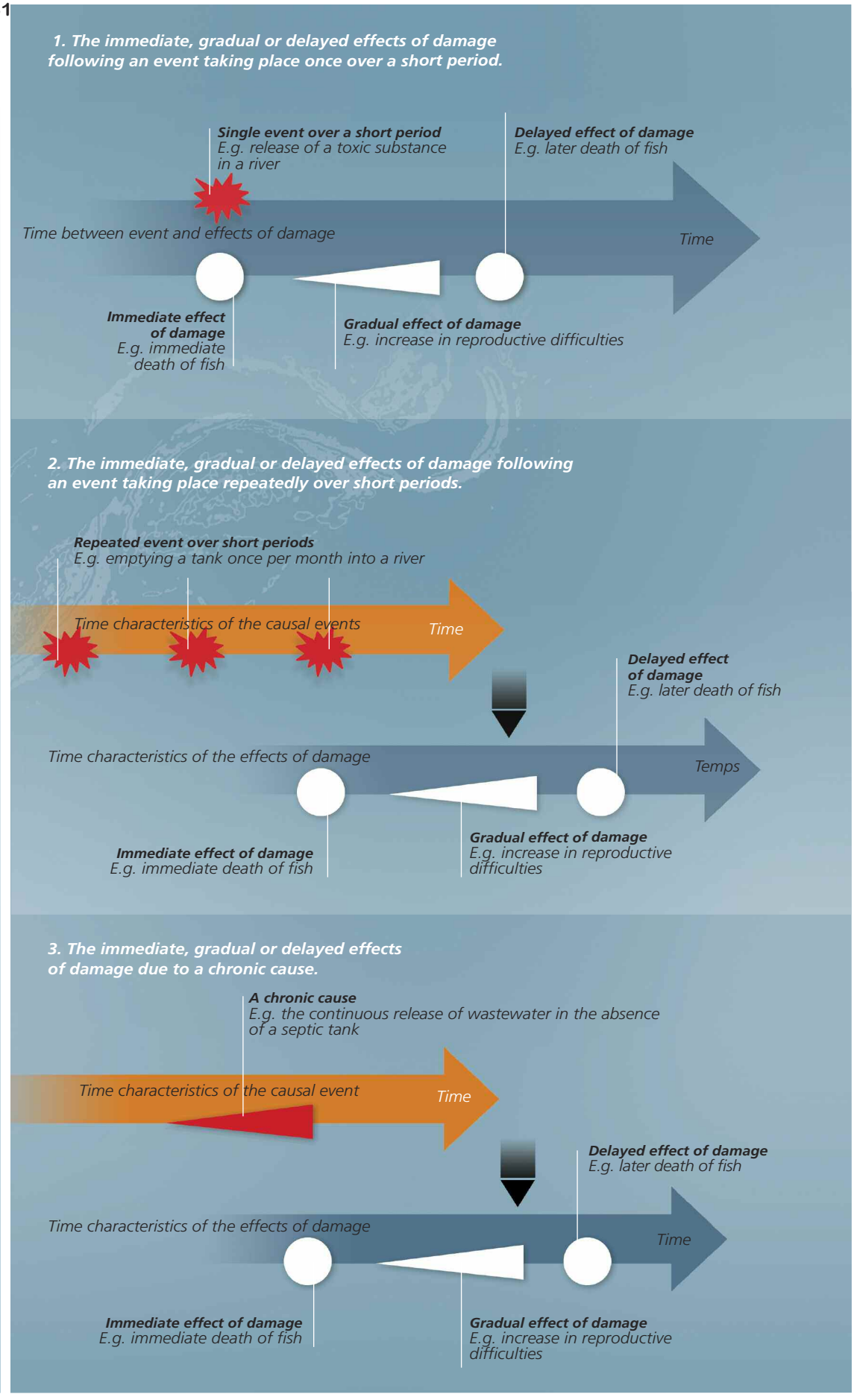
The issue of time perceived in terms of ecological damage lies at the heart of the distorted relationship between society and nature. In society, time is a human construct. That does not mean that it has no meaning, but that it is adjusted to human needs. In nature, time is made up of rhythms, cycles and breaks (Remond-Gouilloud, 1992). Practically speaking, that means that damages in common law are generally perceived on the basis of the causal link between the event giving rise to the damage and the damage itself. This is due to the fact that liability in law depends on damage that is current and certain. But similar to the fact that the event giving rise to ecological damage may take place once over a short period (e.g. a single release of a toxic substance in a river, see Figure 31-1) or repeatedly over short periods (e.g. emptying a tank once per month in a river, see Figure 31.2) or continually on a chronic basis (e.g. releasing wastewater continuously in the absence of a septic tank, see Figure 31-3), ecological damage may not manifest itself immediately (e.g. by the death of fish), except in cases of major accidents. The effects may be gradual (e.g. in the form of increased disturbances in reproduction) or delayed (e.g. death of fish at some later time).

What is immediate, gradual and delayed damage?

As noted above, ecological damage is defined as an impact on the environment and on the functioning of an ecosystem that can constitute a tort (legal consequence) for humans and nature (see Chapter 1). Caused by driving forces in the context of household (including services), industrial or agricultural activities (see Figure 31), this impact may be physical (affecting the hydromorphology of rivers, etc.), chemical (toxic substances) or biological (invasive species, microbiological contamination). The effects may be immediate, gradual or delayed.

Immediate damage produces an effect instantaneously. This is the case for accidents affecting the environment, resulting from a sudden and unforeseen event. The damage (e.g. fish mortalities) becomes clear virtually without delay following the sudden causal event (e.g. the release of a toxic substance in a river). The damage is visible and its cause can be easily identified. Examples are the sudden rupture of a tank or a pipe containing dangerous products that immediately reach the water table or flow into a nearby river. The effects are immediate, i.e. coincidental with the event, and consequently it is easier to observe and understand the situation and assign liability. The situation is very different in cases where the effects of the damage are gradual or delayed.

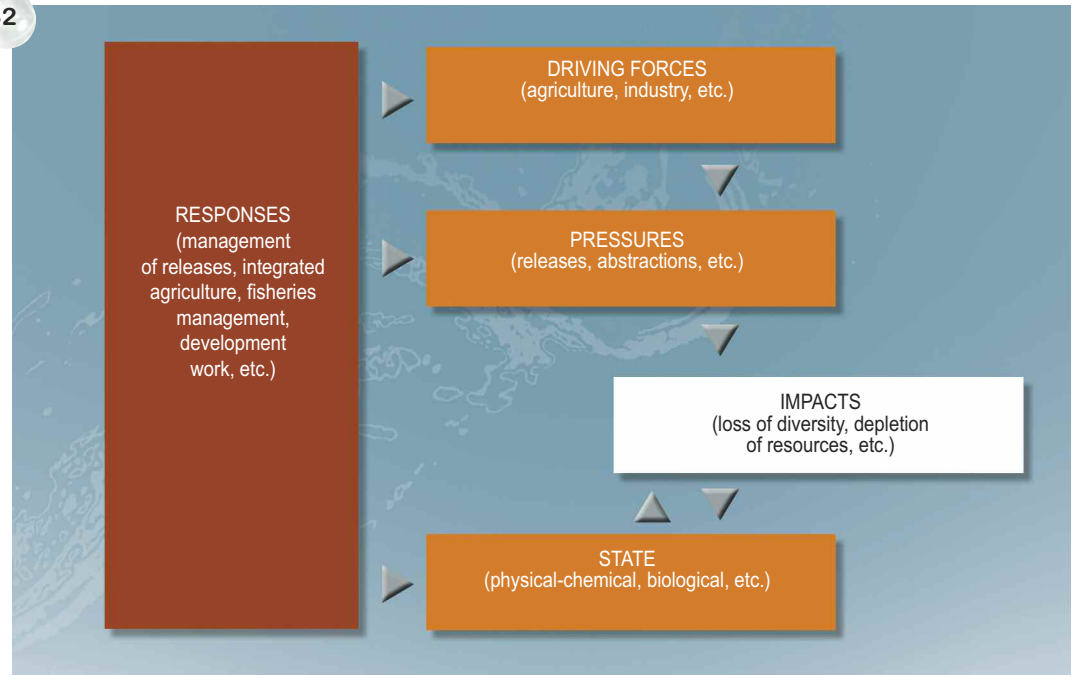
Figure 31



Damage is said to be gradual when the persistence of the causal event progressively produces environmental damage (e.g. increased reproductive difficulties in fish). In some cases, gradual damage may require many years and repeated events to manifest itself. That is the case for chronic pollution that is the consequence of the repeated or continuous release of pollutants. Chronic pollution may also be caused by highly persistent substances that continue to pollute even when the source has been discontinued. In this case, the environment is polluted progressively and the corresponding criteria are decisive in characterising the damage. The same is true when stone banking is installed progressively in several spots to stabilise the banks of a river or meanders are progressively cut to rectify a river bed. In the final analysis, it is the repetition of acts that, over time, significantly impact the morphology of rivers (Wasson *et al.*,1995). The detection of gradual damage is also made possible due to new knowledge on pollutants. In the past, releases that were not considered toxic were not monitored or filtered. Consequently, they accumulated over the years until their danger could be proven scientifically.

Damage is said to be delayed if there is a significant time step between the causal event, which may take place once, repeatedly or be chronic, and the effect produced by the damage. In this case, the effects of the damage occur at some later time. This may occur when, for example, a toxic substance spills, but is not immediately released to the environment either because it is contained and cannot disperse (e.g. packets of substances from a hospital, released to a river, whose contents enter into contact with the water once the packets have dissolved) or because the substance immediately lodges in the sediment. It is only when the sediment releases the substance that the effects will be felt.

Figure 32



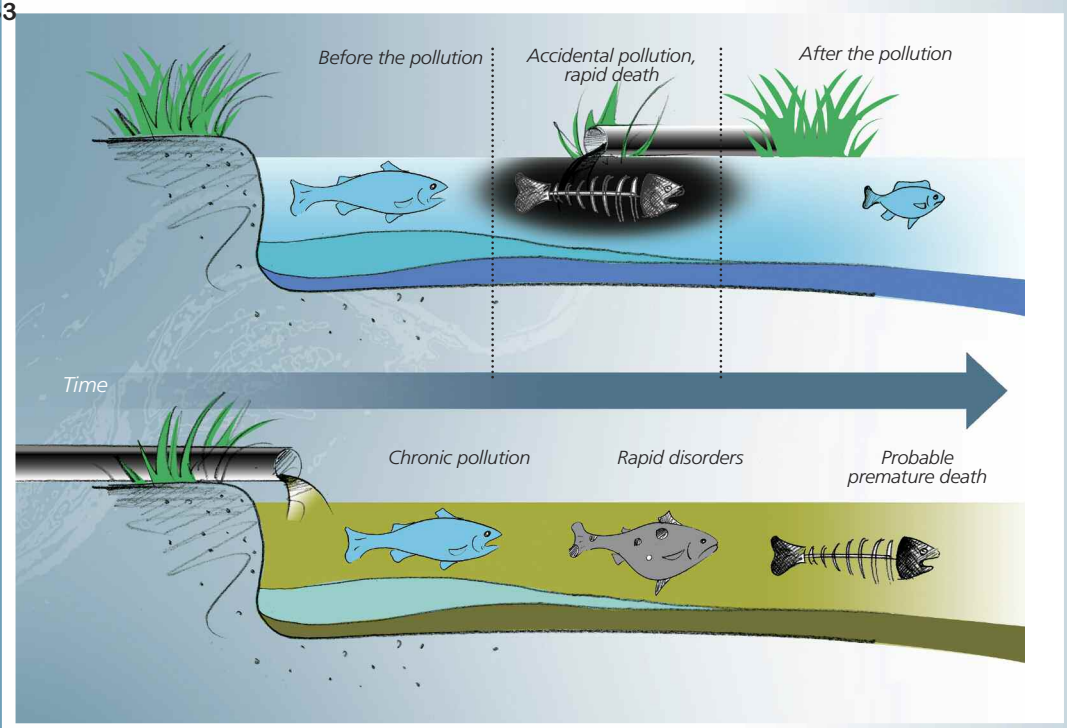
The Driving forces, Pressures, State, Impact, Responses (DPSIR) model. (See EAA, 2000).

Impact times for micropollutants in a river

Micropollutants can provoke disturbances and alterations in the functions of living organisms, leading to adverse effects and in some cases death.
There are two main types of toxicity:

- **immediate toxicity** when the pollutant causes the death or major physiological disorders immediately or shortly after the exposure to the substance;
- **chronic toxicity** when the pollutant causes either irreversible, long-term effects due to the continuous absorption of small doses or cumulative effects.

Figure 33



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See Seine-Normandie Water agency, 2014.

How are these different types of damage handled by the legal system?

As noted above, the effects of damage may be immediate, gradual or delayed (see Box 22). But however long the effects take to become evident, the damage can be more or less long-lasting. This duration of damage implies that the law must take into account whether the damage is reversible or not. This led to adopting or developing concepts and principles such as sustainable development, the precautionary principle and the concept of patrimonialisation, in order either to slow or stop the effects of the damage or to reduce their impact. These concepts and principles have in common that they make it possible to go beyond the scientific uncertainties by taking into account economic, social and political aspects that enable the legal system to address the problem (Kast, 2003).

■ The concept of the irreversibility of ecological damage lies at the crossroads between the past, present and future

Irreversible damage may produce effects over the short, mid or long term, but damage in itself, whatever the term, is not necessarily irreversible. The concept of irreversibility lies at the crossroads between the past, present and future. It implies the idea of a before and an after. It describes a process leading to the disappearance of an element or of a state that once existed but will not return to the damaged site. Environmental irreversibility corresponds to a specific type of damage that results in the impossibility of a return to the baseline condition of the impacted element or situation. This is the case, for example, of the destruction of a rare spawning ground for sturgeon by a gravel miner. To speak of taking into account the irreversibility of ecological damage means that the legal system sees irreversibility as an adverse ecological process (Guilbert, 2013).

To arrive at that conclusion, the legal system had to and continues to adapt because it is difficult for it to determine that irreversibility exists in that the concept involves temporal features with which the law is not accustomed. That means the law must succeed in aligning two concepts, namely "**factual irreversibility**" (based on the scientific observation of, for example, the elimination of a species) and "**legal irreversibility**" (i.e. the legal integration of the ecological situation which establishes the legal decision in time) (Guilbert, 2013). The challenge confronting environmental law is therefore to slow, avoid, reduce and if possible stop acts and behaviour likely to produce an irreversible situation while limiting the scientific uncertainties (concerning the existence of the damage or the proof of its extent) in order to consolidate the legal standing of the decisions taken. The scientific, economic, social and cultural aspects of the irreversibility condition the legal processing of the concept.

This observation explains and leads to three main conclusions.

■ **The irreversibility of ecological damage is analysed by the law in terms of "disappearance" and "destruction".** This makes it possible to take into account the dynamic nature of ecological processes while upholding the need to protect them. The concept raises the question of how to maintain the equilibrium and cycles of ecosystems (the reproduction of species and renewal of resources), taking into account their natural capacity to regenerate and to continuously evolve (absorption of pollutants, loss of species according to the laws of nature). This is what is called the resilience of ecosystems. It corresponds to the capacity of an ecosystem, a habitat, a population or a species to recover a normal degree of functioning and development after having suffered a significant disturbance (Holling, 1973). It is only once the resilience of the ecological system has been exhausted that it initiates a reorganisation of its processes and that the situation may be considered irreversible. In cases of accidental pollution such as oil spills and other catastrophes, the resilience of the environment is generally insufficient. For gradual or delayed pollutions resulting from normal operations, it is essential to define the resilience threshold of the environment.

■ **The law favours a rather broad definition of environmental** even if a degree of uncertainty persists concerning possible reversibility in the future. Environmental irreversibility may be absolute, which is the case for the disappearance of a species. The irreversible process of the disappearance results in a situation that cannot be modified. However, it is important to acknowledge that not all irreversibilities are absolute. The law freed itself of this temporal constraint by deciding not to prolong cases on the basis that the situation may be reversible over the long term. In this manner, it avoided the risk of inaction on the basis of arguments that the environment could possibly, over the very long term, restore itself. This decision is also grounded on the fact that there is no means to determine objectively if and when the restoration could take place.

■ **Irreversibility is seen as a serious consequence** (Remond-Gouilloud, 1992). Scientific uncertainty should not encourage inaction, but it cannot justify all action. A long time span during which it is impossible to return to the prior situation is not necessarily a serious or negative consequence, however in some cases irreversibility is a decidedly adverse consequence. In the latter scenario, the ecological damage may possibly be remediated, but it will not be undone and the consequences may be long lasting. Consequently, though the impossibility of restoration is not certain, irreversible damage is necessarily serious because it constitutes, in any and all cases, a loss of potential.

What is more, the 1995 Barnier law (Law 95-1001 on reinforcing environmental protection) stipulates that "the absence of certainty must not delay effective and proportionate measures to prevent serious and irreversible damage". In its 2005 report titled "Responsibility and socialisation of risk", the *Conseil d'État* discussed a growing suspicion concerning technical progress. Questioning the ambivalent effects of progress has now become systematic. Scientific uncertainty is now associated with the risk of serious and irreversible damage.

Currently, the law distinguishes three levels of more or less long-lasting effects of ecological damage:

- irreversible damage to the environment, i.e. manifest degradation that cannot be remediated;
- damage that is reversible only after a long period that varies depending on the regenerative cycles of the environment and of nature;
- damage that can be remediated over a reasonable time span.

In this manner, the law takes into account the time likely required for the damage to be resorbed, ranging from a few days to decades and even centuries. **Legal proceedings are favoured when the damage to the environment is irreversible or when it cannot be remediated within a reasonable period** (2015 ministerial circular). The 2015 circular stipulates that "the length of time likely required for the damage to be resorbed must be taken into account" and that on this basis, prosecutors should launch legal proceedings if the damage is irreversible or if the damage cannot be remediated within a reasonable period".

Consequently and as noted by M.-J. Littmann-Martin and C. Lambrechts (1992), it becomes apparent that "the notion of irreversibility cannot be separated from that of damage" and that "irreversible ecological damage may be defined as damage that cannot be remediated rapidly, due to scientific or technical reasons, or also economic reasons if the cost of remediation is deemed prohibitive to the point that it is simply not possible".

In spite of all efforts, "the concept retains its multi-faceted mystery even while slowly gaining an emergent form of autonomy" (Littmann-Martin *et al.*, 1992). That is why the concept of irreversibility necessarily evokes other notions that are also confronted with the dilemmas arising from the temporal dimensions linked to the manifestation of ecological damage. All in all, the best solution is to avoid the damage.

■ The precautionary principle as a means to overcome the scientific and legal uncertainties concerning future risks

"Protect ourselves from the unknown in the absence of any known or acknowledged reason. Act or not act according to the questions, mysteries, silences put forward by the current progress of science and technology. That is the curious attitude to which the precautionary principle invites." It was with those words in 2001 that A. Rouyère opened his presentation during the symposium "New legal standards for public liability" held at the *Palais du Luxembourg* in Paris.

It was the Declaration of Rio in 1992 that for the first time referred to the precautionary principle for environmental protection. In French law, the expression "precautionary principle" was used for the first time in the Barnier law (2 February 1995) on reinforcing environmental protection. The precautionary principle, which is a principle assigning responsibility, is an incentive to adopt preventive measures intended to avoid potentially serious damage that would be difficult to remediate and where the causal links have not to date been scientifically proven (Flückiger, 2003). A further purpose is to sanction negligent behaviour (Baghestani-Perrey, 1999). It follows that, where the term irreversibility designates the incapacity of stakeholders to change a situation or a process, the precautionary principle, a fundamental component of sustainable development, encourages us to decide and/or act (either by doing or by refraining from action), when uncertainty prevails, on the basis of assumptions while waiting for further scientific knowledge to be come available (Guilbert, 2013).

The main contribution of the legal precautionary principle and of the philosophical, scientific and social discussions that surrounded its emergence is that it spread the idea that uncertainty and even ignorance may be a source of rights and not only a legal consideration (Rouyère, 2001).

Even though it is by definition confronted with uncertainty, the concept of precaution attempts to dissipate the uncertainty by developing knowledge and to reverse prior decisions where necessary. If there is doubt concerning the causes or effects of events, the worst case is assumed.

That being said, the purpose is not to totally eliminate all risk because there often exists an irreducible margin of risk that is considered socially acceptable in light of the expected advantages. The precautionary principle can therefore be considered an approach to action and decision-making in a context of great uncertainty, requiring measures proportionate to the seriousness of the risk, even if the latter is only potential (Bouzon, 2001). Given the uncertainty surrounding certain technical aspects, the law manages the risk inherent in the system ("I know that I do not know") by setting behavioural standards, imposing both action and non-action, based on our awareness of the deficiencies of our knowledge (Coulon, 2001).

Consequently, **the objective of the precautionary principle is both to protect the environment and to prevent its degradation.** It avoids damage where the consequences are unknown due to scientific uncertainties or to scientific controversy concerning the effective consequences (e.g. the long-term effects of pesticides in water). It is not the same as the preventive principle which aims to avoid damage for which the consequences are known (e.g. releases of toxic substances in water).

■ The "polluter pays" principle as a means to avoid damage or limit its future effects

The "polluter-pays" principle was originally designed specifically to protect the environment from gradual damages by spreading the costs of chronic pollution among the various polluters (Smets, 1993). Given the uncertainties raised by chronic pollution, it could not be managed using the standard liability regimes. This is because chronic pollution progresses insidiously and is often initially absorbed by the environment. It is only when the environment has become saturated that the pollution becomes apparent, often causing irreversible damage. This time lapse between the release of the pollutants and the manifestation of their presence hinders efforts to pinpoint the moment in time when the pollution occurred. As a result, there is uncertainty concerning both the moment when the damage may be ascertained with certainty and the implementation of remedial action.

This principle was included in 1987 in the Single European Act and subsequently in the Maastricht Treaty. In France, it was inserted in the Barnier law (2 February 1995) on the reinforcement of environmental protection. It is defined as a principle "according to which any costs arising from measures to prevent and reduce environmental pollution and from work undertaken against pollution must be assumed by the polluter". Though it is not truly a principle of liability in that it does not designate the responsible entity causing the pollution, it does ensure compensation and contributes to the need of determining the liabilities (de Terssac and Gaillard, 2008). The polluter-pays principle thus engages the environmental liability of an operator, due to his professional activity, in the event of serious damage or the threat of imminent, serious damage to the environment. A threat of imminent damage corresponds to the delicate situation where the damage has not yet occurred, but requires action to avoid its occurrence or to limit its effects.

The 2004 European directive on environmental liability, transposed into French law by the Law on environmental liability (2008), is the first piece of EU legislation to include among its main objectives the implementation of the polluter-pays principle (COM (2010) 581 final, 12 October 2010). It establishes

a common framework for liability in order to prevent and remediate damage caused to animals, plants, natural habitats and water resources, as well as damage affecting soil. It distinguishes two complementary situations, each corresponding to a different liability regime. The first applies to dangerous or potentially dangerous professional activities listed in Annex III of the directive (agricultural and industrial activities requiring a permit, etc.). The second applies to all professional activities not listed in Annex III, but only when damage (or the threat of imminent damage) is inflicted on species and natural habitats protected by EU legislation. In this case, the operator is liable only if he committed a fault or was negligent.

When there is a threat of imminent damage, the cognizant authorities in each Member State may:
- force the operator (the potential polluter) to take all appropriate, preventive measures;
- or take themselves all appropriate, preventive measures and later recover the costs.

When damage has occurred, the cognizant authorities may:
- force the operator to take all appropriate, remedial measures (set by the rules and principles laid out in Annex II of the directive);
- or take themselves all appropriate, remedial measures and later recover the costs.

If several damages have occurred, the cognizant authorities may decide on the order in which they are remediated.

The type of remediation of environmental damage differs depending on the type of damage. For damage affecting water, the objective of the directive is to restore the environment to its conditions prior to the damage. To that end, the damaged natural resources or the degraded ecological services (benefits) must be restored or replaced by identical, similar or equivalent resources/services, either on the damaged site or, if necessary, on a different site.

■ Patrimonialisation of the environment as a means to create responsibility for a shared future

Conservation is the basic component in all patrimonial efforts. The debates on sustainable development, climate change and environmental degradation have continued, under a new guise, a movement launched in the 1800s in the form of policies to preserve/conserve nature by establishing it as part of our patrimony.

Patrimonialisation of the environment contributes to efforts to create responsibility for a shared future. This shared patrimonial responsibility manifests itself as a legal link between the past and the future. **It is part of the effort to create a collective, no-fault liability regime as an alternative to identifying and assigning to an individual a cause or fault likely to initiate damage, that is generally gradual or delayed.** By patrimonialising the environment, there is a shift from individual assignment of liability for damage to the assignment of socialised or collectivised liability. This notion centres on the idea of "saving", in the sense of maintaining something that is threatened, i.e. "safeguarding" it. That implies not only "taking care", but also "guaranteeing", "vouching for" and being "responsible for". The assignment of the adjective "patrimonial" to an environmental object automatically implies the appointment of a responsible entity and the creation of a link between that entity and the object (Crenn, 2003).

That being said, in France, the approach via the resource remains the dominant procedure. Contrary to other types of natural areas (landscapes, mountains, coasts), the patrimonial approach to rivers is less well established even though in the 1992 Water law, water is acknowledged as the shared patrimony of the nation and the European water framework directive (WFD, 2000) noted that "water is not a commercial product like any other but, rather, a heritage that must be protected, defended and treated as such". Rivers are the link between patrimonialised water and river basins designated as the territory for the local management of the resource. Water policy is confronted with a major difficulty concerning two of its main objects (Marc, 2007),

namely rivers fall under the category of possessed goods (state-owned and non-state-owned rivers), but running waters are common goods (Ghiotti, 2009). Hesitating between these two legal categories, the use and management of rivers in France oscillates in its legal standing between two purposes, the first economic, the second social and patrimonial. This raises a number of problems notably because it brings to the fore the question of managing a collective good when confronted with personal interests (agriculture, hydroelectricity, etc.) and consequently the issue of coordinating the preservation of a natural patrimony and the exploitation of the cultural heritage (Germaine and Barraud, 2013).

However, a few decisions by the courts have begun to consolidate the patrimonial value of rivers. In the legal decision rendered by the Tours District Court in 2008 (see Chapter 3), the judge decided to take into account both objective (fish mortality, cleaning of the river, restocking with fish, efforts to inform the public) and more subjective aspects (nostalgia for the landscape and prior fishing conditions, original beauty of the site, the spirit of the area and the history of the people). In this precise case, the factors used to assess the damage and the remediation of the tort were the irreversibility of the situation, the impact on the biomass, the patrimonial value and the "work to remediate the accident", i.e. the creation of aprons to oxygenate the water and the creation of habitats in deep waters.

Consequently, though the environment belongs to those alive today, it becomes patrimony for those who come later (Honneger *et al.*, 2014). It becomes common patrimony only in as much as it is acknowledged as that of future generations (Hartog, 1998). The nature of patrimony resides in the fact it is an inheritance (Cottet, 2013). Environmental features deemed patrimonial are ipso facto seen as inherited, indivisible and irreplaceable (see Box 23). Inherent in patrimony is therefore its projection into the future. It contains a potential future that increases its value, notably social, cultural, economic, symbolic and, of course, territorial, as a strategic issue.

The three stages in the patrimonialisation of the Loire valley

Following the failure of a first attempt, a 260-kilometre section of the Loire valley between Chalonnes and Sully-sur-Loire was placed on the UNESCO list of world heritage as a cultural landscape in the year 2000. As noted by S.Ghiotti (2009), the emergence of the environmentally-based patrimonial dimension in the Loire valley corresponds to a new step in the perceptions and relationships between the local populations and their river environment. In terms of the reference systems brought into play and the time factors in the implemented public policies, this new step follows that of the dikes and that of the dams (Huyghues-Despointes, 2008).

Patrimonialisation took place in three steps.

1. The first step occurred when the river ceased to be seen as "developable" with the cancellation of the declaration of work in the public interest for the Serre-de-la-Fare dam in 1991. This was due in part to two factors:

- the emergence and strengthening of positions and alternatives that were not only credible, but received strong social support along the entire length of the river as indicated by the creation of the *Loire vivante* committee in 1986 and the non-profit *SOS Loire vivante* in 1988, which federated numerous other groups from throughout the valley (Bonin, 2008);
- the new context introduced by political decentralisation, whereby the costs and funding of infrastructure projects provoked changes in the positions of the various stakeholders. The new distribution of costs, benefits and decision-making processes took some time to take root, as evidenced by the discontinuities and duplicate procedures in the system of government for the Loire, that finally stabilised with the creation of the EPALA (public development agency for the Loire and its tributaries in 1984.

2. The second step started with the signature in 1994 of the first *Loire Grandeur Nature* plan (PLGN) between the State, the Loire-Bretagne Water agency and EPALA. Similar to the shift in policy by *Voies navigables de France* (VNF - French waterways authority) for the management of the *Canal du Midi*, the modified position of EPALA concerning hydraulics, the environment and local development signalled a tactical, institutional change where the objective was to conserve its legitimacy and a certain impact in the management and decision-making processes that the change in the perceived nature of the river might have cost the agency. Participation of EPALA in the ecological and environmental management plan for the river is a sign that the opposing opinions between stakeholders are not insurmountable and that the debates also exist within the institutions taking part in the governance of the Loire River.

3. The third step consisted of the creation of the Loire-Anjou-Touraine regional nature park in 1996. This new entity was a further step in the environmental dynamics in the Loire valley, but it can also be interpreted as a parallel initiative (in the fields of patrimony, development and the environment) by one of the stakeholders, the Centre regional council, an important player with whom it will be necessary to coordinate policies.

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The Loire River.

Time factors involved in preserving environments and in remediating ecological damage

Time factors involved in detecting the effects of ecological damage create problems for environmental law, but those involved in preventing ecological damage or remediating the resulting ecological torts are just as troublesome. The procedures selected to protect and remediate the environment take place within a time frame that, once again, raises the issue of the relationship, specific to the human perception of time, with the past, present and future. Whether the measures target protection or remediation, the stakeholders (judges, project owners, etc.) must always juggle with the past, present and future..

Taking action now to avoid future damage

As noted by J. Makowiak (2011), the present may be seen as the existing environment that should be studied and monitored in order to gain knowledge and to preserve it. The monitoring is part of **a continuous, permanent process that can be revealed only in the present**. This existence in the present is manifested by the periodicity of the reports and the creation of monitoring networks aiming, for example, to describe the current status of environments (an example being the WFD monitoring networks). In light of the controlled future, the means of prevention can be based in a present receptive to environmental law. This is because the multiple means of prevention used in the present will serve as “warning systems” and lead to greater awareness of the fragility of environments and species or, in some cases, of their disappearance. It is on this basis and starting from this present toward the future that several means of prevention provided for by the legislator can be implemented.

First of all, environmental preservation in order to avoid ecological damage can be in the form of **zoning** (natural zones with high ecological value (ZNIEFF), Natura 2000 zones, biotope-protection decisions, national nature reserves, zones with environmental restrictions (ZER), etc.). Decisions to protect the biotope, for example, are taken using a procedure that enables a Prefect to establish measures targeting the conservation of biotopes such as ponds, swamps, marshes, hedgerows, copses, heathlands, dunes, swards and all other types of natural environments only slightly impacted by humans, in as much as these biotopes are required for the feeding, reproduction, rest and/or the survival of species. Another example are the zones with environmental restrictions (ZER) that can be used to protect priority water abstractions. Article 21 in the Law on water and aquatic environments (LEMA, 2006) provided for the possibility of creating ZERs in which an action plan is set up to limit erosion, protect wetlands and/or protect abstraction supply zones.

Finally, another example is the placing of a river (or reach) in List 1, which means that no authorisations or contracts for new structures may be granted if they constitute an obstacle to ecological continuity (Art. R214-109 in the Environmental code).

These zoning procedures are conservation measures that sanctuarise certain natural environments (Meur-Ferrec, 2007) in order to limit the anthropogenic pressures likely to damage them. That is why some speak of "isolating" or "caging" environments (Therville, 2013; Arnould, 2005). By using environmental zoning to preserve certain environments from external pressures, the legislator decided to make the present permanent. These measures to safeguard the environment are therefore a purely legal concept of the present because in the real world, natural environments continuously evolve.

The prevention of damage may also be a feature in a project. The design and execution of projects qualified as "lesser environmental impact" require that the "avoid - mitigate - compensate" procedure be implemented (MEDDE, 2013; Onema, 2015). A project qualified as "lesser environmental impact" is one which enables France to meet the European requirements in terms of damage to or the conservation of a certain "status" in the environment, examples being the good status of water bodies as per the WFD, the conservation of protected species or of high-value habitats as per the Habitats directive, etc. These "status objectives" for environments or protected species are subject to mandatory results, otherwise fines may eventually be imposed by the EU. The "avoid - mitigate - compensate" procedure is now the basis for all environmental procedures in preparing projects (impact studies, land clearing, Water law, Natura 2000, protected species, etc.).

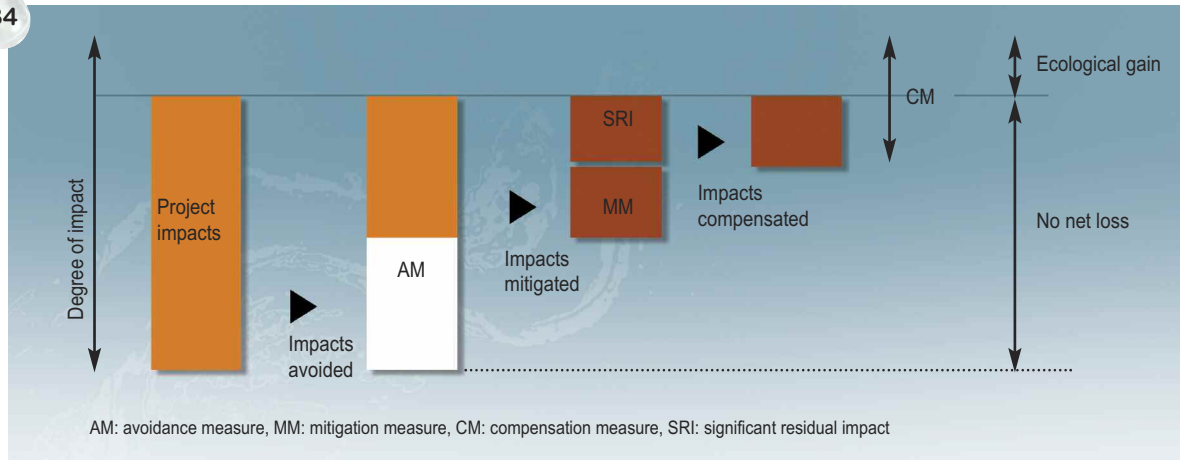
The purpose of the "avoid" in the procedure is precisely not to cause ecological damage, or as little as possible, because it will be necessary to remediate it if the damage is permitted to occur (see Figure 34). The less damage done, the less need for the project owners to correct it or to compensate it. There are three main types of avoidance measures (Onema, 2015):

- avoidance of the project itself. The objective is to determine if the project is worthwhile. For large, linear-infrastructure projects, the value of the project is assessed very early, prior to the design stage, during the public debate;
- geographic avoidance. The tactic here is to modify the site of a project or the itinerary of a linear infrastructure in order to eliminate any impact on environments and/or species requiring protection;
- technical avoidance. Technical solutions are adopted that eliminate any impact.

In addition to the preference placed on avoidance in the "avoid - mitigate - compensate" procedure, it should be noted that for *ex ante* compensation, the case here, compensatory measures are imposed for a future damage. This damage is foreseen given the residual, negative impacts on the environment that the project will have following the failure of the avoidance and mitigation measures, i.e. it is foreseeable, but has not yet occurred (Martin, 2016). Once again, the unavoidable link between the present and future becomes fully visible and enables the legal system to insert the protective measures in a temporal chain of events aiming to preserve the environment in the present by anticipating the damage. This approach is also recommended by the precautionary principle, a principle with applications ranging well beyond environmental law. G.Martin (2016) notes correctly that an operator prospecting a new market can, for example, avoid the risk of not achieving a satisfactory return on the investment.

The most effective means of remediating damage, whether in social, economic or ecological terms, is simply to avoid it or to anticipate it. However, that is not always possible and in such situations, the objective is to remediate the damage and to deal with the time factors inherent in the remedial operation. On the one hand, remedial operations may be organised over more or less long periods. On the other, for each type of remedial action, not only will the evolution of environments follow a different trajectory, but the remedial action itself makes it necessary to constantly juggle between the past, present and future.

Figure 34



Measures in the "avoid - mitigate - compensate" procedure to avoid project impacts on the environment. See Onema, 2015 (Tome 2, GIL guide).

Compensation in kind, a type of remediation that acknowledges the past, takes the present into account and anticipates the future

Compensation in kind consists of contributing to remediating environments that have been degraded, damaged or destroyed. It takes the form of an intentional human intervention (ASTEE, 2013) that initiates or accelerates the process by which a damaged environment returns to its status prior to the disturbance and recovers some of its characteristics (proportion of sensitive species, diversity of habitats, etc.).

■ How is remedial action launched?

Remedial operations can be launched in different manners that each set the action in a different time frame.

As noted above (see Chapter 3), compensation in kind may be initiated by a **procedure of the judicial police**. In this case, the citation for ecological damage drawn up by the environmental inspector trips the procedure intended to address the damage. Once the damage has been confirmed and pronounced as an ecological tort by the judge (see Chapter 3), the judge may sentence the defendant to compensation in kind, among other options. In this case, the remedial action is placed in a time frame that depends on the judicial procedure. In spite of the fact that the courts may take a long time (due to the congestion of the legal system), the value of a judicial procedure is that it normally accelerates the start of the remedial action. **The court decision to remediate the damage means that the time limit for the work may be determined and set by the judge.**

The remediation may also be initiated by a project. In this case, it is the malfunction observed on site that leads to the decision to remediate the damage. That being said, if it is not the triggering factor, the remedial operation will most often be an element in a procedure of the administrative police. All installations, structures, work and developments covered by the nomenclature in the Water law (Annex to article R. 214-1 in the Environmental code) must have been declared or their authorisation requested prior to the launch of the operation.

Articles R. 214-6 to R. 214-56 present the procedure for processing the declaration and authorisation files (Onema, 2012). **In this case, the time frame for the remedial action is long**. The preparation of the project (environmental studies, joint definition of the objectives of remediation, selection of the remediation technique) requires a certain amount of time and the regulatory procedures preceding the decision to authorise the project impose a further delay that can exceed six months.

Finally, compensation in kind may be triggered by an **urgent situation** and be part of a risk-management process. Procedures seeking urgent remediation are possible due to the specific nature of environmental law,

which deals essentially with policing activities. In their capacity to exercise special administrative-police powers, the cognizant authorities have both the power to sanction damage and the power to **issue injunctions** when confronted with urgent situations or accidents. This power to issue injunctions also means that the authorities are relieved of the need to provide prior formal notice. The urgency of the situation justifies immediate action. In the water field, for example, the administrative authorities may order any and all persons to put an end to a cause of danger or to damage to the aquatic environment (Art. L. 211-5 in the Environmental code). Injunctions are frequent in the environmental field. In addition to injunctions, another means to respond to urgent situations is the formulation of emergency action plans when a major hazard has become evident (e.g. pollution following an industrial accident). These plans set up the strategy for action, inform and protect the population and list the measures that the operator must implement. Finally, in addition to these means available to the administrative authorities in exercising their special administrative-police powers, the urgent situation may require the intervention of a judge. Two jurisdictional means are available for urgent situations, jurisdictional injunctions and summary procedures. These two means existed well before the advent of environmental law, but have undergone significant development in the environmental field to enable the legal system to adapt to the specific aspects of ecological damage. One example is the possibility included in the 1992 Water law of launching a procedure to halt a disturbance, in the form of an injunction issued by a Correctional Court following an urgent hearing of the operator or a summons to appear within 48 hours (Art. L. 216-13 in the Environmental code). This procedure may also be triggered by the State prosecutor acting at the request of the administrative authorities or of a non-profit that has been certified or been in existence for over five years. A judge for summary procedures may also halt the execution of administrative decisions. The decision to launch this type of operation takes place over a very short period of time, almost immediately after the urgent situation becomes apparent.

■ What are the different types of remediation? What do they have in common?

There are many types of compensation in kind and they apply to specific types of environmental evolution (see Figure 35).

Restoration of damaged environments may be compared to the restoration of a Renaissance painting that has faded over the years, but where the image and original colours are still sufficiently visible to enable the work of the restoration experts. Through restoration, a damaged environment is turned back in the direction of its **prior trajectory**, i.e. toward the evolution that it would have experienced if the disturbance had not occurred. One of the difficulties in restoration is to characterise the prior trajectory, to select a reference ecosystem that may be seen as “an approximation of the desirable status, a standard selected from several possible alternatives and that may be reached through a succession of steps called a trajectory” (Le Floche *et al.*, 1995). That being said, an actual restoration of the environment to the exact condition that existed prior to the disturbance is simply not possible. In fact, **a restored ecosystem can never be an exact (and static) replica of the past**, as if it were a painting or a dioramic exhibition in a museum (Aronson, 1995).

When the pressure weighing on an environment is too strong or lasts for too long, the environment may no longer have sufficient vitality to restore itself simply through the removal of anthropogenic pressures, i.e. it may be incapable of recovering a level of dynamic activity similar to the activity that would have existed if the disturbance had not occurred. Internal processes are severely modified and the trajectory is modified. In this case, major human intervention is required to change the situation, either by putting the ecosystem back on a favourable trajectory (rehabilitation) or by recreating the ecosystem (replacement). For the most ambitious remediation projects, these three types of intervention may be required and care must be taken to coordinate them over both time and space.

Figure 35

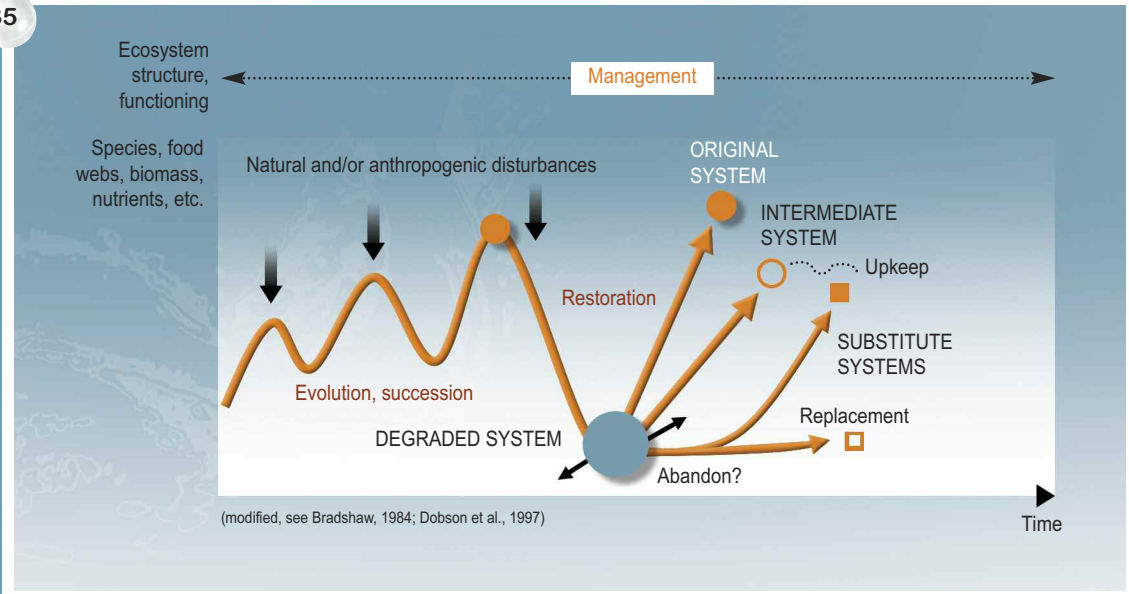


Diagram showing the evolution of ecological systems and the available options depending on the objectives (Barnaud and Fustec, 2007).

It is clear that, though these operations are based on the status prior to the disturbance, **they all take place in the present**. The trajectory, i.e. the path, the itinerary of the environment evolving over time, serves as the basis for the intervention objectives and for the development of a reference model that all are conditioned by the present. Ecological remediation attempts to adhere to the current cultural and environmental realities and trends, in a contemporary ecological and socio-economic approach, i.e. not exclusively technical or development oriented. That is why it is necessary, for this type of project, to take into account scientific knowledge, technical know-how and the perceptions of social groups (Bioret *et al.*, 2011).

These operations also and above all consist of **anticipating the future**. A remedial project always begins with an idea of the future status of the damaged ecosystem or landscape once restored. Similarly, the rights of future generations are mentioned in article L.110-1 of the Environmental code and in the Constitutional charter of the environment. This article, comparable to a social contract, structures the responsibilities and the promise made over the long term. It is a component in the concept of sustainable development which targets not only the responsible use of living resources so that they can be renewed for future generations, but also their conservation and remediation.

Remediation of nature is a means to care for the future generations. Restoration and rehabilitation (but not replacement) of degraded environments are a means to maintain or even to increase the ecological goods and services (populations, ecosystems and landscapes) available to humans in both the current and future generations. These operations are consequently part of a trans-generational process. Avoiding and remediating damage is also a means of acknowledging the long term that is manifested primarily by the legal recognition of a moral right, that of the future generations.

Water is the “shared patrimony of the nation” (1992 Water law) and the WFD states that "water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such". In addition to the issue of the general interest which is inherent in the implementation of this right, there is also the issue of the responsibility of the current generation for the well-being of future generations. Aquatic environments are remediated for both today and tomorrow.

However, remediation of ecosystems is nonetheless a bet on the future. This uncertainty is manifested in the limited control over the results of the work done and the expectations in terms of the future development of innovative techniques.

Remediation of nature means planning ahead. Today, it is particularly difficult to ensure the success and permanence of restoration operations. For example, in spite of a growing number of operations to rehabilitate wetlands in France, very few monitoring programmes have been set up following the work. For this reason, it is difficult to assess the effectiveness of the work done and the value of the work for the future. The reaction of environments following restoration or rehabilitation work is not yet well understood. Each function of an ecosystem (self-cleansing, degrading of organic matter, etc.) may react very differently over time following the work and evolve independently of the other functions (Dausse, 2016). Similarly, work to restore a service (e.g. the supply of drinking water, etc.) is a bet that the service will still be of value in the future. Ecosystem services reflect the interaction between a society and its environment, via the benefits that the society draws from the ecosystems. They reflect the interaction between ecological dynamics, land use and the priorities set among different ecosystem services by local stakeholders and political decision-makers at a given moment in managing a territory (Bierry, 2015; Onema, 2011).

Remediation of nature means innovating. That means, first of all, modifying thought processes. For example, river restoration projects aim to recreate a degree of autonomy for the river. This idea may seem evident today for stakeholders involved in river management. But it represents a historic breakthrough in the technical rationales guiding public policies for work in rivers until recently (Morandi, 2015). The earlier objective of controlling the river was obviously linked to the desire to improve the capacity to foresee river functioning. Efforts to increase the autonomy of a river will necessarily lead to greater uncertainty. Though the overall functioning may remain foreseeable, it may be necessary to accept that it is less foreseeable on the local level (Loire-Bretagne Water agency, 2011). It also means developing new techniques that will make it possible in the future to remediate damage that today cannot be remediated simply because we do not know how.

Conclusion

It is clear that ecological damage raises specific temporal issues. Whether the objective is to observe, avoid or remediate, ecological damage takes place outside of human time frames. It is to coordinate time in nature and time in human society that the law evolved by developing and enhancing a number of concepts and principles that now make it possible, though progress is still required, to better understand ecological damage, as well as to avoid and to remediate it. However, it is also clear that this situation continues to evolve because society evolves in parallel.

Knowledge and technical know-how progress, leading society as a whole to question how it thinks and acts by looking to the past to find the means to take action in the present while planning for the future. Avoiding and remediating ecological damage is a means for society to put sustainable development into effective practice. It is also a means to reconcile time in nature and time in human society. And it signals that we have understood Antoine de Rivarol when he said that “time is like a river, it does not flow back to its source”, meaning that the remediation of ecological damage is similar to time, i.e. we can never turn it back, we can undo certain things, but never completely.

SUMMARY of chapter 5

The time factor in managing ecological damage

Key concept

The time horizons in the legal and social spheres are not necessarily those observed in nature
In law, time is necessarily short, as measured on the human scale. But ecological damage can take a short time or years to occur. The time span during which legal action may be taken corresponds to that between the manifestation of the damage and the limits set by the legal statute of limitations.

Key points in understanding the subject

It is to reconcile these time frames and attempt to coordinate them that the law developed new concepts and succeeded in integrating the various time factors in its system to avoid and remediate ecological damage.

Key points to remember

Time factors concerning the cause of the damage lie in close conjunction with those involved in the manifestation of the damage.

It is generally when the damage becomes clear, precisely because it can be observed, that legal procedures can be launched. But beyond a certain time, legal action is no longer desirable because the evidence fades, causal links become less clear and the responsible person eventually dies. This is a consequence of the time lapse between the cause and the manifestation of the damage.
Three scenarios may be distinguished.

1 The immediate, gradual or delayed effects of damage following an event taking place once over a short period.

2 The immediate, gradual or delayed effects of damage following an event taking place repeatedly over short periods.

3 The immediate, gradual or delayed effects of damage due to a chronic cause.

The procedures selected to protect and remediate the environment take place within a time frame that, once again, raises the issue of the relationship with the past, present and future.

Avoidance of damage today remains the best means to avoid damage tomorrow.
When that is not possible, compensation in kind remains the best solution. Remedial operations can be launched in different manners that each set the action in a different time frame.

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An effort to address ecological damage, i.e. damage to nature, must cover a wide array of hybrid aspects, at the interface between numerous disciplines that no one person can hope to master simultaneously given that ecological damage raises multiple questions in the scientific, political, legal, social, economic, cultural and technical fields. In addition, it necessarily involves a number of stakeholders, with different rights and responsibilities, different work cultures, traditions and concerns, who though complementary in the grand scheme of things, are fully capable of ignoring each other.

Measures to control delictual and even criminal behaviour, and efforts to remediate the ecological torts caused, are gravely hindered by this complexity. In spite of the proliferation of regulations (and their lackings), penalties are rare and rarely dissuasive, and compensation in kind is generally ineffective. This situation is highly prevalent even though the “polluter pays” principle should contribute to raising awareness of risks before damage is done and to improving the implementation of penalties and remedies where the law foresees them. Environmental inspectors, entrusted with the mission of enforcing regulations, are at best virtually invisible and at worst contested and denied any legitimacy in their work. The end result is that the implementation of water law as a whole is largely negated.

Designed as a multi-disciplinary project spanning many professional sectors, this book addresses these issues via the damage caused to water and aquatic environments. The overall objective is to provide water managers and the public and private stakeholders directly involved in implementing water regulations with the necessary information and analysis methods. It is divided into five chapters, corresponding to the five aspects listed below that cover the main issues involved in dealing with ecological damages.

1. Legal basis and liabilities for damage caused to water and aquatic environments. Issues involved in characterising ecological damage.
2. When the legal, scientific and technical sectors work together. Technical aspects involved in dealing with ecological damage.
3. Assessing damage during a trial. From an assessment of damage to an assessment of remedies.
4. Territorial considerations in the legal situation and how they apply to ecological damage.
5. The time factor in managing ecological damage.

This division does not mean that each of the above aspects is not related to the others, but an in-depth discussion on each facilitates the presentation of the issues and serves to guide the reader in a progressive understanding of the topic as a whole.

Delphine Loupsans has a Ph.D in political science and holds a degree in law. She is a policy officer in the field of the human and social sciences at the Research, development and innovation department of the French biodiversity agency. She works on projects dealing essentially with issues surrounding the law and governance of water and biodiversity.

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