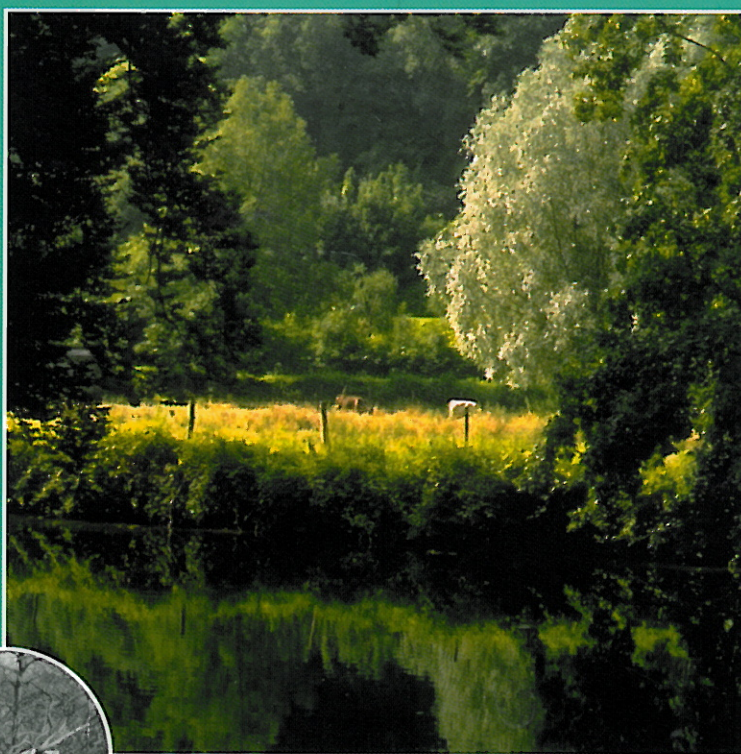


LES CAHIERS

DE L'INSTITUT D'AMENAGEMENT
ET D'URBANISME
DE LA REGION D'ILE-DE-FRANCE

Les vallées d'Ile-de-France

Renouer avec le fil de l'eau



Aubette et Montcient
Bièvre
Essonne
Epte
Grand-Morin
Juine
Lunain
Loing
Mauldre et Gally
Morbras
Orge
Thérouanne
Vaucouleurs
Viosne
Yerres
Ysieux

Dans ce numéro :
l'impact
des tempêtes
de décembre 99
sur les vallées





INSTITUT D'AMÉNAGEMENT
ET D'URBANISME
DE LA RÉGION D'ILE-DE-FRANCE

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Jean-Pierre DUFAY

Rédactrice en chef

Dominique LOCHON

Coordinatrice pour ce numéro

Isabelle CHAGNOT

Avec la participation deNelly BARBIERI, Bernard CAUCHETIER, Roger CHAIX,
Raymond DELAVIGNE, Jean-Louis DU BOIS, Françoise GUYON,
Jean-Jacques LANGE, Paul LECROART, Jackie POITEVIN**Presse**

Catherine GROLEE-BRAMAT (01.53.85.79.05)

Traductions

Andréa CORDÉRO, Traductik

Secrétariat administratif

Christine MORISCEAU (01.53.85.75.48)

Création - Fabrication

Denis LACOMBE

Maquette, illustrations

Elodie BEAU GENDRE, Claudine LIHOSTE-ROUAUD

CartographieCécile MAUCLAIR, Didier PRINCE, Annie RIBONET,
Jean-Eudes TILLOY**Bibliographie**

Marion VIENOT

(01.53.85.79.23)

Mediatheque - Photothèque

Miccette HERCELIN (01.53.85.79.66)

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Par correspondance :

INSTITUT D'AMÉNAGEMENT ET D'URBANISME

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Long live the valleys!

*T*here's more to the Ile-to-France than Paris, a piece of Brie, Beauce and Vexin or the Rambouillet and Fontainebleau massifs... It is a vast, richly complex area in terms of its geographical and human diversity.

For what would the Ile-de-France be without its inhabitants? What would Paris be without its exceptional location, its suburbs or the network of cities, market towns and villages that are strung around it? Would the wide stretches of cereal-growing plateaux which make up a large part of the region's landscape stand out quite so much without the valleys that divide them?

Amidst this complexity, valleys carved out by a waterway, river or stream, play a key role because they have been a cradle for human settlement, seen villages and towns grow up and always provided main transport routes for water, road and railway.

The sites we see today, with their rich natural, cultural and urban heritage, have their origins in this history—rich indeed, but yet so fragile faced with the pressures from within.

Sometimes forgotten too, such as the Bièvre, whose natural course probably became lost, buried under subsequent urban development.

Anxious to preserve the key balances of ecology and landscape, the Ile-de-France region wanted to examine the current state of affairs. To this end, the "Agence des Espaces Verts" (The Green Spaces Agency) instructed Iaurif to study the valleys, to find out about their complexity, potential and identify any threats facing them in order to recommend courses of action for their preservation and highlight them so that the Region could have a coherent framework for its policy.

The results of these studies were delivered in Iaurif "Cahier n° 125-126". They show that, in view of their watersheds, valleys constitute areas of land with long-term development potential.

Severely damaged during the Christmas 99 storm, they must spring to life once again and acquaint the towns, nature and man with their flowing water.



Alain Rist
Vice-Chairman, environmental issues, living environment,
traffic, regional and rural contracts



David Bohbot
Chairman,
The Green Spaces Agency

Que vivent les vallées !

L'Ile-de-France ne se résume pas à Paris, à un morceau de Brie, de Beauce et de Vexin, aux grands massifs de Rambouillet et de Fontainebleau... C'est un territoire vaste et riche de sa complexité, de sa diversité géographique et humaine.

Que serait l'Ile-de-France sans les Franciliens ? Que serait Paris sans le site exceptionnel qui le contient, sans sa banlieue, sans le réseau des villes, des bourgs et des villages qui se relaient tout autour ? Que seraient les grands plateaux céréaliers qui constituent une bonne part du paysage régional sans les vallées qui les découpent ?

Dans cette complexité, les vallées jouent un rôle-clé, qu'elles soient creusées par un fleuve, une rivière ou un ruisseau : parce qu'elles ont été le berceau du développement humain, parce qu'elles ont vu grandir les villages et les villes, parce qu'elles ont de tout temps été les voies de la communication par l'eau, par la route, par le fer...

De cette histoire est née une réalité d'aujourd'hui : l'existence de lieux riches de patrimoines naturels, culturels, urbains. Riches mais ô combien fragiles face aux pressions qui les habitent.

Oubliées parfois, telle la Bièvre, dont le tracé naturel s'est probablement perdu au gré des enfouissements accompagnant l'urbanisation.

Soucieuse du maintien des grands équilibres écologiques et paysagers, la région d'Ile-de-France a souhaité se pencher sur cette réalité. C'est dans ce sens que l'Agence des espaces verts a demandé à l'Iaurif d'analyser ces vallées, pour en révéler la complexité, les potentialités, pour identifier les menaces qui pèsent sur elles, pour proposer les actions qui permettraient de les préserver et de les mettre en valeur afin que la Région dispose d'un cadre cohérent pour sa politique dans ce domaine.

C'est le fruit de ces analyses, livré dans le Cahier n° 125-126 de l'Iaurif, qui montre que ces vallées, prises dans la dimension de leurs bassins versants, constituent autant de territoires porteurs de projets de développement durable.

Durement touchées par la tempête de Noël 99, elles doivent renaître et vivre pour renouer les villes, la nature et les hommes avec le fil de l'eau.



ACW

Murruu



Alain RIST
Vice-président chargé de l'environnement, du cadre de vie,
de la circulation et des contrats régionaux et ruraux

David BOHBOT
Président de
l'Agence des espaces verts

La vallée, une unité d'aménagement

Jacques Lorain

Chargé de mission

Agence des espaces verts

Le maintien des grands équilibres écologiques et paysagers est devenu un enjeu essentiel pour l'Île-de-France.

Les vallées, espaces diversifiés, riches en patrimoine naturel, historique et en paysages, sont aussi des lieux préférés par lesquels la ville a de tout temps pénétré la campagne.

Avec l'accroissement et la densification de l'urbanisation, de nouvelles dimensions sont apparues. Les vallées deviennent des éléments de liaison naturelle entre espaces ruraux et urbains, de coupure verte dans ce milieu urbain et donc un élément essentiel de l'aménagement à l'échelle d'un large territoire.

Un patrimoine régional remarquable

La région d'Île-de-France est remarquable par la densité de son réseau hydrographique. Autour de son fleuve, la Seine, elle compte quatre rivières importantes, la Marne, l'Oise, l'Yonne et le Loing, huit rivières moyennes, le Grand-Morin, l'Epte, l'Essonne, la Juine, la Mauldre, l'Orge, l'Yerres et l'Yvette et quelques 36 petites rivières. Au total, le linéaire de cours d'eau s'élève à 1 700 km.

La majorité de ces vallées est encore située dans l'espace rural mais le quart de ce linéaire est bordé d'une urbanisation dense et de plus de 200 km d'une urbanisation peu dense.

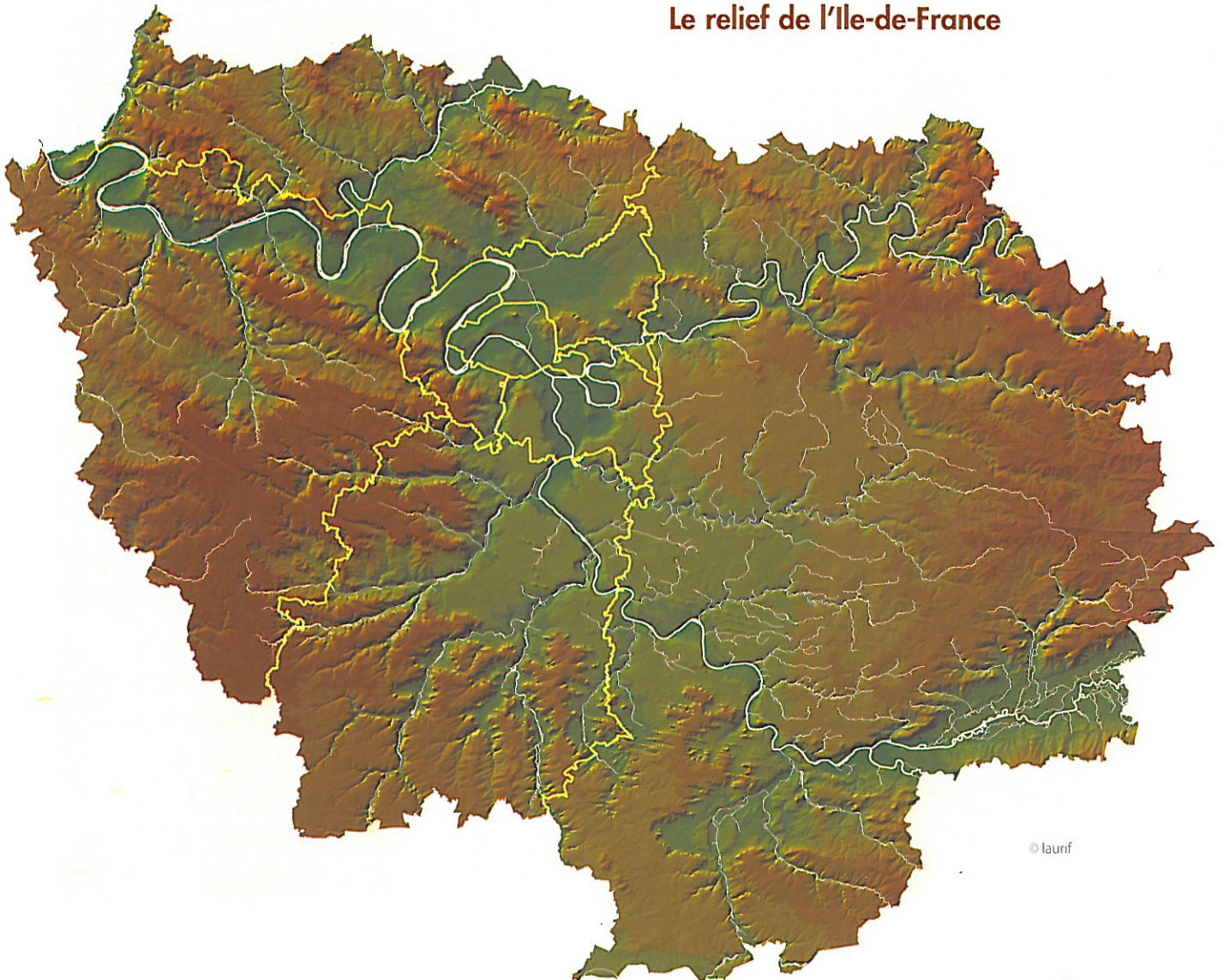
Les vallées constituent un patrimoine inestimable pour l'Île-de-France :

- par la variété et la qualité des paysages : leurs coteaux, leurs boucles, leurs boisements, leurs reliefs souvent marqués, offrent une grande diversité paysagère renforcée par la présence de monuments remarquables (églises, châteaux, parcs, etc.) ;
- par l'importance des richesses naturelles liées au relief et aux types de sol qu'elles recèlent : les milieux humides de fonds de vallée

accueillent de nombreuses communautés végétales et animales pour lesquelles ils constituent parfois le dernier sanctuaire ;

- par le potentiel récréatif dont elles sont naturellement dotées : les vallées sont le siège d'activités de loisirs liées directement à la présence de l'eau (voile, canotage, pêche, tourisme fluvial...) et attirent un public nombreux du fait de leur qualité paysagère ou de leur accessibilité (promenades sur les berges).

Le relief de l'Île-de-France



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S. Rossi/aurif

Une nécessaire protection et mise en valeur

Les vallées ont joué un rôle déterminant dans le développement de la croissance urbaine qui s'est toujours opérée le long de ces axes privilégiés, empruntés ou coupés par nombre de grandes voies de communication. Les travaux hydrauliques, le développement industriel, l'arrivée du chemin de fer ont conduit les implantations urbaines à se rapprocher des rives.

Ainsi, l'agglomération parisienne s'étend aujourd'hui de manière presque continue le long de ses grandes vallées jusqu'à Mantes (Seine aval), Melun (Seine amont), Lagny (Marne) et même Beaumont-sur-Oise, quoique d'une manière plus discontinue le long de l'Oise et ce phénomène n'épargne pas les petites et moyennes vallées.

D'importants conflits d'usage affectent les rives des cours d'eau : installations portuaires ou industrielles, grandes infrastructures de transport, quartiers résidentiels ou carrières de sable et de graviers. Cette cohabitation se fait au détriment des paysages et des milieux naturels. En milieu rural, le recul de l'agriculture, l'urbanisation plus ou moins diffuse ou le recalibrage des cours d'eau ont également bouleversé la physionomie des vallées. L'espace ouvert des vallées évolue continuellement. La multiplicité des fonctions qu'elles assurent et le nombre important d'intervenants rendent leur protection difficile à mettre en œuvre.

Des études pour mieux connaître et agir

L'Agence des espaces verts de la région d'Ile-de-France, chargée de proposer et mettre en œuvre la politique régionale en matière d'espaces verts, de forêts et de promenades, a confié à l'Institut d'aménagement et d'urbanisme de la région d'Ile-de-France, le soin d'étudier les espaces ouverts des vallées des rivières de moyenne importance.

L'objectif des études «Vallées» est multiple :

- révéler la cohérence et la continuité des espaces naturels qui composent les vallées et la fragile harmonie qui s'est établie entre le cours d'eau, sa plaine alluviale et les coteaux qui l'encadrent et aider à la reconnaissance du patrimoine constitué ;
- disposer d'un état des lieux, pour mieux connaître les caractéristiques et les spécificités de chacune des vallées, en termes d'occupation du sol, de valeurs paysagères, de potentiel récréatif et de qualité des milieux naturels, en tenant compte des dispositions réglementaires prévues dans les documents d'urbanisme locaux ;
- identifier la nature des menaces qui s'exercent sur les espaces ouverts : projet d'urbanisation, de passages d'infrastructures, impact du mitage et de la déprise agricole, poids des déprédations... ;
- mesurer le degré de privatisation des berges des cours d'eau ;
- proposer des actions de protection et de mise en valeur des espaces ouverts, l'ouverture au public de certains sites pour des usages récréatifs et/ou pédagogiques, la création d'itinéraires de promenades pédestres, cyclables et équestres.

Les aspects concernant la qualité des eaux, le régime hydraulique, les problèmes liés à l'alimentation en eau potable et à l'assainissement ne sont pas traités dans ces études.

Ces problématiques interfèrent avec celles abordées par les études « Vallées » mais relèvent de la politique régionale de l'eau.

Des actions spécifiques sont menées par la région d'Île-de-France dans le cadre des opérations « rivières propres » dont « Marne pollution zéro » et à travers des politiques contractuelles avec l'Agence de l'eau, les départements et les groupements de communes.

Ces divers objectifs et leur mise en œuvre conduisent à considérer la vallée comme une unité d'aménagement.

Les richesses naturelles des vallées d'Île-de-France



The valley, a development entity

Jacques Lorain

The Green Spaces Agency

Preserving the ecological equilibrium of the landscapes has become an issue of major importance for the Ile-de-France region.

Valleys are diversified areas, with a rich heritage of nature, history and landscapes. They are also the preferential paths which the town has taken to penetrate the countryside from time immemorial.

New dimensions have now appeared with the growth and increase in density of urban areas. Valleys are becoming natural interfaces between rural and urban areas, green breathing spaces within an urban environment. They are therefore an essential element of development on the scale of a large region.

An amazing regional heritage

The Ile-de-France region has a remarkably dense river system.

It has four large rivers around the river Seine: the Marne, the Oise, the Yonne and the Loing; eight smaller rivers: the Grand-Morin, the Epte, the Essonne, the Juine, the Mauldre, the Orge, the Yerres and the Yvette and some 36 small rivers.

In total, the watercourse has a combined length of 1,700 km.

The majority of these valleys still lie in rural areas but one quarter of the watercourse is lined by dense urban expansion and more than 200 km by a more diffuse urbanisation.

These valleys constitute a priceless heritage for the Ile-de-France region in terms of:

- the variety and quality of the landscapes: the hills, the meanders, the woods, the often distinct relief, provide a wide diversity of landscapes which are further reinforced by the presence of remarkable monuments (churches, castles, parks, etc.)
- the abundant natural resources that derive from the relief and the types of soil that can be found there: the wet habitats at the bottom of the valleys are home to numerous communities of plants and animals, and sometimes represent their last sanctuary

- the natural recreational potential with which the valleys are bestowed: they are centres for leisure activities that are directly dependent on the presence of water (sailing, boating, fishing, river tourism...) and attract a great number of people due to the quality of the landscapes and their accessibility (there are footpaths along the river banks).

The need for protection and valorisation

Valleys have played a critical role in the growth expansion of urban areas following preferential axes used or cut across by main transport routes. The hydraulic constructions, the industrial development and the coming of the railways brought urban settlements closer to the river banks.

Today, Paris stretches almost without interruption along the great valleys as far as Mantes (lower Seine), Melun (upper Seine), Lagny (the river Marne) and even as far as Beaumont-sur-Oise, although urbanisation is more uneven along the banks of the Oise. Even the small and the medium sized valleys haven't been spared by this phenomenon.

Serious common practices conflicts have affected the banks of the watercourses. Ports and industrial plants, extensive transport infrastructures, residential areas, sandpits and gravel quarries have all been built, often to the detriment of the landscape and the natural habitats. In the rural areas, the decline of farming, an urbanisation of varying density or the modification of the watercourses have also radically transformed the face of the valleys.

The open land in the valleys is undergoing continual change. The incredible diversity of uses for and the large number of people involved mean that implementing protective measures is no easy task.

Studies for improved knowledge and efficient action

"L'Agence des espaces verts de la région d'Ile-de-France" (The Green Spaces Agency of the Ile-de-France region), which is in charge of suggesting and implementing regional policies for green areas, forests and footpaths, has asked the Iaurif (Urban Development and Planning Institute for the Ile-de-France Region) to carry out a study of the open spaces of medium sized valleys.

This study of the "Valleys" has several main aims:

- to show the coherence and continuity within the natural environment in the valleys and the fragile harmony which has been established between the watercourse, the alluvial plain and the surrounding hills, and to help gain recognition for the heritage this constitutes
- to have at our disposal an appraisal of these areas in order to get a better picture of the characteristics and specificity of each valley in terms of land use, landsca-

pe values, recreational potential and the quality of the natural habitats, taking into account the regulations set out in the local urbanism documents

- to identify the kinds of threats to the open spaces that exist, urbanisation projects, the building of infrastructures, the impact of splinter development and the decline of farming, the negative influence of damage to the environment
- to measure the extent to which the banks of the watercourses are under private ownership
- and to propose protective measures and the development of the open spaces, the opening of certain sites to the general public for recreational and/or educational purposes, the creation of walking, cycling or horse riding paths.

Those aspects concerning the quality of the water, the flow rate, and the problems related to the supply of drinking water and sanitation will not be dealt with by this study. These problems are related to those dealt with in the Valleys study but come within the remit of the regional water policy.

Specific measures are being taken by the Ile-de-France Regional Council as part of the "clean rivers" operations, including "A pollution-free Marne", and via a series of contracts signed with the Water Authority, the Departments and the associations of communes.

These diverse aims and their implementation lead us to consider the valley as a development entity.

The valleys: a contribution to a “cross-disciplinary approach”

Raymond Delavigne
Head of projects

The watercourse and its valley constitute an excellent model for blending a territory and its heritage, with a view to implementing sustainable development by giving a coherence to the waterscape (a term which certain French researchers⁽¹⁾ have suggested translating by the old French word “*aquosité*”). This would be a qualitative expression of the heritage of the valleys and watercourses, a heritage that we must bequeath to future generations in the best possible state.

The valleys geomorphological characteristics serve to map out a cross-disciplinary approach due to their importance within the large regional landscapes.

First, their “hollow” and elongated shape means that they can easily be identified in the regional territories—a factor which should force the valleys to be taken into account for what they are, as development entities, particularly when regulatory documents concerning urbanisation (urban development plans and land use plans) are being drafted. Unfortunately, previous urbanisation plans and cultural changes have often robbed the valleys of their originality. Their value, in terms of the legibility of the landscape, has not been taken into consideration, which is something that should serve as a lesson for the future.

In this respect, priority must be given to the division of the valleys into catchment areas; in other words, the emphasis must be placed on the concept of territory rather than on the river systems alone. With modern analytical tools and the cartographic processing of spatial data within a geographical information system (Sig), a very precise division of a region can be made *ex nihilo*, giving a hierarchical series of catchment areas and sub-catchment areas that is independent of administrative boundaries.

Secondly, valleys are focal points for all kinds of traffic. From time immemorial watercourses have been the main factors in the localisation and development of human settlements, thanks to the ease of movement provided by rivers and to the opportunities afforded by crossing them.

A valley may be considered as a vast and complex ecosystem or as a group of smaller ecosystems, each containing a biotope (a particular physical habitat) and a biocenosis (an association of living creatures affiliated to a biotope). Of these, the wetlands and the hillsides are the most remarkable. However this cross-section vision of the valley must be accompanied by a longitudinal view of it, since its physiognomy changes from the source down to the confluence.

The fact that the river is first and foremost a corridor of river traffic automatically implies that there is a risk of overflow and flooding of the major bed by the watercourse which drains it. The natural equilibrium of its contours, which has been established over the centuries, could be shattered once and for all by the artificial nature of land use within the catchment area, whether this be due to waterproofing the land through uncontrolled urbanisation or “non-sustainable” farming practices used in intensive farming.

Furthermore, the combined effect of, for example, localised cleaning and bank reinforcement works, and the rescinding of the meanders is often catastrophic, yielding entirely the opposite to what was expected.

As valleys were also transport routes that took advantage of their relatively flat land, roads and railways traditionally took the same routes to develop. They brought with them numerous structures for crossing rivers including embankments and bridges that resulted in scarring the sides of the valleys. The major impact that this had on the valleys was only rarely considered in the past under the aspect of disturbance affecting the functioning of the valleys.

Villages were traditionally established around sources, most of which could be found in the valleys. There are also a great number of ecotones, which are interface regions between different biological communities. Among these there are the interfaces between the flood zones and areas not liable to flooding, the wet meadows and the healthier farm land, the hillsides and the plateaux, and the humid and cold valley bottom and the sunny hillsides. These ecotones favour biodiversity and are the source of abundant resources in terms of heritage, natural environment and culture in the valleys.

Valleys also contain both renewable and non-renewable natural resources. Most construction materials are excavated in open-air or underground quarries on the alluvial terraces of the major bed and on the sides of the valley. Unfortunately, this temporary use of the soil and the extraction of a non-renewable resource have not yet been subjected to a genuine sustainable

management policy. Real estate pressure holds sway over this sector. It is therefore hardly surprising that the re-development of the bottom of the valley on the city outskirts has become a “patchwork” with no real aim or comprehensive development policy. Many good opportunities are being missed to reclaim part of the valley for the natural habitat, to promote tourism, to diversify the offer of services.

The bulk of the water supplied to local communities, industry and agriculture comes from surface ground water, deeper sources or aquifers, not to mention the watercourses themselves. It is a renewable resource, which the legislative and regulatory texts are powerless to manage alone. Joint operating plans are required if the progressive exhaustion of the resources by their over-exploitation is to be avoided. The example of the “*contrats de nappe*” (“ground water contracts”) which have brought all the interested parties around the same table looks promising, although a *contrario*, the small number of catchment points actually protected shows the limits of employing only a regulatory approach.

The river system itself is also the main catchment basin for all the wastewater and run-off water from the towns and farms, although widely differing amounts of pollution are picked up. In this respect, water treatment procedures should be adapted to local needs in the context of the catchment area being considered. For those which are less densely inhabited, the rather more efficient techniques of ecological engineering should not be overlooked (infiltration-percolation, lagooning and autonomous purification). The self-purifying capacity of watercourses, which is not generally taken into consideration due to the fact that the dilution ratios are never respected, could be considerably reinforced if the watercourses were no longer considered as simple pipes more or less artificially reinforced, or even as open-air sewers, evacuating their polluted fluid as quickly as possible down to the last great receptacle, the ocean.

On the contrary, any new development should integrate the existing hydraulic components of the watercourse and the nearby habitat of its banks in order to obtain a better balance in the aquatic ecosystem and offer possibilities for various open air water-related activities such as fishing, water sports, relaxation and walking, etc.

In order to achieve this, a much more systematic use should be made of vegetation. Plant engineering techniques exist which should allow the river banks to be consolidated against erosion while favouring aquatic life and embellishing the banks at a much reduced cost compared to the current practices. Moreover, in the zones used as farmland that cross the watercourse, grassy verges would provide a “buffer” against many of the devastating effects of the farming input products (fertilisers and pesticides).

(1) Guillerme (A.), Hubert (G.), Tsuchya (M.): Urban waterscapes. Promoting the hydrographical legacy heritage of Ile-de-France, with reference to the rivers of the prefecture of Tokyo. Volume n° 1 of the Temu laboratory (*Théorie des Mutations Urbaines*), Cnrs, Institut français d'urbanisme, April 1992, 43 p.

The valleys where rivers constitute the main routes are also corridors along which different functions are performed. The most important function of the river/valley partnership is also the least well known. It is part of a natural recycling system in which water is captured, stored, purified by evaporation, which takes it back into the atmosphere where it is redistributed geographically in the form of rain, hail and snow. In practice, the water cycle is never taken into consideration. Development work often perturbs or even hinders the water cycle because it is more often specific and designed for a limited purpose and a restricted area of the valley. For the larger watercourses this work might be to facilitate merchant sailing (not including water sports), flood control, energy production and involve the use of minerals to reinforce the banks. For the smaller watercourses, "anti-tank trenches", harsh cleaning methods, modifications, dyking, concreting the banks and filling in the cut-offs can all have negative effects.

Projects which have a comprehensive approach i.e. are based on a unified and promote integrated concept and aim to upgrade all of the valley's natural resources are still very rare. Generally speaking, there is never any co-operation between (the upper rural sector of a valley and the lower urbanised part of it). Mistakes made in managing the lower valley have repercussions for the upper valley. In this context, the only solution to the problem seems to lie in the unequal power struggle where the advantage is always lying with the advocates in favour of the inorganic versus the ones in favour of a living watercourse.

This conflict is not ineluctable if there is an inclusive conception of the entire valley that should go beyond the goals of a river management system even if these goals deal with a comprehensive river system management.

In order to achieve this aim, the use made locally of resources and ideas would need to be combined with a vision elaborated and shared by the different local councils, with a broad participation in the taking of key decisions.

Underlying this idea of "governance" there is a manifest will to combine social and economic development with a respect for the environment, which is another way of defining sustainable development.

Landmarks for a landscapes' history of the valleys to be continued.

Paul Lecroart
Town planner

One only has to evoke the names of valleys such as the Vézère, the Nile or the Yangtze to remind ourselves of the pre-eminent role of valleys in the founding of sedentary communities, in the migrations of men, merchandise and ideas and eventually, in the crystallisation of cultures.

The presence of running water and the diversity of uses that it allowed, the variety of habitats, soils and exposure their possible use as routes for transport and use for shelter or retrenchment have often made valleys attractive places much sought after in their own right or as a bridgehead for penetrating other territories.

Although in the past the small and medium size valleys of Ile-de-France have been considered as less important than the great natural areas of the Seine, the Oise and the Marne, they have a long and rich history, which has left often more numerous traces than elsewhere. Can this living memory tell us anything about the future?

Valleys have been favoured sites for settlement since prehistoric times

During the Palaeolithic period, valleys were favoured sites for human settlement. In cold periods, the climate was warmer than on the windswept meadows of the plateaux, and plant life was also more abundant. They formed axes for seasonal migratory routes of the hunted fauna also provided the raw materials like flint and sandstone for making tools and weapons.

Traces of settlements have been found that date back to ancient times (more than 35 000 years BC), in particular in the Mauldre, Vesgre and Epte valleys. During the upper Palaeolithic (35 000 to 8 000 BC) the population density appears to have increased in the small valleys in the south of the Ile-de-France region (the Renarde, the Juine and the Essonne). The Loing valley, which joins the Seine basin to that of the Loire, in the south of Fontainebleau forest, became an important settlement during the Magdalenian period (15 000 to 8 000 BC)¹.

During the Mesolithic (8 000 to 4 500 BC) the valleys, now covered with forests, seem to have been less popular for settlements, although the rivers were already being fished, as shown by the discovery of the first pirogues and hoop nets.

During the Neolithic (4 500 to 2 000 BC), the first farmers came from the east through the Marne valley and opened up the landscape by clearing the land. Archaeologists have shown that the land was more densely occupied in the small valleys such as the École, the Mauldre, the Montcient and the Petit-Morin. The islands, peninsulas and spurs, positions that were easy to defend in case of conflict, were highly prized as early as the Chassean period (middle Neolithic).

This defensive role for the valleys is even clearer in the Iron age (beginning in 800 BC), in particular during the period of Gallic independence, with the construction of oppida. These were often situated at the confluence of rivers that marked the frontiers of the territories that various tribes in the Ile-de-France region fought over, including the Parisii, the Sénons, the Carnutes, the Velliocasses and the Meldes. The settlements were localised, at this time, in close proximity to the Seine and the Marne and down-stream from the small rivers that were used for floating wood, transporting wheat and fishing.

From the 1st to the 15th century: the development of agriculture in the valleys

The vine, which was introduced by the Romans, became a common feature on the sunny hillsides of the small valleys. Boatmen known as 'nautes' transported the wineskins along the rivers. Towns began to grow at the intersection between the thalwegs and the new roman roads (Saint-Denis, Arpajon, Jouars-Pontchartrain and Yerres), whereas the cults that involved water worshipping inspired the building of large sanctuaries such Septeuil in the Vaucouleurs valley and Souzy in the Renarde valley.

The late Empire (3rd century AD) was a time of insecurity. 'While the settlements on the plateaux were abandoned, those in the valleys were maintained'². In order to keep watch on the roads, the inhabitants began to surround the towns with walls, traces of which can be found in the toponymy of the Orge valley, for example at Châtres (castrum or Arpajon as it is known today) and Morsang-sur-Orge (murocinctus, a ring of walls).

In the lower valleys to the south of Lutetia-Paris (the Bièvre, the Yerres and the Yvette) the transition between Antiquity and the Early Middle Ages is one of great continuity. The royal Merovingian domains, followed later by the Carolingian domains, often replaced the Gallo-roman villae. The Church organised rural life. The great abbeys installed settlers and serfs on their fiefs, while the "bishops and abbots ceded their uncultivated land to laymen who opened up the landscape by clearing lands and founded new villages"³; Boutarvilliers, Angervilliers and Roinville in the Hurepoix valleys all bear witness to this.

The place of small and medium sized valleys in understanding the past: the example of the Val d'Oise

Small and medium sized valleys hold a particularly important place in the Val d'Oise landscape. For geologists of the Quaternary period and archaeologists, these are unavoidable morphological "structures", because of the surface that they occupy, but especially because of their stratigraphic interest.

The observation of the little rivers and the relationships that people entertain with them is a decisive factor in the context of regional archaeological studies. As a general rule, the thousand-year long frequentation of rivers and their banks has left its traces, in the form of remains or arrangements that the good conditions of fossilisation provided by successive alluvial deposits make it possible to observe.

In the Val d'Oise, it is along these rivers that mankind has, over the centuries, installed hundreds of mills, fords for crossing over, dams to control spates or to create basins for fish farming.

More sophisticated arrangements have even been realised such as the Cistercian abbeys of Maubuisson (on the Liesse brook), of Le Val (on the Vieux Moutiers brook) or of Royaumont (on the Thève): parallel drainage and catchment systems create networks that are independent of the natural waterways. Independently of developments, the small river, close to the habitat, supplies the water necessary for the lives of people and animals, as well as all the plants that are useful to domestic life and the habitat (rushes and reeds) or to crafts (potters for example at Fosses and Bellefontaine).

Valleys that are dry or intermittent, even certain little valleys that are plugged today, are the precious indicators of old topographies and hydraulic organisations. They also sometimes provide information on landscapes modified by man and today fossilised (sector of Bruyères-sur-Oise). Finally, these secondary networks can also serve to mark out territories: the most famous is the valley of the Epte which, since the 10th century, has marked the Vexin region boundary between the country of the Normans and that of the Franks.

The small valleys can also be put into three groups⁽¹⁾: dry vales, vales with almost continual outflow, valleys with continual outflow.

In a dry vale, at Villiers-Adam, silt deposits of 3 to 8 metres thick have helped to identify the alternation of cold and warm climatic phases in the Palaeolithic period. The levels corresponding to the most recent cycle of Ice Age, some 100,000 to 70,000 years ago, have revealed important traces of prehistoric occupation. This stratigraphy shows the continual existence of the vales which regular experience the dynamics of erosion-accumulation.

In the vales with almost continual outflow, the original alluvial sedimentation can frequently be 4 to 11 metres thick. At Genainville, loamy deposits containing protohistoric and Gallo-Roman pottery have been discovered, as well as the vestiges of very significant religious area.

The wide valleys with continual outflow present maximum sedimentary accumulation: 15 metres thick in the valley of the Rhin brook, between Louvres and Goussainville. In these silts are spaced levels of occupation from the High Middle Ages, which are part of a small urban area of before the year 1000, today disappeared. Terraced structures along the valley are evidence of the arrangements made in this period in order to control the overflows from a small waterway. These three examples illustrate the fundamental role that can be played by the small and medium sized valleys in conserving the evidence of archaeological and geological witnesses and therefore the importance that they may be masking for research in these two areas.

Vincent Krier and Philippe Soulier, archaeologists
Department of archeology
in the Val-d'oise

(1) Data on archaeology and geomorphology in the Val-d'Oise have been collected into the geographic information System managed by the *Service d'archéologie du Val-d'Oise* (SDAVO).

After the troubles of the 10th century, which saw in particular the building of the forts of Chevreuse, Monthéry, Étampes and Dourdan in the southern valleys of Ile-de-France, the Capetian period was one of economic revival. The rich land on the plateaux was cleared, abbeys were founded in the hollow of the valleys (Port-Royal-des-Champs in the small valley of Rhodon and Royaumont in the Ysieux valley) and fish breeding grounds were developed. A notable feature of this period was the construction of many watermills for grinding grain. The Croult valley became one of the main milling centres in Ile-de-France⁽¹⁾ (Gonesse bread dominated the Parisian market) thanks to its cereal specialisation in this area, which was rather ahead of its time in France. Beauce wheat arrived on the Parisian market via the Essonne and the Juine rivers before being trans-shipped to the Seine in Corbeil.

Under the influence of the capital, the Parisian countryside became "exceptionally humanised"⁽²⁾ as early as the 13th century. At that time the vineyards, together with vegetable farms (beans, peas, vetches and lentils) and the wet meadows were a traditional aspect of the countryside of the valleys. The villages formed a dense network. Housing was concentrated in the valley of the Vexin or on the plain of France (Beauce), although it was more diffuse in the Hurepoix and Brie valleys.

However, the plateaux were now the sources of most of the agricultural wealth. The status of merchant-labourer was established here during the second half of the 15th century at the time of the agrarian restoration⁽³⁾. Major markets of farm produce sprang up in certain valley towns that lay at the crossroads of a road and a river, such as at Étampes in the Juine valley, Gonesse in the Croult valley, Coulommiers in the Grand-Morin valley, Nemours in the Loing valley and Arpajon in the Orge valley.

(1) "Ile-de-France: des origines à l'âge de fer" (Ile-de-France: its origins until the iron age in: *Histoire et Archéologie*, n°52, April 1981).

(2) Fourcay (B.), *Les origines de l'habitat rural: permanence et implantation nouvelles* (The origins of the rural dwelling: permanency and new settlements), p.172, in: *Ile-de-France at the time of Clovis to Hugues Capet*, archaeological museum of the department of Val-d'Oise, regional archaeology service, Ed. du Valhermeil, 1993.

(3) Rivière (Simone), *The Renarde valley*.

(4) Blazy (J.-P.), *From Goussainville to Saint-Denis, the watermills of Croult valley*, in: *Vivre en Val-d'Oise*, n° 20, 1993, pp. 42-51.

(5) Fourquin (G.), in: *Histoire de l'Ile-de-France et de Paris* (The History of Ile-de-France and Paris), under the dir. of Mollat, Coll. *Portrait de la France Moderne*. Ed. Famot, 1977.

(6) Moriceau (J.-M.), *Les fermiers de l'Ile-de-France. XV^e-XVIII^e siècle* (Farmers of the Ile-de-France in the 15th-18th century), Fayard, 1994.

The Petit-Morin valley: traditional rural economy of a valley

The Petit Morin valley was formed in a limestone platform lying on marls. The farming map attaches it to the Brie dairy area or the Brie of the valleys (Grand-Morin and Petit-Morin) and opposes it to the plateau Bries with their vast open fields. The valley's agricultural landscape is mainly pasture and wood land and still includes some meadows for livestock, mainly cattle. These meadows alternate with woods and apple orchards which were gradually to replace vineyards from the end of the last century. Despite re-allocation of holdings, one still sees "tocards", willows and ashes cut very short into pollards, which in old times used to form the hedges separating the fields. The valley's farming operation was certainly rationalised from the 7th century by the abbey: the abbey of Jouarre, Saint-Pierre de Rebais, the Benedictine priory of Verdelot, the Cistercian abbey of La Grâce N.D. close to Courbeteaux, the Cistercian abbey of Reclus at Talus-Saint-Prix, the abbey of Saint-Gond at Oyes, and so on... It was certainly affected as well by the creation in the 11th and 12th centuries of new towns such as Villeneuve-sur-Bellot, intended to fix the populations on fallowed lands. Their new inhabitants, villeins or serfs, could, in exchange for low dues to the local lord, become owners and pass on their property.

Agriculture, livestock

The wine-producing map of Seine-et-Marne was influenced by the rule of twenty leagues, royal decree of 1577 which, in order to protect the quality of Paris wines, marked off an area of 80 km forbidden for the supply of Paris innkeepers and wine merchants. Within the county, wine-growing there developed more in the valleys outside this area, with the other sectors only producing wine for local consumption. And so, in the Morins valleys, there developed an important production of ordinary wines, accessible to the river traffic. Until the 19th century, their hillsides produced poor quality white wines as well as red and rosé wines drunk locally. Viticulture and viniculture offered small land-owners an additional income. These growers of different crops often called themselves wine-growers because the viticulture side was the most profitable aspect of their business. Wine-growing went into decline towards the end of the 19th century, due to competition from wines from the South, and the destruction of vines by phylloxera and mildew. It was generally replaced on the valley hillsides by orchards, very often of apple trees.

These traditional orchards were often comprised of high growth apple trees dotted across the meadows or even the cultivated plots and chiefly produced cider apples. These fruits could also be distilled thanks to itinerant distillers who regularly set up their stills at very precise points in the valley, because of strict tax and health controls.

Cattle farming played a secondary role in agricultural life up until the 19th century, a time when changes in eating habits, the growth in the population of Paris and the development of rail transport helped to widen the market for supplying milk to the capital. At the end of the 19th century, the Seine-et-Marne became one of the biggest dairy producers thanks to the farming of Flemish and Norman breeds. The manufacture of Brie cheese which, with the milk, provided an additional source of income for farmers was carried out on the farm, before being taken over by industrial cheese makers after the war.

Crafts and industry

Village crafts were intended to ensure the self-sufficiency of a local, essentially farming, population. They contributed to fitting out draught animals and clothing and household equipment for people. Basket makers, clog makers, coopers, carpenters, black-smiths, farriers, wheelwrights, sadlers are different examples of craftsmen who put their mastery of a raw material at the service of the local farming community. From the final third of the 19th century, the development of transports, the progressive circulation of manufactured products, mechanisation and changes in agriculture marked the start of a decline in these crafts or their adaptation to a market economy.

The Petit Morin valley saw the development of a basket making centre which reached its peak at the end of the 19th century towards a Paris market made accessible by rail transport. Its speciality was wholesale basket making, the manufacture of containers for the packaging, handling and transport of agricultural and local household products. Its production was extended to containers for foodstuffs and miscellaneous recipients intended for the Paris markets and shops, to new industries, to postal and railway institutions. This business could provide an additional occupation for farmers during the winter. It was also exercised at family level by small craftsmen or organised into bigger workshops, inside which basket-making works worked for a boss.

The raw material grew naturally as willows on the edge of the Petit-Morin. But its farming, organised into willow beds, helped to improve its natural qualities of flexibility and strength. This crop was to decline because of competition from imported products and plastics.

Many sawmills providing wood to craftsmen were established in the valley. The wood came principally from cuts bought from the owners of woodlands.

The wooded hillsides of the Petit-Morin covered a flint resulting from the weathering of the Brie limestone. It is around La Ferté-sous-Jouarre and particularly in the Petit-Morin valley that this phenomenon of the formation of millstone is most often found providing a very good quality material for stoning roads, building houses and especially making millstones from which this material gets its name. The quarries were not generally very deep, with the millstone being situated in the upper strata of the soil. They were therefore worked open to the sky.

Gypsum has been worked for a very long time in this part of the Seine-et-Marne. It makes it possible to manufacture plaster and particularly in older times the coarse plaster fillers which coated the traditional rural habitat. Plasterers occupied an important place in the local economy (15 plasterers around La Ferté-sous-Jouarre at the start of the 20th century).

Evelyne Baron
Curator of the 'Pays de Seine-et-Marne' museum

Manufacture and country homes: the two vocations of the valleys of Ile-de-France from the 16th to the 19th centuries

In order to satisfy the growing demand from Paris (around 220,000 inhabitants in 1550, 400,000 in 1680, 600,000 in 1750⁽⁷⁾), little by little the development of the watercourses transformed certain valleys into genuine corridors of industry. The watermills were supplied with water by factory races and powered flourmills, draperies, oil-works, tanneries, taweries, spinning mills and paper works. All of these activities were closely linked to the use of the valleys' natural resources: sheep, calves, wood, wheat, *méteil*⁽⁸⁾, barley, oats and linen. At the end of the 18th century, if Cassini's map is accurate, the number of mills in the catchment areas was one hundred and twenty in the Orge and Yvette valleys and about fifty in the Grand-Morin, Juine, Essonne, Mauldre and Croult valleys.

These activities helped to further set the valleys apart from the plateaux. They had more inhabitants and a more diverse economic base and social organisation. However, the hydraulic constructions modified the landscape and the flow rate of the river (mill races, diversions, ponds, dams and narrows) and exacerbated the issue of river system maintenance and common practice conflicts between the farmers, riverside residents, boatmen and factory owners.

In the 16th and especially in the 19th century, the valleys—particularly those to the west and to the south of the capital—became very popular among the nobles and the Parisian upper middle class as places to build their country homes. On the vast domains that they owned they began to build castles and landscape gardens in the valleys. They took advantage of the hills and the views to design classical parks, where the springs were used to create streams and decorated ponds. The castles of Villarceaux, (in the small valley of the brook of Chaussy), Villette, in the Aubette de Meulan valley, Ormesson, in the Morbras valley, Courances, in the École valley and Vaux-le-Vicomte, in the Almont valley are particularly notable examples.

This domination of large privately-owned domains, which was characteristic of the Ile-de-France countryside, tended to intensify during the 17th and 18th centuries. Combined with an excessively high taxation, it mainly resulted in the valleys in an impoverishment of the rural areas which formed the backdrop for the French Revolution. The extremely harsh winter of 1789 is further evidence for the role of the small valleys in supplying the capital: when the rivers froze over, immobilising the mills and merchant boats, unrest increased throughout the region.

When the railways arrived in the Yvette, Orge and Juine valleys between 1840 and 1870, they replaced waterways as the preferred means of transporting merchan-

dise. However, with the exception of the Bièvre valley, which was an important laundry and tawery centre, the valleys were not affected by the industrialisation of the late nineteenth century, which was mainly confined to Paris and its suburbs and the alluvial plains. The improved access to the Parisian market led to an increasingly specialised use of the land (Salmouille for market gardening and the Essonne valley for water-cress beds). At that time the marshlands, riparian meadows and vineyards were disappearing.

The Yvette river was widened and its waters used to supplement those of the Ourcq canal, which could no longer provide Paris with all the water it required. At the same time the upkeep of the watercourses, the struggle to keep the water clean and problems with flooding led to the creation of the first river associations (as early as 1843 for the upper Orge⁽⁹⁾).

Railways and housing: the small valleys subjected to the effects of Parisian expansion

"Within the territorial boundaries of the Paris region, in the one hundred and fifty years between 1801 and 1962, the population has increased more than tenfold" wrote Jean Bastié in 1964⁽¹⁰⁾. Apart from the upper Bièvre valley, which was affected by this profound change as early as 1820, it was only from 1880 and in particular during the period 1920-30 that those valleys with a train service were subjected to an upsurge in property development. Housing schemes began to appear in the castle woods and parks. The valleys of the Yvette, the Orge and the Morbras were the first to be affected. On the other hand those valleys which were not on the main transport routes, such as the Théroanne in the Multien region, endured a sizeable rural exodus. The flanks and the bottom of the valleys, even the furthest way such as the Essonne valley, were heavily exploited to meet the requirements for building materials (stones, bricks and sand). In the 1960's the car and the motorway suddenly meant that those valleys which had been spared this urbanisation because of their distance from Paris, such as Grand-Morin, Ysieux, Essonne and Montcient, now became accessible. The week-end huts became permanent homes and detached houses began to form in groups around the villages without any concern for these areas or the original outline of the landscape.

The town planning tools as a whole set up at that time were powerless against the disorganised urban pressure which continually required that new roads be built and new modifications made to the watercourses.

Today, local and regional policies are increasingly inspired by a more integrated approach to development. The "renaissance" project for the Bièvre valley is a good example of this. Will this kind of project help to provide the valleys of Ile-de-France with a significance, a role, an identity and a revitalised landscape in the next century?

(7) Fourquin (G), in *Histoire de l'Ile-de-France et de Paris* (History of the region of Ile-de-France and Paris), under the dir. of Mollat, Coll. *Portrait de la France Moderne*. Ed. Famot, 1977.

(8) A mixture of wheat and rye

(9) Claude (Viviane), Guillerme (André) – *L'Orge et ses syndicats: approches historiques et techniques d'une rivière péri-urbaine* (The Orge river: a historical and technical approach to a river situated on an urban fringe), Enpte, November 1986.

(10) Bastié (J.) – *La croissance de la banlieue parisienne* (Growth of the Paris suburb), P.U.F., Paris, 1964.

Waterways and the law, historical approach

After a century (since 1791) marked by the division of feeling on the subject, waterways were classified by the law of 8 April 1898 into two categories: "main and subsidiary rivers that are navigable or floatable, having become State-owned waterways (cours d'eau domaniaux - CED)" and "main and subsidiary rivers that are neither navigable nor floatable" having become non-State-owned waterways (cours d'eau non domaniaux - CEND), since the law of 16 December 1964 relating to the system and distribution of water and the fight against pollution. In the Ile-de-France, those in the first category (Seine, Marne, Oise, etc...) cover a linear distance of 486 kilometres, and those in the second a linear distance of 1,210 kilometres.

On CED waterways, the riverbanks and the bed belong to the State which can grant to local residents or to non-residents, the necessary authorisations for different uses (taking water, discharging water, fishing, canoeing, etc...).

On CEND waterways, the riverbanks and the bed belong to the local residents who also own the fishing rights. In both cases, the water is considered to be "*res nullius*" ou "*res communis*", something that cannot be appropriated, but that can give rise to a right of use.

Policing the water and fishing on watercourses, comes under the State (ministry of the environment) via the DDAF (the farming and forestry service), the DDE (the local facilities service) or the navigation service, as the case may be.

Fishing and the management of fish-farming resources are governed by the law of 29 June 1984. Fish are considered to be "*res nullius*" (not belonging to anybody) and the right to capture them (fishing right), an attribute of the right of riverside property owners⁽¹⁾, can only be exercised by its holder if the latter is affiliated to a fishing and fish-farming association, and pays an annual fishing tax. The riverside property owners, whether public or private, may transfer the fishing right to a third party.

The general regulations for activities likely to harm either the waterway or the fish are contained in the *Ordonnance des Eaux et Forêts* (Ordering of Waters and Forests) of 1669, the provisions of which were to be re-adopted by two orders from the Directoire (year VI). The imperial decree of 15 October 1810 (in force until 1917), was, in itself, to form the first major attempt to control nuisances due to "insalubrious, inconvenient or dangerous manufactures and workshops". The law on fishing of 1829 was to make it possible to pursue industrials recognised guilty of destroying fish. The law of 16 July 1976 on "installations classified for the protection of the environment" (update of the denomination of 1810) was to introduce the study of impact and the public enquiry for establishments subjected to authorisation.

The protection of people and property against floods is still governed by a law of 16 September 1807 which apportions the cost of expenditure pertaining thereto, by the riverside property owners of the waterway, whether State-owned or not. The State and local authorities are nonetheless involved in this area,

when the public interest or urgency requires it (cf. 10 year programme for the prevention of flooding, adopted by an Interministerial Committee on 24/01/1994).

On CEND waterways the private owners of riverbanks and bed, as a compensation of their 'right of riverside residents', must assume responsibility for clearing out works (cutting back water weeds, rebuilding riverbanks, removing alluvial deposits, maintaining riverine trees, etc...)⁽²⁾ intended to maintain or re-establish the waterway in its natural widths and depths, maintain the regular flow of water and preserve the correct functioning of the aquatic ecosystems. As in forestry matters, simple plans for the multiyear management of CEND waterways have been encouraged by the State (law of 2 February 1995 relating to the reinforcement of protection of the environment).

The outline law organising the management of the water sector is the law of 16 December 1964, which laid down three innovative principles:

- management of water resources in the context of six catchment basins
- consultation between the various users of the resource, via six Basin Committees
- institution of financial solidarity by the creation of 6 financial basin authorities (water authorities).

Finally, the law on water of 3 January 1992 recognised water as being "part of the Nation's common asset-base. Its protection, valorisation and development as a usable resource, in the respect of natural balances, are of general public interest".

This integral management is intended to ensure the preservation of the aquatic ecosystems and wet areas, protection against pollution, the restoration of quality, the valorisation of water as an economic resource, the fair distribution of this resource in such a way as to satisfy the population's needs in terms of drinking water supply, the conservation of the free outflow of water, protection against flooding, and the different uses (agriculture, fishing, industry, production of energy, transport, tourism, water-based leisure activities, etc...)

For this purpose, plans for the development and management of water (schémas d'aménagement et de gestion des eaux - SAGE) fix, by catchment basins or sub-basins, in the scope of local water authorities, the fundamental orientations of a balanced management of the water resource, under and above the ground (CED, CEND, ground water tables and wet areas).

Pierre Clavel
The Green Spaces Agency

(1) Since the first law on fishing (15 April 1829), resuming an opinion from the Council of State of 27 pluviôse year XIII (16 February 1805), which reckoned that fishing rights were a fair compensation for the duty to maintain rivers by the riverside property owners.

(2) These provisions resulting from the customary law of the *Ancien Régime* were validated by the law of 14 floréal year XI, and have been maintained since then.

The natural habitats and landscapes of the valleys

Isabelle Chagnot
Bernard Cauchetier
Research associates

Morphology and landscape

Elements of geomorphology

The geomorphology of the Ile-de-France valleys emerged from the glaciation cycles of the quaternary period, during which glaciers carved through the great sedimentary platforms that were formed by the erosive action of the sea during the tertiary period. As a direct consequence of the folding of the Pyrenees and the Alps, these platforms underwent an undulation along a west-north-west/east-south-east axis. This regional direction arose from a tectonic structure (folds, crevasses) which was formed in the primary platform during the folding of the carboniferous period (along a Brittany—Massif Central axis). Of these undulations, a syndine (known as the Seine) traverses the entire region and forms a bowl which forces almost all the rivers to converge toward the Seine.

The orientation of numerous valleys is determined by this regional tectonic axis. Apart from the Seine, there is also the downriver part of the Yerres valley and the Orge, Bièvre, Viosne, Théroüanne, brook of Gally, Grand-Morin and Petit-Morin valleys. Other valleys follow “conjugated” i.e. perpendicular directions, such as the Epte, Juine, Essonne, École and Vaucouleurs valleys.

Valleys were carved out by the action of the rising or falling sea level, itself influenced by glaciations. Over the last ten thousand years, the sea level has varied by more than 100 m. These variations gave rise to alternative cycles of sedimentation and erosion of the river beds leading to the formation of terraces, particularly in the big valleys. The deepest valleys lie in the west of the region. This can be explained by the fact that the Seine flows from east to west and also by the higher altitudes at this spot (on Beauce plateau).

The shape of the valleys is determined by the nature of the rock of which they are made. For dense strata such as limestone or chalk, the sides are very steep (the Epte valley is one example). For formations that are softer but have good cohesion, such as sand, the slopes are a little less steep and concave, but quite sloping. Finally, for marl or clay, the shapes are often more open as, for example, in the upper valley of the Viosne and in the brook of Gally valley. There is often a dissymmetry between the two slopes. Those facing south or west are steeper than those facing north or east. In the former

case, the daily cycle of freeze-thawing during cold periods has favoured the formation of escarpments.

Varied and attractive landscapes

The attraction of the valleys of Ile-de-France comes from the variety of landscapes they have to offer. At a regional level they break up the great cereal plains. A more in-depth exploration reveals the variety of landscapes and atmospheres.

Some have a simple configuration, where the shape of the valley is clearly visible, particularly those with a flat bottom and steep sides such as the Epte, Bièvre and Théroüanne valleys. Often, however, they form a succession of sites where open land, fragmented spaces, steep sides and winding rivers all alternate. This kind of diversity can be found in the Grand-Morin, Yerres and Vaucouleurs valleys.

The elements of the landscape which contribute to their image

The relief and its perception

The relief is the most direct element, which allows a valley to be distinguished within a region. Its clarity is reinforced by the lines of the crest and especially by the presence of wooded hillsides. This is the case for the Vaucouleurs valley, where the prominent relief and wooded hillsides make the valley stand out. However, expanses of woods along the bottom or on the gentle slopes may in fact make it more difficult to perceive the valley.

With a more gentle landscape, the river course and the riparian forest constitute striking elements of the landscape. The poplar groves, such as those that can be found in the lower Epte valley, also provide visual landmarks.

The meanders are characteristic of certain valleys. Those of Yerres are particularly remarkable in terms of their regularity and their size, with their vast bends of farmland lined with wooded hillsides. The bends are very tight in the Grand-Morin valley, giving the landscape a complex form, which makes separating the upper from the lower valley very difficult.

Where there are roads along the crests of the valleys, these make for interesting vantage points from which the entire site can be viewed.

Finally, some of the steep-sided valleys, such as the Essonne and the Juine, have rocky outcrops that are remarkable elements of the landscape.

Hidden or visible rivers

Rivers are at the heart of landscapes. They are clearly visible when they are highlighted by an abundant riparian forest or when the banks are developed. A line of vegetation highlights the course of the river in certain parts of the Yerres, Mauldre, Grand-Morin and Lunain valleys.

In other cases they are invisible, hidden by several elements. A dense wooded vegetation keeps rivers

hidden; the Epte valley, which is hidden by poplar groves, is one example. In the open spaces with few slopes farming, if the rivers are not highlighted by a riparian forest they are barely visible, as is the case in the upper Yerres valley and in the Aubette de Meulan valley. Finally, a diffuse urbanisation on the riverside effaces the presence of a river. On some sites the river is now completely invisible, buried and transported through pipes under the urban landscape. The most striking example is the downriver course of the Bièvre, where the river is buried from Verrières-le-Buisson down to its confluence with the Seine. The same is true of the mouth of the Montcient and of the Aubette de Meulan river in the city of Meulan.

The adjacent dry valleys

Aside from the tributary valleys, many valleys have small dry transverse valleys on their territory. Water may be absent from these sites, but they still have many striking features, such as in the transverse valleys of the Essonne (upper Renarde, brook of Bouville).

These thalwegs form a visual and functional link with the surrounding plateaux. They also offer a view, something which is often denied to sites that lie at the bottom of valleys. In the Epte and Grand-Morin valleys the small transverse valleys provide vistas. In the Bièvre valley, they provide a useful communication link with the plateau. Urbanisation first occurred providing a functional link between the plateau and the valley. The thalwegs are characteristic of the Théroüanne valley and provide a direct link between it and the villages of the plateau.

Large domains and parks embellish the countryside

In previous centuries valleys were much sought-after as places of leisure. Beginning in the 16th century large domains were established, attracted by the presence of water and the interesting landscapes. In some valleys, such as the Juine and the Bièvre, there is a whole string of them.

Today these domains are vast protected areas with a rich landscape and heritage. They are part of the green tapestry of either wooded or developed green spaces that line the valleys. Their presence maintains green breathing spaces in the more urbanised areas. In the Essonne valley, for example, the parks in two castles—Fontenay-le-Vicomte and Villeroy—form a barrier that separate the urban areas in the lower valley.

Deteriorating landscapes

Valleys are complex and interwoven habitats that are particularly sensitive to territories changes. The reasons for the deterioration in the landscape are many and all of the valleys are affected to some extent.

The transformation of farming in recent years has led to important modifications of the landscape. Spontaneous reforestation and some closed areas due to a lack of upkeep; the vegetation (hedgerows, riparian forests) has been cut down to enlarge the crop fields and the valley bottoms closed off with poplar groves.

Fragmentation and splinter development are characteristic of the valleys. The fragments are often small and the space compartmentalised. Transport infrastructure increases the compartmentalisation and creates neglected areas that can no longer be managed by farmers. Abandoning the open spaces favours precarious habitats and splinter development.

Urban expansion, which consists of mundane housing that doesn't blend well with the area, is a major factor in the disappearance of the landscape and the river. A case in point is the small village of Rodon, on the Rhodon river (an tributary of the Yvette), that completely blocks the valley. Quarries are another cause of the marked transformation of the landscape. Deterioration can arise when quarries are abandoned or unsuitably renovated, for example by simply filling in the open areas. Of the small valleys in Ile-de-France, Loing is the most affected. The valley has been completely transformed by the digging of sandpits.

The natural habitats of the valleys

Because of their relief and the poor quality of the soil, the valleys were not subjected to the same degree of intensive farming as the plains and the plateaux. Thanks to this, valleys and forests now contain most of the region's biodiversity.

Characteristic valley habitats

The meadows

Meadows and natural grassy fields are typical habitats of the valley sides and bottoms. In the past they were most often used as pasture land but today are disappearing due to the decline of this activity. Their rarity has increased their heritage value. Meadows can be classified according to their hydromorphology and their use (reaping, pasture). The harshest environments were not suitable for intensive farming and so are also often the most interesting in heritage terms. The wettest meadows, which are characteristic of the valleys, are also those that have the greatest numbers of remarkable species. There are some wonderful examples in the Epte valley and in some parts of the Loing and Ysieux valleys.

Several management methods can be used that have various effects on biodiversity. Reaping and exporting hay as animal feed is preferable because the nature of the soil is kept constant. Its use as pasture tends to enrich the soil with animal excrement, which acts as a fertiliser and encourages the growth of more common-

place species. Many meadows are also periodically turned over and replanted with species that make excellent fodder. The effect is that the specific variety is markedly reduced to the advantage of a few selected but commonplace species.

Wetlands

The term wetland⁽¹⁾ covers the wet meadows, the wet forests and marshland. In this chapter we will only be dealing with the latter. Marshland that can be classified as:

- acid peat bogs, which can be found mainly in the valleys of the Rambouillet massif, such as Vesgre, or in certain valleys of the Vexin like the Viosne;
- basic peat bogs, or alkaline lower marsh, which can be found when the ground water lies almost at the surface. They are more common in the region's valleys (the Viosne, Essonne, Juine and Sausseron valleys are some examples);
- reedy marshes situated at the edge of ponds or on the banks of large calm rivers (the Loing, Essonne, Juine and Yvette valleys, among others). The name derives from the large and almost pure population of reeds, bulrushes, baldingères (or false reed), tall sedges and club rush that can be found there. Although these habitats may appear to have little diversity, and house some very rare species of plants (chufas, grande douve, false rice, etc.) and animals (sedge warbler, certain species of heron, rails, etc.);
- river cut-offs and ponds which have different and often artificial origins. Ponds can be the result of old gravel pits (in the Loing valley), peat bogs (in the Essonne valley), or old dams built by the monks in the Middle Ages that were used for breeding fish. These habitats have an amphibious vegetation whose ecological interest increases with the acidity of the water. These are also the only breeding grounds for many species of batrachians and insects. In the more acidic areas, rare plants (bladderworts, various buttercups etc.), insects and other endangered arthropods (dragonflies, spiders etc.) can be found.

The calcareous hillsides

The grassy fields of the calcareous hillsides are of great value thanks to their spectacular cortege of Mediterranean flowers, including numerous orchids. The thinness of the topsoil and the orientation result in very great differences in temperature, to the extent that only highly adapted species can survive. Some species or animal groups are present in large numbers, including reptiles (particularly lizards), crickets, praying mantas and certain groups of butterfly (Argus). The value of these species is reinforced by their rarity. They are now in decline due to the fact that since the land is no longer used for fruit farming and grazing cattle it is not looked after properly.

There are several kinds of calcareous grassy fields: the dry grassy fields that can be found on hard rock and steep slopes (in the Epte and the tributary valleys of the Juine), the "mesoxerophilous" grassy fields that are found on gentler slopes, or on a more chalky or marl soil (in the same valleys and the Mauldre, Vaucouleurs, Viosne and Loing valleys, among others), and the grassy fields found on calcareous sand. Almost all of the fields develop a fruit-tree vegetation (thickets of small thorny shrubs such as hawthorn, blackthorn, wild rose-bush and sometimes épine-vinette), before being taken over by a pubescent oak wood with some laburnum.

Afforestation

Most of the hillsides of the valleys in the region together with the less fertile edges of the plateau experienced a spontaneous reforestation. This is the natural end stage in the development of vegetation in a region of plains like Ile-de-France. It is highly varied. The type depends on the slope, if it is facing the sun, and in particular on the soil, water content and local climate.

Starting from the river there is a succession of:

- a riparian forests, along the banks, which mainly consist of willows and white poplars
- alluvial forests, alder groves and groves with a mixture of alders and ash trees
- forests on the slopes, including groves of ash trees, oak trees together with ash trees at the bottom of the slope and acidophilic oaks on the acidic sandy slopes, and beech trees or even maple trees on the cold northern slopes
- the forests of the plain, which consist essentially of oak groves

There are many other facies, depending on specific local conditions (ravine forests, for example).

Exceptionally interesting valleys and a few quality sites

The diversity and ecological interest of the habitats encountered can vary from one part of the region to another. It is noteworthy that the further the valley is from the city, the greater its diversity and in particular its wealth of vulnerable species. The presence of communication routes is also a decisive factor. Valleys like the Orge which have a railway running through it, undergo a diffuse urbanisation the result of which, despite a very rural appearance, will be commonplace natural habitats. The present situation stems from a type of urbanisation which requires a lot of space

(1) The wetlands may or may not be exploited, and are generally flooded or saturated with freshwater, saltwater or briny water, either permanently or temporarily; the vegetation, when there is any, is dominated by hygrophilous plants for at least part of the year (the Water Law of 3 January 1992).

and the highly artificial practices used by various individuals (the gardens and their surroundings treated with plant-care products, the destruction of wild species, etc.).

Certain valleys have a particularly great wealth of species which constitute a resource to be protected, such as the Loing, the Lunain, the Epte, the valleys upriver from the Juine (the Louette, the Chalouette) and the Petit-Morin. Others, such as the Morbras, have a highly perturbed natural habitat. Finally, there are some where the situation changes from one part of the valley to another. This is the case for the Orge valley which from a habitat rich in diversity upriver from Dourdan, becomes rather commonplace around Brétigny-sur-Orge and finally is completely artificial toward Savigny-sur-Orge. In such valleys that experience an intermediate situation, some "havens" of nature have survived, such as at Athis-Mons or Leuville-sur-Orge. These sites were maintained thanks to local efforts that concentrated on controlling real estate development, but they are extremely fragile due to their isolation from a biological corridor, which could provide the exchanges necessary to their survival.

Vulnerable habitats

Various factors of vulnerability threaten the natural habitats of the valleys of Ile-de-France. In particular, there is:

- urbanisation, which is progressing in a centrifugal manner from almost all the urban centres in the region, particularly Paris and its suburbs. It mainly follows the preferential axes, like roads and valleys. The principal effect of urban expansion is to eat up the valleys natural areas. Although less frequent, some urban centres cut across the valleys, blocking movement between the upper and lower valleys
- fragmentation by transport infrastructure, particularly the more important ones like the Tgv and the motorways. They divide up the territory, eliminating a large part of the genetic exchange between the different compartments
- intensive farming methods and the economic decline of certain farming production channels are further factors of fragility. The richest habitats are those of the meadows and the grassy fields. They are now disappearing and are being replaced by afforestation or drained cultivation. During the last few decades, the meadows have been disappearing at the rate of 50% per decade and the biological diversity of those that remain is diminishing as a result of poor management. The same thing is happening to the calcareous grassy fields. Fruit farms are in decline and sheep pastures have almost completely disappeared over the last fifty years. Natural forests are beginning to grow on the hillsides, although this phenomenon depends on the interaction of factors such as the slope, the type of rock and the direction of the sun.

The process is slower for steeper slopes that face south and have more compact rocks. The more stable grassy fields are situated on the hillsides of the Seine valley downriver from Mantes-la-Jolie and in the valleys of the Essonne and its tributaries. Finally, the wetlands are also in marked decline. The valleys of the Ile-de-France are also affected by this nationwide phenomenon

- pollution from various sources—agricultural, household and industrial—constitute factors of degradation that particularly affect the wetlands. By decreasing the acidity of the habitat it is a threat to the biodiversity of these areas.

From conservation to reclaiming land

The valleys provide habitats that are refuges for biodiversity. However these refuges are under threat and particular care must be taken of valleys in order to conserve and reclaim the natural habitats. Protecting the more remarkable areas is an indispensable stage in saving the richest habitats and the rarest species. Biodiversity reservoirs must be established that will be able to serve as sources for future resettlement programmes.

The richest sites are in some rare cases mature of woods known as "climaciques". More commonly they are areas that have reached an intermediate stage and can still change. These pioneer formations have become rare within the region, so it is indispensable to maintain them as they are and to act to "block" any evolution. This is particularly the case for all the humid habitats on open land (wet meadows, reedy marshes etc.), such as Brignancourt marsh on the Viosne or the wet meadows of the Epte, or even the calcareous grassy fields on the hillsides (the Epte, the Mauldre, the Juine and its tributaries).

Looking after these areas is the first step to conserving the natural habitats of the region. In the long term, the conservation problem must be dealt with comprehensively, in the context of a regional network of areas of interest. This would have the effect of providing diverse "mature" natural habitats that communicate between each other and that would be continually available. This network could be regularly renewed by the creation of "new" pioneer habitats.

Conservation is not an end in itself. It is doomed to fail in the long term if measures are not taken to decompartmentalise the habitats since a protected area which is isolated from other natural habitats will only progressively waste away. The populations of rare species are fragile and may disappear one after the other. The least change in certain environmental conditions (under an outside influence) could be fatal to the local populations due to the poverty of the genetic genotypes (the phenomenon of consanguinity in animal species). The absence of communication between the habitat and other outside reservoirs means that any

resettlement is impossible, which makes it indispensable to maintain and recreate biological corridors between the natural habitats. Valleys, with their linear structures and their special configuration in the region (a radiating structure) are ideal for reconstituting these corridors. Sometimes the simple fact of controlling urban expansion on a band of land a few metres wide along the riverbanks, and looking after it in a "natural" way, is enough to stimulate an efficient exchange between larger and more varied spaces.

Agriculture

Ile-de-France is a region of fertile plains that has been farmed since ancient times. From antiquity, the best land has been used for growing food crops. The more ordinary land was reserved for forests, particularly for hunting (the royal and seigniorial forests). The valleys, which were less fertile, were used for many different activities and were not subjected to intensive farming, like the plains.

Traditionally diversified activities

The relief and the quality of the land are the deciding factors for farming. The valleys, with their sloping surfaces, a soil that is renewed by erosion and wet habitats at the bottom, are generally not suitable for large-scale farming of cereals or oilseed crops. The often-fragmented land ownership also makes them unsuitable for these crops. However, other types of product have been successfully developed in the valleys. The diversity of the habitats—with the attendant constraints and advantages—explains the variety of possible types of farming. Each type of farming used to have its place among the three typical areas of the valleys: the edges of the plateaux and the valley's sides and bottom:

- the edges of the plateaux are, like the plateaux themselves, devoted to large-scale intensive farming
- the steepest sides have remained wooded, although farming activities have developed on the more hospitable hillsides. The calcareous hillsides, particularly those facing south or west, were reserved either for fruit farms (cf. the vine right up till the turn of the century) or as grazing land for cattle
- the valley bottom consisted largely of meadows and market gardens

Traditional farming, which respected nature, used to be based predominantly on animal husbandry, in combination with fodder crops and a few areas of specialised crops.

Among these specialised crops, watercress was characteristic of the bottom of the valleys of Ile-de-France, which was the leading region both in terms of production and consumption. Despite the difficulties, a few important sites remain in the valleys of the Juine and the Essonne.

During this century, the changes in agricultural policies and the economic context lead to a marked modification of the production systems. This process has accelerated since the 1950s and farming in the valleys has been doubly affected by these changes.

Disappearing activities, deserted land

The traditional farming activities of the valleys have been particularly affected by the problem of profitability. The principal reason for abandoning farmland is the decline in animal husbandry. The wet meadows, used in the old days as pasture for cattle, are now neglected. The same is true for the calcareous hillsides, which were previously used as sheep pasture. Since these areas are no longer kept in check by the animals, shrubbery is appearing and they are progressively becoming closed off as trees take over.

Other farming activities are disappearing for reasons of profitability. Fruit tree farms that were established on the hillsides began to decline, first as a result of the effects of the competition from the south of France and later from international competition. Most orchards have been abandoned. This can clearly be seen in the Grand-Morin, Essonne, Vaucouleurs and Viosne valleys. In the Juine valley, the highly specialised farming of watercress is also in decline.

Finally, urban pressure on these areas is also imposing much more constraints on farming. The territories, which are already small and fragmented, are becoming more and more enclosed and disorganised by the expansion of the towns and their infrastructures. The difficulties that farmers have experienced have led to more land lying fallow on certain abandoned parcels. The role of farming in the management of the valleys has been shown to be of primordial importance because it is one of the activities that "produce" landscape. Conserving a form of rural landscape requires that the farming activities, which maintain the land, do not disappear. However, the economic viability of the farms is indispensable. Some form of remuneration for looking after the land would allow farmers to incorporate this need. This is the principle behind the contracts that have been drawn up between farmers and the local communities. As part of the farming and environmental measures, work has been programmed at a local level on the meadows in the Epte valley by the regional natural park of the French Vexin and in the upper Chevreuse valley.

New activities deal with space management. Horses are tending to replace cattle with the expansion of horse riding. Their number has already increased dramatically and they can frequently be seen at pasture on the meadows at the bottom of the valleys like the Ysieux. The presence of horses is related to several types of activities. Breeding horses is a farming activity in its own right while looking after horses is for certain farmers more a way of diversifying their activities.

Finally, riding schools are part of the leisure activities. This diversification of activities should be encouraged because it constitutes an alternative to the traditional management of valley bottom with horses. It is something which could be encouraged by the award of grants to the farmers and other groups, such as the riding schools, could also play their role.

Different types of animal husbandry cattle, sheep and horses could participate in the management of the meadows and the upkeep of the habitats. However, different species have different dietary needs and don't all have the same effect on the decline of fallow land. A study carried out in the Epte valley⁽²⁾ analysed the characteristics of the different species. It showed that the best combination consisted in associating heifers and horses, since these two species complemented each other well in an efficient use of areas of brushwood and refus.

Aside from traditional animal husbandry, certain animals of hardy stock are well adapted to the habitat at the bottom of the valleys. They are more resistant to disease and have a higher tolerance to moist soils. The regional natural park of the upper Chevreuse valley uses these animals in the Rhodon valley.

So, before management programmes for breeding in the valleys can be set up, detailed analyses are required to assess the characteristics of the habitat, the existing activities and any possible complementarity.

Getting back to a more reasoned farm management

The intensification of farming

and the decrease in biological diversity

Diversified crops that were well adapted to the pedological and topographic conditions have become less important as technical progress allowed intensive farming to be used on any land. Starting in the 1950s poplar groves began to become widespread under the impetus of a new forestry policy. Then, at the end of the 1980s, after a period of strong expansion on the plateaux, corn spread into the bottom of the valleys and to the irrigable zones. These phenomena affected valleys like the Epte and the Viosne. The intensively grown crops sometimes stretch as far as the banks of the river, as in the Yerres and Aubette de Meulan valleys. They have also expanded into the dry grassy fields of the hillsides.

One consequence of the expansion of the intensively grown crops is a loss of ecological diversity. In fact these fields are considerably poorer in terms of the variety of species of flowers than the meadows used as pasture and the calcareous lawns.

The natural habitats of the valley are vulnerable areas for which specially adapted methods of management must be used. The contracts signed with the farmers, like the farming and environment measures, are ways of encouraging a more ecological management of the

meadows. The funds provided correspond to the additional expenditure incurred by management methods that take into account the ecological vulnerability of these areas.

Farming and the water cycle

Farming has a fundamental role in the control of the water cycle of the valleys. It is involved at several levels, although the risks are not at all comparable to those from urban pollution. Diffuse pollution from intensive farming can occur where there is the most farming activity, such as in the Loing or the Yerres valleys. Concerning the surface water, the risks increase when the run-off water from farms increases in volume due to draining effects and when there are no grassy or wooded areas to provide some filtration.

The renovation of rural developments should allow an improvement in the comprehensive water management in the valley. Grassy or wooded bands along the riverside should be created in the areas between the intensive farming zones and the watercourse when there are no longer any natural meadows. Hedges should be grown to help give a better control of the run-off water. Contractual measures along these lines should be studied.

The future "*Contrats territoriaux d'exploitation*" (land development contracts), provided for in the new framework law on farming, should be envisaged as management tools to encourage green farming but that don't neglect the economic viability of the farms.

(2) L. Guillemette, L. Lacourt, O. Riffard—*Etude des relations agriculture et paysage dans la vallée de l'Epte* (Study of farming and landscape relations in the Epte valley)—Ecole nationale supérieure d'horticulture de Versailles, Syndicat mixte pour la création du Parc naturel régional du Vexin français—1994.

"Settings for gardens"

Historical parks and gardens have been developed in carefully chosen, even exceptional, sites. The inventory of remarkable parks and gardens in the Ile-de-France region⁽¹⁾ has revealed their preferential localisation along the valleys, whatever the date and style of their origins.

The presence of water is essential to the development of gardens, whether rustic or sophisticated in form (stream, pond, mirror, canal, buffet, stair, fountain, waterfall, basin, spray, grotto, nymphaeum, etc...). Water provides murmuring sounds, freshness and movement, captures the light and the sky, turns the mind to travel or mythology. One can quote the extreme example of Versailles (and also Saint-Cloud, Marly, etc...), nonetheless situated in a marshy vale, where it was necessary to design considerable hydraulic arrangements (system of channels, aqueducts, water containment areas, etc...) in order to have water available for the big water areas.

Indeed, the region's geomorphology is dominated by large and relatively humid plateaux. The valleys, where water is continually available, are favoured places for installing gardens. The humid plateaux of the Brie region (gardens with moats) and the forestland of Rambouillet (gardens of woodland borders and clearings), as well as the hillocks of Arthies (gardens of damp vales), are the exceptions that prove the rule.

The garden heritage combines with the natural sites which it helps to reveal, conserve, even transfigure. The valley slopes are positions from which it is possible to dominate the landscape and enjoy the show, even if sometimes today this is barely legible, because of the closing in of views by tree-planting. In the Hauts-de-Seine department, the gardens have preserved spectacular or original situations in association with the river Seine or in a balcony position on the hillsides looking towards Paris. Even within the urban area, this natural logic remains meaningful. Different types of position lead to varied compositions: on the edge of waterways, inclined on the slopes, or on the rim of a plateau. The contact with water is an exceptional quality that is still conserved in the small valleys. Unfortunately, most of the gardens and parks in the large valleys (Seine, etc...) have been cut off from them by riverside expressways.

The valleys therefore hold the best part of gardens in the region. Some areas of small valleys have been completely invaded. Here are a few examples:

- In Essonne, the concentration of gardens in the valleys is extreme (95%). This is the case of the small valleys imprinted into the plateaux of Beauce and Le Gâtinais (Orge, Remarde, Renarde, Juine, Chalouette, Essonne). In this sector which has long known problems of water supply, the valleys resemble galleries of greenery in the middle of major farming areas. They are the living place where the villages were established. The Juine for example is a valley particularly rich in gardens. In certain sections, these follow on from each other without interruption. This is quite surprising bearing in mind

its relative distance from the capital. These generally occupy the valley bottoms, incorporating the river with its development of water retention systems, and a part of the hillside opening vistas which monopolise the wooded horizon in which they nestle. These estates, often rearranged since the 17th century, draw their charm from the association of elements that can be either rustic (woods, marshes, ponds, meadows, islands, etc...) or built (canals, basins, lanes, borders, factories, etc...).

- The hillsides of the Bièvre valley, especially between Jouy-en-Josas and Bièvres, present a succession of gardens, with a predilection for south-facing hillsides. Sprinkled between the grasslands of the valley bottom and the wooded crest forming the horizon, these gardens domesticate the slopes and, by means of terraces and belvederes, organise panoramic viewpoints on the river and facing slope. Their composition often plays on the contrast between the light of the valley and the shadow of the wooded areas. This arrangement corresponds especially well to the options of a single age: the 19th century. The few earlier gardens were situated at the bottom of the valley or on the rim of the plateau, since the hillsides of this little valley must have been too cramped for classical tastes. On the other hand, the 19th century was to find a choice area for its romanticism, its liking for a protected nature, and also no doubt for purely material reasons: closeness of Paris, the availability of land. These gardens are all comparable in terms of their overlooking of the Bièvre valley, but different in terms of their adaptation to their "micro-site".
- The valleys of the Val d'Oise (Aubette de Meulan, Viosne, Sausseron, Oise, Ysieux) offer a rosary of gardens. The landscaped gardens are the most characteristic of these with their water features and their vast green carpets, whether it is those of the 18th century with their fantasy ornaments or those of the 19th century with ornaments inspired by nature (marked by the use of false-cement wood or cement rockery). These gardens take possession of vales that they control as far as the eye can see, for example in the Viosne valley. The dwelling place, looking down on the heart of the vale, is given a theatrical stage setting. The composition plays on the effects of relief and perspectives in order to insert intimist scenes and walks within wide panoramas. The estate's size makes it possible to combine several features of the surrounding landscape within the very space of the garden: river, meadow, hillside, forest, village, etc... The ultimate art in these gardens is to take over the outside landscape in an overall artistic composition showing geography and nature to advantage.

Christian Thibault

(1) Inventory drawn up by Iaurif, from 1985 to 1995, on behalf of the Green Spaces Agency.

Rehabilitation of the Rabuais marsh in the Sausseron valley

The Rabuais marsh, located in the high valley of the Sausseron, extends over 63 hectares spread over the communes of Amblainville, Arronville and Berville. It is comprised of an alkaline peat bog of major ecological value, fed in its centre by springs and at the edge by surface water, including that from the Sausseron. The site is mainly used for hunting. Several threats are currently hanging over the marsh. The first is linked to a progressive drying out, which has several causes. The development of poplar growing, with its consequences on the hydrological functioning of wet areas, is one. The drop in the level of the water table due to weather conditions over recent years is another. The second factor of deterioration is eutrophication linked to intensive farming which is being seen on the edge of the marsh. This leads to a modification of the area's ecological functioning.

In the scope of its brief to protect wet areas, the Regional Natural Park of the French Vexin has implemented a programme for restoring the

Rabuais marsh. A preliminary ecological study has highlighted the site's main challenges. It has led to proposals of programmes for management and restoration. An agreement has been drawn up with the communes concerned for a 5 year restoration project.

The operation consists, to start with, of establishing small experimental plots testing different management techniques (mowing, using a mattock to uncover the peat, etc.). Monitoring this system will make it possible to devise the most suitable techniques for the environment, which can then be put into general use across the whole site.

The ecological valorisation of the marsh may result in a status of voluntary natural reserve.

Source: Regional Natural Park of the French Vexin – 1996 –
Programme for the restoration and management of the Rabuais marsh –
Study carried out by Ecosphère

Vulnerable Natural Areas in the Loing valley

One of the first sites preserved by way of the departmental policy on Vulnerable Natural Areas in the Seine-et-Marne was in this valley in 1991: this was the Lutin marsh at Veneux les Sablons, at the confluence of the Seine and the Loing.

This site, of major ecological interest, presents typical formations of alluvial areas such as meadows liable to flooding, ox-bows, ponds, and very interesting avifauna (water rail, kingfisher, reed warbler, etc...).

Subsequently, six other sites in the valley benefited from the creation of a perimeter of pre-emption or amicable buyout for vulnerable natural areas.

- The Clémenceau grassland at Moret-sur-Loing, where the Département has developed a rambling circuit opposite the Grange Batelière, now a museum dedicated to the memory of Georges Clémenceau,
- the Sorques plain at Montigny-sur-Loing and Moret-sur-Loing, former sand quarry situated between the Loing and forestland, where a mixture of marshland, ponds and hay meadows forms a unique site,
- the large flooding grasslands and a limestone hillside at Episy right next to the marsh currently being restored with help from the

département, the Water Authorities, the Green Spaces Agency and the Regional Environmental Authority,

- at Saint-Pierre-les-Nemours, two sectors of meadows and woods between the Loing and the canal to be protected from the building of huts,
- the Gandelles meadow at Madeleine-sur-Loing where the commune has become involved to preserve this wet area maintained subsequently by extensive grazing,
- a string of sites along the edge of the Loing at Souppes-sur-Loing, in addition to plots already belonging to the commune.

In this way, approximately 350 hectares have already been preserved and will be shown off to the public in a valley which provides one of the département's most interesting ecological and landscaping sites.

Seine-et-Marne General Council
Department of Water and the Environment
Environment Service

Poplar plantations: landscape and environmental issues

Although their surface area is not necessarily large, poplar plantations have an impact on the landscape and sometimes the ecology which can be locally significant. In the valleys being studied, poplar plantations represent in most cases less than 1% of rural areas (ground use plan 1994). Only the valleys of the Juine (1%), the Théroutanne (1.6%), the Morbras (2.8% in a single place) and the Epte (3.7%) exceed this threshold. And yet the question of poplar farming is often at the heart of rural development issues and is food for debates that are as passionate as they are contradictory. The different issues can be summarised as follows:

Poplars as a farming product

Plantations of poplars were encouraged after the Second World War by forestry and agricultural policies. This type of farming was able to take advantage of wet lands, which until then had not been particularly useful in agriculture. This development was part of the post-war perspectives of intensification. Today, the profitability of poplar farming is put in doubt by the economic context. Poplar plantations have been abandoned. Few are planted. The lack of operation of certain poplar plantations can also be explained by the extreme fragmentation of the plots of land, as in the Théroutanne valley.

Poplar plantations and hunting

In the sites where farming is on a large scale, poplar plantations are prized by the hunters, since they provide small reserves for fauna.

Poplar plantations in the landscape

Poplars have a strong landscape identity, particularly when they extend over a line along the edge of a road or a river. They serve as a visual landmark in open farming landscapes. In the bottoms of valleys, the problematic is slightly different. Their extension has led to an evolution of the landscape, with in particular a tendency to close in the views. This is a new image of the valley which has sometimes been incorporated into current perceptions. This is the case for example in the Epte. In the Ourcq valley, the poplar plantations, now old-established, are part of its identity.

Poplar plantations in the ecosystem

In alignment along rivers, poplars, with their horizontal roots, tend to destabilise the banks. In addition, the leaves, which rot down very quickly, encourage the eutrophication⁽¹⁾ of the rivers. In the bottoms of valleys, the poplar plantations were mainly extended in the place of wet and biologically diversified environments which were formerly meadows and marshes. Poplar farming tends to alter the soil water economy by causing a drop in the water table and reducing the biological diversity. In fact there exists a wide diversity of cases depending on the poplar plantations method of conduct. Several actions help to reduce the ecological impact of a plantation: respecting the characteristics of forestry stand areas, not planting the most peaty sites for which poplars are not suited, forming plantations into a mosaic presenting different categories of age, etc.

Current developments are tending towards a reduction in the importance of poplar plantations. The economic context of the sector does not encourage plantations. Other activities are taking their place, such as the fishing ponds which are dug out in the Viosne valley. In the most asphyxiating environments, where poplars develop poorly, experiments of winning back the marshland are seeing the day, as in the Epte valley⁽²⁾. Finally, new forestry orientations are favouring the production of catalogues of stand areas and the use of species better suited to the environment.

(1) eutrophication: consequences of an excess of organic materials in an aquatic environment.

(2) See insert "The rehabilitation of Frocourt marsh".

The marsh of the lower Essonne valley

The department of the Essonne is a land of contrasts. Despite a high degree of urbanisation to the north, an exceptional natural heritage still remains. There are marshes, fields of orchids, forests, orchards and meadows that are home to what scientists agree is a remarkable collection of flora and fauna.

On Paris' doorstep, the marshes of the lower Essonne valley form a vast marshland that covers more than 600 hectares. The multiple statuses that are superposed on this area (special European protection zone, order of the prefect for the protection of the biotope, natural area of ecological interest for fauna and flora, among others) testify to the wealth of its resources.

Wet forests, reedy marshes and willow plantations make up a diverse mosaic that is centred around the stretches of still water that were formed from abandoned pit bogs that cover the bottom of the valley, sometimes to a depth of 15m! The ferns of the marshes are the best examples of their kind in the whole of the Ile-de-France region. This species, protected by the regional council, has colonised the ponds in the novel form of "tremblants" that look just like floating rafts of vegetation.

Teals, tufted ducks, reed harriers and black kites all come to the marshes during the course of the seasons. In total, six species of bird are considered to be of interest by the European Union. The most remarkable of these is undoubtedly the dwarf Blongios, a small heron that is in danger of disappearing from the European continent and is the object of a monitoring and conservation programme.

For the local councils, the environmental issue at stake is considerable: to succeed in preserving a living ecological entity in an area in contact with highly populated zones. This presupposes that numerous constraints can be controlled or compensated for, such as opening the area to the public, the decline of farming, splinter development and the increasingly artificial nature of the habitats. The department of the Essonne has decided to take up this challenge through its Conservatory of Vulnerable Natural Areas, with the various people and organisations involved.

The entire valley bottom is today covered with pre-emption zones instituted as part of the "Espaces naturels sensibles" (Vulnerable Natural Areas) programme, and 120 hectares have already been acquired by the General Council. The departmental teams who look after the natural habitats have undertaken major restoration work (including a gradual removal of unauthorised dumps and restoration of the wet meadows and the reedy marshes). The marsh flora can be seen along the botanical path in the domain of the Grande-Ile in Mennecy. Other areas were opened to the public at the beginning of 1999. Moreover, 5 agents who have a role as guardians and guides, complete the protection operation in order to ensure the perpetuity of this priceless natural heritage.

Essonne General Council
Environment Department
Departmental Conservatory of Vulnerable Natural Areas

The valleys struck by the blast of the storm

Philippe Balny
Director
The Green Spaces Agency

Underlined by wooded areas partly covered in poplar groves, the valleys as the rest of the Ile-de-France region were hit by the storm which marked the end of 1999. The storm has left its mark on the landscape in a myriad of places. Breaches have now been made in the line of defence that the woods presented to the pressures of urban development in these vulnerable areas. Lessons should be learned in terms of the renewal and management of tree stocks. Any actions implemented over the coming months, both in the forest areas and in the parks or for roadside trees should address this issue since they are in fact shaping the urban and rural landscapes of tomorrow.

The storm which damaged the Ile-de-France on December 26th 1999 was striking in terms of its violence and geographical scale. Neither its buildings nor the trees were "prepared" to withstand violent winds of the kind usually only found on the tip of the Finistère peninsula.

Wind is an enemy of the forest and prevents its development. Accordingly, it is important to know whether or not such violent winds, perhaps the most violent of the millennium, will occur again in the future and, if so, with what frequency? Once every hundred years? Once every ten years? No doubt as a result of climatic change.

If the frequency is once every ten years then existing forests in northern climates will obviously disappear little by little in favour of low vegetation. If it is centennial, then forests of broad-leaved trees made up of oak trees, beech trees, chestnut trees will be easily perpetuated. Forests of coniferous trees, on the other hand, would be under threat.

This line of reasoning has led to a review of certain forest management practices as a precaution in order to ensure sustainable development vis-à-vis non-negligible risks such as another storm.

Sustainable development is a concept that foresters are especially familiar with since it corresponds perfectly to the correct managerial husbandry of the forest. Trees

are planted for future generations. The forest handed down to them should be conserved or enriched.

The tree is a symbol of life. As such it should not be easily cut.

However, this is rather a utopian vision. During the 20th century, many broad-leaved forests were quite simply destroyed and transformed into large farms. This resulted in the public authorities banning forest clearance. Also, in former farming areas, owners have started to plant coniferous trees and poplars in wet habitats with no regard for natural balance.

Urban developments have also greatly pushed the forest back. Today, however, trees in towns are protected and local authorities are anxious to increase their numbers. Furthermore, a real trend has been emerging in collections of trees from all over the world such as arboreta in landscaped parks created from the 17th century onwards. We are currently measuring the highly uneven resistance of these trees to violent storms.

In this context, we will evaluate the consequences of the storm on the policies that foster trees and forests and offer a few themes for reflection.

Multi-purpose forests withstanding climatic changes of the kind

Traditional forests are copses of tree plantations which feature the timber which is the best adapted to the numerous usages that man has put it to over the ages, i.e. wood for building and industry, heating, hunting, decorative purposes. The variety provided by copses with plantations of trees meets of all these requirements.

Copses with plantations of trees have been transformed into irregular plantations over time and the forest now comprises a patchwork of plots of varied composition. This form also ensures a continuum in terms of the wooded areas to which citizens are increasingly attached.

This type of forest is most common in the Ile-de-France region, notably in the form of private forests highly orientated towards hunting and where successions make the capitalisation of standing woods as regular plantations a random affair.

The wind on these forests cause damage which is difficult to measure economically. For example, what will be the average effect on an annual income of 500F/ha if four years of production are lost due to a freak storm in a forest which has been exploited for a century? Theoretical calculations indicate 4% which is obviously very low and can be totally masked by price rises, or compensated for by the selling the wood which has been blown down.

Furthermore, foresters are also used to processing volumes of fallen wood resulting from localised gusts of wind every year. However, the increasingly serious nature of this storm was precisely due to its non-localised nature which makes the process of selling the wood highly problematical.

It is easy to understand that a different logic applies when dealing with homogenous poplars whose wood is valuable in a forest entirely given over to wood production.

In the context of the Ile-de-France, we should therefore adopt the view that such a catastrophe can be overcome in the majority of situations and will lead to the consolidated management of copses of plantations and irregular plantations.

Homogenous populations highly exposed

Clearly poplars and coniferous plantations were particularly badly damaged.

Poplars are trees which grow mainly on the bottoms of valleys, often as a result of abandoning animal rearing on wet meadows.

Valleys are not naturally sheltered from the wind. They can be more exposed if they are oriented in an east-west direction or can be victims of whirlwind phenomena. Indeed we have seen how sheltered valleys have been swept by crushing winds which have been destructive to the trees than side winds.

The cropping cycle of the poplar in the Ile-de-France region is approximately 25 years. Owners can currently expect income of up to 80-100 000 F/ha. Damage can therefore be very significant if trees are about to mature and owners could be encouraged to take out insurance cover. Given their cropping cycle, poplars would only be really threatened if the likelihood of such a storm returning was once every 15 years. We should therefore take the view that poplars are no more threatened than broad-leaved forests. Indeed they may be less so since owners would be less encouraged to shorten the cropping cycle, a trend which has already been observed.

The same cannot be said for coniferous trees, of which there are already very few in the Ile-de-France. They are generally cropped approximately once every 75 years. They resisted very badly both in homogenous populations or growing with deciduous trees. We can therefore expect a decrease in conifers underplanting.

Toward a sustainable forest management

In strictly ecological terms (preservation and development of the diversity of the fauna and flora), the storms at the end of December 1999 were not entirely harmful. Populations which were not adapted and badly rooted were blown down and have left space in the form of holes or clearings which are beneficial to insects and birds. On the other hand, the disappearance of hollow trees has affected the cavernicolous bird, bat and saprophagous insect populations. The rejuvenation of the forest will also benefit small mammals and pioneering plants. As for the uprooting of large trees, this produces tiny wetlands, attractive to batrachians, insects or water plants. Large mammals such as deer, will also benefit from the regrowth of young trees or bushes which will enrich cynergetic potential but pose regulatory problems.

These few examples show how the different biodiversity parameters are imbricated and how this has led to an increased number of pedological and stational studies on the part of the authorities in order to select the best species and their distribution, the promotion of different areas of forest population. This provides a balance between forestry production, the regulation of fauna, preservation of ecosystems and accommodation of the public.

This information will have to be taken into account by the *Comité de Pilotage sur les Orientations Régionales Forestières pour l'Île-de-France* ordered by the state.

A better knowledge of criteria about trees' resistance

It is difficult to evaluate each species' wind resistance. Wind intensities can vary rapidly and as a result cannot be known at a given point in time. Soil conditions are themselves highly variable. It has been observed, however, that while century-old cedars have resisted particularly poorly, no doubt due to their highly developed boughs, sequoias, with high tops have resisted well.

Numerous species have been introduced into France from the end of the 16th century onwards such as the plane tree, the chestnut tree, the robinia varieties and most of the coniferous trees. However, faced with such a rare phenomenon, it will no doubt be difficult to find a correlation between resistance to wind and the "indigenesness" of individual species. Trees play an important role in the environmental, in towns or in the parks, isolated or in rows. They are carefully looked after and it will be particularly interesting to observe how pruning methods used will affect their resistance to wind.

Trees regulatory protective measures to be preserved

Since the storm, many residents on the edge of forests or parks have been worried about the trees posing a danger. On the periphery of urban areas there is now a real temptation to request local governments officials to cut the trees down. In time, this will result in the edges of the woods receding and new town planning developments.

Trees nevertheless benefit from protective measures including classification as wooded spaces in town planning documents which allows trees, including ones standing on their own, to be protected. Local authorities should therefore take care not only to preserve such protective measures but to replace damaged trees. Replacement could lead to the utilisation of a greater diversity of species on a case-by-case basis, i.e. decorative or exotic trees in parks, fruit trees and local species of trees or shrubs adapted to the soil and climate which are attractive to birds and insects (honey-producing plantations).

Planting techniques to be assessed again

We have seen once again how partly grown trees transplanted in clumps of earth are very fragile.

There is a trend among planners towards planting more and more adult trees in order to accelerate seasonal change. Plantations of this type are increasingly expensive for local authorities.

The storm flattened a great many of them, illustrating that their roots had remained in the clump itself and had not grown down into the earth.

As a result we should examine the most suitable planting techniques which are also likely to be the most cost effective.

'The storm atlas': from photo to map, consequences of the storm effects

To evaluate the scale of the damage to the woods and forests and analyse its consequences on the ecological balance and landscapes of the Ile-de-France region, I.A.U.R.I.F. and the regional government departments concerned (agriculture and forest, cultural affairs, amenities, environment) have combined their efforts to finance an aerial photograph project conducted by the I.G.N. throughout the whole of the Ile-de-France region. I.A.U.R.I.F. has interpreted these photographs and produced a computerised map indicating destruction percentages to an accuracy of one hectare. These projects have formed the basis of an atlas comprising photographs and maps comparing the situation in summer 1999 and January 2000. Since the end of March 2000 it has been available for consultation and use by communes, departments, associations, private landowners and the general public.

A "delicate", accurate interpretation

On January 25th and 26th, exactly one month after the storms at the end of the year, two Beechcraft 200 aeroplanes belonging to the I.G.N. set off from Creil (Oise) to photograph the 12 000 km² Ile-de-France region. In clear weather, at an altitude of 4 800 m, over one thousand photographs were taken at 1/30 000 and developed as 24 cm X 24 cm black and white photographs, each representing a surface area of 50 km².

Five photograph interpretation specialists spent 15 days poring over the pairs of stereoscopic photographs in (3D view). Their first task was to identify the "areas of damage". This involved distinguishing holes in the ground corresponding to fallen or missing trees and assessing which were caused by the storm and which for other reasons.

After the initial interpretation, a comparative study was made with the aerial photographs taken in summer 1999.

These areas of damage were classified in four categories pre-defined in conjunction with the *Office national des forêts* (O.N.F.) (National forest office) and the *Inventaire forestier national* (I.F.N.) (National forest inventory) and corresponding to the national system. It represents the percentage of trees on the ground:

- from 0% to 10% of trees fallen, difficult to identify due to the canopy which obscures fallen trees;
- from 10% to 50% of trees fallen;
- from 50% to 90% of trees fallen;
- + 90% of trees fallen.

To provide a greater level of interpretation, the O.N.F. supplied data on one hundred reference plots of land that had subjected to an "actual field survey", (i.e. *in situ* inspection of the damage). This additional data enabled the photograph interpreters to harmonise their individual interpretations and also their studies of the correlation between the nature of the plots and their ground vegetation. It also enabled a clearer understanding of the quantities of fallen trees, type (trees of the future or not), their species (broad-leaved or conifers), type of damage.

From photo to map

Photographic interpretation was conducted using 36 sets of prints. These were then digitalised accurately following the M.O.S. map (Land use map) which is the reference document used by the *Système d'information géographique de la région d'Île-de-France* (S.I.G.R.) (Geographical information system of the Ile-de-France region). This allows I.A.U.R.I.F. to construct maps which combine other data in the S.I.G.R. (contours for example) or factors specially integrated for the purposes of the project (wind direction, type of ground, species - we already know that poplars and conifers were badly damaged, types of forest population). To ensure that it was entirely comprehensive, the cartography was validated by "ground" specialists (O.N.F. and I.F.N.) and by oblique forward pictures taken during a low altitude flight using a D.R.E.I.F. helicopter.

In addition to providing public authorities and the general public with maps and aerial photos in the form of an atlas, the work constitutes an indispensable basis for quantifying damage (basis for the awarding of damages, means to be implemented for clearing away the fallen wood, localisation, etc.) and reflection on the future of the storm-damaged areas (replanting policy, effects on the landscape, survival of the wooded areas, rules for protection, etc.), in particular when damage is located in areas subject to high levels of urban development pressure or in particularly vulnerable and fragile sites.

Source: Brief official note on the Environment, n° 24 - I.A.U.R.I.F., March 2000

Development in the valleys

Isabelle Chagnot
Research associate

The valleys as favoured places of settlement

Villages characterised by the presence of water

Human activity has been present in the valleys since ancient times. Water is a vital resource for man and has been a major factor in the decision to establish settlements. Three patterns of settlement determined where villages and hamlets were situated:

- close to the river at the bottom of the valley or on the foothills, but situated beyond the first flood line, as is the case in the valleys of the Mauldre, Epte, Loing, Essonne, Juine, Théroutanne, Viosne, Ysieux and Grand-Morin
- at the level of the watershed, on the hillsides; the villages here also had plenty of water available, as can be seen in the valleys of the Yerres, Morbras and Grand-Morin
- on the edge of the plateau. This kind of settlement was often reserved for large farms, which in this way could take advantage of the diversity of land offered by both the valley and the farming plateau. This is the case in the valleys of the Orge (in the area surrounding the plateau of Beauce) and the Théroutanne in the heart of the Multien.

Although water may have been the initial reason for settling, today the way rivers are incorporated into urban areas can vary. A few villages use them in the development of public areas. Landscaped river banks, tree-lined walks and public parks all help to unfold the river landscape. Moret-sur-Loing, Rennemoulin on the banks of the brook of Gally and Crécy-la-Chapelle on the Grand-Morin are all examples of villages where the riverbanks have been landscaped. Others have turned their backs on the river. The banks are lined by private gardens and in villages such as Beynes, Cressay, Maule on the Mauldre and at Boussy-Saint-Antoine on the Yerres, the river can only be seen from a few bridges.

Landscaping the riverbanks in the villages is one way of acknowledging the river and the place of the village in the valley. Any scheme that once again makes the river both accessible and attractive to the inhabitants is to be encouraged. The creation of paths, the planting of trees and flowers and the opening of public parks all help to develop the river landscape. The actions should be integrated in the renovation of the minor elements of heritage as part of a comprehensive project to get it regain its entire value.

Landscaping riverbanks sometimes requires major work. When the river has disappeared underground into pipes it has to be exhumed and reintegrated into the surrounding green breathing areas. Thanks to the determination of the local councillors and associations in the lower Bièvre valley, many projects along these lines are now beginning to take shape.

The historical heritage of the villages

Much of the heritage testifies to the importance water used to have in daily life. The wash houses, which are where the women of the village used to meet, are now but mute witnesses to a life which was organised around water. Some of them are interesting from an architectural point of view. The wash house at Ozouerle-Voulgis in the Yerres valley is worth mentioning. The watermills and their races testify to the industrious life of the valley at a time when the river was a fundamental source of potential energy. They stand out in the landscapes of the Orge and Grand-Morin valleys. The valleys also have many bridges. Some of the older ones are remarkable, such as the Roman bridge over the Yerres, the medieval bridge at Gretz-sur-Loing, Buc bridge on the Bièvre, and Montchauvet bridge on the Vaucouleurs.

The "minor" elements of the valleys' heritage are worth saving or restoring for their historical and architectural value. Several watermills have already been transformed into housing. This is an interesting way of protecting the architectural heritage and using the existing buildings to improve housing in the valley. An original example of how this heritage can be used is to be found in the Mauldre valley, where the Chausserie watermill has been transformed into a velocipede museum. However many others, which are also worth renovating, are in a state of abandon. Thematic discovery visits could be based around the water-related heritage like bridges, wash houses, watermills, fountains and springs.

The new urban developments

The changing population

Housing has existed in the valleys since ancient times. Over the centuries, the valleys have always been sought after as places for leisure. The great domains and the castles which remain are testimony to this. Between the two wars, private housing went through a boom period. At that time the valleys were the main routes along which urban expansion took place, particularly when they had a railway, as was the case in the Orge valley. The pressure remained steady until around 1975, the large increase in the population resulting from the increased mobility of the population. However not all valleys underwent the same changes. Those closest to Paris and its suburbs were the scene of a centripetal development, generally from

the lower toward the upper valley. The smallest were absorbed by the city. The Morbras valley, for example, from being a rural area ended up on the city outskirts. Others developed around a second centre, like Nemours or Etampes in the Loing and Juine valleys. The traditionally built-up areas around the confluence of rivers became a bridgehead for further urban expansion toward the upper valley, as was the case in the valleys of the Grand-Morin, the Viosne and to a lesser degree the Montcient. The upper Théroutanne valley grew rapidly under the influence of Roissy. After 1975 the new towns became the epicentres of most of the growth and the more rural valleys, which until then had been spared from urban development, also began to attract people who were moving further and further from Paris. Even when the initial population was quite small, as in the Epte and Lunain valleys, the growth rate could be high.

Traditional housing and the ways in which it expanded

The proportion of second homes is often very high in the valleys, which is an indication of how popular they are for country homes. Second homes make up almost 12% of the housing in the Grand-Morin valley, 14% in the Epte valley and 25% in the Lunain valley. Nevertheless this rate has fallen dramatically in the 1970s as it has been seen throughout the rural suburbs when second homes became main homes. In certain cases, the large increase in the population has not been accompanied by a similar increase in the urbanised surface area thanks to conversion of second homes and vacant housing.

Nevertheless in most cases, population growth has resulted in an urban expansion of varying proportions on the outskirts of the towns and villages. The impact of this expansion on the valley's landscapes partly depends on the existing housing structure. In rural areas, there are three main forms: housing concentrated within the limits of old fortifications (Chaumes-en-Brie, Rozay-en-Brie), which is typical of the Yerres, Théroutanne, Essonne, Juine, Vaucouleurs and Viosne valleys; linear villages, which can be found in the Epte valley and certain areas of the Essonne and Juine valleys; and the fragmented villages into numerous hamlets that are common in certain parts of the valleys of the Orge and the Grand-Morin.

The deterioration of the valleys' landscapes is related to the kind of housing. With concentrated housing the dangers, which are limited, concern urban expansion that clashes with the landscape. Too many new housing estates spoil the entrance to villages, or are built at the bottom of the valley and sever the visual and functional continuity with the river. In those areas where the villages are linear or fragmented into hamlets, the main risk lies in the fusion of the urban fragments.

What future for a small urban valley? The Réveillon valley in the Val-de-Marne

Compared with the Seine, the Marne or the Bièvre, the Réveillon seems the epitome of a "forgotten" river. This modest brook which cuts through the Briard plateau from east to west, like the Morbras, generates a landscape of hillsides and valleys. From its source at Chevry-Cossigny in the Seine-et-Marne department, to its confluence with the Yerres in the Essonne department, the Réveillon has a total length of 20 kilometres. In the Val-de-Marne, over its 6 kilometres of route, it waters the communes of Santeny, Marolles-en-Brie and Villecresnes.

Although fragile, the valley still has a certain landscape and ecological potential. A breathing space at Villecresnes, a countryside walk at Marolles, the other-worldly atmosphere of meadows and farming enclaves beyond Santeny: the quality of a few developed or simply maintained riverbanks on the Réveillon reveals the advantages of the site.

Preserving this green corridor in the Val-de-Marne, conserving the special features of the landscape which emanate from a brook, rediscovering a "natural" haven, are the issues for a predominantly urban county.

In 1994, the Conseil d'Architecture, d'Urbanisme et d'Environnement du Val-de-Marne (C.a.u.e. 94) drew up, on behalf of the county department for the development of the Val-de-Marne, a landscape diagnosis of the Réveillon valley.

This survey attempted to reveal the valley's entity. It was developed around the following themes:

- the valley's ecological features
- landscape entities
- the advance of urbanisation
- relief and infrastructures
- plant surroundings

The survey opened out onto landscape orientations at commune level.

The valley: a natural potential to be protected and preserved, pedestrian continuities to be re-established

Between Villecresnes and Marolles-en-Brie there is a concentration of problems: arrival in the valley of works on the Tgv interconnection, doubled by the deviation of the RD 33, future widening of the RN 19. These cuts generated by the passage of major infrastructures are affecting the valley's integrity by parcelling off woodlands, nibbling away the last farming areas, removing rural paths or access to the banks.

A new image of the valley is being sketched in with the great cut into the green corridor along the route of the Tgv which will encourage pedestrian and cyclist ramblers: while the Réveillon valley thus becomes accessible from the Créteil leisure activity centre, will the development of this section succeed in healing the cuts in the landscape and generating a new balance? How to conserve the rural and natural cachet of this little valley?

Agnès Bataillon – landscape architect – Caue 94
Survey available at Caue in Choisy-le-Roi

In order to limit the impact of the increase in population within the built-up zones, one must first endeavour to increase the population density in the centres of the rural villages, to renovate vacant and old housing and to build new housing along the existing building line of the old housing. When new neighbourhoods are being built, they must blend in well with the village and with the valley. To achieve this, the existing real estate network should form the basic framework for development and a harmonious choice of architectural styles be made. Maintaining the harmony with the river is also essential. This is not just a question of ensuring that the banks are accessible but also that a sufficient transition zone is maintained between the housing estates and the watercourse.

Preserving green breathing spaces between the urban zones is fundamental to the equilibrium of the valley. With regard to this, the wooded areas, farms and castle parks should be protected.

"Splinter development" (or "moth-eaten land") is more diffuse and more difficult to control and is a common form of deterioration of the hillsides and the bottom of the valleys. Several factors make this land vulnerable to the development of a precarious and spontaneous habitat. First, highly fragmented properties make it difficult to control urban expansion. Secondly, if farming or wooded land is not properly managed, a temporary habitat can also develop which over time tends to become permanent. Private wooded land, disused orchards and abandoned farm land are subject to this. The valleys of the Orge, the Grand-Morin and the Loing are particularly affected by this phenomenon. Aside from the impact on the landscape, the splinter development of the riverside can also limit access to the watercourse.

Combating the splinter development requires not only that good use be made of urban development regulations but also that all of the open land be properly managed. Farming is necessary to avoid a degradation of the environment. As for the private woods, which are often poorly managed or not looked after at all, the local councils could envisage acquiring them for purposes of leisure, ecological management or controlling the spread of wild habitats.

Economic activities

Enterprise zones and commercial estates have multiplied over the last few decades and are now part and parcel of the urban landscape. The valleys have not been spared by these developments, which often clash with their environment. They occupy a large surface area that includes building and parking areas. This kind of development sometimes extends as far as the bottom of the valleys into areas liable to flooding, accentuating the imbalance in water management between the urban and rural areas. As for their impact on the landscape, this is related to how well they blend into

the environment of the area and to the nature of the constructions. The mundane nature of the buildings, combined with a proliferation of hoardings, accentuates the negative impact.

In areas as fragile as the valleys, and in particular along the crests and in the valley bottom, the impact on the environment of any construction must be vetted. The enterprise zones must blend into the landscape both from the point of view of where they are situated and the nature of their design and, together with housing estates, should be forbidden from flood zones.

The impact of infrastructures

The building of road infrastructures has a dual consequence for the valley. At a regional level, they drive urban development; locally, they fragment the land in an often irreversible way. The great railway projects also contribute to this fragmentation, particularly the embankments built for bridging the valley. The impact on the landscape is clearly visible, but the effects on the natural and ecological continuity are also harmful. Often paths are also severed, and without any visual, biological or functional continuity the valleys lose their identity. The Bièvre, the Orge and the Morbras are the valleys most affected by this.

The large bridging infrastructures are not the only ones which are harmful. The building of roads in sensitive areas, especially along the river banks, has resulted in the river becoming isolated from the rest of the ecosystem. Access to the river is no longer guaranteed and the barriers are as much ecological as functional. Added to this are the risks of pollution and flooding due to runoff water and the waterproofing of the ground. The bends of the roads also have a significant impact. Locally they can lead to a loss of farmland or wild areas, and to fresh urban expansion. They are a contributing factor in the loss of structure over the entire valley since, by their sheer number, the combined effects of these barriers are irreversible and cannot be detected at the level of a single project.

The building of new infrastructures in vulnerable natural areas and on the banks of the watercourses must be avoided at all cost. The use of embankments to bridge valleys must be banned because of the fragmentation they cause. When building new infrastructures is absolutely necessary, there are several means that can be employed so that they blend in better with the environment:

- the technical choices concerning the heavy infrastructures. For the Tgv lines there are the examples of the Chalifert viaduct in the Marne valley, the landing stage on the Yerres and the viaduct project for bridging the Ourcq valley (Tgv East)
- the restoration by the most direct route possible of continuities thanks to farm and walking paths and tracks for the fauna
- landscape back-up measures for the local infrastructures (e.g. roads, diversions).

Tourism in the valleys

Extensive assets for tourism

The valleys have several assets for developing tourism:

- the beauty and diversity of the landscapes
- walking paths, and sometimes cycling or horse-riding paths, by which the valleys can be explored. The registered hiking trails in the Brie forests of the valley of the Yerres, the ones in the valley of the Epte and the registered hiking trail 11 in the valley of the Essonne, and so on. Short round-trip hikes have also been marked out, and in the Juine valley there is a cycling tour which follows the watercourse
- an architectural and historical heritage which is both rich and varied. Historic towns (Etampes, Nemours, Arpajon, Dourdan), minor elements of water-related heritage, remarkable farms, fine villages, parks and castles all contribute to making the discovery of the regional heritage interesting
- diverse natural habitats that could be of fundamental educational value, particularly when they are all that remains of the countryside in the urban areas or their outskirts
- water is the main source of leisure activities such as fishing, canoeing, rowing and boat trips. These already exist on the Grand-Morin and Loing rivers.

Assets which are poorly exploited today

The development of these activities is held in check by certain shortcomings:

- the accommodation capacity is in most cases thought to be insufficient to allow tourism to develop. Some valleys, such as the Orge and the Loing, already have enough "green" accommodation (country cottages, guest houses, and riding lodges), although they are often poorly distributed throughout the region
- the walking, cycling and riding paths don't benefit much from the attraction of the river, often due to the fact that the banks of the river are not very accessible. However the Orge valley is remarkable for the unbroken walks that have been created along the river by the association of communes of the upper Orge valley
- the leisure facilities on offer differ from one area to another. Only a few valleys have diversified and attractive leisure activities.

The Loing valley, for example, offers many water-related activities (river tourism, canoeing, sport and recreation parks, fishing). The Juine valley offers varied activities centred around the parks and castles which are open to the public, the regional forests, the recreational park of Etampes and the Saint-Vrain wildlife park.

Given this potential and these shortcomings, tourism and leisure activities should be encouraged and set up in the valleys if these leisure centres don't become overcrowded leisure poles with people from the urban

Is the Croult valley threatened with disappearance?

The Croult valley is situated to the North East of Paris, in the Plaine de France area which extends from the Oise to the Marne and as far as the Goële hills to the North. It remains predominantly agricultural upstream and is urbanised downstream. Pressure from the Paris urban area and the development of nationally and internationally based infrastructures leads to the question of the survival, as a coherent area, of this valley in the outlying suburbs.

The Croult valley yesterday⁽¹⁾: a coherent area

Talking of the evolution of the Croult valley leads one to make a diagrammatic distinction of two periods.

1. A period when the region and its economy were inseparable. It is this symbiosis which is the origin of the identity of the place and which forms a coherent landscape.

The plateau de France was very early to become the capital's grainstore. Villages were established on the hillsides and the Croult valley became specialised in the milling trade: some forty mills were spread along the river. But not all were intended for grinding wheat. From the 13th to the 15th century, the clothing industry was well represented in the valley, particularly at Saint-Denis. Downstream, there were also tanneries, dyeing businesses, laundries.

In addition, a market-garden economy developed in the bottom of the valley, with many watercress farms and the production of seasonal vegetables for the Paris markets.

2. A more recent period where the valley is the outcome of separate objectives which end up in fragmenting the region. The local aspect disappears and with it the coherence of the landscape.

After the 1914-18 war, the centres of interest moved towards the railway stations which punctuated the new railway line between Paris-Lille, the villages doubled in size, moved up onto the plateau. The valley became a Paris suburb, where inhabitants went to work. At the end of the World War II, urbanisation accelerated, occupying indifferently the plateau and the valley, until it filled the whole of the region in its southern section. The installation of Roissy-Charles de Gaulle airport further reinforced the process.

Technical progress made it possible to be free of geography. The rivers, which industrial and domestic uses have transformed into sewers, are covered or canalised, like the Croult between Dugny and Saint-Denis since 1957. With the burial of the rivers was finally lost any perception of the valley bottom, since the waterway no longer manifested itself other than spectacularly and violently by floods.

The Croult valley today, a fragmented region

What reality does the term "Croult valley" encompass today?

To the North, the villages of Louvres, Puiseux-en-France, Goussainville, Le Thillay, still punctuate the valley clearly, with an alternation of built-up areas and open farming areas. But the space which separates the built-up areas, in the bottom of the valley, has been reduced. It often involves deserted places, abandoned since the towns turned away from their founding river.

Making sense of the Croult valley gets more difficult the further one goes down southwards. From Gonesse to Dugny the region becomes suburban. Its closeness to Paris multiplies the means of communica-

tion, the rubbish tips, the industrial areas, on a farming substrata which survives in little patches, like at the confluence of the Croult and the Petit Rosne and in the region of Bonneuil-en-France.

The area for water expansion is being inexorably reduced: the tip at Gonesse has banked up a section of the valley and the one at REP (Routière de l'Est Parisien) is planned to totally fill in a tributary valley of the Croult between Mesnil-Aubry and Bouqueval. Further downstream, between Dugny and La Courneuve, embankment follows embankment in the river's area of expansion.

Projects which are extending current trends

The closeness of Roissy airport is leading to the development of several routes of East-West communication, linking the airport area to Cergy-Pontoise. The Croult valley, located immediately to the West, runs the risk of being permanently de-structured by the road logic which demolishes any obstacle in its path: between Louvres and Goussainville, the "Francilienne" passes through the valley on an embankment, despite the site's landscape importance mentioned in several surveys. Other infrastructures also affect the valley: the BIP, the deviation of the RD 84, the future Cergy-Roissy railway (in one of two route options, not decided to date) will be inserted in the flood-risk area of the Croult between Bonneuil, Garges-lès-Gonesse and Dugny.

Development practices under way in the Croult valley juxtapose compartmentalised logics which divide instead of uniting.

The valley, towards a shared area?

While these major projects for the east of the Val-d'Oise are recorded in the regional structure plan, the valleys of the Croult and the Petit Rosne are also mentioned as experiencing problems linked to the urban runoff. They are intended to remain the natural outlet for surface water. This urgent need for recognition of a water area is perhaps the only element of local reasoning which remains unavoidable. It is indeed in the organisation of the different projects amongst themselves that may be founded a coherent territory, based on water as the common denominator for the whole valley.

Reserving the valley's control to the needs of water retainment would make it possible to link water and the landscape to the benefit of the local communities. For, in this section of the Val-d'Oise which is heavily deprived and accumulates pollution problems, it is clearly evident that the living space of its inhabitants is poorly organised and systematically ignored in any major project.

This is why it is necessary, for each project, to re-evaluate the local scale which is too often to re-evaluate the local aspects which are too often smothered by regional aspects. The valley area must remain a place with uses (recreational, ecological, etc...) and an essential breathing area for this urban density.

Sophie Bourdin – Landscape architect

(1) cf. The watermills of the Croult valley, Jean-Pierre Blazy, in *Vivre en Val-d'Oise*, no. 20. June-July-August 1993.

areas. These fragile habitats must be promoted while maintaining a harmony and balance between tourism, nature and urban extension. From this perspective, tourism should be encouraged along the following lines:

- rural tourism: "green" accommodation, leisure sites that blend in well with the environment, hiking paths
- theme visits and educational activities. The natural habitats of the valleys of the Viosne and the Epte would be ideal for learning about the country. In the Mauldre and brook of Gally valleys water would be the key element, whereas in the Yerres valley the rural buildings heritage (villages, dovecotes, farms) would be the main attraction
- activities should be organised to avoid any common practice conflicts. Fishing, for example, should not be hindered by sporting activities, and in the same way exploring the country should not be disturbed by activities such as mountain biking. To achieve this the various paths should all be properly signposted.

Regulatory texts concerning the development in the valleys

The Schéma directeur régional d'Ile-de-France (Sdrif) de 1994 (The 1994 regional urban development plan for Ile-de-France), based on discussions held in the context of the elaboration of the regional "Plan vert" (Environment scheme), emphasises the importance of the valleys. The rural valleys are defined as areas of landscape where urban development must be accomplished in harmony and respect for the area. Nevertheless, in the outskirts, several of the Sdrif (Regional urban development plan for the Ile-de-France) projects threaten the continuity of the valleys. The infrastructures and urban expansion planned for the Morbras and Orge valleys will add to their disorganisation and fragmentation.

The land use plans at best protect the valley bottom and the wooded hillsides. They do not provide a coherent vision for the area. In-between these regulatory texts, it is at the level of the local communities that the development of the valleys should be discussed. However the local urban development plans, based on administrative boundaries, don't pay sufficient attention to the geography of the valleys. The Yerres valley is the only one which has some kind of coherence, at least for its rural areas, since the perimeter of the urban development plan for Yerres-Bréon corresponds quite closely to the contours of the valley. In contrast, the Orge valley is dealt with by seven separate development plans. This dispersion of policies is not at all conducive to a comprehensive development project.

The acknowledgement that valleys are development entities should be confirmed in suitable texts elaborated with the co-operation of all the local councils.

The regional country parks represent a form of co-operation between the local councils which provides a coherent vision of a territory. Their action could be beneficial for several valleys.

Water management in the valleys

Jackie Poitevin
Research associate

Some aspects concerning the regulations

The watercourses in the small valleys: privately owned rivers

The law concerning water is based on common practice from ancient times. It has been refined by several texts since the civil code of 1804, where appeared the concept of "domaniality" from the Roman law. There are two types of watercourse: those which belong to the state (domanial) and those which don't, depending on whether the land across which they flow belongs to the state or not. By contrast, when surface water belongs to nobody it is a "*res nullius*" that can not be part of private property.

Most of the watercourses in the small valleys are privately owned, except in the lower Grand-Morin valley and a few areas of confluence (the Epte). Half of the watercourse bed belongs to the riverside property owners, which implies that the latter have both rights and obligations which are of great importance in the development of the rivers and their environs.

The riverside property owners must ensure that the banks are looked after, any obstructions removed, the bed dredged and so on. Often, however, given the high cost and the absence of any compensation they no longer fulfil these tasks. The law gives the local councils the right to carry out development or maintenance work and to charge the property owners for the work carried out. However the councils now frequently finance this work and in the small valleys they have formed themselves into in an association for the upkeep of the rivers.

Another consequence of this private ownership is that the banks are privately owned and, in contrast to the public watercourses, walking and fishing are forbidden. Theoretically, the private owners even have the right to close the watercourse and thus prevent any activity on the river. However, the increasing popularity of water-related leisure activities has forced changes in jurisprudence and in the law. The Water Law of 1992 confirms the possibility of using non-motorised transport, on condition that property rights are not infringed.

What the Water Law of 3 January 1992 has changed

The Water Law of 3 January 1992 is the most recent reference law. It defines water as a common heritage of the Nation, to be managed in a comprehensive way and in a spirit of sustainable development, in order to pro-

tect it and hand it down to future generations in the best possible condition. It takes up the old notion of basins (law of 1964), but has two original aspects: it gives a key role to local initiatives and a concerted management. The local authorities can intervene in the development of a basin in matters relating to the upkeep of the watercourse and flood control. It provides a much wider vision, moving from a policy of water protection to one of protecting ecosystems.

Policing the water

On private watercourses, the state conserves its power to enforce law and order in the general interest. Ten ministries deal with water but it is the ministry of the environment and its regional authority (Diren), that co-ordinates all of the measures concerning water. As for policing the water, the ministry delegates this responsibility to the navigation service when the river is navigable, to the local facilities service (Dde) for state-owned watercourses, to the farming and forestry service (Ddaf) for private rivers and to the local social services (Ddass) for monitoring drinking water.

Quality of the water

Water of a high quality is required for use regarding production or leisure activities such as irrigation, swimming and fishing, as well as for maintaining a well-balanced aquatic ecosystem. Even walking loses its attraction if the water carries floating objects or has a disgusting smell.

Unsatisfactory quality of water

Different methods for evaluating the quality of water have been developed. A quality grid was defined in 1971 based on physicochemical parameters and is used to indicate on maps the "standards of quality" and their annual variations. The maps of watercourse quality provide an unsatisfactory picture in most valleys. The water is generally of good quality in the upper basin or at the regional boundary but then deteriorates rapidly. Some rivers, such as the Morbras, the Mauldre, the brook of Gally, the Orge and the Ysieux have water of a particularly low quality.

The sources of water pollution are mainly urban and result from an inadequate or insufficient sanitation system. Improving the water quality is one of the main aims of the local councils and indeed the Water Law of 1992 charges them with improving the sanitation conditions. They must define the public and private areas of sanitation, the areas where waterproofing must be limited and those where specific facilities must be set up to deal with rain water and run-off water. For towns of more than 2,000 inhabitants or where there is an equivalent concentration of industry, the sewerage and water purification systems must be in place by the year 2005; for towns with more than 15, 000 inhabitants the deadline is 2000. For several

years now many river associations have made this their priority, including the Siarvg in the lower valley of the Yerres, Sivoa. in the Orge valley and the association of communes for the development of the Morbras.

Run-off water from the roads must also be dealt with. This is a source of chronic pollution that accumulates from the by-products of combustion, the wear and tear on vehicles and roads, seasonal pollution from the salt used for icy roads in the winter, and accidents.

Controlling farm waste is another major issue for improving the quality of water as it is the case in some rural valleys like the Juine or the Loing. Measures to protect water against nitrates have already got under way as a result of regulatory measures and partnership agreement. They often require that farming practices be modified in order to limit the concentration of nitrates in percolating and run-off water. Specific improvements can be proposed to reduce the effects of run-off water, including hedges, ditches and grassy verges.

Improving the quality of water also requires a good knowledge of the sources of pollution at a catchment area scale. Sanitation plans should be developed, although given the high cost of the sanitation systems a great deal of thought should first be given to how waste can be controlled and how run-off water can be dealt with on waterproofed surfaces. Furthermore, all those who have a role to play in improving water quality i.e. the local councils, factory owners and farmers, should be involved. This is the aim of the Schémas d'Aménagement et de Gestion des Eaux (Sage) (Development Water Management Plan) and also various contractual measures such as the "river contracts", "clean river" contracts and "groundwater contracts".

As for farm pollution, the "ferti-mieux" (fertilise better) contracts are designed to answer this problem. They exist in the Seine-et-Marne department, in the Voulzie valley and the Doue basin.

The quality of the habitats

Physicochemical parameters don't accurately reflect all of the characteristics of the living habitat that is water. Indicators of the biological or piscicultural quality are also required. Few rivers in Ile-de-France are in the salmon-breeding category and the majority don't have a particularly interesting fauna. Only a few stretches of river are still wild, have an underwater plant community with a lotique appearance⁽¹⁾, are well oxygenated and contain species of fish that are registered in annex II of the Habitat directive (River Lamprey, Planer

(1) Lotique appearance: watercourse sections at the speed of the fast water (along the axis of water circulation).

Lamprey, Loach, Bitterling, Bullhead) as it is the case for the Dragon, a tributary of the Voulzie; the Lunain; the Vannetin, a tributary of the Grand-Morin; the Grand-Morin, upriver from la Ferté-Gaucher; the Théroanne upriver; the Petit-Morin upriver; and the Yerres upriver.

The quality of the habitats is important for biological diversity but also for leisure activities like fishing. Some rivers, such as the Viosne and the Vaucouleurs, are potentially good for fish breeding and related activities. Preserving the high quality of the habitats, and more generally the river ecosystems, became a priority with the Water Law of 1992. One way to improve the quality is to revise the methods used to clean rivers and to encourage practices that respect the diversity of the habitats. In relation to the upkeep and stabilisation of the banks, priority must be given to the introduction of vegetation and developments that provide shelter for animals. These techniques are starting to be implemented in some valleys like the lower Orge.

The departmental plans concerning fish-breeding activities have established a fish management policy for the rivers.

Maintaining the quality of subterranean water

Valleys are ideal areas for harnessing drinking water. The quality of subterranean water must be maintained to ensure this activity and until now this has been the case for most of Ile-de-France. However there are dangers, particularly when the subterranean ground water is in contact with surface water, as in the Yerres valley. In the Mauldre valley some catchment points had to be abandoned because of river pollution.

Here again the participation of all those involved is indispensable for ensuring a proper management of the resource. This is the aim of the "Champigny ground water contract" signed in 1997, which concerns in particular the Yerres. Monitoring samples of drinking water and improving farming practices within the catchment areas is an avenue of research worth exploring in the valleys.

Risks of flooding

The risk of flooding is not the same throughout the valleys of Ile-de-France

As a result of its situation around the confluence of the Seine with all its tributaries, the water which passes through the Ile-de-France region has been collected over a territory more than four times its size and the region is therefore subject to major risks of winter flooding. This type of flooding concerns largely the Loing, Yerres and Grand-Morin valleys and is more fragmentary for the Orge or Mauldre valleys and only concern the confluence with the main watercourses in the other valleys. The population density in these areas is one factor that makes them vulnerable to flooding

and leads to damage in housing and business facilities. This is the case for the Loing at Nemours and at the confluence with the Seine, the Yerres downriver from Brie-Comte-Robert, the Grand-Morin near to Coulommiers and at its confluence with the Marne, the Orge from Arpajon right up to the Seine and the downriver section of the Mauldre.

Rainstorms are another cause of flooding. The growing tendency to waterproof the land in urban areas and the disappearance of almost all the embankments has led to an increase in run-off water which accumulates in the lower points of the catchment area, causing temporary flooding that can vary in intensity depending on the land use. Flash floods strongly affect the highly populated areas. In this respect the Bièvre valley has the highest population density with values above 1,000 inhabitants/Km². The situation is similar in the Morbras valley, which is within the urban area, and also the Aubette de Meulan and Vaucouleurs rivers at their confluence with the Seine.

Natural causes aggravated by unsuitable developments

Individual developments don't necessarily have a significant impact on the extent of flooding but in combination can have a catastrophic effect on the valley scale:

- progressive urbanisation in flood zones: the arrival of industrial and commercial activities and the development of transport infrastructures progressively augments the surface area of waterproofed land. Consequently the volume of run-off water increases, exacerbating overflowing and impairing the buffer role of the major bed
- rural developments that reduce the natural retention capacity of soil: cutting down hedges, labouring land slope-wise, the absence of a carpet of vegetation between the main crop fields, turning over the riparian meadows and farming the bottom of the valleys
- work on the riverbeds: dyking, modifying their size, splitting the bends or altering the riverbed, although they may have a beneficial protective effect locally, worsen the situation either upriver or downriver by hindering or accelerating the flow
- not taking proper care of the watercourses and abandoning constructions contributes to the formation of obstructions to the flow of water.

Solutions found

The quantity of water carried by the winter floods is such—4 billion m³ in Paris in 1910—that it is difficult to markedly reduce their effects, even at the regional level. The only way to limit the damage caused by these phenomena is to maintain fields upon which it is forbidden to build and that can act to absorb the overflow. By contrast, the impact of flash floods generally can be moderated within the catchment area of a valley.

Protection against flood-related risks comes under the law of 2 February 1995 relative to strengthening the protection of the environment. This law instituted plans for the prevention of predictable natural risks, particularly those related to flooding. A plan has been elaborated for the lower Orge valley and others are in preparation for the Yerres and upper Orge valleys, among others. These texts limit the possibility for urban expansion in the natural flood overflow fields.

Methods for fighting floods have sometimes been set up. The flow rate of the river Bièvre, which is buried in the lower valley, is divided between several overflows that come out in the Seine. In addition, when required, surface or buried basins can be used to retain part of the rainstorm water. In the upper brook of Gally, open air basins have been created that are integrated into the network of green spaces. In the Orge valley a whole string of flood overflow basins have been built.

This kind of achievement is only possible if the valleys are managed in a consensual manner by the association of communes or new towns. Indeed for these measures to work smoothly it is indispensable that the entire catchment area be taken into account. By contrast, in those cases where there is no general arbitration authority, the prevention of flooding is difficult. This situation still predominates in the valley of the Yerres, where the inhabitants of the upper valley don't understand the justification for flood overflow basins on farm land to allow urbanisation of the lower part of the valley.

Progress must still be made in order to avoid development projects that exacerbate the risks of flooding. Urbanisation on a flood zone must be definitively outlawed. The techniques for the upkeep of the watercourse must be improved and suitable rural developments encouraged (flood overflow zones, meadows liable to flooding, wooded hedges). These practices presuppose a radical change in farming techniques. Innovative means of action, such as the contractual easements, should be encouraged, particularly for dealing with the constraints related to the flood overflow zones. In this situation, a local council could acquire an easement on the land which would give it the right, for example, to temporarily flood a field but would leave management responsibility to the owner.

Only dialogue and negotiation across the entire area of a valley and its catchment area will allow an urbanisation project to be rejected in favour of a submersible field, to maintain grassy verges around a stream, to remove trees that have fallen into a minor river bed or to create temporary storage areas for run-off water.

Toward a concerted management

Looking after the river: a first step toward a more comprehensive management

The regulations hold that riverside property owners must look after the watercourses. This was respected as

long as the expenses incurred entailed a "compensation": firewood, a guaranteed water supply to run a mill, to water the animals or to embellish a prestigious park. Most of these motivations have disappeared, with the result that there is a notable lack of upkeep of certain rivers like the Aubette. In most cases, the associations now take charge of this upkeep.

The upkeep of the river must now be the result of a collective discussion that takes into account sometimes contradictory interests, including protecting the aquatic heritage, stabilising the banks and improving the flow to prevent flooding. The techniques used presently are often outmoded and should be modernised to make them more compatible with a comprehensive management that takes into account both the hydraulic and the ecological constraints.

A leisure activity that is directly involved in river management: fishing

Fishing is an activity that is common on the region's rivers. The law of 1984 established the obligation for fishermen to form themselves into a registered association for fishing and fish-breeding (Aapp). The riverside property owners, who own the fishing rights on their land, can transfer these to an Aapp in exchange for the upkeep of the watercourse. The association would then have right of way.

Fishing is practised on most of the rivers studied and sometimes on the ponds also. The latter were created with a view to diversifying the range of activities possible in the Viosne valley, or after the closure of a quarry in the Loing valley.

The development of fishing requires the protection or indeed the restoration of the fish-breeding habitats, which can be organised and encouraged in certain valleys. However the modifications that are brought about by the growing number of fishing ponds must be monitored in terms of their effect on the landscape of the valley, the flow rate of the watercourse and its quality.

Opening the riverbanks to the public also favours this activity. This can be envisaged thanks to rights of way negotiated with the riverside owner or by the state acquiring certain areas of land at the valley bottom.

The river associations: key participants who can have a federative role

The river associations were generally created to ensure the upkeep necessary to allow the water to flow as quickly as possible down to the main rivers. For some of these associations, such as the association of communes for the upkeep of the banks of the Montcient and its tributaries, this

Plans for the development and management of water: regulatory tools for a concerted management of water at catchment area level

The law on water of 1992 provides for the establishment of development documents corresponding to "stacked" geographical units: Structure Plans for the Development and Management of Water (Schémas Directeurs d'Aménagement et de Gestion des Eaux - SDAGE) and Plans for the Development and Management of Water (Schéma d'Aménagement et de Gestion des Eaux - SAGE), in order to bring in consultation of the parties involved in the water sector. The SDAGE is drawn up and adopted by the Catchment Area Committee, with approval by the administrative authorities. The SAGE is drawn up by a Local Water Commission (Commission Locale de l'Eau - C.L.E.)⁽¹⁾ and after a statutory and public approval process, it is the subject of an order from the préfecture; it is enforceable against town planning documents. The local authorities which are members of a single SAGE can join together in a public corporation: "the Local Water Community".

The Ile-de-France is part of the SDAGE Seine-Normandie approved on 20 September 1996. Its territory has been divided by way of indication into eighteen SAGE perimeters, only two of which, until now, have been initiated: the Mauldre and lower Marne without the Théroutanne valley which did not want to be included; the Orge-Yvette, the Juine-Essonne-Ecole and the Bièvre are the subject of SAGE set-up proposals.

The SAGE for the Mauldre was the first to be launched in the Ile-de-France as, from the mid-80s, the General Council had wanted the sector's water problems to be handled in a coherent manner. A committee for the catchment basin of the Mauldre and its tributaries (COBAHMA) involving 66 communes was set up in 1992 just after publication of the law on water. In 1994, when the scope of the SAGE was fixed and the local water commission constituted with its three sections: regional authorities, State, users, it was the COBAHMA which was put in charge of supervising the surveys needed by the SAGE. The Mauldre CLE was comprised of 16 elected representatives (communes, associations, General Council), 8 "users" (farmers, water producers, fishing and nature associations, etc.) and 8 representatives of the State. The main problems that arose were those of restoring the quality of water, preventing floods, providing drinking water and improving the aquatic environment. 10 specific actions have been recorded in the SAGE and approved on August 19th 1999.

(1) The C.L.E. is comprised of three parts: local councillors, representatives of users and associations, representatives of State departments.

The maintenance of rivers and banks by methods of ecological engineering

The maintenance of rivers and banks consists of different operations: clearing out the river, readjustment, cutting back the water weeds, rectification of banks, etc. These are intended principally to restrict silting, facilitate the flow of water, avoid flooding. But the methods which have been used for many years have led to an artificialisation of the waterways: banks that are steep and even concreted, straightness of waterways, homogeneous speeds of currents. These have had negative consequences, encouraging the erosion and the collapse of banks, the loss of biological diversity, and silting up.

At present, new techniques are being implemented to re-create diversified environments. The development of the banks is at the heart of this problematic. For example, it involves re-creating gentle slopes in order to avoid erosion and encourage the establishment of semi-aquatic plants. Plant life on the banks plays an essential role in their stabilisation. Several techniques of plant engineering use willows

and alders for this purpose. The advantage of plants is also to provide shelters and spawning areas for fish and other aquatic fauna.

This new approach to the maintenance of riverbanks is starting to be implemented in different valleys of the region. The inter-communal association of the lower Orge valley has been working for several years with management methods intended to improve the ecological quality of the environment. The technicians who are in charge of this area are trained in the new techniques. A charter for the ecological maintenance of the banks of the Orge has been drawn up.

In the Aubette de Magny valley, as well as along its tributary the Chaussoy brook, the regional natural park of the French Vexin has signed an agreement for ecological restoration works on the banks with the river association and fishing federation. It is the insertion association *Vexin Insertion Emploi* which has been put in charge of carrying out these works.

Contractual policies for a concerted management of water

Water management simultaneously involves many parties involved in development. Beyond the hydraulic problems, which are already complex, it must take into consideration all the other sectorial policies likely to affect the water cycle (farming, sewerage, water supply, operation of quarries, etc.). Concerted management is necessary in order to take into account the issues and interests of various parties involved, while at the same time keeping the objective of preserving the resource.

In this context, several types of contractual measures, at national or regional level, have already seen the day in the Ile-de-France: river contract, clean rivers contract and water table contract.

The river contracts, when these were initiated in 1981, were intended to locally mobilise the parties involved in the water sector around objectives of river quality. They were followed at national level by the Ministry of the Environment. The procedure was revised in 1994 in order to adjust it to the end-purposes of the 10-year plan for the restoration and maintenance of rivers. Wider objectives were defined: "The river contracts are for the purpose of preserving, restoring and maintaining a river and its ecosystem. For this, they must introduce a balanced management ensuring both the satisfaction of qualitative and quantitative uses of the water, the preservation of aquatic ecosystems, the prevention of risks of flooding, the protection, the enhancement and the development of the water resources, in an outlook of sustainable development." (decree of 24 October 1994).

A contract now corresponds to a programme for the overhaul of a waterway that different partners – institutional financiers as well as public and private owners – undertake to perform. The Ministry of the Environment contributes financially for carrying out preliminary surveys and certain of the programme's actions. The contracts must

always be the subject of a global and concerted procedure, and be exemplary in nature. Priority is given to those which enter into the scope of a Plan for the Development and Management of Water (SAGE).

The upper Yvette valley was the subject of an old-type contract in 1989.

The "clean river" contracts were initiated by the Regional Council of the Ile-de-France in partnership with the Seine-Normandie water authority. Its operations concern the quality of water understood in an overall sense: collection and treatment of waste waters, control of the run-off and de-pollution of rain waters. The contracts cover several years, they can include investment works and accompanying actions such as the operation, administrative, financial or statutory management of the works. The Bièvre, Essonne, Orge and Yvette, Morbras, Viosne, Yerres and Ysieux, have already used this procedure.

The water table contracts are for the purpose of maintaining the quality of underground water tables intended for the supply of water to populations. In the Ile-de-France, the limestone water table of Champigny, located in the Seine-et-Marne and centred approximately on the Yerres, suffers from over-heavy consumption and qualitative deteriorations of agricultural, domestic, urban and industrial origins. A partnership approach has been introduced in order to develop a new way of managing underground water supplies. Objectives for improving knowledge, management and restoration of quality have been defined in agreement with users of the water table. The perceptions, opinions, expectations and recommendations of the latter have added a great deal to the technical surveys carried out in parallel. This led to the signature of a water table contract on 1 July 1997. The contract is financed by the Region, the Water Authority and the Seine-et-Marne department. Twenty million Francs may, to start with, be earmarked for this.

upkeep is of primordial importance. Other associations have specialised in sanitation, although most deal with both aspects.

Their main asset is an in-depth knowledge of their land and the characteristics of their watercourse. They have also gone beyond the strict boundaries of the local council to concern themselves with a linear entity, the river. However the valley is still covered on some occasions by several associations with different policies or interests. In the Yerres valley the association downriver, which is a built-up area, and the one upriver, which is rural, have joined forces in a study group designed to look at the hydraulic problems over the entire valley. In the Orge, the associations of the upper and lower valleys, despite following different policies, have been in discussion with each other to define technical characteristics such as the calculation of the volume of leaked water in the urban parcels.

Some have been forced to widen the scope of their activities and have become key participants in the development of the valleys. They have implemented a series of actions designed to combat pollution and flooding. However they are also involved in restoring the natural habitats, opening areas to the public and creating paths. The associations who are most advanced in the implementation of a comprehensive policy are the association of communes for the lower Orge valley, the association of communes for the upper Orge valley, the association of communes for cleaning up the valley of the Bièvre. Among the most noteworthy efforts, it is worth mentioning the more ecological methods for the upkeep of the banks, the acquisition and opening to the public of land with a view to creating a green network and the management of both the meadows liable to flooding and the wetlands.

The associations have a key role to play in the comprehensive development of the valleys. Their mission should be strengthened with a view to obtaining a better co-ordination between policies, the people involved and the action to be taken. The local councils must be able to rely on them in order to work in the valley at a supra-communal level.

The methodological approach

Isabelle Chagnot
Research associate

The "small and medium-size valleys" study, commissioned by the "Agence des espaces verts" (The Green Spaces Agency) of the Ile-de-France Region had several aims⁽¹⁾. A methodology that could be used for all of the studies of small valleys was therefore established which had several objectives:

- to provide information about the valleys at the level of the region as a whole that might allow comparisons to be made between different parts of the region, since the valley is studied as an entity which is not limited by administrative boundaries
- to use a multidisciplinary approach in the study of the valley in order to define the main problems concerning its development
- to make detailed cartographical proposals for each homogeneous entity that could be used as a basis for discussion on what action local councils should take.

An approach to the valley in its continuity

Valleys are places endowed with a strong identity within the landscape. Paradoxically however, they are rarely considered as development entities. Whereas water management has moved in a very positive way from the river alone to the catchment area as a whole, the question of development remains too confined within administrative boundaries and ignores the geographical unity of the valley.

The originality of the study carried out is to look at the valley in its continuity, a notion which is more geographical than administrative.

The continuity of the valleys is a key element for development for different reasons:

- they are fundamentally important interfaces within the region, particularly between the rural and urban areas
- they are often the main routes of communication (river, rail or road traffic) and urban development axes
- they act as biological corridors through the aquatic habitats that constitutes a river and the plant habitats of the valley.

Acknowledging the existence of geographical entities of development implies taking measures suited to each type of habitat. For example, these can be measures to reinforce the interface role and continuity of public areas in order to preserve vulnerable farm land and wild areas that are under threat.

An in-depth knowledge of the land

A multidisciplinary analysis provides a diagnosis

Valleys form complex sites where the issues are varied and contradictory as well. They are the main routes of communication and urban development, and yet have a concentration of remarkable natural habitats and a heritage of great quality. In order to understand everything that is at stake in the development of the valleys, the studies have analysed the following points:

- urbanism: a study of the land use plans to inform the measures taken on the NC and ND areas
- demography: a study of the variations in population to determine the areas of strong growth and the future risks of urban expansion
- analysis of the landscape: to find those places that are outstanding and must be upgraded
- ecological interest: to determine if measures to preserve or reclaim land are required in order to encourage or limit access to the public
- heritage: a study of the heritage elements that help to make an area attractive.

The interaction of these different elements will provide a definition of the main issues specific to each valley and allow a diagnostic map to be established.

The definition of landscape units and action units

The analysis of each valley is based on the division of an area into homogeneous units, which form the basis for the proposals. These units are delimited after a reconnaissance of the area and correspond to physical and visible limits: land use, topographical breaks, barriers formed by infrastructures and homogeneous landscape entities.

Several levels of proposals

Proposals concerning the entire valley

In order to reinforce the unity of the valleys, proposals concerning all of the valleys are made according to the problems they pose:

- the rehabilitation of the river
- the control of urbanisation
- improving and creating new paths
- the protection of natural areas
- the development of leisure activities etc.

Proposals for each homogeneous section

If one looks more closely, one can see that valleys often have several segments, each with its own characteristics. The problems and issues are different for segments that are urban, very wild, farmed, wooded or evolving and the proposals must be suited to each one. For example, in the valley of the Grand-Morin, it can be distinguished:

- the lower valley as far as Crécy-la-Chapelle: this is an area where urban pressure is very strong, the aim

being to promote the open land at the bottom of the valley in order to create a large green corridor.

- the bends of Serbonne and Guérard: this coherent area of wild land has some of the most beautiful landscapes of the valley; it is a priority segment for the protection of its landscapes.
- Coulommiers valley: this area is characterised by varied landscapes. There is an expanding urban area on the right bank, and a risk of splinter development on the left bank. The aim is to channel the developments to the right bank and elsewhere preserve the wild areas.
- the upper valley: this rural area is subjected less to urban pressure and the main issue is to preserve its rural area from splinter development.

Detailed proposals for each unit

The aim is to make detailed proposals for each unit of homogeneous land before beginning work. Each unit is described by its land use and its classification in the land use plan (Pos), then a proposition is established according to a typology common to all studies:

- woods to be bought and opened to the public: the woods which potentially could be opened to the public have several qualities including their intrinsic quality (landscape, flora, size), their situation (proximity to urban areas, to other recreational areas, buffer zones), and the fact that they are part of a green network
- woods to be preserved in the interest of the landscape: these private woods, which are often poorly managed if at all, are part of the identity of the valley's landscape. These hillside woods, isolated copses and wet forests are not easy to visit
- farmland to be conserved: this concerns the most stable farm land, protected by regulations on urbanism, which are generally situated on the edge of the plateaux. Some, however, are classified as "farmland to be conserved for its landscape and/or recreational interest". This land is situated mainly at the valley bottom or on the hillsides and, together with other elements like woods or rivers, is a feature which contributes greatly to the quality of the landscape
- vulnerable farmland: this vulnerable land is situated on the outskirts of urban areas and is threatened by their expansion, or else is fallow land that has been abandoned at the bottom of the valley. Its protection

(1) Cf. supra. "La vallée, une unité d'aménagement" (the valley, a development entity).

requires that the local authorities put in place a concerted policy, and acquiring the land is an option which might be envisaged. The "vulnerable farmland offering a landscape and/or recreational interest" is the most interesting in the valley and must be rehabilitated or redeveloped

- wet habitats to be conserved: these are the natural habitats that are interesting from an ecological point of view, such as the marshlands and wet forests.

Other areas of land contribute to the overall quality of the valley and are to be conserved such as the castle parks, ponds, leisure facilities, family gardens, public gardens and woods.

A changing methodology

The difficulty was to provide coherent results on valleys with different problems, and so the approaches have been refined as new cases arose.

The methodology has thus changed as the 16 studies of the valleys progressed.

The initial objective

The initial objective was to acquire an accurate knowledge of the land that was potentially interesting in order to act appropriately. Valleys are strategic sites for the development of open land where there can be a clash of contradictory interests: urban development, landscape value, the role as a green link, recreational areas to be opened to the public and wild areas to be protected. Several kinds of action are possible: land control of wooded areas (by acquisition, contractual easement or opening contracts) with a view to opening them to the public or of vulnerable farmland; the creation of green corridors; contracts for opening private land to the public; and implementing measures for the protection of natural areas.

The proposals map gives an overall view of the vulnerable areas in the valley that are to be protected or possibly to be opened to the public.

Multi-criteria analyses that are becoming more complete

The definition of the units and related proposals were mainly determined from multi-criteria analyses, but also from analyses in the field and projects from local authorities.

The multi-criteria analyses, which are based on a good knowledge of the land, concerned the regulations on urbanism, land use, the natural areas, the heritage, the vulnerability of farm land and so on. Little by little this knowledge provided a clearer picture of all of the issues relating to the development of the valleys. The natural habitats were dealt with superficially in the initial studies (the Yerres, the Montcient, the Aubette and the Grand-Morin). However, it quickly became apparent that the ques-

tion of their future was fundamentally important, at which point they became the subject of a much more in-depth study. In the same way, the changing concerns about development lead to greater attention being paid to the question of landscape, particularly the main landscapes at the level of the valley as a whole but also the areas of exceptional interest, how they were changing and the effects of barriers. A more detailed analysis of the landscape of some valleys (Morbras, Orge and Bièvre) is underway.

The marking system for the landscape units

The initial studies adopted a methodology of detailed analysis for each landscape unit according to where it was situated and the interest of its landscape.

Each unit was given a mark according to different criteria that allowed an estimate to be made of its landscape value and its recreational potential:

- criteria concerning its situation: contact with the river—accessibility
- criteria of landscape quality for the open land: atmosphere of the unit—view from a distance—relief—visible pollution—strata of flora
- criteria of landscape quality for the wooded land: quality of the woods—view from a distance—splinter development—diversity of the land.

The sum of the marks obtained for each of the criteria allowed the units to be classified according to their interest and proposals to be made concerning the kind of action to be taken as a priority.

In the valley of the Yerres, for example, this method revealed areas where there was a concentration of units of great interest. These areas now have been given priority in the proposals.

The advantage of this method is on the one hand that it gives a detailed knowledge of the land thanks to the fact that all the units were visited, and on the other hand it provides a basis for the development proposals.

Its main limitation is that it can be quite arduous to use and there is also an inevitable element of subjectivity in marking the units. Only the studies of the valleys of the Yerres, the Montcient, the Aubette de Meulan, and the Mauldre used this marking system.

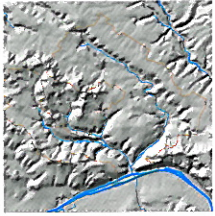
Making the results comparable

The proposals for each landscape unit were entered both into a table and onto a map on a scale of 1/25000. The maps all used the same key so that the actions to be taken were coherent between studies. This coherence between the studies didn't prevent the keys from being adapted for each case, depending on the problems studied in each valley. So, in certain valleys, particular attention was paid to the poplar groves, in others it was the farm meadows, in some the leisure areas and others yet the natural habitats.

Synthèse par vallée

Les vallées étudiées constituent un patrimoine inestimable qui est encore pour l'essentiel bien préservé mais qui se trouve de plus en plus soumis aux pressions urbaines et aux transformations de la gestion des sols. Les 16 études de vallée réalisées ont permis de définir les actions à entreprendre pour assurer une protection et une mise en valeur des espaces ouverts et des berges. Une synthèse de chacune d'entre elles permet de mettre en valeur les particularités.

Crédit



Vallées de la Montcient et de l'Aubette de Meulan

Jean-Jacques Lange
Chargé d'études

Les petites vallées de la Montcient et de l'Aubette de Meulan se découpent dans le plateau du Vexin, au cœur du Parc naturel régional.

Deux vallées qui forment un ensemble

Les vallées de l'Aubette et de la Montcient, bien que de morphologies différentes, appartiennent à un même ensemble géographique. Traversant le plateau agricole du Vexin, elles ensèrent les buttes d'Arthis et se rejoignent au niveau de leur confluence avec la Seine dans l'agglomération de Meulan-Hardricourt. A cet endroit, les vallées sont difficilement perceptibles, l'Aubette est partiellement enterrée. Il est proposé de remettre en valeur la rivière à la confluence, en la découvrant et en l'intégrant au parc qu'elle longe.

Des vallées très rurales à mettre en valeur

Les espaces agricoles sont dominants dans ces vallées très rurales, qui s'inscrivent dans le plateau céréaliier du Vexin. La vallée de l'Aubette, en parti-

Un site de grand intérêt au cœur du Vexin



Golf

Château et parc remarquable

© laurif

culier, marque peu le paysage. A l'amont, la rivière est d'autant moins visible qu'elle est peu entretenue et peu mise en valeur. Par endroits, l'absence de ripisylve est totale. Il est proposé de replanter certains secteurs pour souligner le cours d'eau. Dans le golf de Gadancourt, les berges ont cependant fait l'objet d'un aménagement original. Il serait intéressant de se servir de cet exemple pour mettre en valeur d'autres sites.

Les prairies sont encore présentes dans le fond de la vallée de la Montcient. Le long de la rivière, le moulin de Gaillon à Gaillon-sur-Montcient témoigne du patrimoine rural lié à l'eau.

Meadows can still be found at the bottom of the Montcient valley. Along the river, the Gaillon watermill in Gaillon-sur-Montcient is an example of the rural water-related heritage.

J.J. Lange/laurif



Le château de Théméricourt s'insère dans un magnifique parc traversé par l'Aubette de Meulan. Acquis par le Conseil général du Val-d'Oise, il abrite la Maison du parc du Vexin français.

The Théméricourt castle is located in a magnificent park which is crossed by the Aubette de Meulan. Today property of the Val-d'Oise General Council, it houses "la Maison du parc du Vexin français".

Y. Arthus Bertrand/Altitude



La vallée de la Montcient bénéficie d'un relief plus accentué. La rivière est aussi mieux entretenue sur le plan hydraulique que l'Aubette. Mais deux golfs privés ferment le paysage.

Les pressions urbaines sont assez bien contrôlées. L'existence du Parc naturel régional (Pnr) du Vexin permettra de confirmer cette préservation des paysages ruraux. Un peu plus touchée par les extensions urbaines, la vallée de la Montcient reste cependant mieux préservée que bien d'autres vallées de la région.

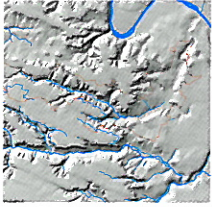
Un réseau de chemins de randonnée pour mettre en valeur le patrimoine

Les vallées de la Montcient et de l'Aubette forment deux axes majeurs de liaison entre le cœur du Vexin français et la vallée de la Seine. Elles représentent des axes paysagers forts sur lesquels il faudrait s'appuyer pour développer des axes de randonnée, déficitaires dans cette partie du Parc naturel régional.

Le patrimoine rural le plus riche se concentre dans les villages. Les itinéraires de promenade proposés s'organisent autour de leur traversée. Dans la vallée de l'Aubette, ils sont plutôt situés en haut des versants. Le passage le long de la rivière offre moins d'intérêt dans la partie amont.

Outre le petit patrimoine lié à l'eau, les vallées de la Montcient et de l'Aubette se caractérisent par des fonds de vallées ponctués de châteaux et de parcs remarquables. Un des plus admirables est le château de Villette qui allie splendeur des bâtiments, beauté du jardin et originalité du site. Le château de Théméricourt, en bordure de l'Aubette, abrite la maison du P.N.R du Vexin.

	Aubette de Meulan	Montcient
Situation (départements concernés) :		
- dans la région	Val-d'Oise, Yvelines	Val-d'Oise, Yvelines
- hors région	/	/
Situation par rapport au Plan Vert régional	couronne rurale	couronne rurale
Nombre de communes	12	9
Population (1990)	15 371 hab.	14 546 hab.
Longueur :		
- en Ile-de-France	22 km	11 km
- totale		
Superficie du bassin versant		
Superficie du périmètre d'étude	12,2 km ²	
MOS (1994) :		
- espace naturel	89,5 %	82,9 %
- espace urbanisé	10,5 %	17,1 %



Vallée de la Bièvre

Françoise Guyon

Architecte-Urbaniste

Seul affluent parisien de la Seine, la Bièvre relie Paris aux grands espaces forestiers et agricoles du sud-ouest de l'agglomération. Elle garde, malgré sa situation périurbaine, un caractère paysager remarquable. Mais, à l'aval, la rivière est depuis longtemps enfouie.

Une vallée riche de son passé

Urbanisée par vagues successives à partir de Paris, la vallée présente des séquences contrastées :

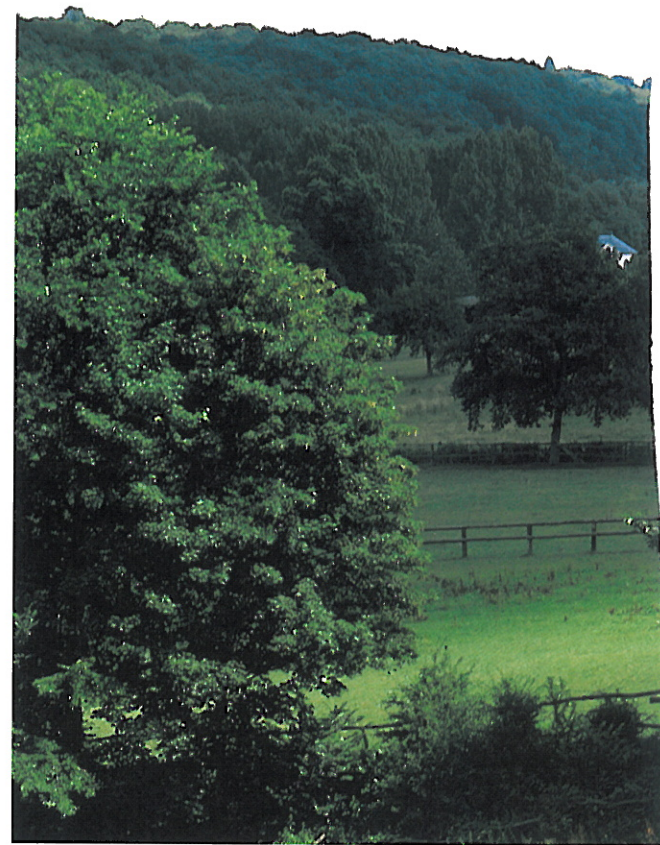
- une vallée aval totalement urbanisée,
- un secteur périurbain qui pivote autour du massif de Verrières,
- une vallée amont à dominante forestière et rurale,
- et à la source, un plateau récemment investi par la ville nouvelle de Saint-Quentin-en-Yvelines.

Elle dispose d'un patrimoine riche et original lié à la présence de l'eau et à la proximité de Paris et Versailles : réseau d'aqueducs, de rigoles, présence de nombreux parcs... Une de ses originalités vient de sa vocation ancienne pour des activités innovantes, souvent liées à l'eau (manufactures royales

des Gobelins et de Jouy, tanneries...), tradition qui perdure au travers de la présence d'un ensemble remarquable de centre de recherche et de formation et d'activités de haute technologie.

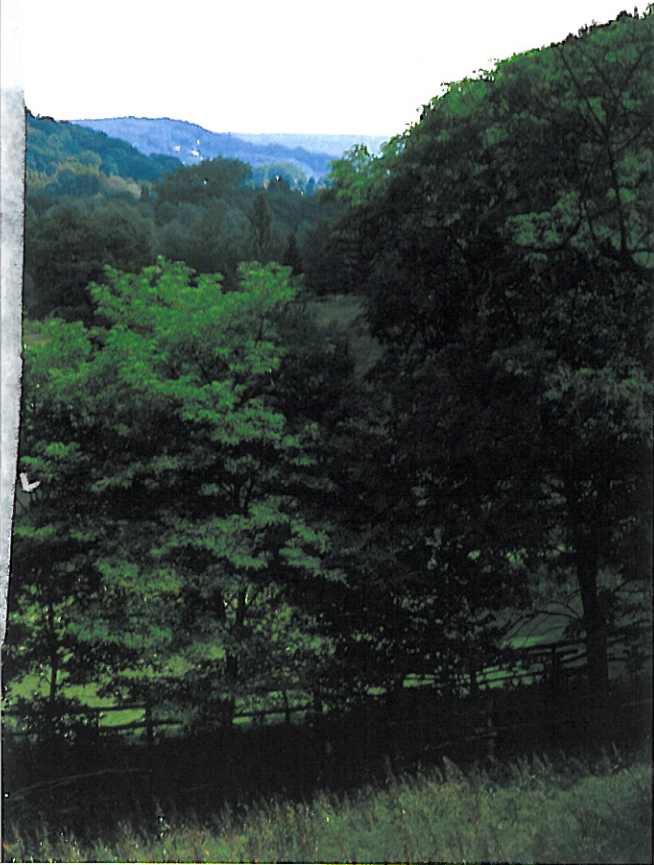
A l'amont, un site paysager et récréatif exceptionnel soumis à des pressions urbaines qu'il faut maîtriser

Située à proximité des pôles de développement importants que sont Saint-Quentin et le plateau de Saclay, la haute vallée de la Bièvre forme une coulée verte boisée où alternent étangs, parcs, cultures et prairies. L'Etat, les collectivités et les associations ont œuvré pour sa protection et sa mise en valeur. Son site est en instance de classement et le Syndicat intercommunal d'aménagement de la vallée de la Bièvre (S.I.A.V.B.) a mené une politique exemplaire de régulation des eaux et d'ouverture des berges de la rivière au public. Ainsi, une promenade de 20 km permettra bientôt de joindre la base de loisirs de Saint-Quentin-en-Yvelines à la coulée verte du sud parisien. Les



acquisitions en cours permettront d'élargir et de diversifier la trame verte ouverte au public. Il reste à mettre en œuvre une gestion plus écologique de la Bièvre et des milieux naturels mais le principal enjeu concerne l'avenir des multiples projets d'infrastructure qui menacent l'intégrité du site.

	Bièvre amont	Bièvre aval
Situation (départements concernés)		
- dans la région	Yvelines, Essonne	Hauts-de-Seine, Val-de-Marne
- hors région		
Situation par rapport au Plan Vert régional	ceinture verte, trame d'agglomération	
Nombre de communes	9	8
Population (1990)	102 650 habitants	212 720 habitants
Longueur :		
- en Ile-de-France	36 km	
- totale		
Superficie du bassin versant	198 km ²	
Superficie du périmètre d'étude		
MOS (1994) :		
- espace naturel	52,4 %	3,4 %
- espace urbanisé	47,6 %	96,6 %



*La haute vallée de la Bièvre
forme une coulée verte
où alternent étangs, parcs,
cultures et prairies.
The upper Bièvre valley forms
a green corridor
where ponds, parks, farmland
and meadows can still be found.*

F. Guyon/laurif

A l'aval, une vallée urbaine à reconquérir

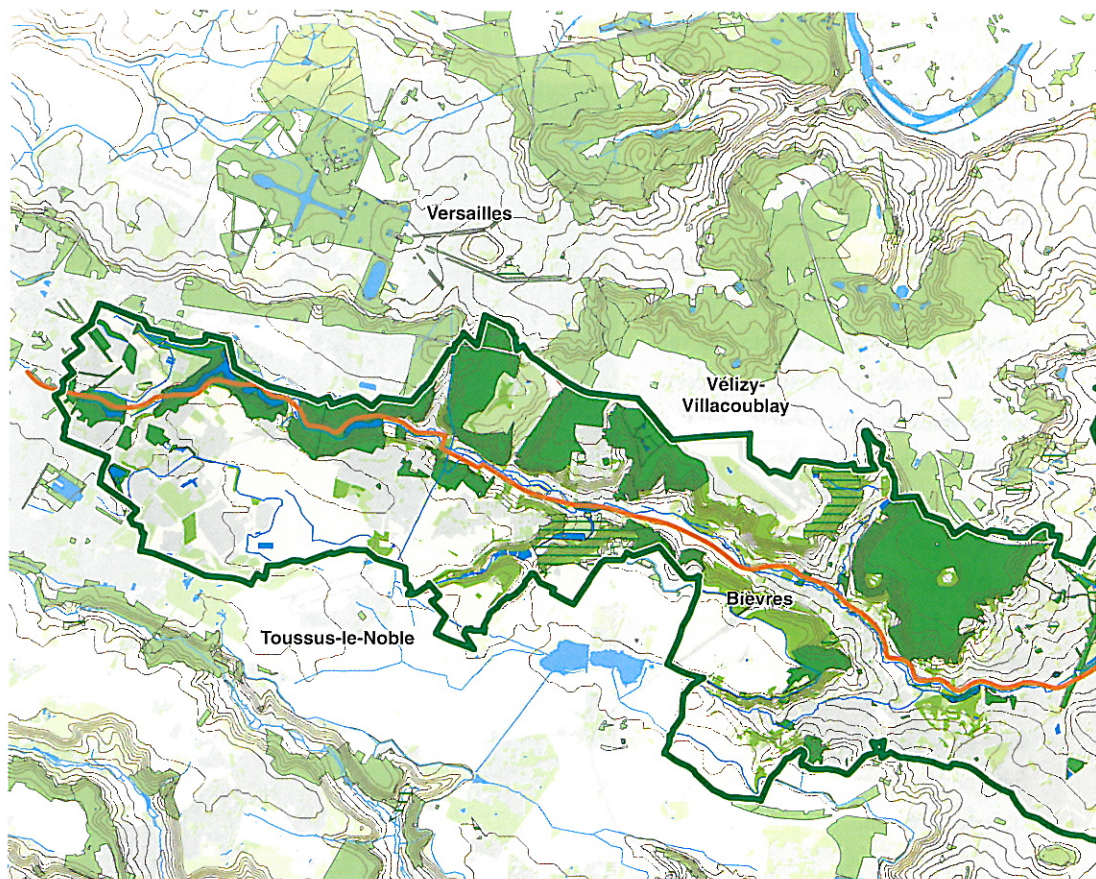
En aval, la rivière a été enfouie au cours des ans et détournée de son cours pour exploiter sa force motrice ou utiliser ses eaux.

L'enjeu dominant de ce secteur est donc de retrouver l'identité de la vallée et de la restructurer autour de sa rivière. Ce qui signifie une réouverture, même partielle de la Bièvre et la redécouverte du paysage de la vallée. Elus, associations et gestionnaires de l'eau travaillent dans ce but depuis de nombreuses années.

Un projet qui concerne l'ensemble du bassin de la Bièvre

Ce projet nécessite, à l'amont comme à l'aval, de prendre en considération l'aménagement et la gestion d'un territoire correspondant à l'ensemble du bassin versant de la Bièvre, et pas seulement à celui des communes qui lui sont directement riveraines. C'est à cette seule condition qu'une démarche pertinente peut être menée pour faire renaître la Bièvre.

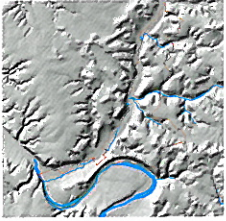
Une coulée verte entre l'agglomération et le plateau agricole de Saclay



espace vert et boisé public ■
promenade de la Bièvre —

0 1km

© laurif



Vallée de l'Epte

Jean-Jacques Lange
Chargé d'études

La vallée de l'Epte s'étend à l'extrême nord-ouest de la région, la rivière servant de limite régionale. La partie francilienne se trouve sur le territoire du Parc naturel régional du Vexin.

Des paysages préservés et une richesse naturelle remarquable

Les paysages naturels de la vallée suivent un schéma assez classique : hauts de coteaux boisés, flancs en culture, fonds de vallées humides. Le tout forme un ensemble harmonieux, dont une grande partie est protégée au titre des sites classés.

Sur le plan des milieux naturels, la vallée de l'Epte compte parmi les plus riches de la région. Les deux types de milieux les plus intéressants des vallées de l'Île-de-France sont représentés de manière remarquable : coteaux calcaires et zones humides.

Les peupleraies sont un autre élément clé de la vallée. Elles forment un motif paysager prédominant, en particulier à l'aval. Les arbres répartis sur des parcelles en bande de différents âges, permettent le développement d'un sous-bois qui offre une diversité floristique plus grande que dans d'autres sites de la région.

La question de la gestion des milieux écologiquement riches est majeure pour ce site. Les milieux humides pas ou mal gérés risquent la banalisation. Prairies humides et peupleraies réclament des attentions particulières pour conserver la biodiversité. Les prairies pâturées sont menacées d'abandon, suite à la disparition de l'élevage extensif. La qualité des milieux en cause nécessite des actions adaptées. Dans ce sens, la présence du Parc naturel régional du Vexin est une chance pour cette vallée car plusieurs opérations sont entreprises pour conforter ses richesses : mesures agri-environnementales, reconversion d'une peupleraie en marais, etc.

Les peupleraies comblent le fond marécageux de la vallée suivant un gradient de densité croissant de l'amont vers l'aval.

Poplar groves cover marshy valley bottom becoming more and more dense from its upper part to its lower sector.

J.J. Lange/laurif

Une vallée encadrée par deux pôles culturels

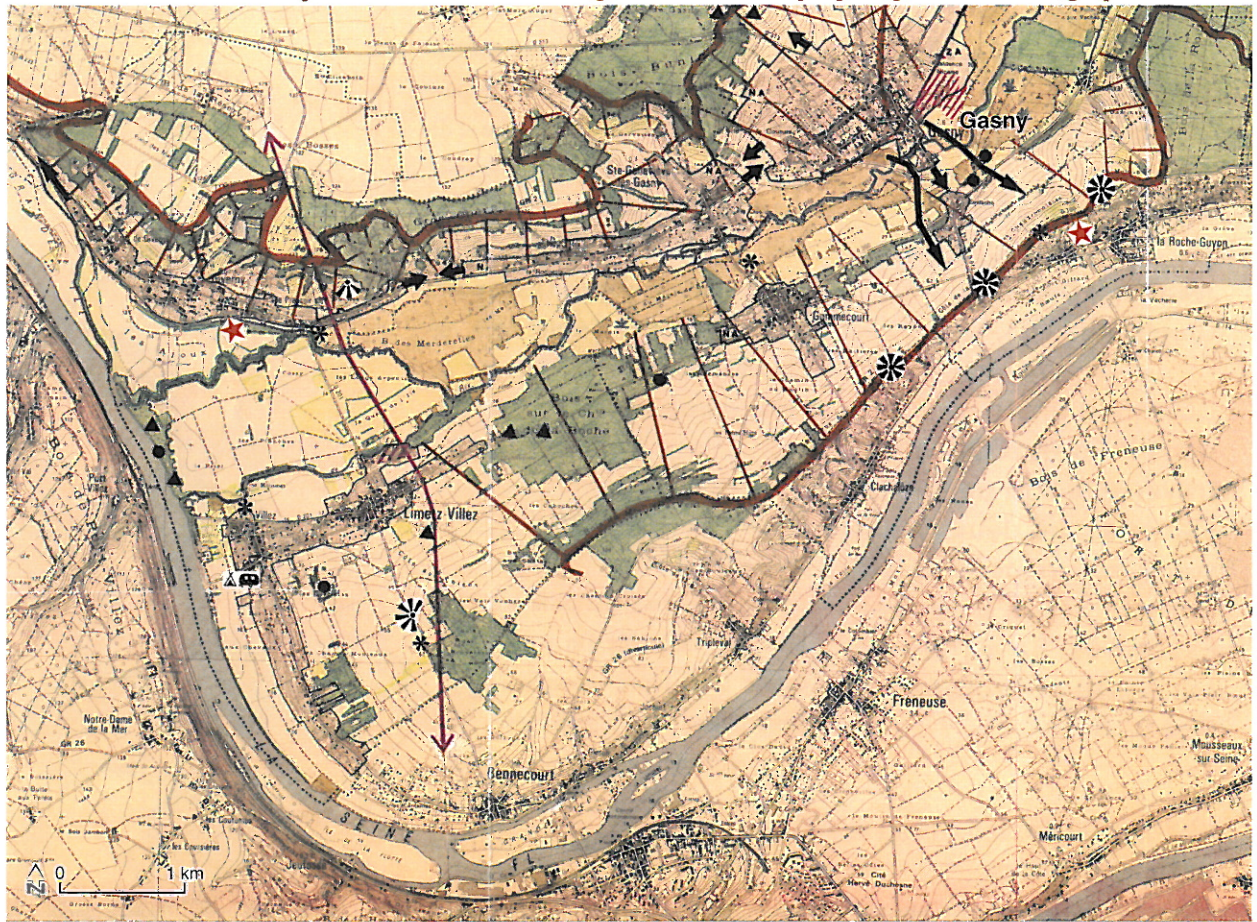
La vallée bénéficie d'atouts tant culturels que naturels pour favoriser sa découverte.

L'attractivité culturelle est un facteur décisif pour sa mise en valeur. Deux pôles remarquables encadrent la partie aval : La Roche-Guyon à l'est et Giverny à l'ouest. Le moulin de Fourges, un peu plus au nord, complète ce triangle d'intérêt touristique qui attire de nombreux visiteurs, étrangers surtout. La vallée de l'Epte, dont les paysages ont été peints par les impressionnistes, est au cœur de ce circuit.

Les milieux naturels, pour leur richesse et leur diversité, pourraient faire l'objet d'itinéraires de découverte. La bonne accessibilité des berges permettrait d'envisager une promenade le long de la rivière ou en fond de vallée.



Vallée de l'Epte : une vallée de grand intérêt paysager et écologique



© Iaurif

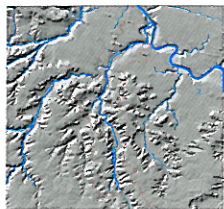
- convexité de versant et pentes
- cours d'eau
- étangs, marais
- bois
- peupleraie en bon état / en mauvais état
- prairie
- zone urbaine et urbanisable
- projet d'extension de la zone d'activité / de la zone d'habitat
- tendance au mitage
- risque de jonction ou d'extension des zones urbaines
- zone à activités dominantes
- voie ferrée abandonnée
- ligne haute tension
- route bruyante N 14
- élément ponctuel remarquable
- élément ponctuel nuisant
- point de vue remarquable
- camping - caravanning
- aire de repos dégagée ou aménagée



Une vallée frontalière

La situation de la rivière comme limite entre deux régions, la Haute-Normandie et l'Ile-de-France confère à la vallée un rôle majeur de liaison. Plus que dans toute autre vallée de la région, les limites administratives devraient s'estomper devant une organisation globale de la vallée. Et surtout une préservation de ses richesses paysagères, naturelles et culturelles. Le classement en site et l'existence du Pnr dans la partie francilienne assurent une assez bonne maîtrise du développement urbain. Mais un point noir subsiste autour de Gasny, dans le département de l'Eure. Une coordination interrégionale est indispensable pour éviter des développements qui perturberaient l'harmonie de l'ensemble.

Situation (départements concernés) :	
- dans la région	Val-d'Oise
- hors région	Eure, Seine-Maritime, Oise
Situation par rapport au Plan Vert régional	couronne rurale
Nombre de communes	22
Population (1990)	10 193 hab.
Longueur :	
- en Ile-de-France	
- totale	117 km
Superficie du bassin versant	1 467 km²
Superficie du périmètre d'étude	11,8 km²
MOS (1994)	
- espace naturel	92,1 %
- espace urbanisé	7,9 %



Vallée de l'Essonne

Jean-Louis Dubois

Chargé d'études

L'Essonne prend sa source dans la forêt d'Orléans et traverse le sud de l'Île-de-France sur les deux tiers de son parcours pour se jeter dans la Seine à Corbeil-Essonnes. La vallée est encaissée et profonde de 60 à 90 m.

Un chapelet de plans d'eau et de zones humides

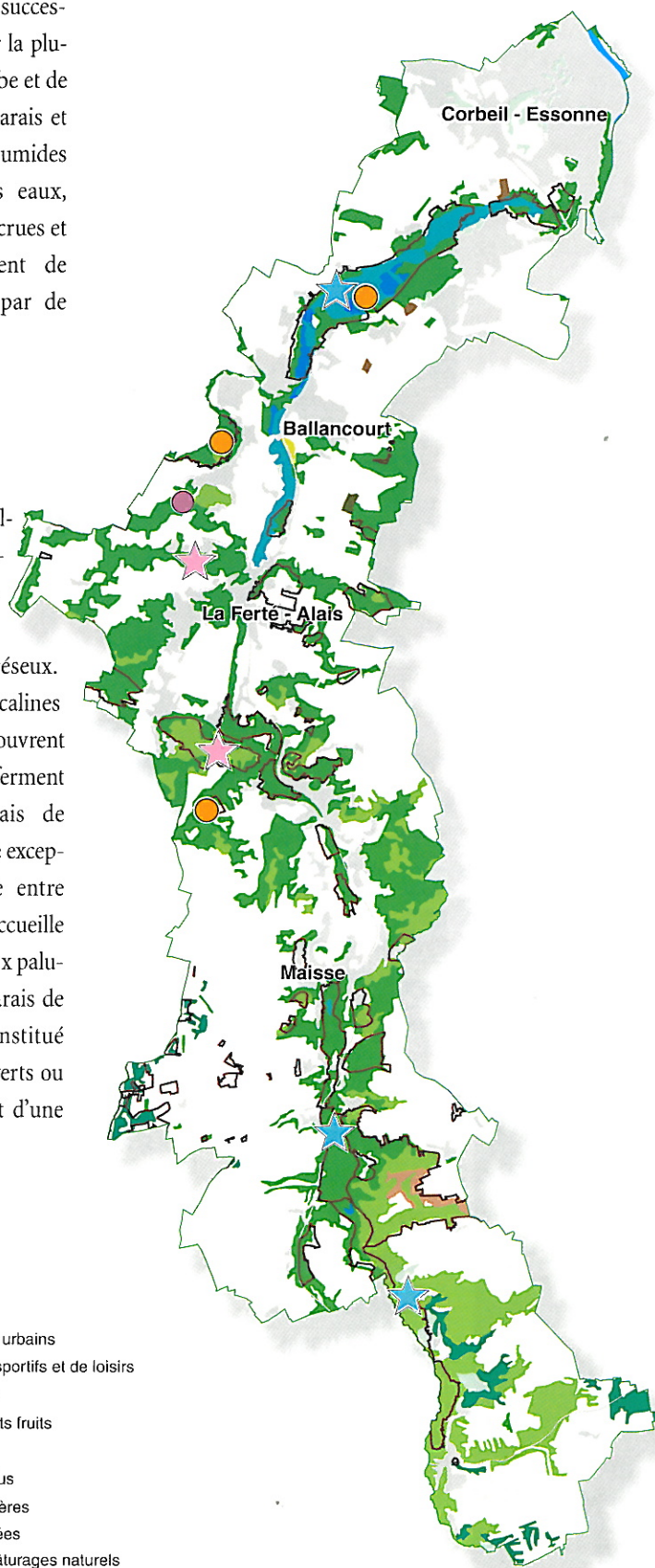
Elle présente des coteaux abruptes coiffés de bancs de grès et des fonds humides souvent marécageux. Jalonnée de moulins, de villages et de bourgs qui alternent avec les cultures et les bois, elle offre des paysages de qualité mis en valeur par plusieurs châteaux entourés de parc. Mais les boisements et l'urbanisation font que la rivière reste peu visible.

Le fond de vallée renferme une succession de plans d'eau, issus pour la plupart de l'exploitation de la tourbe et de l'ouverture de carrières, des marais et des cressonnières. Ces zones humides contribuent au stockage des eaux, ralentissent la propagation des crues et régulent l'étiage. L'écoulement de l'Essonne est ainsi marqué par de faibles écarts saisonniers.

Un patrimoine naturel remarquable

Le patrimoine naturel de la vallée est remarquable. On y rencontre trois types de milieu particuliers : les marais, les milieux calcaires et les chaos gréseux. Les marais et les tourbières alcalines sont d'une grande richesse. Ils couvrent plus de 1 800 hectares et renferment des espèces rares. Le marais de Buthiers est réputé pour sa flore exceptionnelle, la grande roselière entre Prunay et Bruno-Bonneveaux accueille de nombreuses espèces d'oiseaux paludicoles et cavernicoles, et le marais de Fontenay-le-Vicomte est constitué d'une mosaïque de milieux ouverts ou boisés refuge d'une avifaune et d'une flore remarquables.

Des milieux naturels riches et diversifiés



Zone naturelle d'intérêt écologique floristique et faunistique

□ znieff de type 1

Protection réglementaire

○ arrêté de protection de biotope

● réserve naturelle volontaire

Milieux naturels remarquables

★ platières et chaos gréseux

★ milieu humide, roselière

Ecozones

■ tissu urbain

■ espaces verts urbains

■ équipements sportifs et de loisirs

■ terres arables

■ vergers et petits fruits

■ prairies

■ forêts de feuillus

■ forêts de conifères

■ forêts mélangées

■ pelouses et pâturages naturels

■ landes et broussailles

■ forêts et végétation arbusive en mutation

■ marais intérieurs

■ eau

0 5 km

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Les landes et pelouses sur coteaux calcaires, vestige d'anciennes pâtures ou zones d'éboulis, forment des milieux particuliers où l'on rencontre l'Orchidée et la Mante religieuse.

Les chaos gréseux et les platières (affleurement de roches) supportant de mares temporaires, sont constitutifs de biotopes uniques en Île-de-France, refuge d'espèces thermophiles rares (lézards, reptiles, insectes, etc.), autour de Cerny, Vayres-sur-Essonne et D'Huisson-Longueville.

La commune de Fontenay-le-Vicomte a vu des zones humides répertoriées dans les espaces naturels sensibles du département.

Wetlands in the commune of Fontenay-le-Vicomte have been categorised as vulnerable natural areas in the department.

J.L. Dubois/laurif



Situation (départements concernés) :	
- dans la région	Seine-et-Marne, Essonne
- hors région	Loiret
Situation par rapport au Plan Vert régional	couronne rurale, ceinture verte
Nombre de communes	26
Population (1990)	94 515 hab.
Longueur :	
- en Île-de-France	58 km
- totale	90 km
Superficie du bassin versant	1 945 km²
Superficie du périmètre d'étude	27 387 ha
MOS (1994) :	
- espace naturel	84,4 %
- espace urbanisé	15,6 %

Ces milieux remarquables sont d'une grande fragilité. Ils ne pourront se maintenir durablement sans une gestion adaptée et une protection vis-à-vis d'une surfréquentation touristique. Un programme d'acquisition est engagé dans le cadre de la politique des espaces naturels sensibles du département.

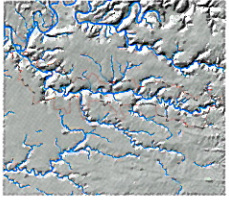
Préserver le paysage

L'occupation du sol de la vallée reste à dominante rurale. Si le plateau est le domaine de la grande céréaliculture, les coteaux et la vallée voient alterner polyculture, pâturage et bois. Dans le fond de vallée une culture spécifique perdure : les cressonnières. Malheureusement cette activité est en régression. Elle reste présente à l'amont, où elle a reçu en 1992 un label «paysage de reconquête» du ministère de l'Environnement.

La variété des paysages contribue à l'attrait de la vallée comme lieu de résidence et domaine récréatif, même

si les bois publics sont peu nombreux (base de loisirs de Buthiers, parc de Villeroiy) et l'accueil touristique encore modeste. Mais cette harmonie est menacée par l'urbanisation qui se développe de manière intensive à partir de l'aval et fait craindre la formation d'un tissu urbain continu le long de la rivière par jonction des villages et bourgs. Le mitage d'un parcellaire souvent très morcelé favorise quant à lui la prolifération de cabanons entraînant une banalisation de nombreux sites.

La vallée de l'Essonne possède de nombreux atouts, pour peu que son aménagement concilie une croissance urbaine modérée, le maintien de coupures naturelles entre les urbanisations, la préservation des zones humides du fond de vallée et des milieux naturels remarquables et le développement des itinéraires randonnées en ménageant des vues sur la rivière et une découverte de la nature à l'exemple du parcours pédagogique de Maisse.



Vallée du Grand-Morin

Jean-Louis Dubois

Chargé d'études

La vallée du Grand-Morin est une vallée longue qui se découpe dans le plateau de Brie, au cœur de la Seine-et-Marne.

Un paysage caractéristique et complexe

La vallée du Grand-Morin forme une entité bien distincte dans le paysage du plateau de Brie. Longue, étroite et sinueuse, la vallée est fortement encaissée dans le plateau. La présence de méandres serrés qui se divisent souvent en chenaux contribue à la complexité du paysage. De l'amont à l'aval, les sites et les paysages sont variés : du plus rural au périurbain en passant par des secteurs de grande qualité paysagère comme les boucles de Serbonne et de Guérard.

Une présence humaine ancienne

La vallée du Grand-Morin se distingue d'autres vallées rurales par une présence humaine forte et ancienne. Depuis longtemps, la rivière a été utilisée pour son énergie mécanique et électrique. De nombreux moulins témoignent de cette activité. La présence de cette énergie a permis le développement de petites industries en fond de vallée. Mais certaines de

ces activités sont aujourd'hui en déshérence. Les bâtiments et installations, parfois abandonnés, tendent à dégrader le paysage de la vallée.

La présence de nombreux villages proches de la rivière concourent aussi à donner une impression de présence urbaine importante, même dans la zone rurale. D'autant plus que ces villages sont souvent éclatés en plusieurs hameaux.

Un des grands enjeux dans la vallée est donc de maintenir des coupures vertes entre les zones d'urbanisation pour éviter que les villages ne se rejoignent. Ainsi, entre Coulommiers et Boissy-le-Châtel, le maintien d'une coupure naturelle est indispensable pour contrer la tendance des deux urbanisations à se rejoindre. Plus en amont, des coupures vertes sont aussi nécessaires autour de Jouy-sur-Morin et la Ferté-Gaucher, dans un espace complexe où l'urbain est fortement imbriqué au rural.

Quatre secteurs, quatre enjeux

Dans la partie la plus urbaine, en aval de Crécy-la-Chapelle, la vallée voit sa fonction résidentielle s'accroître. Néanmoins, le fond de vallée présente d'intéressantes potentialités pour la création d'une coulée verte. L'ancienne branche alimentaire du canal de Chalifert pourrait participer à la constitution de ce réseau vert.

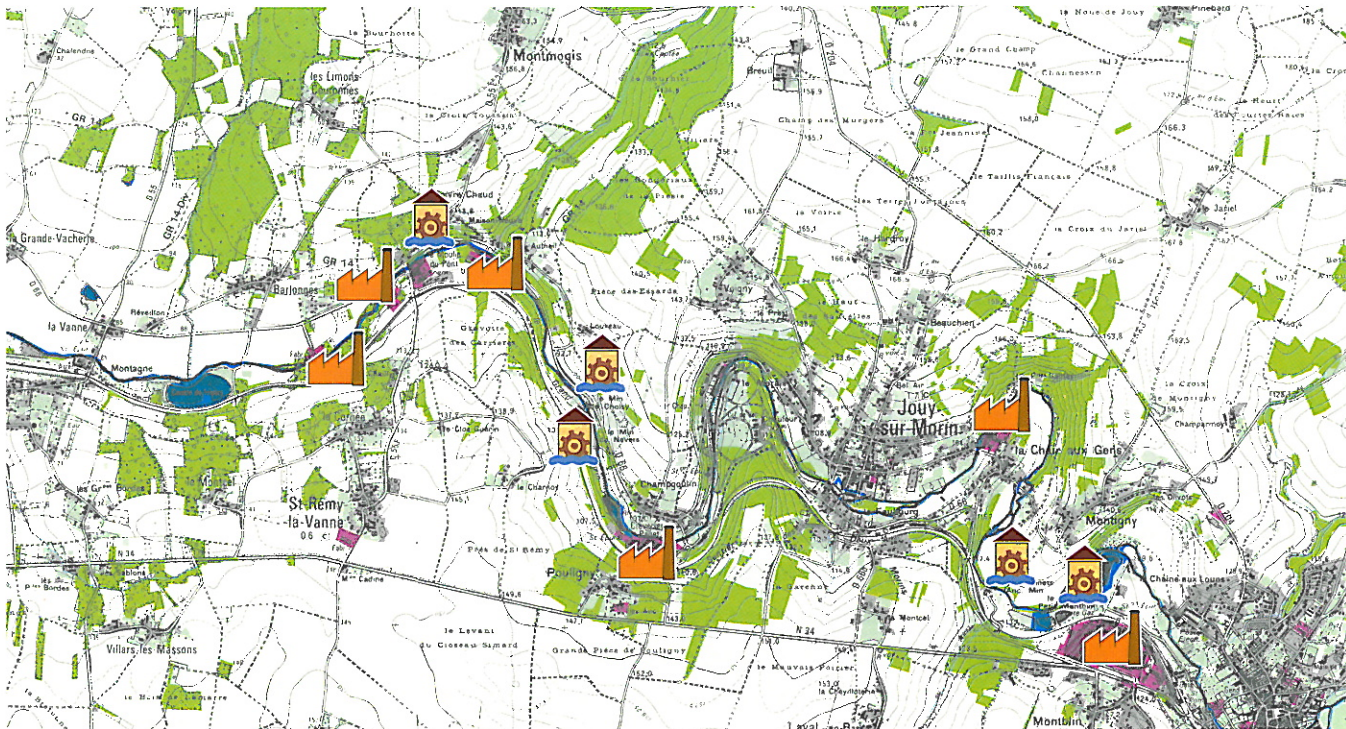
L'habitat briard traditionnel se caractérise par des pignons pointus et des toits à pentes avec ou sans lucarne, recouverts de tuiles plates, et par une forte utilisation de pierre meulière ou du maëllon de calcaire.

Traditional Brie homes are characterised by pointed gables and slanted, flat-tiled roofs which may include skylight and extensive use of millstone or rubble limestone.

J.L. Dubois/launif



Vallée du Grand-Morin : une présence historiquement ancienne



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- espace urbanisé
- zone industrielle
- espace boisé
- culture



Entre Crécy-la-Chapelle et Coulommiers, le Grand-Morin parcourt en boucles un paysage naturel remarquable parsemé de villages, dont il y a lieu de préserver l'identité.

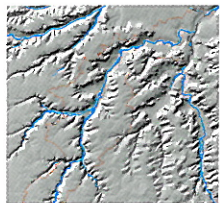
Dans la partie centrale, autour de Coulommiers, la vallée offre des paysages variés convoités par un développement urbain qui nécessite d'être canalisé.

Enfin, le secteur amont, le plus vaste, a conservé un caractère rural marqué, mais des coupures vertes sont à maintenir entre les villages dont l'urbanisation a tendance à se joindre.

De l'aval à l'amont, des cheminements en fond de vallée sont proposés pour valoriser les potentialités touristiques intéressantes mais encore peu développées. La qualité des sites est en effet propice aux activités de loisirs et de plein air. Les loisirs liés à l'eau (canoë, canotage, pêche, baignade) seraient favorisés par le retour à une bonne qualité de l'eau de la rivière.

Situation (départements concernés) :	
- dans la région	Seine-et-Marne
- hors région	Marne
Situation par rapport au Plan Vert régional	couronne rurale
Nombre de communes	27
Population (1990)	55 277 hab.
Longueur :	
- en Ile-de-France	76 km
- totale	119 km
Superficie du bassin versant	1 235 km²
Superficie du périmètre d'étude	28,5 km²
MOS (1994) :	
- espace naturel	85,2 %
- espace urbanisé	14,8 %





Vallée de la

Juine

Jean-Louis Dubois

Chargé d'études

La Juine prend sa source près de Méréville et s'écoule vers le nord entre bois et coteaux. La vallée, verdoyante et humide, offre des sites d'une grande qualité, bien que la rivière reste souvent cachée.

Une vallée d'une grande richesse naturelle, paysagère et patrimoniale

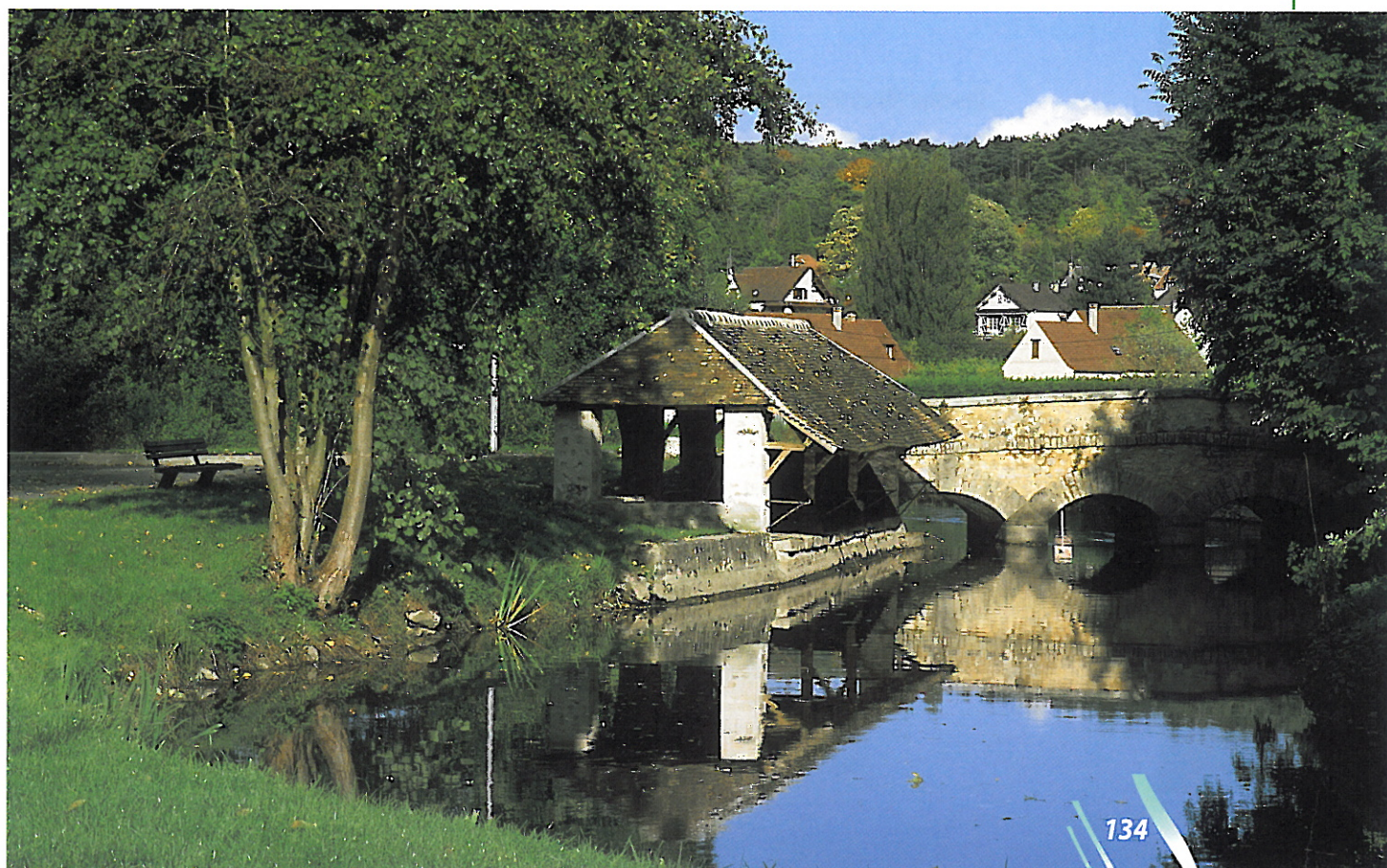
La vallée compte cinq sites géologiques d'intérêt scientifique et des espèces floristiques et faunistiques rares (Orchidées, Mante religieuse, etc.) Les pelouses et coteaux calcaires, les anciennes tourbières, les zones marécageuses, la classent parmi les milieux naturels les plus remarquables d'Ile-de-France. A cet égard, le marais d'Itteville, d'une superficie de 80 ha, est un des plus intéressants. Il s'inscrit dans une succession d'étangs et de marais disséminés le long de la vallée. Les villages, les bourgs et la ville d'Etampes possèdent un patrimoine historique et architectural de qualité (églises, moulins, ponts, architectures civiles...), auxquels sont associés plusieurs grands domaines, avec leurs châteaux et parcs. La plupart des parcs sont protégés, certains sont ouverts au public. Ils concourent à l'attrait récréatif de la vallée.

Tandis que le plateau est le domaine de la grande céréaliculture, le fond de vallée conserve une culture spécifique, celle du cresson. Les principales cressonniers sont implantées à l'amont. Elles nécessitent une eau de grande qualité et génèrent localement un paysage original, qui tend malheureusement à disparaître en raison des difficultés économiques que rencontre cette activité.

A Ormoy-la-Rivière, site inscrit et classé, la qualité des espaces naturels et paysagers incite à préserver les zones humides de fond de vallée, d'empêcher les bourgs de se rejoindre en délimitant des coupures vertes.

At Ormoy-la-Rivière, a listed and classified area, the quality of its natural spaces and landscapes calls for the preservation of the wetlands at valley bottom as well as maintaining green breathing areas between villages to prevent them from converging.

J.L. Dubois/aurif



De grandes potentialités pour la découverte du patrimoine et les loisirs de nature



Une vallée de qualité à préserver

La vallée de la Juine est un bon exemple de site naturel et paysager dont il faut préserver l'harmonie, d'autant que les menaces de dégradations sont déjà pressantes.

Le développement urbain est intense à l'aval. Les villes et villages tendent à se rejoindre, risquant de conduire à la formation d'un tissu de banlieue.

Une urbanisation incontrôlée conduirait à un appauvrissement des paysages et des biotopes, comme du cadre de vie.

Il importe donc de protéger les zones humides, de conserver la continuité de l'espace naturel et de maîtriser le développement urbain en maintenant des coupures vertes entre les villes et villages pour empêcher leur jonction.

La préservation des milieux naturels remarquables est un enjeu primordial. Pour prévenir les risques de banalisation ou de surfréquentation, le Conseil général de l'Essonne a engagé un programme d'Espaces naturels sensibles, qui permet d'assurer à la fois la protection, la gestion et la valorisation pédagogique.

La vallée de la Juine est propice à un développement des loisirs de plein air dans le respect du patrimoine naturel et des sites. La variété des

Monuments Protégés

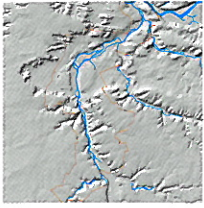
- architecture religieuse
- architecture civile
- architecture militaire
- petit monument
- vestige archéologique

Parcs et Forêts Publics

- parc de château
- espace boisé
- base de loisirs
- parc animalier
- ★ jardin remarquable
- site classé
- site inscrit
- tissu urbain

itinéraires de promenades à pied, à vélo ou en VTT, la pratique de l'escalade et de la pêche, les parcs et châteaux ouverts au public, la présence de trois forêts régionales (Etréchy, Saint-Vrain, Cheptainville), d'un bois départemental (Chamarande) et d'autres bois communaux, ainsi que deux pôles touristiques (base de loisirs régionale d'Etampes et parc animalier de Saint-Vrain) contribuent à une offre de loisirs diversifiée, dont il y a lieu d'améliorer la cohérence. Il est proposé d'étendre les possibilités de promenade en bord de rivière pour rapprocher la population de l'eau, de parfaire le réseau des itinéraires de randonnée en assurant les continuités manquantes et de développer l'accueil du public à l'amont encore peu équipé.

Situation (départements concernés) :	
- dans la région	Essonne
- hors région	Loiret
Situation par rapport au Plan Vert régional	couronne rurale
Nombre de communes	18
Population (1990)	56 087 hab.
Longueur :	
- en Ile-de-France	45 km
- totale	51 km
Superficie du bassin versant	758 km²
Superficie du périmètre d'étude	25,1 km²
MOS (1994) :	
- espace naturel	86,5 %
- espace urbanisé	13,5 %



Vallée du Loing

Roger Chaix

Architecte - urbaniste

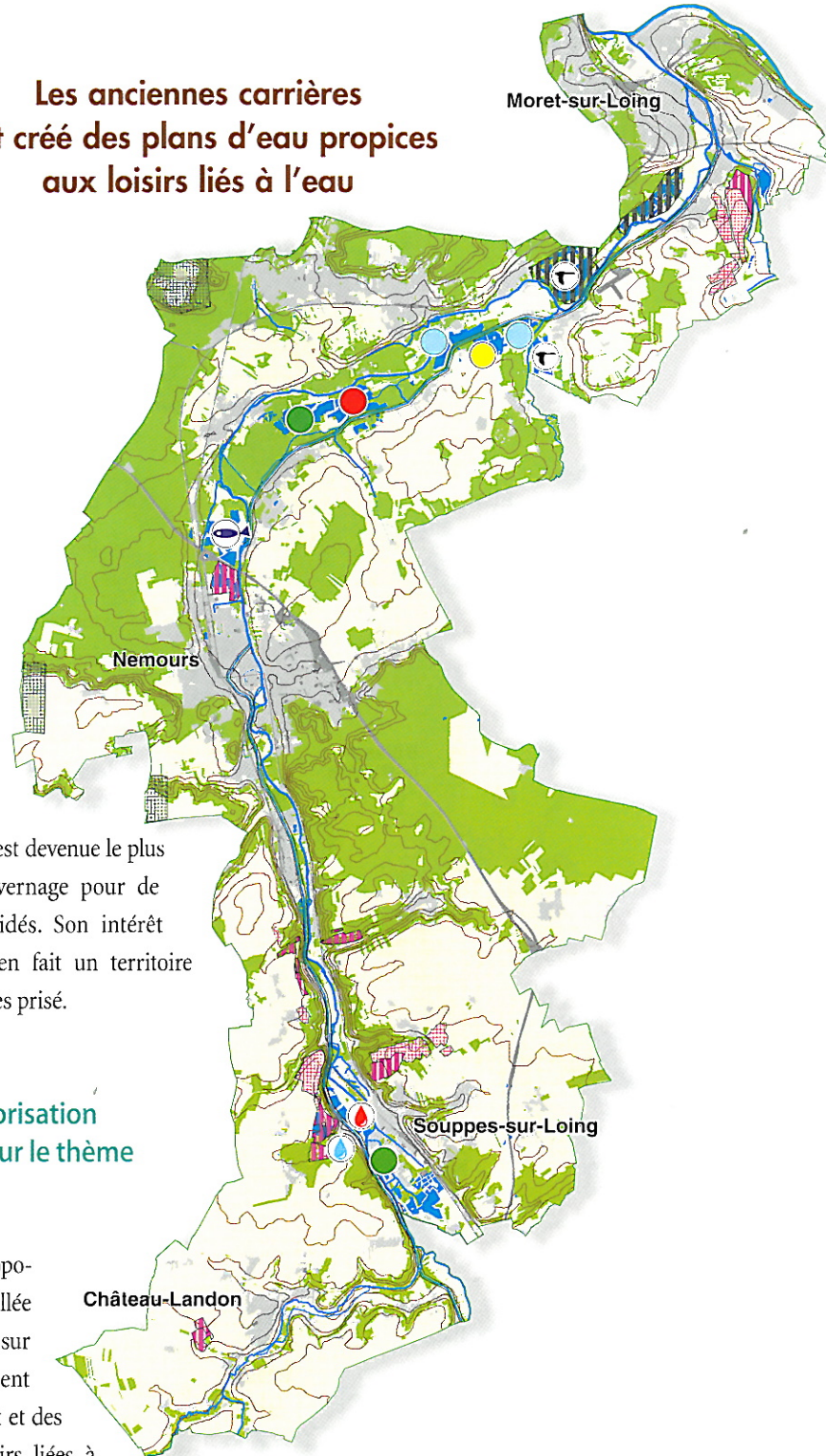
Le Loing prend sa source dans l'Yonne et vient se jeter dans la Seine à Saint-Mammès. La vallée traverse les zones rurales et forestières de la Seine-et-Marne au sud de la forêt de Fontainebleau.

Des éléments paysagers naturels, riches et variés

Eloignée de l'agglomération parisienne, la vallée du Loing est restée très naturelle. Son principal atout est la richesse et la diversité de ses milieux naturels et de ses paysages. Les espaces boisés sont une composante dominante de son environnement. Plus d'un tiers de l'occupation du sol est constitué de bois, dont une grande partie appartient à de grands massifs boisés ouverts au public. Ce site réunit aussi les deux types de milieux les plus remarquables des vallées : zones humides de fond de vallée et coteaux calcaires.

Mais ce qui fait son originalité, c'est la présence de nombreux plans d'eau, issus de l'exploitation ancienne des carrières. L'exploitation des granulats a profondément modifié la vallée, au détriment des prairies humides et des forêts alluviales. La perte de certains types de milieux naturels a été contrebalancée par la progression d'une autre forme de richesse écologique. Les plans d'eau artificiels ont peu à peu été colonisés par les oiseaux. La

Les anciennes carrières ont créé des plans d'eau propices aux loisirs liés à l'eau

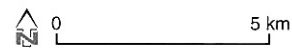


vallée du Loing est devenue le plus grand site d'hivernage pour de nombreux anatidés. Son intérêt ornithologique en fait un territoire d'observation très prisé.

Vers une valorisation touristique sur le thème de l'eau

La principale proposition pour la vallée du Loing repose sur un développement du tourisme vert et des activités de loisirs liées à l'eau. Elle bénéficie de plusieurs atouts pour ce type de projet :

- il s'agit d'un pôle très complémentaire de la forêt de Fontainebleau, toute proche et très visitée. Le site de Fontainebleau est surfréquenté et un site de loisirs sur la vallée du Loing permettrait de desserrer un peu cette pression ;



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Source : Iaurif - Drire - Unicem

Fonction des plans d'eau	
haute valeur écologique à protéger	
traitement antipollution	
traitement antipollution - potentialités d'ouverture	
zone de loisirs existante	
zone de loisirs à aménager	
potentialités d'ouverture pour les loisirs	
zone de loisirs - potentialités d'extension	
plan d'eau pour la pêche à mettre en valeur	
autre fonction	
Carrières abandonnées	
calcaire lacustre	
sable et gravier, sable industriel	
Carrières autorisées	
calcaire lacustre	
sable et gravier, sable industriel	

Situation (départements concernés) :	
- dans la région	Seine-et-Marne
- hors région	Yonne, Loiret
Situation par rapport au Plan Vert régional	couronne rurale
Nombre de communes	18
Population (1990)	51 435 hab.
Longueur :	
- en Ile-de-France	35 km
- totale	136 km
Superficie du bassin versant	4 250 km²
Superficie du périmètre d'étude	22,1 km²
MOS (1994) :	
- espace naturel	85 %
- espace urbanisé	15 %

*Le développement de nouveaux plans d'eau artificiels
lié à l'exploitation des sablières a modifié l'espace rural.*

*Ceux-ci sont pour la plupart inaccessibles
car privés ou réservés au seul usage de la pêche,
comme ici à Souppes-sur-Loing.*

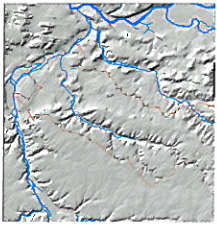
*The development of new artificial lakes associated
with the operation of sand quarries has changed
the rural landscape. They are mostly inaccessible
because they are either private or used for fishing only,
as in Souppes-sur-Loing.*

R. Chaix/aurif



- de nombreuses potentialités de loisirs existent, notamment grâce à la présence de plans d'eau et de la rivière, pour des activités nautiques. La mise en valeur par ce type d'activité permettrait de réhabiliter les carrières à l'abandon. Il serait pourtant nécessaire d'avoir une vision d'ensemble des aménagements possibles à l'échelle de la vallée, d'une part pour assurer la complémentarité et non la concurrence des usages, d'autre part pour préserver éventuellement des sites d'une richesse biologique remarquable ;
- la vallée comporte des pôles patrimoniaux de grande valeur. Les villes de Nemours et Moret-sur-Loing attirent déjà de nombreux visiteurs ;
- les intentions des communes à travers les schémas directeurs locaux vont dans ce sens.

L'approche globale de la vallée, la coopération entre les communes et le développement de l'offre en infrastructures de loisirs seront nécessaires pour mettre en œuvre cette proposition.



Vallée du Lunain

Roger Chaix

Architecte - urbaniste

La vallée du Lunain, affluent du Loing, est une petite vallée rurale du sud de la Seine-et-Marne. Le Lunain arrose le bocage gâtinais.

Un caractère rural et naturel à préserver

Située en dehors des grands axes de communication et de développement, la vallée du Lunain a conservé son caractère rural. Le paysage est formé d'une alternance de bocages, étangs, champs et bois. La variété de ces paysages en fait une vallée «miniature» où se concentrent des éléments paysagers remarquables.

L'hydrologie du Lunain en fait une rivière semi-permanente à l'amont. Cela a des conséquences à la fois sur l'agriculture et les milieux naturels. A l'amont, les terres labourées s'étendent dans le fond de vallée. Mais l'élevage, surtout ovin, reste encore très présent. Cela permet un maintien de l'entretien de l'espace et la préservation du caractère rural de la vallée qu'il faudrait poursuivre dans le cadre d'une politique agri-environnementale. Les prairies pâturées sont plus présentes à l'aval de Lorrez-le-Bocage. C'est aussi dans cette partie de la vallée que l'on trouve les milieux naturels les plus intéressants, car l'hydrologie

de la rivière permet le maintien des prairies humides de fond de vallée, bordées de saules têtards.

La vallée du Lunain est en effet très riche du point de vue écologique. Prairies humides et coteaux calcaires participent à sa qualité. A noter également le milieu exceptionnel du marais d'Episy. Cependant, l'abandon des prairies humides commence à perturber l'équilibre biologique. Le maintien de l'activité d'élevage est essentiel pour préserver le caractère de la vallée. Les enjeux principaux de la vallée se situent dans la sauvegarde des richesses paysagères et écologiques. Les coupures et liaisons vertes doivent être maintenues entre les urbanisations. Les mitages des espaces naturels et les urbanisations linéaires qui coupent ces espaces sont à proscrire.

Situation (départements concernés) :	
- dans la région	Seine-et-Marne
- hors région	Yonne
Situation par rapport au Plan Vert régional	
couronne rurale	
Nombre de communes	15
Population (1990)	7 279 hab.
Longueur :	
- en Ile-de-France	26 km
- totale	45 km
Superficie du bassin versant	270 km ²
Superficie du périmètre d'étude	20,1 km ²
MOS (1994) :	
- espace naturel	94,9 %
- espace urbanisé	5,1 %

L'hydrographie

particulière au Lunain

nécessite la création de passerelles à côté d'un gué.

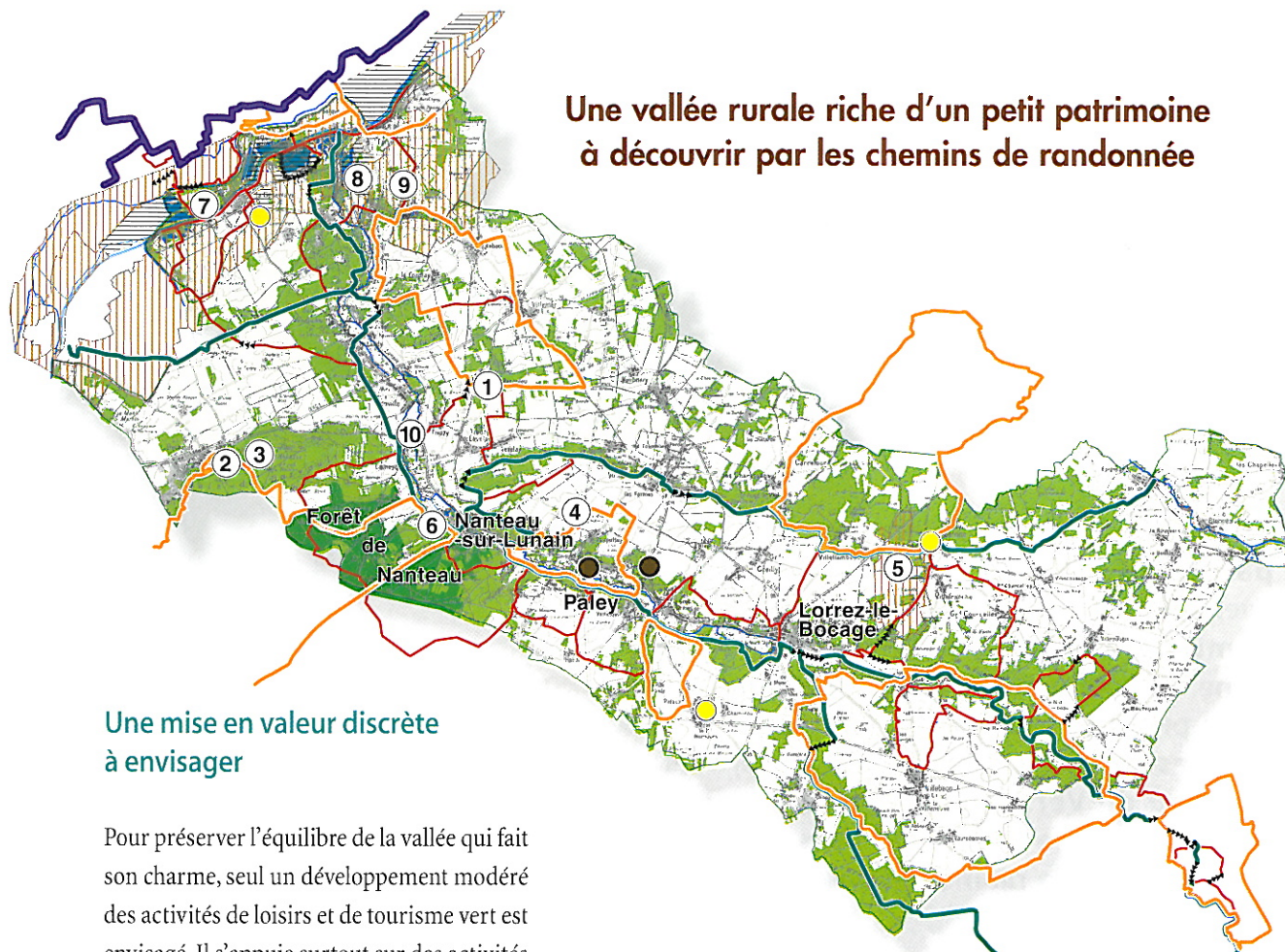
Specific to the Lunain, hydrography

calls for the creation of footbridges next to a ford.

R. Chaix/aurif



Une vallée rurale riche d'un petit patrimoine à découvrir par les chemins de randonnée



Une mise en valeur discrète à envisager

Pour préserver l'équilibre de la vallée qui fait son charme, seul un développement modéré des activités de loisirs et de tourisme vert est envisagé. Il s'appuie surtout sur des activités liées à la nature permettant de découvrir la vallée. La randonnée est l'une des principales formes de valorisation possibles. Des itinéraires pédestres, équestres ou cyclistes sont à développer sur des cheminements adaptés. La présence de points de vue intéressants sur l'ensemble de la vallée est à valoriser dans ce cadre. La présence de la forêt domaniale de Nanteau est aussi un atout pour l'aspect récréatif de la vallée, mais il faudrait envisager l'ouverture d'autres forêts au public.

Le patrimoine est un autre aspect de la mise en valeur du site. Le petit patrimoine lié à l'eau peut constituer une trame pittoresque pour la découverte. Mais il existe aussi un certain nombre de châteaux à découvrir, qui bien que privés, contribuent à la richesse historique de la vallée.

Les aménagements doivent être adaptés à la fréquentation souhaitée. Ils peuvent être plus denses au confluent avec le Loing, en particulier pour les activités nautiques.

site classé

site inscrit

Monument

architecture religieuse

vestige archéologique

tuilerie de Bezauleu - patrimoine bâti ①

sablère de Darvault ②

patrimoine naturel et patrimoine géologique ③

carrière du bois de l'Abbesse - patrimoine naturel ④

menhir de Pierre-Fille: patrimoine historique ⑤

château de Chéroy-sur-Seine - patrimoine bâti ⑥

château de Nanteau-sur-Lunain: patrimoine bâti ⑦

bois des Bauges: patrimoine naturel ⑧

marais d'Episy: patrimoine naturel ⑨

vallées aux ânes: patrimoine naturel ⑩

les Grands-prés: patrimoine naturel ⑩

Cheminement existant

itinéraire de grande randonnée pédestre balisé (GR)

circuit pédestre de petite randonnée décrit mais non encore balisé (AHVOL de A à F)

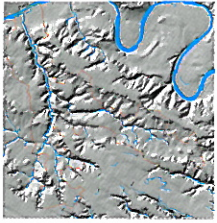
Cheminement proposé

grand itinéraire à mettre en valeur sur chemin existant

petit circuit à mettre en valeur sur chemin existant

proposition de création de chemin

0 5km



Vallées de la Mauldre et du ru de Gally

Bernard Cauchetier

Chargé d'études

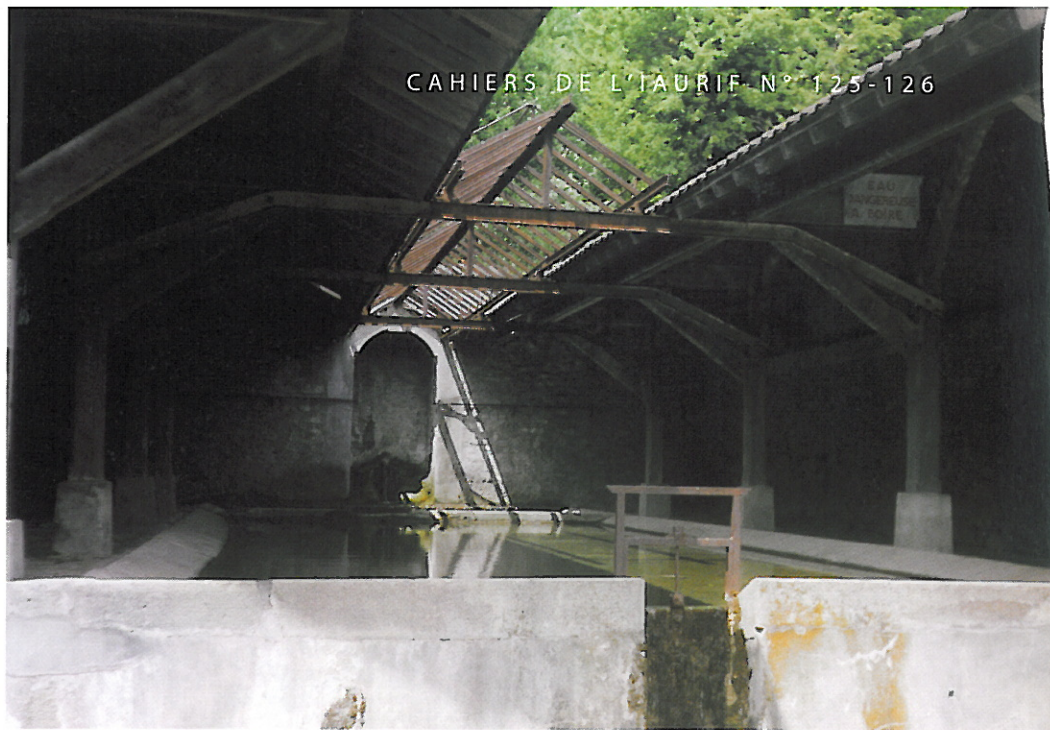
La vallée de la Mauldre parcourt le nord des Yvelines, depuis la forêt de Rambouillet jusqu'à la Seine. Son affluent, le ru de Gally, prend sa source dans le prestigieux parc du château de Versailles et traverse la zone naturelle d'équilibre de la plaine de Versailles.

Une vallée axée sur la thématique de l'eau

Dans la vallée de la Mauldre et du ru de Gally, une thématique principale se distingue : celle du patrimoine et des activités liées à l'eau. Plusieurs axes pour cette thématique :

Une vallée de liaison entre des sites majeurs de la région

Les vallées de la Mauldre et du ru de Gally forment un axe de liaison majeur entre des sites de grande importance pour l'eau dans la région. Au nord, on trouve la vallée de la Seine, fleuve principal qui traverse la région. Au sud, le massif de Rambouillet est considéré comme le château d'eau des Yvelines. De nombreuses rivières y ont leur source. À l'est, le château de Versailles et ses parcs représentent un patrimoine fondé sur l'élément eau de renommée internationale.



Le petit patrimoine lié à l'eau très présent

Les villages des vallées de la Mauldre et du ru de Gally recèlent un petit patrimoine lié à l'eau très riche et varié. Les lavoirs, moulins et fontaines ponctuent la vallée. Les biefs aménagés caractérisent aussi un fond de vallée occupé par les prairies, dans les méandres de la Mauldre. L'aqueduc de l'Avre est un élément marquant du paysage, notamment lorsqu'il devient un ouvrage de pierres pour traverser la Mauldre. Enfin, les sources sont nombreuses et parfois liées à un site remarquable : source de Boussy, source de Méry.

Le village de Rennemoulin, tourné vers la rivière, est un bon exemple de mise en valeur de ces différents éléments.

Un intérêt historique du patrimoine de l'eau

Le château de Versailles, dans le parc duquel le ru de Gally prend sa source, et ses jeux d'eau, est au cœur de la thématique de l'eau dans la vallée. Il représente en outre un patrimoine prestigieux. D'autres traces historiques de cette préoccupation fondamentale de l'eau subsistent dans la vallée, avec le domaine des hydrauliciens de Louis XIV, le château de Grand-Maison à Villepreux.

Source et lavoir à Montainville.

Les villages des vallées de la Mauldre et du ru de Gally recèlent un petit patrimoine lié à l'eau très riche.

Sources and wash house in Montainville.

The villages of the Mauldre and brook of Gally valleys boast very rich minor elements of heritage related to water.

B. Cauchetier / laurif

Pour une meilleure gestion de la ressource en eau

Reconquête de la qualité de l'eau

La très mauvaise qualité de l'eau des rivières, et en particulier du ru de Gally et la Mauldre aval, est un obstacle sérieux à toute mise en valeur touristique. Valoriser l'immense patrimoine architectural de la vallée suppose que la rivière puisse offrir une vitrine de qualité. Des efforts d'épuration doivent encore être faits pour atteindre les objectifs de qualité de l'eau fixés par l'Agence de l'eau. La réalisation d'une station de lagunage en amont du ru de Gally serait un moyen d'intégrer dans le paysage de la vallée une solution moderne d'épuration des eaux.

	Mauldre	Ru de Gally
Situation (départements concernés) :		
- dans la région	Yvelines	Yvelines
- hors région		
Situation par rapport au Plan Vert régional	couronne rurale	ceinture verte
Nombre de communes	15	11
Population (1990)	49 259 hab.	53 394 hab.
Longueur :		
- en Ile-de-France	37 km	21 km
- totale		
Superficie du bassin versant	470 km ²	
Superficie du périmètre d'étude	22,2 km ²	
MOS (1994)		
- espace naturel	76,8 %	79,3 %
- espace urbanisé	23,2 %	20,7 %

Un site de réserves en eau souterraine

L'intérêt de la vallée dans le domaine de l'eau tient aussi à la présence des captages d'eau souterraine. Les réserves de ce secteur ont une importance régionale pour l'alimentation en eau. La qualité de ces ressources doit être assurée. Une gestion agricole prenant en compte ces contraintes pourrait être proposée aux exploitants. Les contrats de type agri-environnementaux sont adaptés à ce contexte.

Préservation des zones humides et inondables

La vallée de la Mauldre possède des milieux humides d'une grande richesse, fragilisés par l'abandon des pratiques agricoles et les pressions. Protection et gestion doivent être envisagées pour ces espaces sur l'ensemble de la vallée.

La vallée présente de fortes potentialités pour une mise en valeur sur le thème de l'eau. La découverte du patrimoine et des sites naturels pourrait être complétée par des activités plus pédagogiques concernant l'alimentation en eau ou le lagunage. La création de cheminements et l'amélioration de l'accessibilité des berges devront accompagner ce projet.

Liens entre le château de Versailles, la forêt de Rambouillet et la vallée de la Seine

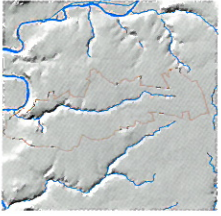


Patrimoine lié à l'eau dans les vallées de la Mauldre et du ru de Gally

-  lavoir
-  moulin
-  château et parc remarquable

 0 5 km

© Iaurif



Vallée du Morbras

Françoise Guyon

Architecte-urbaniste

La petite vallée du Morbras est incluse totalement dans la ceinture verte, au cœur de zones fortement urbanisées. Elle constitue un couloir d'accès privilégié de l'agglomération dense aux grands massifs forestiers de l'est parisien.

Une petite vallée menacée de la ceinture verte

L'évolution de la vallée du Morbras illustre un modèle d'extension de l'urbanisation en zone périurbaine. Ce cas révèle comment un développement mal maîtrisé entraîne la perte d'identité d'une entité géographique autrefois bien dessinée. Les nouveaux documents d'urbanisme renforcent la pression urbaine et le processus de déstructuration des espaces naturels. Les zones d'urbanisation autorisées en fond de vallée et en rebord de plateau et les nouvelles infrastructures menacent le paysage, la continuité de la trame verte de fond de vallée et les coupures vertes entre les agglomérations. Les grandes enclaves agricoles qui marquent encore l'identité de la vallée sont amputées, de plus en plus fractionnées et cloisonnées. L'avenir de l'activité agricole, déjà en équilibre précaire mais indispensable pour la gestion de l'espace et le maintien du caractère paysager ouvert de la vallée, devient très incertain.

Une qualité de l'eau à reconquérir

La qualité des eaux du Morbras est très mauvaise et le niveau de pollution alarmant. L'habitat aquatique est quasi inexistant. En période d'étiage, les gênes olfactives sont un obstacle à toute mise en valeur. Cette dégradation s'explique principalement par l'insuffisance des moyens de traitement des eaux usées. La situation devrait s'améliorer dans les prochaines années car la reconquête de la qualité du Morbras est un des objectifs prioritaires du Schéma d'aménagement et de gestion des eaux Marne aval. Les travaux et réflexions qui auront lieu dans le cadre du Sage seront l'occasion de rassembler tous les partenaires de la gestion des rivières, en vue d'une prise en compte globale de l'aménagement des vallées, à l'échelle du bassin versant.

Au-delà de l'amélioration de la qualité des eaux, et pour permettre une réappropriation de la rivière, il faudra favoriser une bonne compatibilité des différents usages de l'eau afin de développer le potentiel écologique, paysager et récréatif du Morbras et lui donner un rôle structurant du développement urbain.

Une identité du paysage encore visible mais sensible

La lisibilité et l'identité du site ont longtemps reposé sur des entités géographiques et paysagères bien individualisées, structurées par la trame foncière rurale, et ordonnées par le maillage géométrique des grands parcs de châteaux, des allées de chasse et des anciennes routes royales.

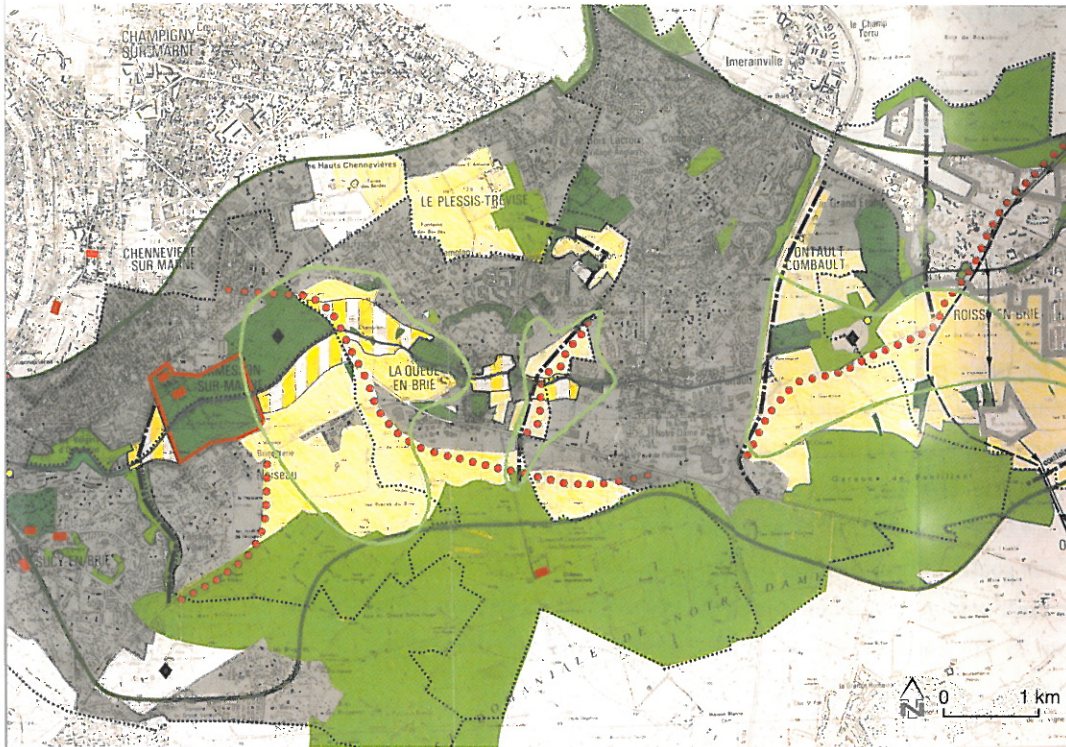
Mais actuellement, les grandes lignes du paysage tendent à s'estomper face au développement urbain. Les transitions entre le tissu urbain et rural se dégradent. Les espaces agricoles, éléments forts du paysage, deviennent de plus en plus difficiles à gérer. Les ruptures visuelles se multiplient. Le maintien d'une trame paysagère visible, qui accompagnerait les développements urbains, est un enjeu clé sur le territoire de la vallée du Morbras. Les changements rapides qui s'opèrent dans cette zone font qu'il y a une véritable urgence à traiter cette question dans l'aménagement de la vallée.

Les zones d'urbanisation autorisées en fond de vallée et en rebord de plateau menacent le paysage.
Authorised urban development areas at the bottom of the valley and at the edge of the plateau threaten the landscape.

F. Guyon/aurif



Une vallée périurbaine où sont imbriqués les espaces urbains agricoles et forestiers



© laurif

- limite de bassin versant
- limite communale
- zone urbaine et extension (plan d'occupation des sols)
- limite de la zone urbaine existante (Roissy-en-Brie)
- espace boisé et vert public
- bois privé d'intérêt paysager et/ou récréatif
- milieu humide
- espace agricole
- parc classé ou inscrit
- monument classé ou inscrit
- grand équipement de sport et de loisirs
- coupure d'urbanisation
- zone d'équilibre paysager
- projet routier
- projet de réseau ferré d'intérêt régional
- projet de renforcement de ligne électrique haute tension

De bonnes potentialités pour une trame verte

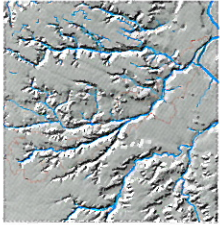
Dans cette zone urbaine en fort développement, l'objectif est d'équilibrer et de diversifier l'offre récréative, d'aménager une véritable coulée verte le long du Morbras et de structurer le semis actuel d'espaces verts et boisés autour d'un réseau continu de circulations douces.

La vallée, enserrée par de grands massifs forestiers, dispose de nombreux atouts pour créer une trame verte de dimension régionale. La structure du paysage, les bois, les parcs urbains existants et le réseau historique de parcs et jardins doivent servir de base à sa composition.

Cette trame peut se développer autour de trois axes : la coulée verte du Morbras, les forêts en lisières de plateau et les liaisons vertes transversales qui assurent les discontinuités urbaines et relient la vallée à sa périphérie conformément aux objectifs régionaux. Même petite, la rivière, élément structurant du paysage, peut en constituer l'armature principale à condition de mettre en valeur ses berges et le patrimoine proche et de les rendre accessibles au public par l'aménagement des chemins ruraux et de promenades urbaines. La protection réglementaire, l'acquisition ou l'ouverture au public des espaces verts résiduels sont nécessaires pour assurer la continuité et la diversité de cette trame verte et pour conforter à l'aval, de la Marne à la Queue-en-Brie, un ensemble paysager et récréatif remarquable.

Comment mettre en œuvre ces orientations ? Les pressions réglementaires et foncières sont si fortes que seule une politique volontaire et coordonnée à l'échelle du bassin versant permettra de reconquérir la rivière et ses berges, de maintenir l'activité agricole et d'éviter la fermeture et la dégradation du paysage.

Situation (départements concernés) :	Seine-et-Marne, Val-de-Marne
- dans la région	
- hors région	
Situation par rapport au Plan Vert régional	ceinture verte
Nombre de communes	8
Population (1990)	95 845 hab.
Longueur :	
- en Ile-de-France	17 km
- totale	
Superficie du bassin versant	80 km²
Superficie du périmètre d'étude	6,5 km²
MOS (1994) :	
- espace naturel	60,2 %
- espace urbanisé	39,8 %



Vallée de l'Orge

Paul Lecroart

Urbaniste

La vallée de l'Orge offre l'exemple d'une vallée de liaison entre ville et campagne, au sud de la région. Prenant sa source dans le plateau de Beauce, en amont de la forêt de Dourdan, elle se jette dans la Seine 52 km plus loin à Athis-Mons. Elle traverse ainsi des paysages ruraux, des zones urbanisées, mais aussi des secteurs de transition en pleine mutation.

Un axe de développement

La vallée de l'Orge constitue un axe régional de développement urbain, qui progresse peu à peu vers les zones rurales. La ligne de chemin de fer (RER C) qui dessert toute la vallée a été un facteur de développement, mais ce sont surtout les routes qui ont entraîné une urbanisation diffuse et mal maîtrisée. Les infrastructures transversales (A6, Francilienne et RN 20) tendent à morceler la vallée en trois secteurs : un secteur urbain à l'aval, un secteur intermédiaire où les zones urbaines tendent à se rejoindre, et un secteur rural déjà menacé à l'amont, notamment en fond de vallée.

De nombreux atouts, une grande fragilité

De nombreuses actions de valorisation ont déjà été engagées dans la vallée de l'Orge. Les deux syndicats de rivières ont joué un rôle majeur, mais également la Région, le département de l'Essonne et certaines communes. A l'aval, les berges ont été aménagées et les parcs publics offrent de nombreuses activités de plein air. Les diverses actions du syndicat intercommunal de la vallée de l'Orge aval (S.I.V.O.A.) ont permis la création d'une continuité paysagère et de promenade autour de la rivière sur environ 25 km entre Arpajon et Athis-Mons. A l'amont, le syndicat intercommunal de la vallée supérieure de l'Orge (S.I.V.S.O.) mène de nombreuses actions visant à protéger les milieux sensibles : préservation et gestion des zones humides, protection et aménagement des berges, etc.

La vallée bénéficie d'atouts majeurs pour renforcer son rôle de liaison entre les villes riveraines. C'est une des seules vallées où une promenade continue est envisageable le long des berges ou à proximité. Véritable coulée verte dans la zone urbaine, cette liaison s'appuierait à l'amont sur les chemins de randonnée.

Des enjeux sur le secteur intermédiaire

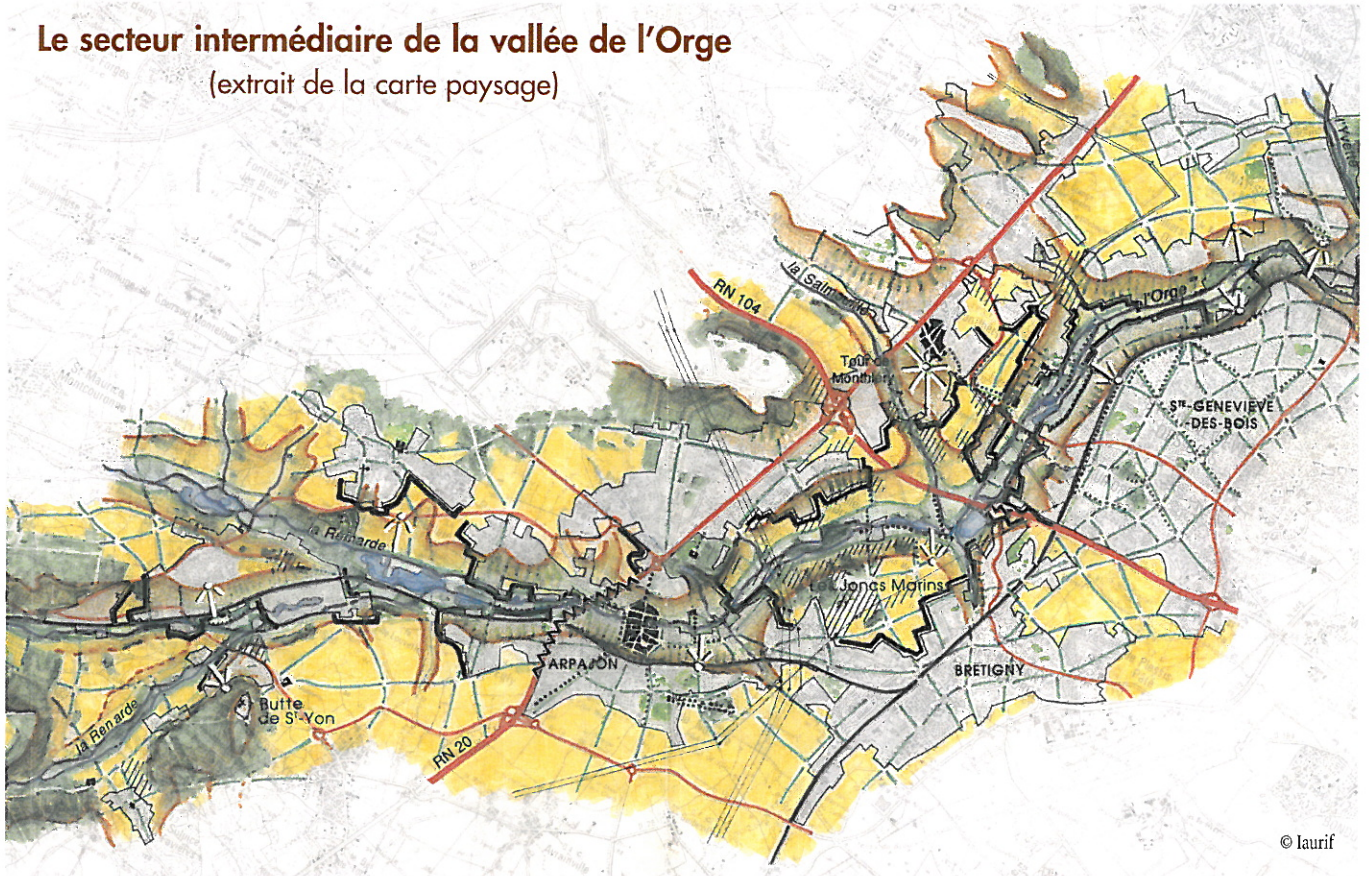
Le secteur intermédiaire, entre Brétigny-sur-Orge et Breux-Jouy, est celui où se concentrent les principaux enjeux de l'avenir de la vallée.

L'Orge est l'une des rares vallées où une promenade continue est possible le long des berges ou à proximité.
The Orge is one of the rare valleys where an extended walk is possible along or near the river banks.

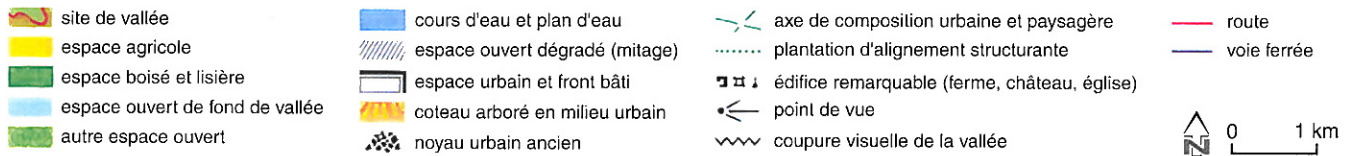
S. Danicic/laurif



Le secteur intermédiaire de la vallée de l'Orge (extrait de la carte paysage)



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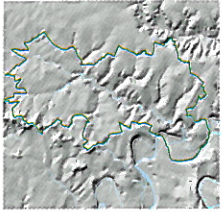


Les pressions de l'urbanisation s'y concentrent. Les villes tendent à se rejoindre sans laisser de coupures vertes. Le projet routier C6 risque d'accroître la déstabilisation du secteur. Le mitage y est particulièrement présent.

L'aménagement d'un grand parc régional sur le domaine des Joncs-Marins, en cours d'acquisition par l'Agence des espaces verts, contribue à faire de cette zone un secteur clé pour l'ensemble de la vallée.

Certaines des orientations et des actions préconisées par l'étude sont d'ores et déjà reprises par les syndicats. D'Arpajon à Athis-Mons, le S.I.V.O.A. et les communes ont retenu 120 propositions dans le cadre du «Plan paysage» qu'elles viennent d'approuver.

	Orge amont	Orge aval
Situation (départements concernés) :		
- dans la région	Yvelines, Essonne	Essonne
- hors région		
Situation par rapport au Plan Vert régional	couronne rurale	ceinture verte
Nombre de communes	13	15
Population (1990)	37 914 hab.	239 329 hab.
Longueur :		
- en Ile-de-France	52 km	
- totale		
Superficie du bassin versant	980 km ²	
Superficie du périmètre d'étude	23,8 km ²	
MOS (1994) :		
- espace naturel	86,2 %	31,8 %
- espace urbanisé	13,8 %	68,2 %



Vallée de la Théroutte

Nelly Barbiéri

Architecte - urbaniste

La vallée de la Théroutte est située dans la couronne rurale, au cœur du plateau très agricole du Multien.

Un paysage de qualité, bien préservé

Une large dominante agricole

Avec près de 80 % de son territoire occupé par l'agriculture, la vallée de la Théroutte est la plus agricole de toutes celles étudiées. L'agriculture est moderne et dynamique, dans la continuité de l'activité agricole du plateau du Multien. La dominante agricole

dans un paysage animé par quelques boisements notamment autour de la rivière, confère à la vallée une impression de grande harmonie. Le paysage ouvert qui en résulte permet de nombreuses vues sur la vallée.

Des villages de qualité

A l'écart des principales voies de communication, la vallée ne connaît pas de développement urbain important. Seuls les bourgs de Saint-Pathus et Saint-Souplet, situés près de la source, ont connu une extension marquante, sous la forme de lotissements mal intégrés dans le paysage. A l'aval, Congis-sur-Théroutte s'est développé plus anciennement sur le site stratégique de la confluence avec la Marne.

Les autres villages ont conservé leur caractère rural de qualité. Ils occupent différentes positions : autour de la rivière, sur le versant, sur le plateau ou dans les vallons adjacents.

De belles fermes ponctuent la vallée et les villages, témoignant de la forte activité agricole.

Les vallons secs transversaux

Le paysage a pour caractéristique originale la présence de thalwegs transversaux qui viennent se jeter dans la vallée, assez large. Ces vallons secs lui donnent un aspect ouvert et mettent en communication visuelle la vallée et les villages situés sur les plateaux.

Un fond de vallée boisé

Au milieu des vastes étendues agricoles, la rivière et le fond de vallée sont soulignés par des boisements. Beaucoup de peupleraies y ont été développées. Leur présence dans le paysage est bien visible.

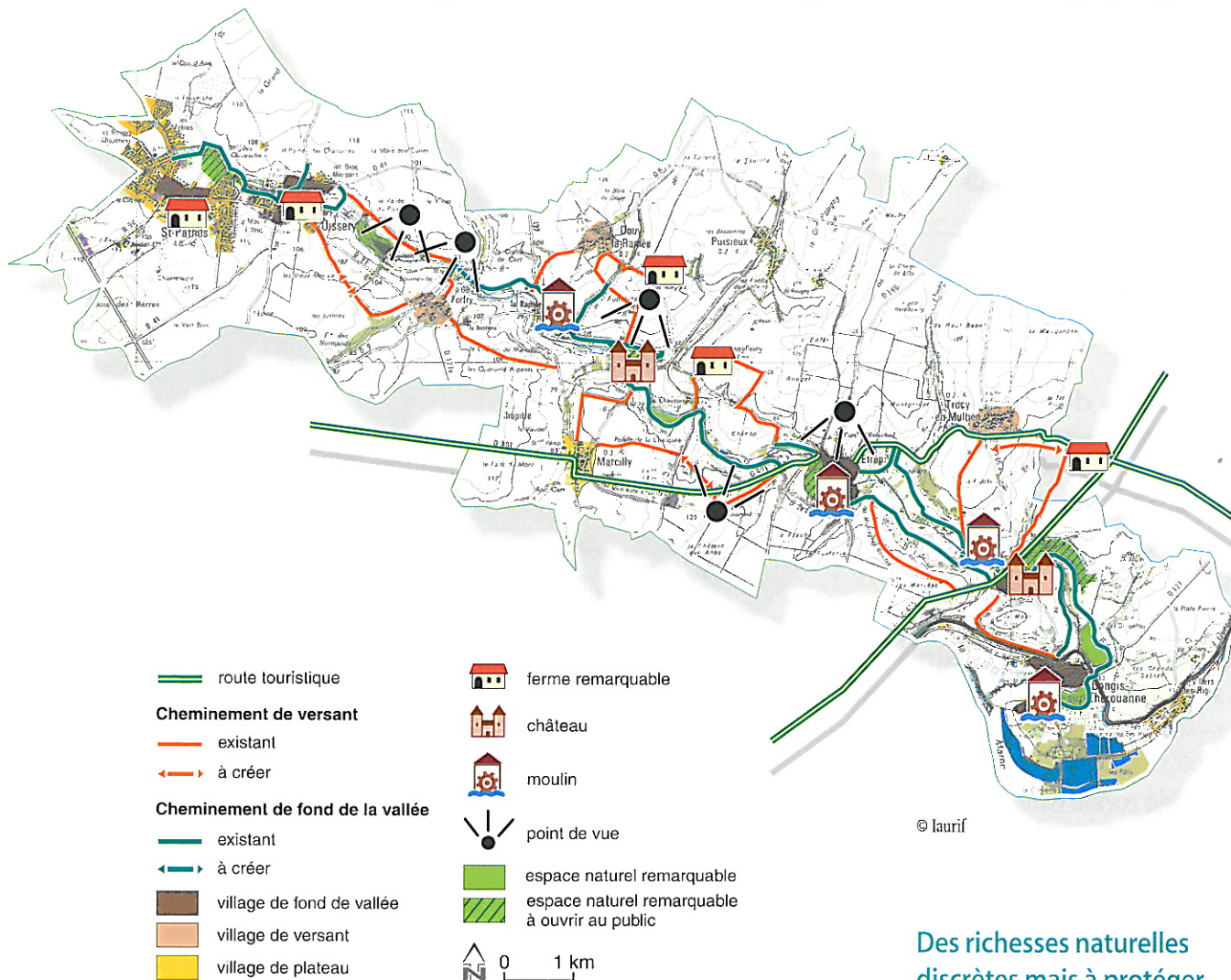
La vallée de la Théroutte est la plus agricole de toutes les vallées étudiées.

The Théroutte valley is the most agricultural of all the valleys studied.

N. Barbiéri/aurif



Des cheminements pour la mise en valeur du patrimoine rural et paysager

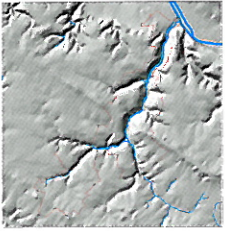


Des richesses naturelles discrètes mais à protéger

Les prairies humides des fonds de vallée et les bras de rivière sont des milieux naturels riches mais peu connus. Ils sont en régression faute d'entretien. Les reboisements spontanés ou liés aux plantations de peupliers contribuent à leur dégradation. Le développement important des peupleraies a été un facteur de banalisation des milieux. Mais avec la baisse de leur rentabilité économique, beaucoup sont abandonnées. Les peupleraies les moins entretenues possèdent des taillis favorables au maintien de la biodiversité.

Une action prioritaire à mener dans cette vallée est la reconquête de ces milieux naturels humides.

Situation (départements concernés) :	
- dans la région	Seine-et-Marne
- hors région	
Situation par rapport au Plan Vert régional	couronne rurale
Nombre de communes	15
Population (1990)	12 676 hab.
Longueur :	
- en Ile-de-France	23 km
- totale	
Superficie du bassin versant	174 km ²
Superficie du périmètre d'étude	8,6 km ²
MOS (1994) :	
- espace naturel	94,5 %
- espace urbanisé	5,5 %



Vallée de la Vaucouleurs

Bernard Cauchetier
Chargé d'études

La vallée de la Vaucouleurs est une vallée largement rurale, située à l'ouest des Yvelines et proche de la limite régionale. La rivière se jette dans la Seine à Mantes, seul pôle urbain du secteur.

Une vallée rurale isolée et préservée

Des paysages ruraux de qualité

Ses paysages variés, ruraux et bien préservés, ainsi qu'un petit patrimoine, riche et bien réparti sur l'ensemble de la vallée, sont ses deux points forts. Le patrimoine (églises, patrimoine lié à l'eau, mythologique) sans être spectaculaire, est très bien intégré dans le site et mérite qu'on s'y arrête.

La préservation des paysages de la vallée peut s'expliquer par un certain isolement au sein de la région. La vallée est éloignée des grands axes de développement. Seule la ville de Mantes constitue un pôle d'attraction et un moyen d'accès à la vallée. De ce fait, elle se trouve peu valorisée, avec très peu de structures d'accueil, malgré la qualité de ses paysages.

Son isolement est renforcé par un certain manque d'accessibilité et de visibilité de ses berges. Dans la partie amont,

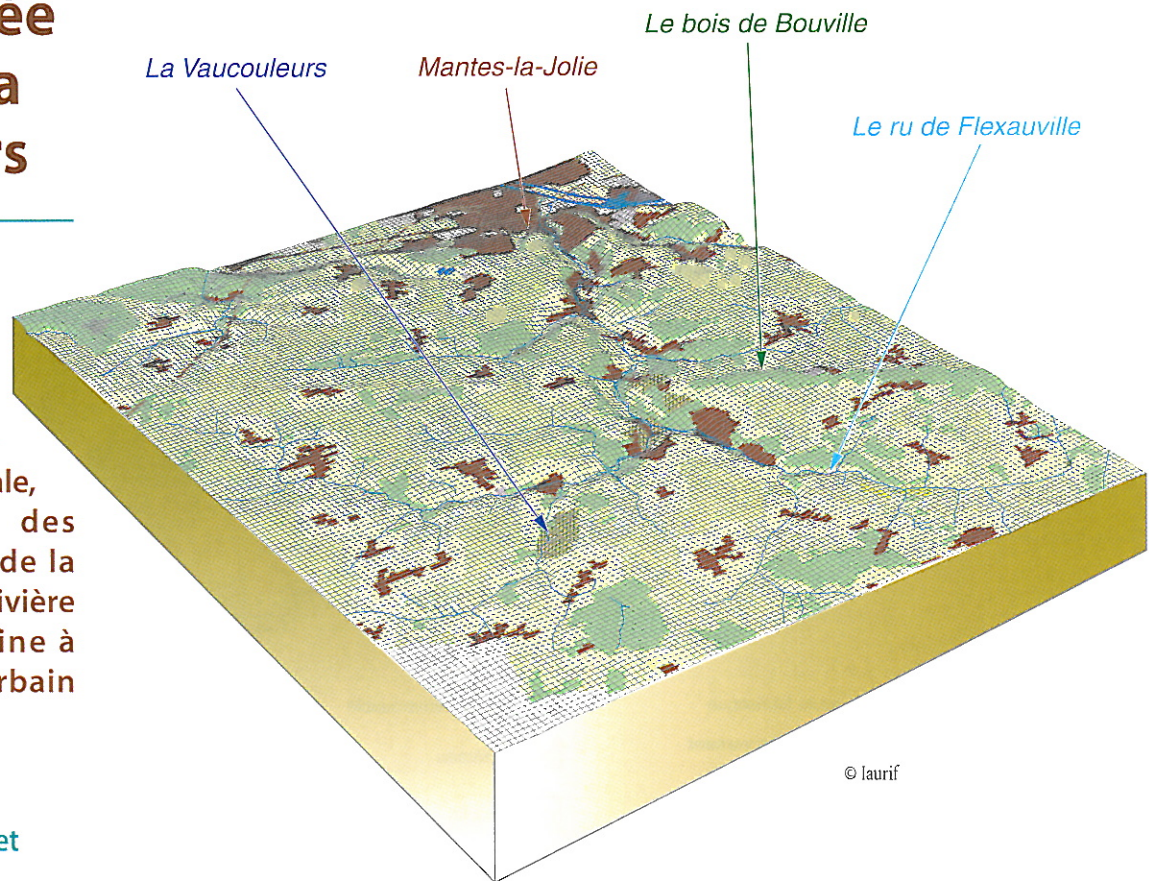
le paysage cloisonné ne permet pas d'ouverture sur la rivière. En aval de Septeuil, les points de vue deviennent nombreux et de grande qualité.

Une séparation nette entre l'agglomération de Mantes et la zone rurale

La ville de Mantes forme l'extrémité aval de la vallée. Malgré l'importance de ce pôle urbain, la coupure entre la zone rurale et l'agglomération est très nette. Elle correspond à la limite communale. L'urbanisation se trouve de fait contenue d'un côté de la route contournant Mantes. Le reste de la vallée donne ainsi une véritable impression de préservation.

Les zones de captage d'eau potable auparavant situées en bordure de l'agglomération ont été déplacées pour la réalisation de l'échangeur routier. Localisées maintenant dans la partie

Une vue originale de la vallée de la Vaucouleurs



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rurale de la vallée, elles pourront contribuer à la préservation de son caractère naturel.

Des axes possibles de valorisation

Tout en conservant le caractère rural de la vallée, il est proposé quelques actions prioritaires de valorisation :

Protection et gestion des espaces ouverts

Les paysages ruraux de la vallée sont un de ses atouts majeurs. Ils sont formés par un ensemble diversifié de milieux dont certains ont un intérêt écologique notable. La gestion est cependant le point clé de leur préservation. Elle doit être adaptée au type de milieu rencontré. Ainsi, les pelouses calcaires, milieux les plus riches de la



*Très éloignée des grands axes de développement,
la vallée de la Vaucouleurs possède peu
de structures d'accueil en dépit de la qualité de ses paysages.
Removed from main development axes,
the valley of the Vaucouleurs has few structures for accomodations
despite the high quality of its landscapes.*

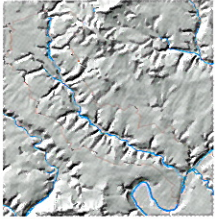
S. Rossi/aurif

vallée, sont menacées d'enfrichement par manque d'entretien, les anciennes pratiques de pacage ayant été abandonnées. La gestion agricole paraît être bien appropriée. Il en est de même des prairies de fonds de vallées qui pourraient faire l'objet de mesures agri-environnementales. En revanche, les boisements de ravins méritent d'être protégés mais peuvent évoluer selon leur propre dynamique.

Découverte par des cheminements pédestres et cyclistes

Les paysages de cette petite vallée méritent d'être découverts par des moyens «doux» correspondant à son caractère paisible. Le petit patrimoine rural lié à l'eau, toujours présente, constitue un fil conducteur pour la découverte. Les sentiers de randonnée pédestre existants pourraient être complétés par des cheminements permettant l'accès aux berges. L'activité de pêche serait ainsi favorisée. Des itinéraires cyclistes sont aussi proposés à la fois pour longer la vallée d'amont en aval et pour permettre des itinéraires en boucle à partir des gares.

Situation (départements concernés) :	
- dans la région	Yvelines
- hors région	
Situation par rapport au Plan Vert régional	couronne rurale
Nombre de communes	11
Population (1990)	24 495 hab.
Longueur :	
- en Ile-de-France	20 km
- totale	
Superficie du bassin versant	192 km²
Superficie du périmètre d'étude	5,8 km²
MOS (1994) :	
- espace naturel	81,5 %
- espace urbanisé	18,5 %



Vallée de la Viosne

Bernard Cauchetier
Chargé d'études

Au cœur du Parc naturel régional du Vexin, la vallée de la Viosne relie le plateau agricole du Vexin et la ville nouvelle de Cergy-Pontoise. En dehors de la ville nouvelle, la vallée conserve un caractère rural riche et diversifié.

De grandes potentialités mais des risques de dégradation

La vallée de la Viosne est remarquable pour ses qualités paysagères, naturelles et piscicoles. Les évolutions actuelles présentent cependant des risques de dégradation de l'ensemble de ses potentialités.

La qualité des paysages

Les paysages ruraux de la vallée sont de qualité et diversifiés. Malgré la desserte ferrée, les villages ruraux sont assez bien préservés des développements d'urbanisation. Les coteaux abrupts et boisés marquent la vallée étroite. Les fonds de vallées ouverts laissent voir quelques belles perspectives sur des zones humides de grand intérêt.

Mais ces paysages sont en constante évolution. L'extension des peupleraies a fortement contribué à la fermeture des paysages.

La richesse des milieux humides

Les milieux humides sont les milieux écologiquement les plus remarquables dans la vallée. Certains d'entre eux ont un intérêt au moins régional. Mais les transformations récentes tendent à en diminuer la valeur. La multiplication des peupleraies, notamment dans les zones tourbeuses, et la rectification des berges qui l'accompagne, tendent à nuire à la diversité biologique. Si leur extension s'est stabilisée, ce sont aujourd'hui les étangs de pêche qui se multiplient dans le fond de vallée, sur les friches humides. Les conséquences sur le fonctionnement de l'écosystème n'en sont pas moins notables.

La qualité de la rivière et son intérêt piscicole

La Viosne est une des rivières les plus intéressantes sur le plan de la qualité piscicole. Celle-ci est liée à la bonne qualité de l'eau et des habitats.

L'étang de la Vallière à Santeuil possède peu de zones libres.

Principal site ornithologique de la région, certaines espèces très rares viennent y faire halte.

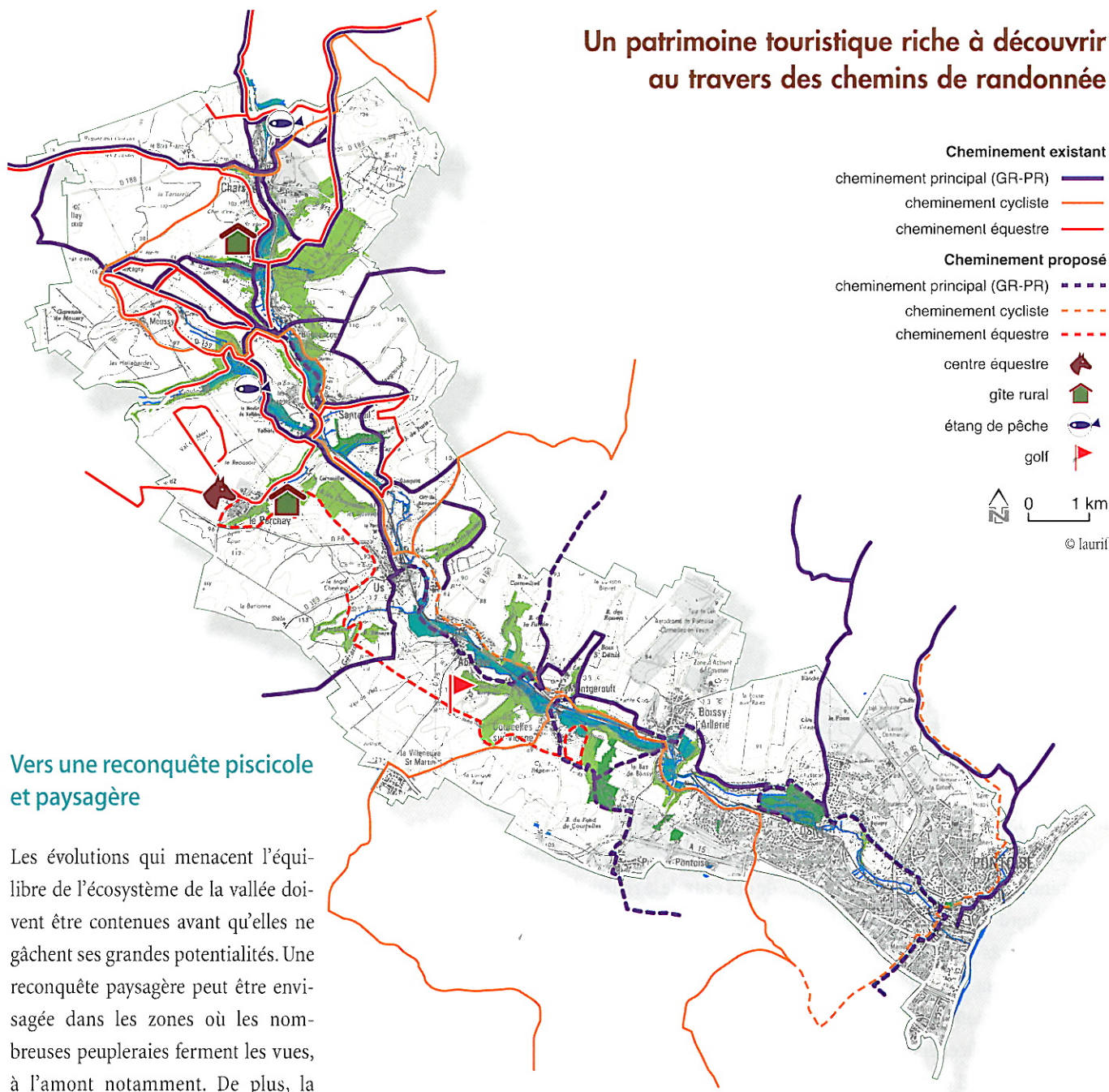
The Vallière pond in Santeuil has few free areas.

As the region's leading ornithological site, certain extremely rare species make a stop in this area.

B. Cauchetier/iaurif



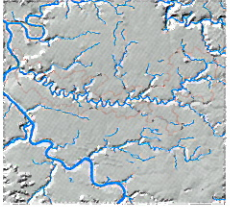
Un patrimoine touristique riche à découvrir au travers des chemins de randonnée



Vers une reconquête piscicole et paysagère

Les évolutions qui menacent l'équilibre de l'écosystème de la vallée doivent être contenues avant qu'elles ne gâchent ses grandes potentialités. Une reconquête paysagère peut être envisagée dans les zones où les nombreuses peupleraies ferment les vues, à l'amont notamment. De plus, la réouverture des fonds de vallée serait parfaitement compatible avec une réhabilitation des habitats piscicoles et la protection des zones humides. D'autres mesures sont aussi nécessaires pour améliorer le potentiel piscicole de la rivière (reconstitution de frayères, protections de sites naturels, réaménagement des berges...). Le schéma de vocation piscicole du département fait des propositions dans ce sens. Le Parc naturel régional du Vexin joue un rôle prédominant dans cette démarche.

Situation (départements concernés) :	
- dans la région	Val-d'Oise
- hors région	Oise
Situation par rapport au Plan Vert régional	couronne rurale, ceinture verte
Nombre de communes	13
Population (1990)	46 678 hab.
Longueur :	
- en Ile-de-France	20 km
- totale	
Superficie du bassin versant	196 km²
Superficie du périmètre d'étude	15,1 km²
MOS (1994) :	
- espace naturel	82 %
- espace urbanisé	18 %



Vallée de l'Yverres

Nelly Barbiéri

Architecte - urbaniste

La vallée de l'Yverres est située au cœur du plateau agricole de la Brie. Elle crée une liaison entre les zones rurales de Seine-et-Marne et les zones urbaines de l'Essonne et du Val-de-Marne, formant deux secteurs bien distincts.

Les méandres : des éléments paysagers typiques

L'occupation du sol, très agricole, distingue peu la vallée du plateau de Brie. Les grandes cultures céréalières atteignent le bord de la rivière. Mais plusieurs éléments paysagers caractéristiques marquent le site : un relief qui s'accroît d'amont en aval et rend perceptible la vallée, une ripisylve qui souligne le cours d'eau, des méandres serrés qui révèlent son identité paysagère. En limite de la zone rurale, ces méandres forment un motif constant de boucles agricoles entourées de boisements de coteaux.

La question hydraulique : un fil conducteur pour l'ensemble de la vallée

Sur le plan hydrogéologique et hydraulique, la vallée de l'Yverres présente plusieurs particularités. Une



relation étroite existe entre la nappe de Champigny et la rivière. La présence de gouffres entraîne l'infiltration rapide des eaux de la rivière dans la nappe. Cela la rend très vulnérable à la qualité de l'eau de l'Yverres.

La contrainte majeure du site est liée au régime hydraulique de la rivière et aux risques d'inondations. Le régime torrentiel, avec des crues subites et un faible étiage, en fait un cas unique en Ile-de-France. Le secteur urbanisé de l'aval présente des risques importants d'inondations. Les constructions en zone inondable et l'imperméabilisation des sols ont accentué le phénomène. Les zones rurales sont sollicitées pour favoriser un écoulement plus naturel de la rivière. Pour traiter cette question, un syndicat d'études a été créé, rassemblant les syndicats de rivières de l'amont et de l'aval. Outre la limitation des constructions à proximité de la rivière, plusieurs solutions

sont examinées (bassins de rétention, zones naturelles d'expansion des crues) sans qu'aucune n'ait encore fait l'objet d'un consensus. Mais ce syndicat représente un premier pas vers une vision globale de l'aménagement de l'ensemble de la vallée.

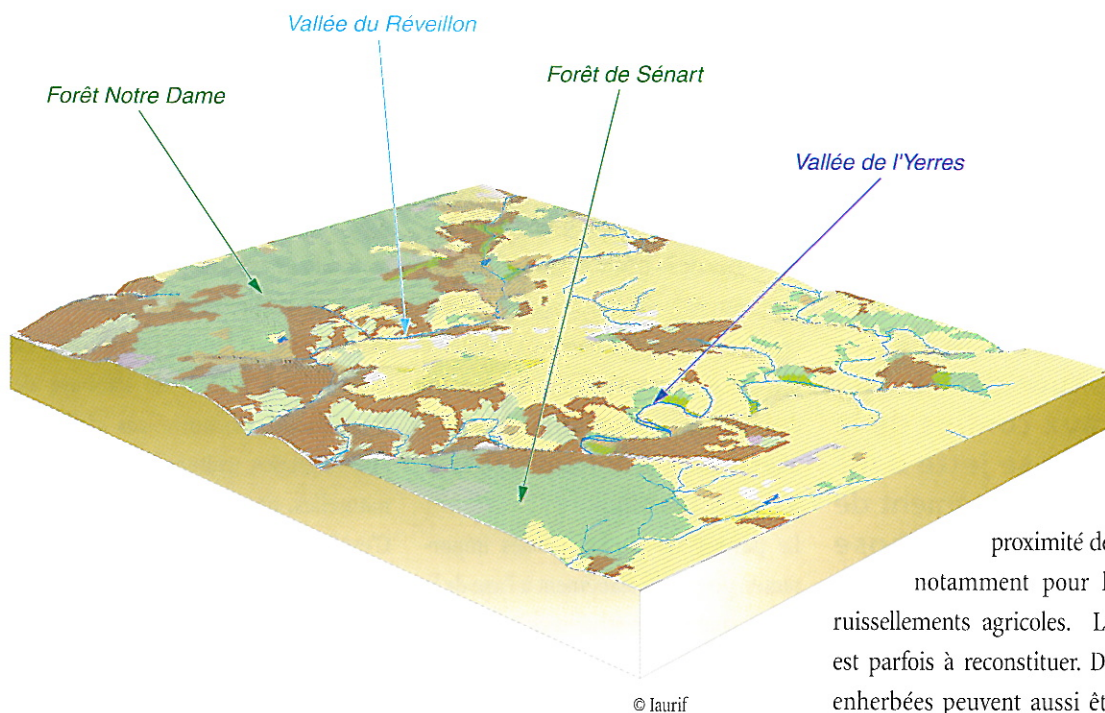
Une vallée agricole à l'amont

Le secteur amont, correspondant au département de Seine-et-Marne, offre des espaces ruraux de qualité. Les bourgs, situés sur les coteaux, sont bien préservés des extensions inesthétiques

Le chemin de grande randonnée de pays des vallées et forêts briardes suit la vallée sur la quasi totalité de son cours mais longe rarement le cours d'eau.
The hiking trail in the Brie valleys and forests of the region runs through practically the entire valley but rarely along the watercourse.

N. Barbiéri/laurif

Le paysage de la vallée de l'Yerres est marqué à l'aval par une série de méandres serrés où alternent les boucles agricoles et les boisements de coteau



proximité de la rivière, notamment pour limiter les ruissellements agricoles. La ripisylve est parfois à reconstituer. Des bandes enherbées peuvent aussi être envisagées. Dans le cadre de la gestion des inondations, la création de zones naturelles d'expansion des crues est à étudier avec la profession agricole.

	Yerres amont	Yerres aval
Situation (départements concernés) :		
- dans la région	Seine-et-Marne	Val de Marne, Essonne
- hors région		
Situation par rapport au Plan Vert régional	couronne rurale	ceinture verte
Nombre de communes	21	11
Population (1990)	51 891 hab.	141 647 hab.
Longueur :		
- en Ile-de-France	90 km	
- totale		
Superficie du bassin versant		
Superficie du périmètre d'étude	32,6 km ²	
MOS (1994) :		
- espace naturel	90,8 %	48,2 %
- espace urbanisé	9,2 %	51,8 %

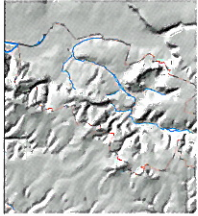
Un secteur très urbanisé à l'aval

A l'aval de Combs-la-Ville, la présence de la voie ferrée a favorisé le développement urbain et le tissu urbain est aujourd'hui dense. Mais la vallée reste très présente dans le paysage grâce au relief accentué. La rivière est un élément dominant du paysage, malgré la proximité des constructions. L'aménagement de certaines sections des berges a contribué à la mettre en valeur.

Dans ce secteur de la vallée, tous les espaces naturels restants doivent rester non construits. La continuité de la promenade le long de la rivière doit être recherchée pour former à terme un véritable «parc des bords de l'Yerres».

et du mitage. Cette partie de la vallée est discrète pour ce qui est de ses richesses patrimoniales ou naturelles. Un petit patrimoine lié à l'eau ponctue la rivière : lavoirs, ponts et gués, typiques de ce site. L'ensemble donne une impression d'harmonie qu'il faut préserver.

L'agriculture y est la principale forme d'occupation du sol. Très intensive, elle s'est développée jusqu'au bord du cours d'eau. Il n'existe presque plus de prairies, et même la ripisylve est parfois inexistante. Les principales propositions pour ce secteur seraient de recréer des espaces de transition à



Vallée de l'Ysieux

Nelly Barbiéri

Architecte - urbaniste

L'Ysieux est une petite rivière, située dans le Val-d'Oise, aux confins de la région, qui se jette dans l'Oise. L'environnement de la vallée se compose d'espaces boisés et agricoles très imbriqués. Elle est incluse dans le projet de parc naturel régional des Trois forêts.

La porte de la forêt de Chantilly

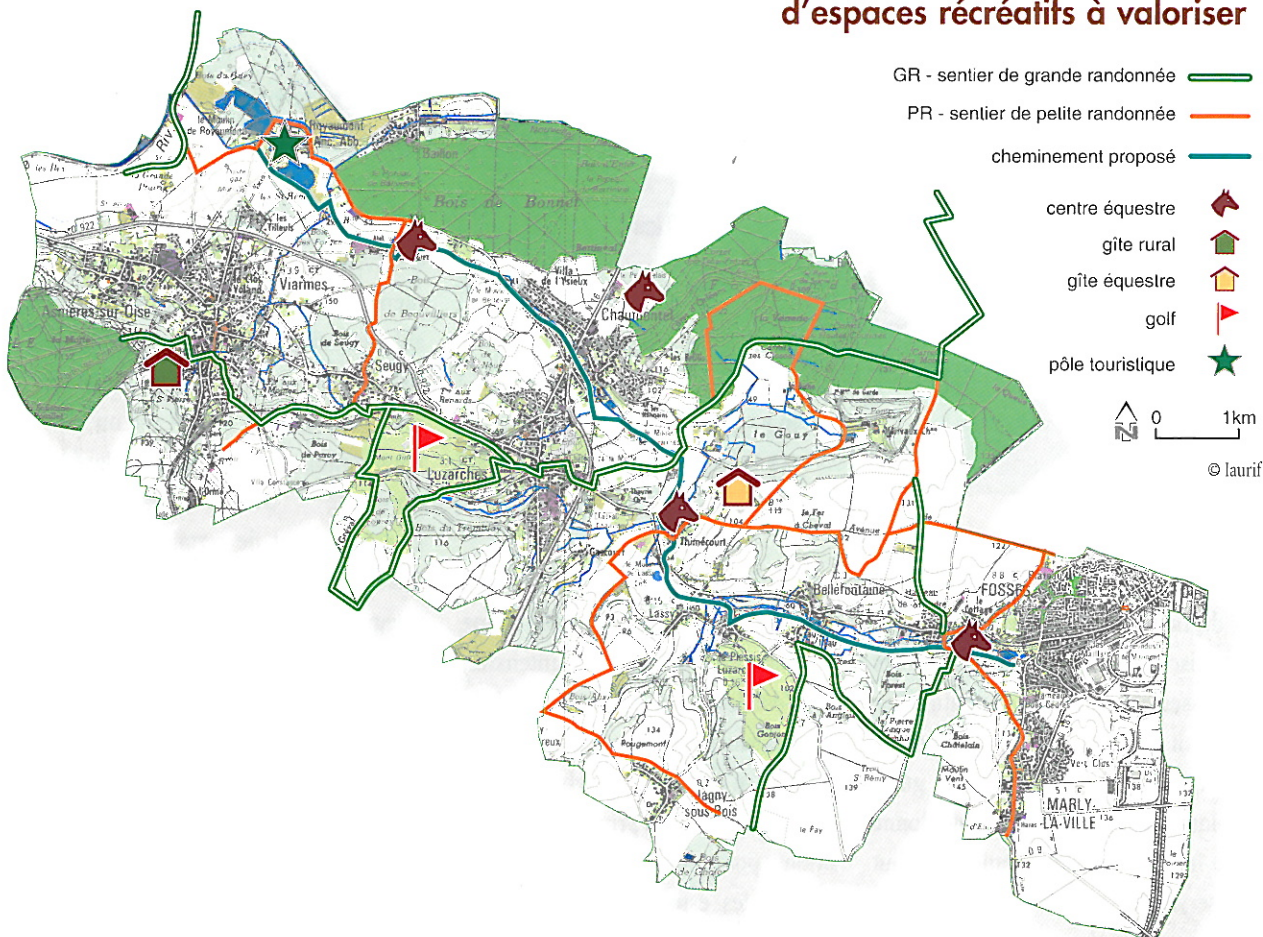
Le paysage de la vallée de l'Ysieux se distingue par l'avancée du massif forestier de Chantilly continu sur le haut du versant nord, il se fractionne sur le bas de la pente et sur l'autre versant. Au sud, s'étend le vaste plateau céréalier du pays de France. La vallée a une place privilégiée de charnière entre deux entités paysagères très vastes. Elle représente en Ile-de-France la porte de la forêt de Chantilly.

Le passage de plusieurs voies importantes, perpendiculairement à l'axe de la vallée, contribue à structurer le paysage. Cela renforce aussi sa vocation de liaison.

Un patrimoine historique majeur

Située entre Paris, Saint-Denis et Senlis, la vallée recèle de nombreuses marques historiques depuis le Moyen Age. Sa valeur patrimoniale et architecturale se traduit par de nombreux châteaux, jardins et des villages remarquables (Luzarches en particulier). Le secteur aval autour de l'abbaye de Royaumont concentre ces richesses patrimoniales, culturelles mais aussi naturelles, dans un site exceptionnel. C'est le joyau de la vallée.

La vallée de l'Ysieux, en bordure de la forêt de Chantilly, concentre un grand nombre d'espaces récréatifs à valoriser





Le relief peu accentué de la vallée, l'urbanisation et les écrans boisés rendent difficiles la perception de la vallée dans son ensemble.

The valley's slightly pronounced relief, urbanisation and wooded areas make it difficult to get a view of the valley as a whole.

N. Barbiéri/laurif

Un enjeu important : maintenir des coupures vertes

L'urbanisation est assez étendue dans la vallée. Elle s'est développée depuis les villages situés aux carrefours de la rivière avec les trois routes principales qui la traversent : Asnières-sur-Oise, Luzarches, Fosse. Les zones de discontinuité entre les espaces urbains sont encore présentes mais tendent à se réduire. Leur maintien est un enjeu clé dans l'aménagement de l'ensemble, pour préserver des paysages encore exceptionnels. Le relief peu accentué de la vallée, l'urbanisation et les écrans boisés rendent difficiles la perception de la vallée dans son ensemble. Le maintien d'espaces ouverts en fond de vallée et sur les coteaux contribuera à conserver l'identité du secteur.

Actuellement, le réseau de chemins de randonnée est relativement dense mais ceux-ci sont souvent perpendiculaires à l'axe de la rivière. Un chemin sensiblement parallèle à la rivière, complétant le réseau existant, permettrait de mieux la découvrir.

Situation (départements concernés) :	
- dans la région	Val-d'Oise
- hors région	
Situation par rapport au Plan Vert régional	ceinture verte
Nombre de communes	11
Population (1990)	29 449 hab.
Longueur :	
- en Ile-de-France	15 km
- totale	
Superficie du bassin versant	75 km²
Superficie du périmètre d'étude	26 km²
MOS (1994) :	
- espace naturel	79,4 %
- espace urbanisé	20,6 %

The Montcient and Aubette de Meulan valleys

Jean-Jacques Lange

Research associate

The small valleys of the Montcient and the Aubette de Meulan are carved out of the plateau of the Vexin, in the heart of the regional natural park.

Two valleys that form a coherent entity

The Aubette and Montcient valleys, although morphologically different, belong to the same geographical entity. They cross the farming plateau of the Vexin, hug the mounds of Arthis and meet up at their confluence with the Seine in the town of Meulan-Hardricourt. At this point the valleys are difficult to see and the river Aubette is partially buried. It has been proposed that the river be restored at the confluence by exhuming it and incorporating it into the park that it flows past.

Highly rural valleys that should be enhanced

Farmland is the dominant feature of these highly rural valleys, which are part of the cereal plateau of the Vexin. The Aubette valley in particular makes little impression on the landscape and in the upper valley the river is even less visible, although poor upkeep and unsuitable development have not helped. At some parts there is a total absence of riparian forests, so it has been proposed that certain sections be reforested to enhance the watercourse. In the Gadancourt golf course the banks have, however, been developed in an original way. It would be interesting to use this example to develop other areas.

The Montcient valley has a more pronounced relief. The river is also better looked after from a hydraulic point of view than the Aubette. However two private golf courses have closed off the landscape.

Urban pressure is reasonably well controlled and the existence of the regional natural park (Pnr) of the Vexin enables to reinforce the preservation of the rural landscapes. The Montcient valley has been slightly more affected by urban expansion but is still one of the best conserved valleys of the region.

A network of nature trails to promote the regional heritage

The Montcient and Aubette valleys are the two main interfaces between the heart of the French Vexin and the Seine valley. They have outstanding landscapes we may rely on to promote nature trails which are lacking in this part of the regional natural park.

	Aubette de Meulan	Montcient
Location (departments concerned):		
- in the region	Val-d'Oise, Yvelines	Val-d'Oise, Yvelines
- outside the region	/	/
Location according to the Regional Green Spaces Plan	Rural suburbs	Rural suburbs
Number of communes	12	9
Population (1990)	15,371 inhabitants	14,546 inhabitants
Length:		
- in Ile-de-France	22 km	11 km
- total		
Surface area of catchment areas		
Surface area of the sector being studied	12,2 km ²	
Mos 1994 (Land use - 1994):		
- natural area	89.5%	82.9%
- urban area	10.5%	17.1%

The suggested nature trails are organised around the villages, where the most interesting rural heritage is concentrated. In the Aubette valley they are mostly situated on top of the hillsides; the journey along the river is less interesting in its upriver section.

Apart from the minor elements of water-related heritage, the Montcient and Aubette valleys are characterised by the castles and remarkable parks that are dotted across the bottom of both valleys. One of the finest is the Villette castle, which allies splendid buildings with a beautiful garden and an original setting. Théméricourt castle, on the banks of the river Aubette, houses the regional natural park of the Vexin.

The valley of the Bièvre

Françoise Guyon
Town planner - architect

As the only Parisian tributary, the river Bièvre links up Paris to the large wooded and farming areas situated in its south-west outskirts. It is endowed with a remarkable landscape despite its location in the periphery. But down-river and since a long time, the river has been buried.

A historically rich valley

The valley was urbanised by successive stages, and presents contrasting sequences:

- a lower valley completely urbanised
- a peripheral sector that pivots around the Verrières massif
- a highly rural and wooded upper valley
- at the source, a plateau that has recently been surrounded by the new town Saint-Quentin-en-Yvelines.

It enjoys a rich and original heritage associated with the presence of water as well as the proximity of Paris and Versailles: network of aqueducts, channels, numerous parks, etc. One of its distinguishing features lies in its past vocation for innovating often water-related activities (the royal manufactures of the Gobelins and Jouy, tanning, etc.); a tradition which endures through the presence of an outstanding pole for research, training and high technology activities as well.

In the upper valley, an exceptional scenic and recreational site subject to urban pressure that must be controlled

Located near important development areas – Saint-Quentin and the Saclay plateau – the upper valley of the Bièvre is made up of a green wooded corridor that includes ponds, parks, fields and meadows. The state, local authorities and associations have all worked toward its protection and promotion. The upper Bièvre valley is waiting for being classified as protected area and the Syndicat Intercommunal d'Aménagement de la Vallée de la Bièvre (SIABV – an intermunicipal association for the development of the Bièvre valley) has headed an exemplary policy for water regulation and for opening the river's banks to the public. A 20-km promenade will soon link the recreational centre in Saint-Quentin-en-Yvelines to the green corridor in the south

of Paris. Acquisitions in progress will allow for the expansion and diversification of this green network opened to the public. There's still an environmentally-friendly farming management for the Bièvre and the natural habitats that must be implemented. However the main issue relies on the numerous infrastructure prospects that threaten the site's integrity.

A lower urban valley to be reclaimed

Throughout the years, the river in the lower valley has been buried and diverted from its course to make use of its driving force or its water. Therefore, the main objective in this area is to restore the valley's identity and restructure it around the river. This calls for the reopening – even partial – of the river Bièvre, as well as the rediscovery of the valley's landscape. Elected officials, associations and water-management specialists have all been working toward this goal for many years.

	Upper Bièvre	Lower Bièvre
Location (departments concerned):		
- in the region	Yvelines, Essonne	Hauts-de-Seine, Val-de-Marne
- outside the region		
Location according to the Regional Green Spaces Plan	Green Belt, agglomeration network	
Number of communes	9	8
Population (1990)	102,650 inhabitants	212,720 inhabitants
Length:		
- in Ile-de-France	36 km	
- total		
Surface area of catchment areas	198 km ²	
Surface area of the sector being studied		
Mos 1994 (Land use - 1994):		
- natural area	52.4%	3.4%
- urban area	47.6%	96.6%

A project that concerns the entire Bièvre basin

This project must take into consideration – both in the upper and lower valley – the development and management of a territory that represents the entire catchment area of the Bièvre, not just that which includes the communes that directly surround it. This is the only way that appropriate measures can be taken to revitalise the Bièvre valley.

The valley of the Epte

Jean-Jacques Lange
Research associate

The Epte valley extends over the extreme north-west of the region, its river acting as the regional boundary. The section of the valley located in Ile-de-France is part of the regional natural park of the Vexin .

Preserved landscapes and remarkable natural resources

The valley's landscape is in many ways quite typical, with woods on the hilltops, farmed hillsides and wet valley bottoms. In combination they form a harmonious scenic landscape, much of which is protected as a conservation area.

The valley of the Epte is one of the richest in the region for natural habitats. The two most interesting types of habitat of Ile-de-France are remarkably represented with the calcareous hills and the wetlands.

The poplar groves are another key element of the valley. They are a predominant leitmotif of the landscape, particularly downriver. The trees are divided up into parcels of land according to their age, which has allowed an undergrowth to flourish that contains a greater floral diversity than in many other parts of the region. The question of how best to manage these ecologically rich habitats is a major issue. The wet habitats, which are poorly managed if at all, are in danger of losing their floral and faunal resources. Wet meadows and poplar groves need special care to conserve their biodiversity and with the disappearance of intensive breeding from these parts, the pasture meadows risk being abandoned. The quality of the habitats at stake needs suitable action. The presence of the regional natural park of the Vexin is, in this respect, a blessing for the valley since several projects have been undertaken to preserve and enrich its resources, including environmentally-friendly farming measures and reconverting a poplar grove into marshland.

A valley flanked by two cultural centres

The valley has both cultural and natural assets to favour its discovery.

The cultural attraction is a decisive factor for its development. It is flanked by two outstanding centres in the downriver valley: La Roche-Guyon to the east and Giverny to the west. The Fourges water mill, which is a little further north, completes this triangle of tourist

attractions which brings in many visitors, particularly foreigners. The valley, whose landscapes inspired the Impressionists, is at the heart of this triangle.

The natural habitats, in terms of their resources and diversity, could be integrated into nature trail itineraries. The easy access to the river banks makes a tour along the river or the bottom of the valley a possibility worth envisaging.

A boundary valley

The river Epte acts as a boundary between two regions, the Upper-Normandy and Ile-de-France regions. That gives the valley a major role as an interface zone. More than any other valley of the region, the administrative boundaries should be overlooked and priority given to a comprehensive management of the valley, particularly with respect to the preservation of its landscape, wildlife resources and cultural assets. The fact that it has been listed as a conservation area and the existence of the Pnr in the Ile-de-France region ensures a relatively good control of urban expansion. However, one black spot remains around Gasny, in the department of the Eure. Inter-regional co-ordination is indispensable to avoid any extensions that would spoil the overall harmony.

Location (departments concerned):	
- in the region	Val-d'Oise
- outside the region	Eure, Seine-Maritime, Oise
Location according to the Regional Green Spaces Plan	Rural suburbs
Number of communes	22
Population (1990)	10,193 inhabitants
Length:	
- in Ile-de-France	
- total	117 km
Surface area of catchment areas	1,467 km ²
Surface area of the sector being studied	11,8 km ²
Mos 1994 (Land use - 1994):	
- natural area	92.1%
- urban area	7.9%

The valley of the Essonne

Jean-Louis Dubois
Research associate

The river Essonne takes its source in the Orléans forest. Two thirds of its course crosses the southern Ile-de-France area before flowing into the Seine at Corbeil-Essonnes. The valley is deep (60 to 90m).

Stretches of still water and wetlands

It has steep slopes topped with banks of sandstone and wet bottoms which are often marshy. Watermills, villages and market towns stretch along it interspersed with farms and woods. Its landscape is high quality, set off by several castles surrounded by parks. However, wooded areas and urbanisation mean that the river is hardly visible. The valley bottom encloses a series of stretches of water most of which have resulted from peat digging and the opening of quarries, marshes and watercress fields. These wetlands contribute to storing the water, slow down flood propagation and regulate the etiage. As a result, the flow of the Essonne is only subject to slight seasonal variations.

A remarkable natural heritage

The valley has a remarkable natural heritage. It features three specific types of habitat - marshes, calcareous habitats and many sandstone formations. Its alkaline marshes and peat bogs are extremely rich. They cover an area of over 1,800 hectares and provide a habitat for a variety of rare species. The Buthiers marsh is well known for its exceptional flora, the large reed bed between Prunay and Bruno-Bonnevaux is home to numerous species of paludicolous and cavernicolous birds. The Fontenay-le-Vicomte marsh features a patchwork of open or wooded areas which provide a remarkable refuge for the avifauna and flora. The moors and the grassy fields on the calcareous hillsides, the remains of former pastures and mass of fallen earth create special habitats for orchids and the praying mantis. The sandstone formations and the platiaries (rocky outcrops) have temporary pools and feature populations of biotopes only found in the Ile-de-France area and provide refuge for rare thermophilous species such as lizards, reptiles, insects, etc. in the area around Cerny, Vayres-sur-Essonne and Huison-Longueville. These remarkable habitats are highly fragile. Their preservation will only be sustained with appropriate management and protection from excessive tourist traffic. An acquisition programme has been undertaken in the framework of a departmental policy regarding the vulnerable natural areas.

Preserving the landscape

The valley land use remains predominantly rural. While the plateau is an important cereal-growing area, the slopes and the valley are used alternately for mixed farming, pasture and woodland. The bottom of the valley has a specific form of farming, watercress fields, which still exist. Unfortunately this activity is in decline. It is still present along the upper valley and was earmarked, as "landscape for recovery" in 1992 by the Ministry of the Environment.

The landscapes' variety has made the valley attractive as a recreational area and a place to live even if not many woods are open to the public (the recreational centre in Buthiers, the park in Villeroy) and tourist facilities are still modest. However, this harmony is threatened by urban pressure intensively spreading from the lower valley and has led to fears that a continuous section of development along the watercourse as the villages and market towns tend to converge. The splinter development of patches of land which are often highly piecemeal fosters the proliferation of sheds leading to the loss of originality of numerous sites. The Essonne valley has many positive assets provided its development respects the following conditions: a moderate urban growth, conservation of green breathing spaces between development projects, preservation of wetlands in the valley bottom and of remarkable natural habitats, development of hiking footpaths providing views over the river and enabling nature to be discovered—e.g. the nature trail at Maisse.

Location (departments concerned): - in the region - outside the region	Essonne, Seine-et-Marne Loiret
Location according to the Regional Green	
Spaces Plan	Rural suburbs, Green belt
Number of communes	26
Population (1990)	94,515 inhabitants
Length: - in Ile-de-France - total	58 km 90 km
Surface area of catchment areas	1,945 km ²
Surface area of the sector being studied	27,387 ha
Mos 1994 (Land use - 1994): - natural area - urban area	84.4 % 15.6 %

(1) Vulnerable Natural Areas

The valley of the Grand-Morin

Jean-Louis Dubois
Research associate

The valley of the Grand-Morin is a long valley that stands out on the Brie plateau, in the heart of the Seine-et-Marne region.

A characteristic and complex landscape

The valley of the Grand-Morin forms a very distinct entity in the landscape of the Brie plateau. It is a long, narrow and sinuous valley which is extremely hemmed in on the plateau. It has tight meanders that often divide it into channels, adding to the complexity of the landscape. The landscapes vary greatly all along the valley, with sections that are rural and others that lie on the outskirts of urban zones. There are also areas of outstanding scenery such as the bends of Serbonne and Guérard.

indispensable to counter the tendency of the two urban areas to fuse. Further upriver, green zones are also necessary around Jouy-sur-Morin and la Ferté-Gaucher, in a complex area where there is a strong overlap between urban and rural areas.

Four sections, four kinds of problem

In the most urbanised area (the lower part of Crécy-la-Chapelle), the valley is adopting a more residential character. Nevertheless, there is a significant potential at the bottom of the valley for the development of a green corridor. The canal's former main branch, Chalifert could help in such a development project. Between Crécy-la-Chapelle and Coulommiers, the Grand-Morin circles around a remarkable natural landscape dotted with villages whose natural identity must be preserved. In the central part around Coulommiers, the valley boasts a diversity of landscapes that have been made vulnerable by urban pressure that must be controlled. Eventually, the vaster sector in the upper valley has maintained a true rural character, however green breathing spaces must be preserved between villages which tend to converge. Itineraries from the lower to the upper valley are being considered to maximise interesting but still under-developed tourist potential. The sites' quality is ideal to promote outdoor recreational activities. Water-related activities as canoeing, boating, fishing and swimming would be favoured by restoring the river water quality.

Location (departments concerned):	
- in the region	Seine-et-Marne
- outside the region	Marne
Location according to the Regional Green Spaces Plan	Rural suburbs
Number of communes	27
Population (1990)	55,277 inhabitants
Length:	
- in Ile-de-France	76 km
- total	119 km
Surface area of catchment areas	1,235 km ²
Surface area of the sector being studied	28,5 km ²
Mos 1994 (Land use - 1994):	
- natural area	85.2 %
- urban area	14.8 %

A valley inhabited by man since ancient times

The valley of the Grand-Morin is different from other rural valleys in that man has settled there and used its resources from ancient times. The numerous water mills are evidence of the fact that for a long time the river was exploited to produce mechanical and electrical energy. This energy allowed small industries to develop on the bottom of the valley; some of these activities, however, are now escheat. The buildings and installations, sometimes abandoned, now tend to be a blot on the landscape of the valley.

The many villages that lie close to the river also help to give the impression that even in the rural areas there has been a lot of urbanisation. This is further accentuated by the fact that many of the villages are spread out in little hamlets.

Thus one of the major issues in the valley is to preserve the green zones between the urban areas to avoid the villages agglomerating. So, maintaining a natural green zone between Coulommiers and Boissy-le-Châtel is

The valley of the Juine

Jean-Louis Dubois
Research associate

The Juine takes its source near Méréville and flows toward the north between forested areas and slopes. The green, humid valley boasts beautiful, quality sites, even though its river often remains secluded.

A valley full of natural resources, landscapes and a rich cultural heritage

The valley includes five geological sites of scientific interest as well as rare plant and animal species (orchids, praying mantis, etc.). Its lawns, calcareous slopes, antique peat bogs and marshlands make the valley one of the most remarkable natural sites in Ile-de-France. The 80 ha Itteville marshland is of particular interest, with a succession of ponds and swamps scattered throughout the valley.

The villages, towns and the city of Etampes have an excellent historical and architectural heritage (churches, mills, bridges, civil architecture, etc.) as well as several large estates with castles and parks. Most of its parks are protected and some are open to the public. They enhance the recreational appeal of the valley.

While the plateau is a notable cereal growing area, the bottom of the valley is specifically used to cultivate watercress, the principal beds of which are planted in the upper part. They require significant quantities of water and display an original local landscape. Unfortunately, however, they are disappearing due to the economic difficulties suffered by this activity.

A superb valley that merits preservation

The Juine valley is a prime example of an area with significant natural resources and exceptional landscapes whose unique harmony must be preserved, especially since they will soon begin to deteriorate.

Much urban development is taking place in the lower valley. Cities and villages tend to converge, potentially resulting in the creation of a suburban framework. Excessive urbanisation would eventually degrade the landscape, the biotopes and the living environment.

Therefore, it is essential to protect the wetlands, preserve the continuity of natural areas and effectively manage urban development by maintaining green areas between cities and villages to keep them from intersecting.

The preservation of exceptional natural environments is a key objective. To conserve the unique qualities of the area and avoid an excessive influx of people, the Essonne Regional Council has adopted a programme for Vulnerable Natural Areas. The programme is designed to help protect, manage and heighten awareness of these areas.

The Juine valley is an ideal region for the development of outdoor activities with respect for its natural heritage and sites. The region offers a wide range of recreational activities - numerous hiking, bicycle and mountain bike trails, climbing and fishing, public parks and castles, three regional forests (Etréchy, Saint-Vrain, Cheptainville), a departmental forest (Chamarande) and other communal forests as well as two tourist poles (Etampes regional recreational area and Saint-Vrain animal parks) - which could be more effectively managed. Proposals include: developing promenades along the river to bring people closer to the water; improving hiking trails by adopting coherent solutions; and providing tourist facilities in the ill-equipped upper valley.

Location (departments concerned):	
- in the region	Essonne
- outside the region	Loiret
Location according to the Regional Green Spaces Plan	Rural suburbs
Number of communes	18
Population (1990)	56,087 inhabitants
Length:	
- in Ile-de-France	45 km
- total	51 km
Surface area of catchment areas	758 km ²
Surface area of the sector being studied	25,1 km ²
Mos 1994 (Land use - 1994):	
- natural area	86.5%
- urban area	13.5%

The valley of the Loing

Roger Chaix

Town planner - Architect

The river Loing takes its source in the Yonne and flows into the Seine at Saint-Mammès. The valley traverses the rural and forest areas of the Seine-et-Marne department to the south of Fontainebleau forest.

Natural and landscaped elements that are both rich and varied

Far removed from Paris and its suburbs, the valley of the Loing has remained very natural. Its main asset is its abundance of species and the diversity of its natural habitats and landscapes. The wooded areas are a major aspect of its environment. More than a third of the land is wooded and a great deal of this is part of the wooded massifs that are open to the public. The wetlands of the valley bottom and the calcareous hills (the two most remarkable types of habitat of the valleys) are also represented in the valley of the Loing.

However, what makes it original is the presence of numerous stretches of still water that were formed after the old quarries were abandoned. The use of aggregates has greatly modified the valley to the detriment of the wet meadows and alluvial forests. The loss of certain types of natural habitats has been compensated by the growth of another kind of ecological resource. The artificial stretches of still water have been colonised little by little by birds and the valley of the Loing has now become the largest wintering area for many birds of the Anatidae family. This ornithological interest makes it a much prized observation area.

Promoting tourism on the theme of water

The main proposal for the valley of the Loing is based on the promotion of a green tourism and water-related activities. It has several assets for this kind of project:

- it is a very complementary pole with Fontainebleau forest, which is very near and attracts a lot of visitors. Fontainebleau is overcrowded and a leisure area in the valley of the Loing would help alleviate this pressure
- there are many potential leisure activities, particularly with the many stretches of calm water and the river, which could be used for water sports. Development based on this kind of activity would allow the quarries to be rehabilitated. It would, however, be necessary to have a comprehensive vision of the kind of development possible throughout the valley, on the one hand to ensure that they are complementary and not in competition with the present uses, and on the other hand to try to preserve those areas with exceptional biological resources
- the valley has certain areas with a high concentration of valuable heritage. The towns of Nemours and Moret-sur-Loing already attract many visitors
- the intentions of the communes, as shown by the local urban development plans, are consistent with this proposal

A comprehensive approach to the valley, co-operation between the communes and a development of infrastructures will be necessary in order to implement this proposal.

Location (departments concerned):	
- in the region	Seine-et-Marne
- outside the region	Yonne, Loiret
Location according to the Regional Green Spaces Plan	Rural suburbs
Number of communes	18
Population (1990)	51,435 inhabitants
Length:	
- in Ile-de-France	35 km
- total	136 km
Surface area of catchment areas	4,250 km ²
Surface area of the sector being studied	22,1 km ²
Mos 1994 (Land use - 1994):	
- natural area	85%
- urban area	15%

The valley of the Lunain

Roger Chaix
Town planner - architect

The valley of the Lunain, which is a tributary of the Loing, is a small rural valley to the south of the Seine-et-Marne department and waters the bocage of the gâtinais region.

Location (departments concerned):	
- in the region	Seine-et-Marne
- outside the region	Yonne
Location according to the Regional Green Spaces Plan	Rural suburbs
Number of communes	15
Population (1990)	7,279 inhabitants
Length:	
- in Ile-de-France	26 km
- total	45 km
Surface area of catchment areas	270 km ²
Surface area of the sector being studied	20,1 km ²
Mos 1994 (Land use - 1994):	
- natural area	94.9%
- urban area	5.1%

A natural rural valley that should be preserved

The valley of the Lunain is situated off the main transport and development routes and for this reason has managed to conserve its rural character. The landscape is a succession of bocage, ponds, fields and woods. The variety of landscapes makes it a "miniature" valley where there is a concentration of wonderful landscapes.

The hydrology of the Lunain gives rise to a semi-permanent river in the upper valley, which has repercussions both for farming and the natural habitats. Upriver, crop fields are spread across the valley bottom, although animal husbandry, particularly of sheep, is still common. As a result, the land is still well-conserved and the rural nature of the valley is preserved and is something that should be pursued in the context of the farming and environmental policy. Pasture meadows are more common downriver from Lorrez-le-Bocage. The most interesting natural habitats are also to be found in this part of the valley. The wet meadows on the valley bottom, which are lined with tadpole willows, have been conserved due to the favourable hydrological characteristics there.

The valley of the Lunain from an ecological point of view has an abundance of natural resources, not least of which are the wet meadows and the calcareous hills, although Episy marsh is also an extraordinary habitat worth mentioning. The ecological balance is slowly being unsettled by the fact that wet meadows are being neglected. In order to preserve the valley's character animal husbandry must be supported.

The principal issue in the valley is the safeguarding of the landscape and ecological resources. Green breathing spaces and interfaces must be conserved between the urban areas. The splinter development of the natural habitats and the linear urbanisation that fragment the land must be banned.

A low key promotion is envisaged

In order to preserve the harmony that gives the valley its charm, only a modest development of leisure and green tourism activities is envisaged. This should be based in particular on nature-related activities that provide the possibility of exploring the valley. Hiking is one of the main possible ways to promote the valley. Walking, horse-riding and cycling paths should be developed along appropriate paths. This framework offers numerous viewpoints about the valley as a whole that should be encouraged. The state-owned Nanteau forest is an additional asset for the recreational potential of the valley, although the possibility of opening other forests to the public should be considered.

The heritage resources are another aspect of the promotion of the valley. The minor elements of water-related heritage could form part of a picturesque discovery network. There are also a number of castles to be visited which, although privately-owned, are part of the historical treasures of the valley.

Developments must be adapted to the number of visitors planned for. These developments could be more important at the confluence with the Loing particularly for water sports activities.

The valleys of the Mauldre and the brook of Gally

Bernard Cauchetier
Research associate

The valley of the Mauldre crosses the north of the Yvelines department from Rambouillet forest down to the Seine. Its tributary, the brook of Gally, takes its source in the prestigious park of the Château of Versailles and traverses the natural and harmonious area of the plain of Versailles.

A valley that focuses on the theme of water

In the valleys of the Mauldre and the brook of Gally, the main leitmotiv is clearly the heritage and activities related to water. This centres on several main themes:

An interface valley between the major areas of the region

The valleys of the Mauldre and the brook of Gally form an important interface zone between the areas of major significance for the region's water. To the north lies the valley of the Seine, the main river that crosses the region. To the south there is the Rambouillet massif which is considered to be the water tower of the Yvelines department. Many rivers take their source here. To the east lies the château of Versailles and its parks, an internationally renowned heritage famed for its use of water.

Mirror elements of water-related heritage

The villages in the valleys of the Mauldre and the brook of Gally have a very rich and varied water-related heritage, including the wash houses, water mills and fountains. The renovated reaches are also characteristic of the valley bottom, which is covered with meadows in the meanders of the Mauldre. The aqueduct of the Avre is a striking element of the landscape, particularly when it becomes a stonework for crossing the Mauldre. Finally, there are numerous springs that are sometimes linked with in a remarkable site, such as the springs of Boussy and Méry.

The village of Rennemoulin, facing the river, is a good example of how these elements should be promoted.

The water-related heritage of historical interest

The château of Versailles and its famous fountains, which stand in the park in which the river brook of Gally takes its source, are the elements at the heart of the water theme. The domains of the hydraulics engineers of Louis XIV and the Grand-Maison castle at Villepreux are further testimony to the history of this fundamental interest in water in the valley.

Improving the management of the water resources

Restoring the quality of the water

The very poor quality of the river water, particularly in the brook of Gally and the downriver section of the Mauldre, is a major obstacle to encourage tourism. Promoting the fabulous architectural heritage of the valley presupposes that the river water is a suitable showcase. Efforts to clean up the water must be made in order to attain the water quality objectives decided by the "Agence de l'eau" (the Water Agency). Building a lagooning station in the upriver section of the brook of Gally would be a good way of integrating a modern solution to water purification into the landscape of the valley.

An area with reserves of subterranean water

The presence of subterranean catchment points is an additional feature of the importance of water to the valley. The reserves in this area are important for supplying the whole region with water, which implies that the quality of these resources be maintained. Farming methods that take into account these constraints should be proposed to the farmers. In this respect, agreements similar to the farming and environment contracts would be suitable.

Preserving the wet lands and the flood zones

The valley of the Mauldre has wet habitats that are rich in resources but have been made vulnerable by the disappearance of farming and urban pressure. Throughout the valley these areas must be protected and properly managed.

There is a very good possibility that the theme of water can be exploited to promote the valley. Exploring the heritage and the natural areas could be supplemented by more educational activities concerning the supply of water or lagooning. The creation of paths and improving the accessibility of the banks should also be incorporated into this project.

	Mauldre	Brook of Gally
Location (departments concerned):	Yvelines	
- in the region	Yvelines	Yvelines
- outside the region		
Location according to the Regional Green Spaces Plan	Rural suburbs	Green belt
Number of communes	15	11
Population (1990)	49,259 inhabitants	53,394 inhabitants
Length:		
- in Ile-de-France	37 km	21 km
- total		
Surface area of catchment areas	470 km ²	
Surface area of the sector being studied	22,2 km ²	
Mos 1994 (Land use - 1994):		
- natural area	76.8%	79.3%
- urban area	23.2%	20.7%

The valley of the Morbras

Françoise Guyon
Town planner - architect

The little valley of the Morbras lies entirely within the green belt, in the heart of a highly urbanised area. It is a highly popular route between the dense urban areas and the great forest massifs to the east of Paris.

The small valley's green belt in danger

The changes in the valley of the Morbras are a good illustration of a model of urban expansion in an area on the urban outskirts. It is a case which shows how poorly controlled development can lead to a geographical entity losing a previously well-defined identity. The new urbanism plans increase urban pressure and the process whereby the natural areas lose their structure. The urban zones that have been authorised at the bottom of the valley and on the edge of the plateau, together with the new infrastructures, are a danger to the landscape, the continuity of the green network at the valley bottom and the green breathing spaces between the towns. The great farming enclaves that still characterise the valley identity have been amputated, and are increasingly fragmented and compartmentalised. The future of farming, which is already precarious, is now looking bleak. However, farming is needed in the valley to ensure that the land is not abandoned and to maintain its open landscape.

Restoring the good quality of the water

The quality of the water of the Morbras is very poor and the level of pollution alarming. The aquatic habitat has almost disappeared and the bad smell that arises during the low water periods is an obstacle to any kind of promotion of the area. This degradation can be explained mainly by the lack of adequate means to purify the wastewater. The situation should improve in the next few years since restoring the water quality is one of the main priorities of the Urban Development and Water Management Plan for the lower Marne. The discussions that will be held in the context of this plan will be the occasion to bring together all the people concerned by the river management with a view to taking into account the development of the valley right across the catchment area.

Beyond the improvement in the water quality (in order to reclaim the river), a good compatibility of different water uses will have to be encouraged in order to deve-

lop the ecological, landscaped and recreational potential of the valley of the Morbras and to give it a structural leading part in urban development.

A visible but fragile landscape identity

The well-defined identity of the valley was for a long time based on a distinct geographical and landscaped entities structured around a network of farms and mapped out by the geometrical mesh of the great castle parks, the hunting paths and the old royal roads.

Today, however, the main contours of the landscape are beginning to fade beneath urban development. The zones of transition between the urban and the rural land are deteriorating and the farm land, a key aspect of the landscape, is becoming more and more difficult to manage. Visible ruptures are on the increase.

Maintaining a visible landscape network that would accompany urban development is a key issue in the valley of the Morbras. The rapid changes that are taking place here mean that dealing with the question of development in the valley is a matter of real urgency.

A valley with good prospects for the creation of a green network

The aim in this fast growing urban zone is to find a balance and diversity for the recreational activities on offer, to develop a proper green corridor along the Morbras and to structure the existing patchwork of green and wooded areas around an unbroken network of non-motorised means of transportation.

The valley, hemmed in by the great forest massif, has many assets that would favour the creation of a green network across the region. The structure of the landscape, the woods, the existing urban parks and the network of historic parks and gardens must be used as the basic framework for this network.

This network should be developed along three main lines: the green corridor of the river Morbras, the forests on the edge of the plateau and the diagonal green links that provide green zones between the urban areas and link the valley to its periphery, in accordance with the aims of the regional council.

Despite the fact that it is small, the river is a key element in the structure of the valley and should constitute its nerve centre, on condition that the banks and the nearby heritage resources are restored and made accessible to the public by opening paths through the countryside and the urban areas. Statutory protection combined with the acquisition or opening to the public of the residual green areas are both necessary to ensure the continuity and diversity of this green network and also to bolster the downriver section, from the Marne to the Queue-en-Brie, which has a remarkable and recreational landscape unity.

How should these aims be implemented? The statutory and real estate pressure are so strong that only a determined and co-ordinated policy dealing with the catchment area as a whole will enable the river and its banks to be reclaimed, to maintain farming activities and to avoid the closing off and the degradation of the landscape.

Location (departments concerned): - in the region - outside the region	Seine-et-Marne, Val-de-Marne
Location according to the Regional Green Spaces Plan	Green belt
Number of communes	8
Population (1990)	95,845 inhabitants
Length: - in Ile-de-France - total	17 km
Surface area of catchment areas	80 km ²
Surface area of the sector being studied	6,5 km ²
Mos 1994 (Land use - 1994): - natural area - urban area	60.2% 39.8%

The valley of the Orge

Paul Lecroart
Town planner

The valley of the Orge is an example of a valley that links town and country in the southern part of the region. Springing up from the Beauce plateau, in the upper part of Dourdan Forest, it extends to the Seine 52 km further in Athis-Mons. It stretches through rural landscapes, urbanised areas as well as rapidly developing transitional sectors.

	Upper Orge	Lower Orge
Location (departments concerned): - in the region - outside the region	Yvelines, Essonne	Essonne
Location according to the Regional Green Spaces Plan	Rural suburbs	Green belt
Number of communes	13	15
Population (1990)	37,914 inhabitants	239,329 inhabitants
Length: - Ile-de-France - total	52 km	
Surface area of catchment areas	980 km ²	
Surface area of the sector being studied	23,8 km ²	
Mos 1994 (Land use - 1994): - natural area - urban area	86.2% 13.8%	31.8% 68.2%

An axis for development

The valley of the Orge is a regional urban development axis which is gradually advancing to rural zones. Although the railway line (RER⁽¹⁾ C) that serves the whole valley was a factor for development, it is the roads which principally lead to dispersed and poorly organised urban development. Cross-country highways (A6, Paris Orbital, RN 20) tend to divide the valley into three sectors: the urban sector in the lower valley, an intermediate sector where urban areas tend to converge and an already threatened rural sector in particular, in valley bottom, upstream.

Numerous assets, but a great fragility

Many improvement actions have already been initiated in the valley of the Orge. The two river associations have played a major role, as well as the region, the Essonne department and certain communes. In the lower valley, the banks have been developed and public parks offer numerous outdoor activities. Various actions implemented by the Association of communes of the lower Orge valley (Sivoa) have prompted the creation of a 25 km walkways and landscape network around the river between Arpajon and Athis-Mons. The association of communes of the upper Orge valley (Sivso) is conducting numerous actions for the preservation of sensitive areas: protection and management of wetlands, protection and development of river banks, etc.

The valley has significant advantages to reinforce its role as a link between riverside towns. It is one of the only valleys where a continuous promenade can be built along the banks or nearby. Like a real green corridor within the urban area, this link relies on hiking trails in the upper valley.

Challenges posed in the intermediate sector

The main challenges that will determine the future of the valley are concentrated in the intermediate sector, between Brétigny-sur-Orge and Breux-Jouy.

This area concentrates most of urban pressure. Cities tend to converge without allowing for green breathing spaces. The C6 highway project may further destabilise the sector. Splinter development, in particular, is a major concern.

The development of a large regional park on the property of Joncs-Marins, currently being acquired by the "Agence des Espaces Verts"⁽²⁾, will help make this area a key sector for the entire valley.

The aims and actions proposed by the study have already been accepted by the Association of communes and Water Authorities. From Arpajon to Athis-Mons, the Sivoa and the local councils will implement 120 proposals within the 'Green Plan' they have just approved.

(1) RER: Express suburban train network

(2) The Green Spaces Agency

The valley of the Théroouanne

Nelly Barbiéri
Town planner - architect

The Valley of the Théroouanne is located in the rural suburbs, in the heart of the highly agricultural Multien plateau.

A high quality, well-preserved landscape

A wide predominance of farmland

Considering that nearly 80% of the territory is farmland, the valley of the Théroouanne is the most agricultural region of all the valleys studied. The agriculture is modern and dynamic, thus ensuring the continuity of the farming industry of the Multien plateau. The landscape's predominance of farmland accentuated by some woods, particularly around the river, gives the valley a pleasant sense of harmony. As a result, the open landscape offers many views onto the valley.

Quality villages

Removed from the principal means of communication, no significant urban development has been carried out in the valley except the villages of Saint-Pathus and Saint-Souplet, located near the source. They have undergone any marked planning - housing development projects which are poorly integrated into the landscape. At the lower part of the valley, Congis-sur-Théroouanne had formerly been strategically developed at the confluence with the river Marne.

The other villages have maintained their exceptional rural nature. They are located around the river, on the slopes, on the plateau and in small adjacent valleys.

The valley and the villages are enhanced by beautiful farms which display the region's strong farming industry.

Small, dry transverse valleys

The valley of the Théroouanne has an original landscaped characteristic with some transverse thalwegs that stretch to the relatively wide valley. These small, dry valleys give it an open aspect. The villages situated on the plateaux can be seen from the valley.

A wooded valley bottom

Amongst the vast stretches of farmland, the river and the valley bottom are accentuated by woods, notably poplar groves, which can easily be seen throughout the landscape.

Discreet natural resources which must be preserved

Few people are familiar with the natural rich habitats of the wet meadows located in the valley bottom and the river branches. However, these areas are regressing due to a lack of maintenance. They are further degraded by spontaneous reforestation or the planting of poplar trees. The significant development of poplar groves has affected the originality of the area. In fact, many have been abandoned because they are no longer as financially profitable as they once were. The least maintained poplar groves have coppices that help preserve biodiversity. Priority action in the valley should focus on the recovery of these natural humid areas.

Location (departments concerned):	
- in the region	Seine-et-Marne
- outside the region	
Location according to the Regional Green Spaces Plan	Rural suburbs
Number of communes	15
Population (1990)	12,676 inhabitants
Length:	
- in Ile-de-France	23 km
- total	
Surface area of catchment areas	174 km ²
Surface area of the sector being studied	8,6 km ²
Mos 1994 (Land use - 1994):	
- natural area	94.5%
- urban area	5.5%

The valley of the Vaucouleurs

Bernard Cauchetier
Research associate

The valley of the Vaucouleurs is a predominantly rural valley located west of the Yvelines department near the regional border. The river flows into the Seine in the city of Mantes, the only urban area in the sector.

An isolated and preserved rural valley A high quality and rural landscape

The area has two strengths: its diverse, rural and well-preserved landscape, and a small but rich heritage spread well throughout the valley. Although not spectacular, the valley's heritage (churches, water-related heritage, mythology) is very well integrated in the area and is worth stopping for.

The valley's preserved landscape is attributed to its relative isolation within the region, as it is far removed from the main areas of development. The city of Mantes is the only pole of attraction and provides a means of access to the valley. As a result, it is not highly developed, with very few structures for accommodations despite its exceptional landscape.

The isolation of the valley is reinforced by insufficient physical and visual accessibility to its river banks. The sectioned landscape in the upper sector does not open onto the river. An increasing number of excellent views can be found below Septeuil.

Total separation between the city of Mantes and the rural area

The city of Mantes constitutes the lower extremity of the valley. Despite the importance of this urban pole, there is a clear division between the rural zone and the agglomeration at the border of the commune. Urban expansion is contained on one side of the highway around Mantes. As a result, one gets a real impression of preservation from the remainder of the valley.

Areas where drinking water was harnessed, previously located alongside the agglomeration, were relocated to construct the highway interchange. Today they are located in the rural part of the valley and will contribute to the preservation of its natural qualities.

Possible development schemes

A number of priority development projects have been proposed that will also preserve the rural nature of the valley:

Location (departments concerned): - in the region - outside the region	Yvelines
Location according to the Regional Green Spaces Plan	Rural suburbs
Number of communes	11
Population (1990)	24,495 inhabitants
Length: - in Ile-de-France - total	20 km
Surface area of catchment areas	192 km ²
Surface area of the sector being studied	5,8 km ²
Mos 1994 (Land use - 1994): - natural area - urban area	81.5% 18.5%

Protection and management of open spaces

The valley's rural landscape is one of its major assets. It is made up of a diverse group of environments, some of which have a marked ecological interest. However, management is the key to its preservation; it must be adapted to the type of environment encountered. The calcareous fields, the valley's richest areas, may turn into fallow lands due to a lack of maintenance, as grazing is no longer practised. Farm management appears to be the appropriate solution. Meadows at valley bottom could also be the subject of environmentally-friendly farming measures. On the other hand, the afforestation of gullies deserve to be protected, but may evolve at their own rhythm.

Discovery by means of pedestrian and bicycle paths

The landscape in this small valley is worth discovering "gentle" means, in keeping with its peaceful nature. The ever present small, rural water-related heritage serves as a guiding element in the discovery of the area. The pedestrian hiking paths could be supplemented by paths leading to the river banks, thus encouraging fishing. Cycling routes have also been proposed that run along the valley and offer ring routes from the train stations.

The valley of the Viosne

Bernard Cauchetier
Research associate

Located in the heart of the regional natural park of Vexin, the valley of the Viosne links the farming plateau of Vexin to the new city Cergy-Pontoise. Outside the new city, the valley maintains its rich and diversified rural quality.

Significant potential, but risk of degradation

The valley of the Viosne is remarkable for the quality of its landscape, natural areas and pisciculture. Nonetheless, current developments may lead to the degradation of all of its potentialities.

The landscapes' quality

The valley boasts high quality and diversified rural landscapes. Despite the railway service, the rural villages are quite well preserved from urban expansion. The narrow valley is accentuated by its steep, forested slopes. The open valley bottom offers beautiful views onto wetlands of great interest.

However, these landscapes are constantly changing. The spreading of poplar groves has significantly blocked the landscapes.

Rich wet habitats

The wet habitats are the most remarkable ecological areas in the valley. Some of them have at least a regional interest, but the recent changes tend to diminish their value. The valley's biodiversity tends to be damaged by the increasing number of poplar groves, notably in peaty areas, as well as the rectification of the river banks. Although the development of the former has been stabilised, today there is a rising number of fishing ponds in the bottom of the valley, in humid fallow lands. This has a notable effect on the ecosystem.

The quality of the river and pisciculture interest

The Viosne is one of the most interesting rivers in terms of pisciculture, due to the quality of the water and habitats.

Recovery of pisciculture and the landscape

The changes which pose a threat to the balance of the valley's ecosystem must be contained before they destroy its considerable potentialities. A recovery of the landscape could be considered in areas where numerous poplar groves block the panorama, particularly in the upper sector. Furthermore, the reopening of the valley bottom would be perfectly compatible with the restoration of pisciculture habitats and the protection of wetlands. Further measures are also necessary to improve the potential of pisciculture in the river (restoration of spawning areas, protection of natural sites, reorganisation of river banks, etc.). The department's pisciculture scheme has made similar proposals. The regional natural park of Vexin plays a major role in this measure.

Location (departments concerned):	
- in the region	Val-d'Oise
- outside the region	Oise
Location according to the Regional Green Spaces Plan	Rural suburbs, Green belt
Number of communes	13
Population (1990)	46,678 inhabitants
Length:	
- in Ile-de-France	20 km
- total	
Surface area of catchment areas	196 km ²
Surface area of the sector being studied	15,1 km ²
Mos 1994 (Land use - 1994):	
- natural area	82%
- urban area	18%

The valley of the Yerres

Nelly Barbiéri

Town planner - architect

The valley of the Yerres is located in the heart of the agricultural Brie plateau. It provides a link between the rural areas of the Seine-et-Marne department and the urban areas of the Essonne and Val-de-Marne departments, thus forming two clearly distinct sectors.

Meanders: characteristic elements of the landscape

With a highly agricultural land use the valley is badly distinguished from the Brie plateau. The large cereal crops extend to the edge of the river. However, the site is marked by several characteristic elements of the landscape along the river that makes the valley perceptible; a ripisylve which marks the watercourse; and narrow meanders that upgrade the landscape. At the end of the rural zone, these meanders form a consistent curling agricultural motif surrounded by woody slopes.

Hydraulics: a leading thread for the entire valley

As regards hydrogeology and hydraulics, the valley of the Yerres has several particular characteristics. There is a close relation between Champigny ground water and the river. The abysses cause the river water to infiltrate rapidly into the ground waters, which makes it very vulnerable to the quality of the water in the Yerres. The valley's major constraint is associated with the hydraulic regime and the risk of flooding. The torrential regime, with its sudden rise in water levels and minor low-water marks, is unique in Ile-de-France. The lower urbanised sector presents significant risks of flooding. Construction projects in areas prone to flooding and ground waterproofing have further accentuated this phenomenon. Rural areas are sought after to encourage a more natural river flow. A research association that brings together all of the river associations in the upper and lower sectors was created to address this issue. In addition to construction restrictions near the river, several solutions are being examined (compensating reservoirs, natural flood expansion areas). However, there still has been no consensus on one of these proposals. Nevertheless, this association represents an initial step towards a global vision of the

	Upper Yerres	Lower Yerres
Location (departments concerned):		
- in the region	Seine-et-Marne	Val-de-Marne, Essonne
- outside the region		
Location according to the Regional Green Spaces Plan	Rural suburbs	Green belt
Number of communes	21	11
Population (1990)	51,891 inhabitants	141,647 inhabitants
Length:		
- in Ile-de-France	90 km	
- total		
Surface area of catchment areas		
Surface area of the sector being studied	32,6 km ²	
Mos 1994 (Land use - 1994):		
- natural area	90.8%	48.2%
- urban area	9.2%	51.8%

development of the entire valley.

A rural upper valley

The upper sector including the Seine-et-Marne department boasts exceptional rural areas. The villages on the slopes are well preserved from the unsightly urban extension and splinter development. This part of the valley has a more discreet heritage and natural resources, with a small water-related heritage on the river: wash houses, bridges and fords that are characteristic of the area. Together they give an impression of harmony that must be preserved.

The land is principally used for farming. It is a very intensive industry which has departments developed up to the river bank. Meadows have become scarce, and sometimes there is no ripisylve. The leading proposals for this sector include the re-creation of transitional areas near the river, particularly to restrict the farming, the restoration of some ripisylves, and the setting up of grassy strips. The creation of natural flood expansion areas is a project that must be examined with farming experts in order for more effective flood management.

A highly-developed sector in the lower part of the valley

The railway below Combs-la-Ville has prompted urban development. As a result, today this area has become a dense urban fabric. However, these changes have not overshadowed the valley, which remains ever present thanks to the striking relief. Despite the nearby construction projects, the river is a prevailing element in the landscape. In fact, it has been accentuated by the development of certain sections of its banks.

All of the remaining natural spaces in this part of the valley must remain undeveloped. The development

must be in keeping with the continuity of the promenade along the river to form a real "riverside park on the Yerres".

The valley of the Ysieux

Nelly Barbiéri

Town planner - architect

The Ysieux is a small river located on the borders of the Val-d'Oise department that flows into the Oise. The valley is made up of overlapping wooded and farming areas, and is part of the Three Forest regional natural park project.

The gateway to the Chantilly forest

The landscape of the valley of the Ysieux has a distinguishing characteristic – a vast woodland. Particularly visible on the northern side, it marks the overhang of the forest massif of Chantilly. The large cereal plateau of France extends through the south. The valley is in a privileged location between two vast landscapes; it represents the gateway to the Chantilly Forest in Ile-de-France.

Perpendicular to the axis of the valley, the passage that is made up of several important roads helps shape the landscape and reinforces its role as a linking valley.

An important historical heritage

Located between Paris, Saint-Denis and Senlis, the valley contains numerous historic marks that date back to the Middle Ages. The valley's abundant castles, gardens and remarkable villages (Luzarches in particular) attest to its rich heritage and architecture. The rich patrimony, culture and natural areas are concentrated in an exceptional site further below, around the Royaumont Abbey. It is considered the valley's treasure.

A considerable challenge: maintaining green breathing spaces

Development in the valley is quite extensive. Urban planning projects have been carried out from villages located at the crossroads of the valley with three main roads that run through it: Asnières-sur-Oise, Luzarches and Fosse. The green spaces between urban areas are still present but are beginning to decrease. Maintaining them is a key challenge in the development of the valley in order to preserve the remarkable landscape that still remains.

It is difficult to get an overall view of the valley due to an only slightly pronounced relief, development projects and the woodlands. The preservation of open spaces at the bottom and on the slopes of the valley will help maintain the identity of the sector.

Today, there is a relatively dense network of hiking trails, however they are often perpendicular to the river's axis. To facilitate the discovery of the river, a trail more or less parallel to the river could be designed to supplement the existing network.

Location (departments concerned):	
- in the region	Val-d'Oise
- outside the region	
Location according to the Regional Green Spaces Plan	Green belt
Number of communes	11
Population (1990)	29,449 hab.
Length:	
- in Ile-de-France	15 km
- total	
Surface area of catchment areas	75 km ²
Surface area of the sector being studied	26 km ²
Mos 1994 (Land use - 1994):	
- natural area	79.4%
- urban area	20.6%

Challenges and Actions

Easily identified in the landscape, valleys play a major role in regions. They offer all the necessary elements for the residents of the region: exclusive living zones, areas for transit and connections, valuable natural sites, catchment areas in the heart of the water cycle and recreational areas. These landscapes and functional entities – which must demonstrate solidarity between the upper and lower sectors – form a natural environment which can serve as the basis for regional development. Today there is talk of intermunicipal efforts for projects, regions and territory organisation; accordingly, valleys must be recognised as complex systems that have to be considered as a whole. It is important to work toward concerted management, from an environmental as well as urban and economic development perspectives. Valleys are exclusive areas for implementing the concept of sustainable development on a supramunicipal scale.

A major challenge: valleys, units of development

Why are valleys considered units?

Valleys are areas which are recognised and well-individualised by geographers. By definition, they transcend administrative boundaries, which often serve as the basis for development procedures. They contain a number of remarkable characteristics, which should be considered as a whole.

Remarkable landscape entities

The valleys in the landscape of the Paris basin are remarkable. Although the large valleys such as the Seine, the Marne and the Oise give structure the smaller ones also boast notable landscapes regarding farming plateaux within the region. The latter also show a 'sunken' relief in the plateaux. However, the disjuncture can also be caused by changes in land use. The valleys contain a succession of woodlands, farmland, prairies and natural

sites which contrast with the uniformity of the plateaux. It is not easy to define the valleys. The dividing lines on a slope form a boundary which can be used as a basis for defining the landscapes entities of a valley.

Valleys are like ecosystems

The valley's ecosystem is made up of two principal elements: water and vegetation.

Water:

is a guiding element which allows for biological continuity throughout the valley. It also provides a link between the different areas of the valley: run-off water provides a link between farmland and the river, and the purification network supplies a link between urban areas and rivers. Considering this, water is also the principal carrier of various forms of pollution.

Vegetation:

Like water, vegetation also allows for continuity throughout the valley, notably through underwater and riparian vegetation. It forms a network between the different elements in the valley: riverside vegetation, afforestation, urban vegetation. Hedges and other linear systems play a major role in these links.

Water and vegetation are essential for the movement of the fauna, which use ecological passages made up of hedges, river banks, streams and other elements.

Therefore, valleys are true biological corridors where the notion of natural continuity is imperative.

Solidarity among territories

Established on a geographic entity, valleys are sites where a certain amount of solidarity is needed throughout the area. All communes are linked by a natural element –water– and various actors must ensure its quality throughout its course. The river associations were created to address this global approach. With respect to development, solidarity must also take into account the risk of floods. Ground waterproofing in urbanised areas has consequences on the entire valley. Such is the case for example in the valley of the Yverres between the lower urban area in the beginning and the rural sector. Concerted and intermunicipal management of the catchment area is required to deal with this "natural" solidarity.

Linking areas

Valleys form natural linking axes between major areas in the region.

Links between urban and rural areas:

In the framework of regional development, valleys are part of a transverse section that provides a link between the three other concentric sections: the central agglomeration, the green belt and the rural suburbs. Such is the case in several valleys: Orge and Yverres which stretch from the rural suburbs to the green belt; Bièvre, which crosses the agglomeration from the green belt, etc. They are known for giving structure regarding green corridors.

Links with large natural entities:

forests, plateaux, large valleys. Valleys form links between vast natural areas: large national forests in the upper part, such as the Rambouillet massif in Mauldre, the Dourdan Forest in Orge, the Crécy Forest in Yverres, or nearby in the Chantilly Forest in Ysieux and the Fontainebleau Forest in Loing. The valley of the Ysieux forms a real transition between two ecosystems: the Oise forests in the north and the plain of France in the south; between the plateaux and the large valleys in the region: the Vexin plateau and the valley of the Seine in Aubette de Meulan and Montcient; the Hurepoix plateaux and the Valley of the Seine in Vaucouleurs; the Multien plateau and the valley of the Marne in Théroüanne; and the Brie plateau and the valley of the Marne in Grand-Morin.

Links between the Ile-de-France region and surrounding regions:

Many rivers spring up well beyond the regional boundaries. The valleys provide a communicating link between two regions that have their own characteristics and developments: for instance, the Loing river has its source in Yonne, and the Essonne springs up in the forest of Orléans. The valley of the Epte plays a particular role, as the river forms a boundary between the Ile-de-France and the Upper Normandy regions. Although the Ysieux river does not constitute an administrative boundary, the valley is located on the border of the Oise Department.

Links with recreational areas:

Valleys serve a number of recreational areas and integrate them in a chain of infrastructures and diversified and complementary zones. They are lined with forests open to the public (the forests of Cheptainville, Saint-Vrain, Etrechy in of the valley of the Juine, the forest of Nanteau in the valley of the Loing, the forest of Verrières and many other public woods in the Bièvre valley), as well as recreational areas (Etampes for the valley of Juine, Buthiers for the valley of the Essonne) and a large number of more modest recreational infrastructures, such as equestrian centres. The axis of the valley creates a link between urban areas and rural recreational zones.

How should these territories be considered?

Recognise the particularity of the territories

The notion of "territory" is too often overlooked in regional planning and development projects. A territory can be considered in different perspectives according to the objectives defined. From a geographical perspective, it is based on natural boundaries and spatial challenges; from a more economic point of view, other considerations such as urban poles and employment will be taken into account. In any case, it transcends administrative boundaries.

Recognize that valleys are territories with an array of common problems.

A Contract to open Gillevoisin castle parks in Janville-sur-Juine to the public

The domain of Gillevoisin is one of the numerous castle parks that are dotted across the valley of the Juine and is listed as one of the most beautiful gardens in the Essonne. It stretches over 40 ha along the bottom of the valley on both banks of the river Juine.

The domain is occupied by a medico-professional institute whose mission is to care for maladjusted or handicapped adolescents and to help them with their social and professional integration. The horticultural section gives the young a chance to learn about the work involved in the upkeep of the park. The opening of a tea room, together with the creation of a catering section, was the first step in opening up the domain to the outside world.

Ten years ago the national institution Koenigswarter decided that its property, consisting of meadows, woods and gardens, would be run in an ecological manner. The meadows help to preserve open land, which is becoming extremely rare in the valley and is a reserve for the fauna, particularly the birds. A convention was signed with an association to use the land as pasture for horses and to look after it in a manner that was compatible with the ecology of the habitat.

In order to provide better access to the domain (visits were only possible on an informal basis until recently) the institution signed an agreement with the "Agence des Espaces Verts" (the Green Spaces Agency) in 1997 that allows free access to the park at weekends and at certain times during the week. The meadows will remain closed to the public.

The "Agence des Espaces Verts" (the Green Spaces Agency) will meet 95% of the park's expenses for development that goes toward improving the facilities for the public and the landscape of the area. The work will involve building an adventure playground and a car park, restoring the French-style formal garden and lining up the lime trees, setting up a means of signalling and the creation of paths through the woods.

The urban park of Roissy-en-Brie

The Morbras is more of a stream than a river, but nevertheless has an essential role in the urban make-up of Roissy-en-Brie. There is an almost unbroken walk with adventure playgrounds, meadows and a park in the old centre, along the brook that crosses the urban part of the commune from east to west, from the forest of Ferrières to the inter-communal recreational park that was built around a detention basin. The landscape design is uneven and the water is sometimes polluted but the Morbras and its walk, which are visited regularly by cyclists and walkers, is the main artery of a system of walking paths and cycling tours and provides a focal point for the closed in neighbourhoods that make up the town. The park has been developed on both banks of the river Morbras, close to the centre of the old town, and leads to many of the community amenities. It has been created around the rural church and the vestiges of the old castle and its park. It thus provides a suitable context for this heritage, gives the town a heart and an identity that provides it with a link to its past.

Agricultural and environmental measures in the Epte valley

The protection and management of the valleys are among the objectives of the regional natural park of the French Vexin. The valley of the Epte, located in an area of outstanding natural beauty in the reference plan of the regional natural park chart, is the subject of a local operation for the preservation of a farming system capable of managing the site's sensitive areas.

The valley presents a great diversity of landscapes and environments. The presence of livestock farming contributes to this richness. However, the development of farming practices and the regression of livestock farming are having a harmful effect on the farming management of meadows and hillsides, and one can see a deterioration of natural environments. This is resulting in the progressive closing of the environments, bringing a halt to their maintenance, and the disappearance of certain animal and plant habitats with the reduction of meadowlands to the benefit of maize growing and poplar growing, the impoverishment of environments due to over-intensive practices.

The local operation, amongst other agri-environmental measures, is a means of fighting against such degradations. It is intended to:

- maintain existing meadowland, fighting against the closing of areas by grazing and mowing,
- encourage farming practices that are respectful of the environment,
- manage areas left abandoned.

The principle of this operation, financed by the European Union and the Ile-de-France region, is to establish a contract with volunteer farmers, who undertake to comply with a specification determining the practices intended to meet the chosen objectives, in exchange for which they receive an allowance based on the constraints that have been imposed. These constraints involve, for example, the level of fertilisation, the use of phytosanitary products, the date and frequency of cutting, the maintenance of landscape features, the stocking of animals. They are adapted to the type of environment: valley meadow, hillside meadow, abandoned meadows. Several levels of constraints are proposed to farmers.

The specification was signed in 1996. Approximately 30 livestock farmers are concerned, for an area of 640 hectares. This operation seems to have made it possible to maintain farms which were in difficulty. Scientific monitoring is carried out by the regional natural park on ornithological, botanical and entomological aspects.

Other local operations are in the course of being set up within the regional natural park area in the Montcient and Sausseron valleys and on the Arthies hillocks. This will mean another 600 hectares of meadowlands that will be protected.

Source: Regional natural park of the French Vexin

Urban planning documents must particularly recognise the existence of these territories and the challenges they pose.

Develop an intermunicipal approach on territories with geographical significance.

Valleys are going along with an intermunicipal approach to urban planning, space management and recreational development.

Reinforce their linking role

Develop pedestrian, cycling and equestrian itineraries. Interesting sites are often found in the most rural parts of a valley: natural areas, public forests, recreational sites and areas of cultural heritage. Various itineraries connect these areas and offer a global vision of the valley. They ensure links between upper and lower areas, different sectors and surrounding valleys and plateaux.

Create green networks in urban areas. Real green networks can be created in urban areas, including non-polluting means of transportation, a network of urban parks, forests and recreational areas. The river and its banks, in particular, must serve as a basis for development. Private gardens, tree alignments and wooded slopes are also part of the vegetation. Certain valleys with plenty of green breathing spaces, public forests and facilities that give access to the river are well-adapted for this type of development. The valley of the Orge already offers a promenade embellished with parks throughout the lower sector. The valley of the Yerres and the valley of the Grand-Morin have good potential in the urban sector for continuous green corridors which would combine such links with public green breathing spaces.

Protect the function of green corridors in surrounding urban valleys. Surrounding urban valleys, such as Bièvre and Morbras, form large green corridors that link densely populated zones to more natural spaces made up of forests and farmland. It is essential that these areas be preserved, by protecting farmland and creating promenades trimmed with a green network between the different areas and along the river.

Preserve the ecological and landscape continuities

The preservation of the ecological and landscape continuities is a major challenge in the development of valleys. They particularly rely on the vegetation which must be preserved on the bottom of the valley and on their slopes. In order to preserve these continuities they must not be disturbed by development projects. Cross-country infrastructures not only have a visible impact on the landscape, they also present physical obstacles to the movement of persons and animals. Whether it involves housing, economic activities or sometimes even recreation, urban development produces apparent and functional divisions. From an ecological perspective, it hinders the natural course of water. Areas exposed to flooding at the bottom of the valley are the "minimum"

Souppes-sur-Loing, a progressive creation of leisure developments on the banks of the Loing

The development of the banks of the Loing for leisure activities has been carried out progressively under the aegis of Mr. Prudhomme, who was the mayor of Souppes-sur-Loing for almost forty years.

The project began by cleaning up the area and knocking down the many huts that had been built there in order to transform a site of around one hundred hectares into an area open to the public. Following this, the acquisitions and developments were carried out progressively, depending on municipal finances. The mayor, who was a vet, negotiated the acquisition of the land directly with the farmers. It was in this way that in 1962 the commune acquired Varennes pond, a stretch of water covering 10 ha, and its environs, on which a water sports centre was built.

The aims of the land use plan of 1978 included reinforcing the tourist and leisure vocation of the area as well as the protection and acquisition of the banks of the Loing. The creation of leisure and accommodation facilities, the development of the existing camp site, the protection of the green areas and the opening of various paths have since been accomplished. To the north of Souppes-sur-Loing there is the wildlife park of Emprunt, which has a tourist centre containing 40 beds and a path along the banks of the Loing opposite the sugar house. To the south lies the sports grounds, a camping site with 266 spaces and the water sports leisure centre, which has a swimming pool and facilities for water sports. It also has a club house with a restaurant. The pond is used for water sports like windsurfing, sailing and canoeing.

The work of a local association: the A.H.V.O.L.

The association for the harmonious development of the valleys of the Orvanne and the Lunain (A.H.V.O.L.) was founded in 1975 to preserve the environment of these two charming valleys of the Gâtinais region. It is involved in all of the development and environment issues concerning this area as well as in cultural activities such as concerts, plays, exhibitions and so on. This involvement led it to propose eleven walking and hiking tours, six of which are designed to allow visitors to discover the valley of the Lunain and its environs.

These 15 to 25 km round-trip itineraries take a maximum of one day. They are:

- a tour of the lower Lunain valley: a 15 km trip starting at Villemer, on the plateau, with its farmland criss-crossed by hedges and trees, between the river Orvanne and the downriver section of the Lunain. It runs past the beautiful Villeron pond and passes by the tile factory of Bezanleu, which can be visited
- a tour of Nanteau forest: almost 25 km long, beginning at Nanteau-sur-Lunain, this is a pleasant forest walk that passes through the villages of Darvault and Poligny and covers part of the G.R.13 (a registered hiking trail)
- a 16 km tour in the shape of the number 8 of the history of the Lunain, which begins in Paley, crosses a highly interesting section where there are the standing stones of Pierre Fitte, the Roche aux fées, Paley castle and then passes through the picturesque hamlets of Préaux, St Liesnes, les Ortures and Tesnières
- a 18 km tour of the plateau between the Orvanne and the Lunain. Starting at Voulx, on the Orvanne, this is a section with a lot of farmland criss-crossed by hedges and trees and with several woods, which goes through the villages of Saint-Ange-le-Viel and Chevry-en-Sereine, with its castle on the crest of the northern hillside of the Lunain
- a 20 km tour of the Lunain and its tributary the Dardou begins in the wooded and picturesque village of Chéroy, in the Yonne. It also passes through the village of Vaux-sur-Lunain
- a 13 km tour of the Lunain oxbow lakes. Like the previous one, it leaves from Chéroy, then follows the meanders of the upper valley of the Lunain across a very varied landscape.

This is how the AHVOL justifies its work: "man needs paths. They are irreplaceable ways to know and defend our environment and the rural areas, to preserve our health and our mental balance, to bring to life and to bring back to life the countryside".

The Viosne river contract

With a predominantly agricultural territory in the upper area and a more urban tendency further below, the catchment area of the Viosne covers a surface area of 196 km² and has a population of about 40,000 inhabitants. The Viosne joins the Oise at Pontoise. It flows slowly in the upstream part – a rural zone – resulting in significant sedimentation and seldom overflows. Further downstream the area is developed; the river sometimes floods and is of lower quality. The surrounding environment of the river and its tributaries is rich in humid areas, which helps preserve rare species of fauna and flora. It also has an interesting “small architectural heritage” associated with water.

In order to preserve and promote the advantages of the Viosne, 17 communes of the catchment area, 5 associations of communes and the Departmental Federation of Approved Fishing and Pisciculture Associations decided to initiate actions to meet the following objectives:

- improvement of the quality of the water by restoring decontamination networks, the creation of purification stations and balancing reservoirs, etc.
- protection, management and development of natural sites and the landscape (definition of measures for the protection and development of swamps, land acquisitions, etc.)
- improvement of drainage conditions

(construction of a balancing reservoir, gauging of the reservoir)

- manage rain water (creation of decontamination reservoirs, set-up of a gauging station, etc.)
- restore pisciculture in the river (reparation of the banks and other improvements to the river bed)
- maintenance of the river (clearing and reinforcement of the equipment)
- restoration and promotion of the architectural heritage associated with water (promotional actions, signposting, brochures, restoration of bridges and wash houses)
- promotion of the area, the accommodations and public awareness (development of pedestrian walkways, parking areas, etc.)
- management of the drinking water resource (reinforcement of the network and harnessing of a spring).

The Viosne river contract consists of a 5-year programme of operations from 1993 to 1997. All of the actions benefit from financial aid granted by the Val-d'Oise Regional Council, the Ile-de-France Regional Council, the “Agence de l'eau Seine Normandie” (Seine Normandy Water Agency) and the state.

Val-d'Oise Regional Council
Environment Mission

space that should be strictly preserved as natural areas, as it has the advantage of extending through the entire valley. However, development plans should include the major bed, the slopes and the watersheds.

Propose thematic and geographic development plans

Tourist development. As valleys have their own unique potentialities, they are adopting a wide variety of recreational activities: activities that open the door to their historic heritage, instructive activities regarding their natural heritage, visits of the landscape, pedestrian and cycling trails and water-related activities such as boating and fishing. There are many possibilities. Although such variety is part of the richness of the valleys, it can also cause common practice conflicts between users and owners. Therefore, it would seem worthwhile to make proposals for the development of valleys, and promote the activities each valley provides. Organising tourism is the

first step toward development. In order to avoid common practice conflicts, it is essential to make effective use of all of the possibilities. For instance, fishing must not be disrupted by sports activities, nor should visits to natural environments be disturbed by mountain bikers. Signs are necessary in valleys where there is a concentration of outdoor trails in order to effectively direct pedestrians, horse riders and cyclists. In the valley of the Loing, numerous ponds can be developed and promoted. They serve for a variety of activities: recreational area, fishing ponds, bird watching, protected natural sites. River associations certainly have a role to play, to assume the organisation of such development projects, as they have a global view of the valley. The associations of lower Orge and Bièvre have already carried out similar projects for the development of the entire valley. Intermunicipal efforts must be encouraged to avoid competitive development activities and to help promote the areas. Communication is the second step in the development of rural tourism. The idea of a valley is quite conceivable for the public and potential

users. Fact sheets for each valley providing information on accommodations, pedestrian trails, the historic and cultural heritage and sports activities would be useful promotional tools.

Development of natural spaces. In addition to forests, valleys benefit from the most remarkable natural environments in the region. Although this gives these areas their unquestionable value, they have not been well protected, much less developed. Valleys could be the first step toward building ecological systems which include protected areas and environments that link with one another. It would be easier to protect and manage a group of sites located in an area such as a valley. Moreover, the global vision of a valley facilitates the organisation of activities in different areas: strictly protected areas, an ecological management of areas and informative areas with infrastructures for public reception. A global approach of the valley also takes into consideration the continuity of vegetation and its extension to the city. The river can serve as an axis for the penetration of nature into the city if it is supplemented by vegetation. Actions for the management and recovery of nature are complementary to other development projects in valleys:

- the management of open spaces can be carried out thanks to rustic animal races (grazing) and the cultivation of orchards with old varieties of fruit. This could help produce high-quality, brand-name products and simultaneously serve as genetic greenhouses that are indispensable for future genetic developments
- the rebuilding of biological corridors can often be combined with the implementation of non-polluting means of transportation
- the discovery of the architectural and historical heritage is complementary to that of natural environments. Their mutual enrichment only enhances the beauty of the valleys
- in the most developed areas, in particular, there is a strong need for instructive sites both for students and the general public. Currently, certain enclosed and protected sites are worthy of development, which would be essential to ensure their continuity and maintenance.

Develop concerted management of the valley between all actors and uses based on the water cycle

Water is an essential element in a valley's ecosystem. Water cycles enable us to appreciate all of the activities of a valley. Water is at the heart of all the challenges involved in planning and development projects and is of particular interest to many actors: municipalities in charge of the conveyance of drinking water and purification, water producers who use underground sheets of water, industrialists who use water for their activities, farmers and designers of green spaces with irrigation and drainage needs, quarrymen, etc. Water management implicates public and private interests. To consider all of the sector-

based policies that have an interest in water management, we must shift from a river approach to a valley approach and all of the issues it involves.

Farming is concerned by water cycles at different levels. The management of flood expansion areas by farming is an important challenge for valleys exposed to flooding. The re-creation of these zones requires a radical change in operating methods, which must be considered in regard to the valley and with all interested parties. Similar talks have already taken place in the valley of the Yerres. Farm waste management is also important for better water quality. Actions have been undertaken to protect water polluted by nitrates, in conformity with new regulations or co-operative procedures. Such measures often require changes in certain practices to limit infiltration and the flow of water containing nitrates. Specific solutions to reduce the effects of water flow – hedges, ditches, grassy strips, etc. – can also be proposed.

Urban policy is at the centre of the water issue in the valleys. The problem regarding the treatment of areas exposed to flooding is one aspect, both to prevent future construction projects and to examine what is to become of existing structures. Today, all development issues involve the treatment of liquid waste. However, the treatment of turn-off water in infrastructures must also be taken into account. Another important element is the creation of urban green spaces. If development is well adapted, they facilitate the inclusion of nature – plant and animal species – within urban expansion and encourage the restoration of water and the reinvestment of river banks.

There is a wide variety of water-related recreation. These activities are often more highly developed in national rivers, and demonstrate good potential in the valleys that interest us, despite the restriction regarding the rights of riverside residents. Fishing is a common activity in the region's rivers; among other things, it requires adequate water quality. The creation of lakes also allows for the proposal of new activities: walks, fishing, boating, etc. Certain valleys would be willing to open the river banks to the public in order to improve their linking function and increase the potential for pedestrian trails. "Opening" contracts can be established with riverside residents. From a wider perspective regarding the improvement of the recreational potential of the valley, we can consider the public acquisition of more sizeable terrain in order to create a real green network.

The development of quarry materials has considerable consequences on water cycles. It can affect the productivity of harnessing, alter the piezometry and the expanses of water around the quarry and constitute a pollution risk in the event of an accidental or clandestine spilling of polluting or toxic substances. The reorganisation of quarries provides opportunities for new recreational activities and for the creation of ecologically rich environments, as is the valley of the Loing.

Principal actions

The richness of the valleys in Ile-de-France is in their diversity. Considering their human and urban aspects, as well as their heritage, each valley has its unique characteristics and original qualities. Nevertheless, they always encounter the same problems at different levels. Therefore, it is necessary to define the various challenges involved and the valleys concerned by each of them, in order to propose targeted actions for each case. Although the selected topics are not definitive, they help identify each valley in relation to a regional problem, and determine which ones present similar challenges. Valleys which have not been studied could be briefly analysed in order to compare them to other valleys and define the principal challenges involved. The studies are based on qualitative and quantitative criteria that evaluate the potentialities and threats posed in each valley (or parts of valleys) when they present very different characteristics throughout the territory.

Valleys noted for their natural environments

Their abundant and diversified environments form a real ecological network which gives these valleys an exemplary disposition in the region. Example: Epte, Lunain, Loing, Essonne, Juine, Viosne.

Actions:

- preservation of the continuity of spaces
- management of the valley
- improvement through educational methods.

Criteria used to evaluate the potentialities and the richness of a valley:

- natural richness and quality of the environment
- richness of heritage (developed heritage, water-related heritage, etc.)
- quality of landscape

Criteria used to evaluate potential threats and pressure:

- farming characteristics
- location in the region
- population (number of inhabitants and structure)
- organisation of villages

Natural richness

Valleys are the areas that offer the greatest richness and diversity of natural environments in the region. They do not have the same interests, as such environments are either very numerous, diversified and well distributed in the valley, or on the contrary, are limited to specific locations.

Valleys with interesting localised natural environments

These valleys present good ecological potential, but environments of interest are more specifically localised. They may also be more fragile. Example: Ysieux, Vaucouleurs, Mauldre, upper Orge, Grand-Morin, Yerres.

Actions:

- protect the most interesting elements
- preserve or re-create links between areas
- avoid further parcelling
- define well-adapted management methods for the preservation of fragile areas.

Valleys with only residual sites

These valleys have a few natural sites throughout the territory. For the most part, they have insufficient links between them and are strongly threatened by urban pressures. Their isolated location makes them particularly fragile. Example: Morbras, lower Orge.

Actions:

- preserve the remaining natural areas for their valuable heritage and educational purposes.

The rehabilitation of Frocourt marsh

Frocourt marsh, which covers roughly 70 ha of the Epte valley, is part of a group of habitats that are acknowledged as being of great ecological interest. It is situated in the commune of Amenucourt and is run by an association of communes that regroups Amenucourt, Fourges and Bray-et-Lû.

This area was chosen by the regional natural park of the Vexin in the context of its mission to restore, develop and manage vulnerable habitats, and in particular the wet habitats. The association has agreed to discuss with its different partners new management orientations to satisfy its environmental objectives.

Frocourt marsh was chosen because it met several criteria:

- it is part of an area of great ecological interest
- it is no longer a wetland because it has been used for growing poplar trees. Before the 1950s, the marsh was used as a hygrophilous pasture meadow and for hunting and fishing. After several decades of growing poplar trees the habitat has been dried out and impoverished
- there is a good possibility that it can be restored to a "natural habitat".

A study was carried out in 1995 to take stock of the ecological resources of the area, evaluate the regeneration potential of the habitat and suggest what kind of measures could be taken to fulfil this potential. After this study, a 5-year convention was signed between the regional natural

park and the association of communes in order to reclaim part of the poplar groves for marshland.

Presently, two parcels of 8 ha are concerned by this new management. The rest of the area is run by the French Forestry Commission. Preliminary work has allowed the area to be cleared of brushwood and restored. It is also planned to dig a pond to attract batrachians and provide a water hole for the animals. A convention has been signed with a farmer to use one of the parcels as pasture for Camargue horses. Other animals, cattle or sheep, will be brought in. The presence of several species with different dietary needs will balance plant consumption and allow a better upkeep of the land. The calcareous hills will also be used for grazing sheep.

A comprehensive management plan for the next ten years will be established for the entire area, thanks to a joint effort by the PNR and the French Forestry Commission.

Reopening a poplar grove in a wetland has never been done in the region. Even if it is not necessarily transposable to other areas, this shows that in specific cases it is possible to rehabilitate and manage vulnerable areas.

Taken from: The regional natural park of the Vexin— 1995—Ecological inventory prior to the elaboration of a management plan for Frocourt marsh.

"Espaces naturels sensibles" (Vulnerable Natural Areas) in the valley of the Grand-Morin

After establishing contacts with the district of Crécy-la-Chapelle, an initial study of the 'strategic' sections was carried out by the Environment Department in 1996. It dealt mainly with the valley bottoms from Tigeaux, upriver, down to its confluence with the Marne.

The decision as to which areas should be protected as part of the Vulnerable Natural Areas project was based on the projected local urban development plan that was being draw up, and on the proposals made in the study commissioned by the Iaurif on behalf of the "Agence des espaces verts d'Ile-de-France" (the Green Spaces Agency of the Ile-de-France Region).

It concerned:

- sections that were important from a landscape, ecological or recreational point of view
- and/or
- sections threatened by uncontrolled urbanisation ("cabanisation")

The district quickly took over this project and organised the debate with the communes of Crécy-la-Chapelle, Voulangis, Couilly-Pont-aux-Dames, Villiers-sur-Morin and Saint-Germain-sur-Morin.

Other communes, such as Condé-Sainte-Libiaire, Esbly and Coutevroult then expressed their interest in a similar approach.

Although it would not appear to be possible to take control of all of the banks (one part has already been urbanised), other measures will ensure the connection between the areas that are at present state-owned and those that will be in the future, as a result of acquisitions made as part of the VNA project. These measures include re-establishing legal easements, establishing contractual easements and marking out trails. If all of these projects are completed, more than 130 ha will have been preserved and opened to the public along the river Grand-Morin. There remains to be studied the new connections required or old ones to be preserved (hiking paths, cycling tours) between the different sites, and also with other places of architectural or historical interest in the valley.

Seine-et-Marne Regional Council
Water and Environment Service
Environment Department

Rich heritage

Valleys offer a rich and diverse heritage, in particular a unique water heritage. The valleys' heritage also offers interesting elements such as historic urban poles, characteristic villages, castles and large estates. While some valleys have a distinguished heritage due to their remarkable features, in others it is more discreet.

Valleys with no particular heritage of interest

Heritage is not a major factor in these valleys. Example: Essonne, Théroutanne, Montcient, Morbras.

Actions:

- preserve the existing small rural heritage and maintain the quality of the villages.

Valleys with an urban pole or an interesting monument

The heritage in such valleys is concentrated in one or two attractive areas. Example: Orge, Epte, Ysieux.

Actions:

- develop interesting poles
- use these poles as a starting point for the discovery of the entire valley with other thematic visits (natural heritage, forests).

Valleys with specific types of attractions throughout the territory

In addition to a considerable richness, these valleys have a specific type of attractions – nautical heritage, castles, estates – throughout the valley. They often also have villages or an interesting developed area. Example: Mauldre and Gally, Aubette, Grand-Morin, Bièvre, Yerres, Vaucouleurs, Lunain, Viosne.

Actions:

- protect a landmark which, although perhaps not so spectacular, adds to the identity of the valley
- provide thematic visits.

The Septeuil nymphaeum

During the construction of the R.N. 183 deviation at Septeuil, several archaeological sites were brought to light. Amongst these, a Gallo-Roman sanctuary, located at the confluence of the brook of Flexanville and Vaucouleurs, was able to be systematically excavated.

This temple was dedicated in the 1st century to the water cult. The marble statue of a nymph held a pitcher from which welled one of the site's springs. In the 4th century, the temple was reorganised and dedicated to Mithras before being abandoned in the 5th century. Subsequently, the Vaucouleurs left alluvial deposits on the site, changed its route and submerged it.

The Yvelines General Council, with help from the Ministry of Culture and from the Region, has put the site on display to enable the public to discover it. It has been decided to rebuild the temple ruins from the 1st century as they appeared to archaeologists during their excavations. The only exception to this pure reproduction, two pillars have been replaced to give an idea of the dimensions of the sanctuary. This "true false ruin" has not been rebuilt at its original place as this would have meant turning the river and moving the source back in order to put it out of the water.

Today, this monument, on the edge of the main road, is easily accessible and means that any member of the public can put themselves in the place of an architect faced with the revealing of a site.

Valleys with an interesting and diversified array of features

These valleys offer a concentration of diverse historical and cultural landmarks, a rich architecture and a small but noteworthy rural heritage. Example: Juine, Loing.

Actions:

- develop the valley's entire heritage
- provide thematic visits.

The quality of the landscape

The quality of the landscape in an area is based on a number of criteria. In a valley, this includes diversified areas (farmland, afforestation, prairies, villages, etc.), the view of the valley and the river, the integration of villages, the presence of splinter development or destructured elements.

Remarkable overall quality

These valleys benefit from a well-preserved and diversified landscape, where the imprint of urban development blends with rural landscape. They offer a good view of the valley and the river. Example: Théroutane, upper Yerres, Epte, Vaucouleurs, Loing, Lunain, Gally.

Actions:

- maintain the diversity of the landscapes
- preserve areas from urban expansion as well as splinter development that may alter them.

Interesting landscape

The interesting landscape in the areas is reflected through the relief and the distribution of wooded and agricultural spaces. However, it doesn't offer as good a view of the valley. Certain sequences are quite exceptional. Example: Montcient, Grand-Morin, lower Yerres, Essonne, Juine, upper Bièvre, Aubette.

Actions:

- upgrade the most interesting landscape sequences
- avoid urban development projects that deteriorate the landscape (splinter development, poorly integrated urban expansion).

Difficult to perceive valleys and rivers

Valleys are poorly developed. They are concealed either by relief, urban expansion or a lack of open space. Example: Ysieux, upper Orge, Morbras, lower Bièvre, lower Orge, Mauldre.

Actions:

- recover views of the valley
- enhance the presence of the river; for instance, by developing the surroundings.

La Bièvre: recovery of the lower valley

For the past several years, the Ile-de-France Region has initiated measures to make sure that a comprehensive approach is implemented in the appropriate territories. The development of regional natural parks is one of the best illustrations. Such measures aim at identifying "project territories", around which various actors can be mobilised and associated. These measures are exemplary in that they reveal the potential of these territories to improve the living environment, preserve their heritage, develop activities and raise awareness of concerned actors. They are implemented in an operational manner and followed up by the establishment of an, mixed union-type structure which ensures the effective management of projects and allows for common long term objectives to be met.

Residents of the Bièvre have long fought to save their river. Collective actions taken by their associations have helped forge their conviction for recovering its entire course.

Quickly taken under the wing of institutions, these objectives gave rise to many projects in the upper valley of the Bièvre aimed at preserving nature and the valley's landscape. In the lower valley like in Paris, the river has been forsaken for nearly a century, and its recovery is dependent upon the slow pace of urban development. To this end, much perseverance will be needed to continue that which has already been started in the upper valley.

These goals have given rise to new stamina, and must incite elected officials and inhabitants to consider other ways to manage a region that they have inherited; one which they, in turn, will be responsible for passing on to future generations. The implementation of a new approach conducive to sustainable development will cover the entire region of the Bièvre basin. Therefore, from the upper to the lower part of the valley and the entire catchment area of the river, the "flow of the current" will become the fundamental element of the region's new-found identity.

In this framework, the Ile-de-France Region organised a symposium on 26 May 1999 that addressed, "the Bièvre, the river of Ile-de-France". The symposium called for the revival of the river and decided to create an association.

This measure will give a new dimension to actions which are progressively being implemented on-the-field.

Actions such as the partial reopening of the Bièvre in Verrières, the new riverside promenade (completed during the renovation work done in

Gentilly's city centre) and the park and basin expansion projects in Haÿ-les-Roses all underscore the credibility of these objectives. The inter-municipal charter on the environment has just been materialised by the creation of a community of agglomerations including seven communes from the lower Bièvre valley that puts forth a very recent concern: building local development on a shared identity and history. The "Bièvre clair" basin contract heralds the implementation of a water planning and management scheme (SAGE), which could serve as an instrument for reflection and monitoring, as well as the first tool for concerted management.

Surrounded and dispersed by large infrastructures and effaced by urbanisation, the lower valley has suffered significantly. Its relief is hardly visible in Antony, where the valley widens, then intensifies in the Val-de-Marne department. In Paris, major urban development projects in the XIXth century radically changed the topography and buried the Bièvre under a thick embankment along nearly its entire course.

Considering this, the main challenge in this sector is to recover the identity of the Bièvre basin and restructure it around the river. Elected officials, associations and water management experts have all been working toward this goal for many years. Uncovering the river is technically possible along most of its course. However, water quality and regulation must be improved in order to allow the Bièvre to disconnect from the purification system and this is a prerequisite for its reopening. Protective land measures are also needed to ensure its urban integration and include a real green network.

Repossession by the inhabitants and the promotion of a green system of regional interest calls for the re-creation of the river's ecosystem, reorganisation of the banks, construction of a promenade linking Paris to the source of the Bièvre as well as the restoration of its heritage.

The area can be recovered by pursuing the restoration work initiated in the Val-de-Marne department: creation of belvederes, protection of vegetation on the slopes, improvements on the bed of the Bièvre and on the axes that define the valley's morphology. Like in the upper valley, restoration work should also take into consideration a network of 'gentle traffic' including valley bottom and transversal itineraries (hiking trails, small adjacent valleys and walkways along aqueducts) that link the river to interest points in the valley and plateaux.

Agriculture

Various types of agriculture are found in valleys with significant agriculture in rural areas. Although the breeding of livestock has decreased and there has been more intensification, some have maintained a certain diversity. Such diversity enhances the richness of the landscape, however it also makes much more fragile.

A predominance of intensive farming

There is a predominance of large cultivations which stretch to the riverbanks. Wet meadows have practically disappeared. Example: Aubette, Théroüanne, Yerres, Gally.

Actions:

- encourage environmentally-friendly farming
- plan areas for recovery and transition between highly intensive sectors.

Diversified farming with meadows

Farming in these valleys is more diversified, and the breeding of livestock is still practised. In certain cases, horse breeding has replaced other forms of breeding, but the meadows have been well-preserved. Example: Epte, Grand-Morin, Montcient, Vaucouleurs, Ysieux.

Actions:

- reinforce agriculture in space management.

Location in the region

The three principal sectors in the region – the central agglomeration, the green belt and the rural suburbs – each have specific problems concerning urban planning and open spaces. Valleys provide a link between these different areas. The environmental challenges and urban pressures vary according to their location.

Rural suburbs + green belt

Often quite long, these valleys spring up in rural areas and join in an agglomeration. Pressure is exerted from the lower to the upper parts along the axis of the valley, especially if there is an important communication basis. Example: Essonne, Orge, Viosne, Yerres.

Actions:

- reinforce their role as a link between urban and rural areas
- develop a green corridor with a green network extension to the city
- avoid upper urbanisation extension.

Rural suburbs

Far removed from the central agglomeration, these valleys have less pressure than in the green belt. Nevertheless, they are not overlooked by urban development, inasmuch as the people are increasingly seeking rural areas to live. Some may also have an attractive urban pole. Example: Aubette, Epte, Grand-Morin, Juine, Loing, Lunain, Mauldre, Montcient, Théroüanne, Vaucouleurs.

Actions:

- valleys must preserve their rural aspect and natural richness
- green tourism has to be expanded.

Green belt

These valleys are located in the green belt and are already periurban. They have undergone significant urban development which varies from one area to another. However, urban development in the brook of Gally valley – in the green belt – stagnated due to a protected area: the plain of Versailles. Example: Bièvre, Gally, Morbras, Ysieux.

Actions:

- preserve agricultural areas as breathing spaces
- expand a green network that relies on agricultural spaces, public forests and urban parks
- boost green public spaces' offer.

Population

Like the location in the region, the size of the population and its settlement throughout the valley play a role in the pressures exerted regarding urban development.

Rural valleys without an urban pole

Such valleys, or sections of valleys, have a rather low population (less than 20,000 inhabitants) and no important urban poles.

Example: Théroüanne, Epte, Lunain, upper Yerres.

Actions:

- encourage moderate growth in these valleys.

Medium-sized valleys with one or more poles

These valleys have a population of 50,000 to 60,000 that is concentrated in one or two principal cities. The remainder of the valley is mainly rural. It can be noted that these cities – Coulommiers, Nemours, Etampes – have an interesting history. Example: Grand-Morin, Loing, Juine.

Actions:

- avoid significant population growth outside urban areas.

Rural valleys with an urban pole

Mostly rural, the well-defined urban pole is found at the junction of these valleys. The new city Cergy-Pontoise, in Viosne, is the largest with 40,000 inhabitants. The others have a population that ranges between 10,000 to 15,000 inhabitants. Example: Viosne, Vaucouleurs, Aubette, Montcient.

Actions:

- maintain the rural nature of the valley by preventing urban expansion beyond the pole.

Population spread throughout the valley

The valley's population is quite evenly spread throughout the valley, in villages and cities of various sizes. Example: Ysieux, Mauldre, brook of Gally, upper Orge (30,000 to 54,000 inhabitants), upper Bièvre, Morbras (around 100,000 inhabitants).

Actions:

- maintain natural areas between urbanised sectors.

Urban poles

Urban sections of certain valleys with widespread and continuous urban development. Example: lower Yerres, lower Orge, lower Bièvre.

Actions:

- reinforce urban poles based on the structure of the valley and the river current.

Protecting the plain of Versailles from urbanisation

When the urban development plan for Paris was being drawn up in 1965, the decision was taken to adopt a discontinuous urban organisation, with the creation of new towns.

In order that this intention be realised, the decision had to be backed up by proposals for the management of these discontinuous areas. In 1973 discussions began on the definition of a regional policy for the discontinuous areas, which became the Natural Equilibrium Zones (Zne).

The first regional example of this kind of proposal was the Green Book for the Plain of Versailles, in which the river brook of Gally figures. Published in November 1974, this document made a certain number of proposals designed to maintain the farming and natural areas. They were accompanied by proposals to furnish instruments that would provide regulatory muscle, help to control land use and provide funds for the local councils.

In practice, these proposals became a kind of moral contract between the local councils and the administrations, a sort of charter without any regulatory clout that had to be incorporated into the various regulations concerning urbanism so that they became legally binding. The Natural Equilibrium Zones, particularly that of the plain of Versailles, benefited from having a full-time official administrator who worked with the councils to revise the land use plans in the manner proposed by the Green Book. A maximum rate of population growth of 1% was decided at a time when annual growth rates of 5% were frequent in the area. This is how the plain of Versailles was preserved from an urbanisation that the experts had predicted would cover the entire plain by 1985.

Structure of villages

The Ile-de-France region boasts a wide variety of villages which are also found in the valleys. The structure of concentrated villages, streets or hamlets, have a direct influence on their future development. Urban development projects will vary and will be more or less well integrated into the landscape.

Scattered housing likely to converge

In certain regions like Brie, villages are made up of multiple hamlets, the housing in which ultimately converges. Housing is scattered throughout the valley, almost continuously in certain areas. Example: Essonne, Juine, Vaucouleurs, Epte, Ysieux, Orge, Grand-Morin, Mauldre, Loing, Bièvre.

Actions:

- maintain green spaces between urban development projects
- prevent splinter development.

Housing developments – individual villages

These villages are made up of housing developments, often with traditionally developed areas. Housing developments are particularly visible, as they are removed from the village. Certain, more linear villages are clearly separated from each other, yet have the same characteristics as grouped housing. Example: Yerres, Théroutanne, Lunain, Gally, Epte, Viosne, Aubette, Montcient.

Actions:

- ensure the integration of urban development.

Glossaire



Arboricole : qui vit dans les arbres.

Association végétale : groupement de plantes de différentes espèces, correspondant à un certain type d'habitat.

Avifaune : les oiseaux.

Buser : faire passer l'eau dans une buse (gros tuyau).



Caducifolié : qui perd ses feuilles à une saison donnée.



Abiotique : se dit d'un milieu sans vie.

Abrouissement : dégâts provoqués par les cerfs, chevreuils et daims lorsqu'ils broutent les pousses terminales et latérales des essences ligneuses.

Accidentel, elle : espèce de très faible fréquence, dont la présence dans un groupement végétal est purement aléatoire.

Amendement : toute pratique ou substance destinée à améliorer les propriétés physico-chimiques d'une terre à des fins agricoles.

Anatidés : canards et oies.

Anthropique : d'origine humaine.

Anthropophile : qui aime le voisinage de l'homme.

Arboré : se dit d'une formation végétale comportant des arbres épars (ex. : recouvrement inférieur à 10 % au sens de l'inventaire forestier national).

Arborescent : végétaux ligneux ayant le port et la taille d'un arbre.



Bief usinier : canal de dérivation qui conduit les eaux d'un cours d'eau.

Biomasse : masse des êtres vivants (animaux et végétaux) présents dans un certain milieu. Elle est exprimée en kilogrammes (ou en tonnes) de matière fraîche ou de matière sèche — c'est-à-dire déshydratée) par unité de surface (hectare ou kilomètre carré).

Biotope : ensemble des caractéristiques physiques caractérisant un écosystème.

Biocénose : ensemble des espèces végétales et animales vivant dans un biotope.

Bois : ensemble des tissus résistants formant les troncs, branches et racines des plantes ligneuses.

Boqueteau : au sens de l'inventaire forestier national, toute surface d'une largeur moyenne d'au moins 25 mètres comprise entre 50 ares et 5 hectares où l'état boisé est acquis.

Bosquet : au sens de l'inventaire forestier national, toute surface d'une largeur moyenne d'au moins 15 mètres, comprise entre 5 et 50 ares, où l'état boisé est acquis.

Cariçaille : formation végétale où une laiche (*Carex* en latin) domine. Celui-ci peut former des touradons (grosses touffes à croissance verticale résultant de la régénération de la plante sur ses propres débris).

Cavernicole : qui habite des cavités (d'arbres, de falaises, du sol ou de construction).

Cépée : touffe de rejets sortant de la souche d'un arbre coupé.

Chablis : arbre ou ensemble d'arbres renversés, déracinés par suite d'un accident climatique le plus souvent (vent, neige, givre).

Circulation douce : itinéraires pédestres, cyclistes, équestres.

Climacique : végétation qui a atteint un état d'équilibre idéal dans des conditions naturelles stables.

Climax : état d'équilibre d'un écosystème sous l'action des seuls facteurs climatiques et édaphiques.

Confortement minéral : renforcement des berges avec des matériaux minéraux.

Colluvions : matériaux d'érosion non véhiculés par des cours d'eau, ayant migré par gel/dégel, gravité...

Corticole : espèce vivant sur, sous ou dans l'écorce des végétaux ligneux.

Cytise : arbrisseau ou arbuste vivace aux fleurs en grappes jaunes de la famille des papilionacées (trèfles, genêts).



Déprise agricole :

abandon de culture.

Dulçaquicole : relatif aux eaux douces.



Ecosystème :

ensemble d'un biotope et d'une biocénose qui y est associée.

Ecotone : zone de transition marquant le passage entre deux écosystèmes de nature différente.

Embâcle : obstruction d'un cours d'eau.

Endémique : particulier à une région.

Entomologie : partie de la zoologie qui traite des animaux articulés et particulièrement des insectes.

Entomofaune : les insectes.

Eperon (rocheux) : avancée en pointe d'un contrefort rocheux.

Equienne : peuplement forestier dont les arbres sont sensiblement du même âge.

Espèce appétante : qui plaît et répond aux besoins de l'animal.

Essartage : suppression de l'étal boisé par arrachage et brûlage des arbres et broussailles sur une surface donnée pour y faire une culture.

Etiage : baisse périodique des eaux d'un cours d'eau (plus bas niveau).

Euthopisation : conséquences d'un excès de matières nutritives en milieu aquatique. Cela conduit à la prolifération d'un certain nombre d'espèces, puis à l'asphyxie progressive du milieu par diminution de la teneur en oxygène dissous.



Fontinal : situé

à proximité immédiate d'une source.

Groupements fontinaux : associations végétales particulières croissant aux abords des sources.

Forêt : au sens de l'inventaire forestier national, toute surface d'au moins 4 hectares, d'une largeur moyenne en cime d'au moins 25 mètres, où l'étal boisé est acquis.

Frottis : décollement et effilochage de l'écorce des balivaux et des jeunes résineux par frottement, principalement par les bois de cervidés.

Fruticée : formation végétale constituée par des arbustes et des arbrisseaux.



Gagnage : lieu où se

rassemble certaines espèces pour chercher leur nourriture.

Granulat : matériaux (sables, graviers, etc.) entrant dans la composition du mortier et du béton.

Graphiose : maladie due à un champignon s'attaquant spécifiquement à l'orme et provoquant un dessèchement du feuillage qui aboutit à la mort de l'arbre. Le vecteur est un insecte, un scolyte dont la larve creuse le bois en formant des dessins particuliers.



Habitat : emplacement,

endroit où vit une espèce.

Héliophile : se dit d'un végétal qui ne peut se développer complètement qu'en pleine lumière.

Hélophytes : végétaux aux racines situées dans la vase dont les feuilles et les fleurs sont situées hors de l'eau.

Hivernage : le fait de passer l'hiver. Un hivernant peut ou non être migrateur.

Hydrologie : étude des eaux et de leurs propriétés.

Glossaire

Hydromorphe : aspect plus ou moins humide d'un milieu.

Hydrophytes : végétaux aquatiques nageants et flottants (potamots, myriophylles, utriculaires...).



Junipéraie : formation arbustive à base de genévriers.



Karstique : relief particulier aux régions dans lesquelles les roches calcaires forment d'épaisses assises et résultant de l'action (en grande partie souterraine) d'eaux dissolvantes.



Lagunage : méthode d'épuration de l'eau reposant sur la circulation lente de l'eau dans des bassins peu profonds.

Lande : formation végétale plus ou moins fermée, caractérisée par la dominance d'espèces sociales lignieuses basses (éricacées, ajoncs, genêts...). Les landes résultent souvent d'une régression anthropique de la forêt sur sol acide.

Lessivage : entraînement mécanique, par l'eau de l'argile et des sels minéraux présents dans les couches supérieures du sol.

Ligneux : qui à la nature et/ou la consistance du bois. Les végétaux ligneux sont les arbres, arbustes, arbrisseaux et sous-arbrisseaux, ainsi que certaines lianes.



Marnage : différence de niveau entre le niveau des hautes eaux et le niveau des basses eaux de la mer, d'une rivière ou d'un lac.

Mégisserie : art de préparer les cnirs. Lieu où s'exerce cette industrie.

Mésophile : qui affectionne ou recherche les endroits ni trop secs, ni trop humides. Pelouse mésophile : prairie constituée de végétaux présentant cette caractéristique.

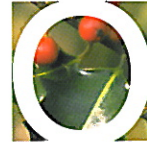
Mésoxérophile : qui affectionne ou recherche les endroits modérément secs. Pelouse mésoxérophile : prairie abritant des végétaux présentant cette caractéristique.

Messicole : plante annuelle qui habite les champs cultivés.

Mitage : destruction de l'espace agricole ou naturel, occasionnée par la multiplication des emprises imputables à la construction.



Nitrophile : qui affectionne les sols riches en substances azotées (nitrates, ammoniac...). Exemple : les orties qui croissent préférentiellement dans les endroits sur-fumés, sont des végétaux nitrophiles.



Oléoprotéagineux : plantes susceptibles de produire de l'huile ou des protéines.

Ombrogène : généré par les pluies.



Pacage : terrain où l'on fait paître les animaux.

Paléosol : sol fossile.

Paludicole : qui vit dans les marais.

Palustre : se dit d'une espèce localisée aux zones marécageuses.

Pelote de réjection : boulette contenant les parties non assimilables des aliments (os, poils...) et régurgitée par le bœuf.

Pelouse : formation végétale herbacée, ménageant des espaces nus.

Pertuis : trou.

Phragmitaie : formation végétale dominée par les phragmites (vrais roseaux).

Plan de chasse : document fixant le nombre d'animaux qu'il est prévu de prélever sur une chasse après estimation du cheptel total présent.

Plastique : parlant d'une espèce animale ou végétale, capable de s'adapter à des situations très diverses tolérant des conditions environnementales variées, donc sans exigences écologiques très prononcées.

Platière : plate-forme rocheuse.

Pollinisateur : en parlant souvent d'un insecte, individu qui intervient dans la fécondation croisée des phanérogames en transportant le pollen d'une fleur à l'autre sur le pistil d'une autre fleur de la même espèce.

Populiculture : culture du peuplier.

Prairie : formation végétale herbacée dense (à complet développement) dont le dynamisme naturel vers un stade boisé est stoppé par la pratique régulière des coupes ou du pâturage.

Prairie hygrophile : prairie constituée de végétaux affectionnant l'humidité.

Praticole : qui vit dans les prés.

Psammophile : qui aime le sable.



Relevé floristique :

inventaire des espèces végétales présentes sur une surface de terrain donnée ou notation d'une partie d'entre elles relatif à un milieu.

Relique : espèce d'origine très ancienne aujourd'hui presque éteinte et ne se trouvant plus que dans un nombre très limité de localités.

Remise : zone calme servant de gîte au gibier.

Rivulaire : néologisme, qui vit sur les rives.

Ripsisylve : forêt croissant aux bords des eaux, caractéristique des dépressions alluviales.

Ru : petit ruisseau.

Rudérale : plante qui se développe dans un milieu très transformé par l'homme (décombres).



Salmonicole : qui se

rapporte aux saumons (rivière salmonicole : où vivent les saumons).

Stratotype : site ayant servi à la définition des étages géologiques, divisions géochronologiques reconnues internationalement et servant d'étalons.

Sylvicole : qui vit dans les bois et les forêts.

Synclinal : pli qui présente une concavité vers le haut.



Thalweg

ou **talweg** : ligne joignant les points les plus bas du fond d'une vallée.

Thermophile : qui aime les milieux chauds.

Toponymie : ensemble des noms de lieux.

Tourbière : groupement de végétaux où se forme la tourbe composée d'espèces très spécialisées.



Ubiquiste : répandu partout, pratiquement indifférent aux conditions du milieu naturel.



Vernal : printanier

Vesce : plante herbacée commune, à feuilles pennées, terminée par des vrilles de la famille des pois et papilionacés.



moins aride.

Xérique : sec, plus ou

moins aride.

Xérophile : qui affectionne ou recherche les lieux secs ou arides. Pelouse xérophile : prairie constituée de végétaux préférant la sécheresse.



Z.N.I.E.F.F. :

sans valeur juridique, l'inventaire des ZNIEFF liste les milieux dignes d'être protégés soit parce qu'ils recèlent des habitants espèces protégées au titre de la loi (ZNIEFF de type 1) soit parce qu'ils représentent des entités écologiques indispensables à la préservation de ces dernières (ZNIEFF de type 2).

Zones naturelles «NC» et «ND» : zones naturelles et agricoles des plans d'occupation des sols.

Glossary

A **Abiotic**: Non living devoid of life.

Aggregate: Any mass of mineral particles, e.g. sand, river shingle, broken stone or brick, that a suitable binder can combine into a coherent whole.

Anatidae: Family of mainly aquatic birds with flat, lamellate bills (except *Mergus*). The front toes are webbed. Many Anatidae are sexually dimorphic. They have thick feathers with insulating down. The flight feathers are moulted simultaneously after breeding. They feed on vegetable and animal foods. They nest on the ground or in holes in trees, among rocks, or in the earth, and the nest is usually lined with down. There are 143 species with cosmopolitan distribution.

Anthropic: Of or belonging to a human being; of a human sort. Also, concerned with or relating to human beings. In Geology, term applied to the period of the deposits in which human remains are found.

Appetent species: One which an animal likes and fulfills its needs.

Arborescent: Tree like in growth; approaching the size of a tree, or having a woody stem.

Arboricole: Inhabiting or haunting trees.

Assarting: The action of grubbing up the trees and bushes in a forest, so as to turn it into arable land.

Avifauna: All the bird species of a region or period.

B **Biocenosis**: A general term, used mainly by Central and Eastern European ecologists, for any community of plants and animals.

Biomass: The total weight of the living components (producers, consumers and decomposers) in an ecosystem at any moment, usually expressed as dry weight per unit area.

Biotope: Environmental region characterized by certain conditions and populated by a characteristic biota or community.

Brook: A small stream, rivulet.

Browsing: Damage caused by goats and many wild herbivores on bushes and shrubs.

C **Caricac**: Vegetable formation predominantly of sedge (*Carex* in Latin). The latter can grow in tower-like formations (large clumps of vertical growth resulting from the plant growing out of its own debris).

Cavernicolous: Cave dwelling.

Climax: The mature or stabilized stage in a successional series of communities when dominant species are completely adapted to environmental conditions.

Colluvium: A heterogeneous mixture of weathered material transported by gravity to be deposited at the base of a slope.

Corticolous: Growing on or in tree bark.

Covert: Shelter for wildlife, especially a thicket that hides game.

D **Deciduous**: Applied to trees that shed their leaves seasonally and to the leaves thus shed; to the perianth of a flower if this is shed after fertilization; and to scales that are readily shed in fish.

Decline of farming: The abandoning of land under cultivation.

Dutch elm disease: A vascular disease of elms caused by a fungus which is transmitted by bark beetles and which produces destructive toxic substances that are largely responsible for wilting and yellowing of the foliage, defoliation and death first of local areas then of the entire plant.

E **Ecosystem**: A relatively self contained ecological system defined by the types of organisms found in it and their interactions, e.g. forest, grassland, soil, etc.

Ecotone: Zone of intergradation between ecological communities.

Endemic: A descriptive term for plants or animals naturally occurring in a particular area. Also called indigenous.

Entomofauna: Insects.

Entomology: That branch of natural history which deals with physiology, distribution and classification of insects.

Etiage: The stage of a stream or lake when the stage or discharge is clearly below the average value.

Eutrophication: Process of nutrient enrichment in aquatic ecosystems. It occurs naturally over geological time, but may be accelerated by human activities, e.g. sewage disposal, or land drainage: such activities are sometimes termed 'cultural eutrophication'. The rapid increase in nutrient levels stimulates algal blooms. On death, bacterial decomposition of the excess algae may deplete oxygen levels seriously. This is especially critical in thermally stratified lakes, since the decaying algal material typically sinks to the hypolimnion where, in the short term, oxygen replenishment is impossible. The extremely low oxygen concentrations that result may lead to the death of fish, creating a further oxygen demand, and so leading to further deaths.

Even-aged: Of a forest or stand, composed of trees having no, or relatively small, differences in age.

F Fontinal: Located in immediate proximity to a spring.

Fontinal groupings: Specific vegetable colonies, which grow on the edges of springs.

Food plot: A natural, sown, or planted area with grains, berry-bearing bushes, etc. supplying food for wildlife.

Forest: A large area of uncultivated land covered by trees and underwood. Blocks of woodland in excess of 1,000 acres are classed as forest by the Forestry Commission. The original meaning was unenclosed woodland or open, mainly treeless, areas reserved for hunting, usually belonging to the Crown, e.g. the New Forest.

Fraying: The abrasion of the bark and wood of stems by deer.

Fresh water: Water containing little or no chloride ion. According to the Venice system, which classifies brackish waters by their percentage chloride content, fresh water contains 0.03% or less of chloride.

G Grassland: Vegetation dominated by grasses. Grassland occurs where there is sufficient moisture for grass growth, but where the environmental conditions, both climatic and anthropogenic prevent tree growth. The extensive mid latitude grassland is known as steppe or prairie, whereas the corresponding tropical vegetation is called savannah.

Grassy field: Partially covered with herbage in general, blades, leaves and stalks of which are eaten by horses, cattle, sheep, etc.

Grazing land: Any area of pasture, meadow or other grassland available for stock to graze. There are various methods of pasture management all of which require an appropriate satisfactory stocking rate, aimed at providing an adequate supply of herbage at an efficient rate of usage.

H Habitat: The unit area of environment.

Heliophyte: Plant characteristic of, and showing adaptation to, bright, sunlit habitats, as opposed to shade tolerant or shade preferring species.

Helophyte: A cryptophyte that mainly or exclusively grows in soil or mud saturated with water.

Hydrology: Science dealing with waters of the earth in rivers, streams, lakes, in or below the land surface, in the atmosphere, in all its states — their occurrence, distribution and circulation through the unending hydrologic cycle of precipitation consequent runoff, stream flow, infiltration and ground water, eventual evaporation and reprecipitation. It is concerned with the physical, chemical and physiological reactions of the water with the rest of the earth and its relation to the life of earth.

Hydromorphic soil: Soil developed in the presence of excess water all or part of the time.

Hydrophyte: An aquatic plant living on or in the water.

I Inorganic bank reinforcement works: Reinforcement of the banks with mineral materials.

J Juniperae: Bush-like formation of Junipers.

K Karstic: An aquifer within a karst limestone rock matrix. Such aquifers are normally characterized by large void spaces, relatively high values for hydraulic conductivity, flat water tables, and extensive networks of solution channels within which Darcy's law is not obeyed and flow may be turbulent.

L Laburnum: Family Leguminosae. Genus of trees with trifoliate leaves, and leafless, pendulous racemes of yellow pea like flowers. The fruits are rounded pods containing poisonous seeds. They are also cultivated for ornament.

Leaching: To subject to the action of percolating water, etc. with the view of removing the soluble constituents to lixiviate. Also used with reference to the action of water.

Ligneous: Woody.

Log jam: An obstruction of the stream channel by debris, logs or other material, causing an afflux.

M Mesophilous: Mesophile thriving at moderate temperatures.

Mesoxerophilous: Something which is fond of, or seeks out moderately dry spots.

Mesoxerophilous grass: Grassland which provides a habitat for vegetation with this characteristic.

Glossary

M Moor or moorland: Open country, usually on high ground, having acid soil (mostly peat) and covered with heather, coarse grasses, sedges, bracken, etc.

N "NC" and "ND" nature areas: In the framework of zoning plan all space is divided on a vocational basis. "NC" designates agricultural areas and "ND" natural areas.

Nitrophilous: Of a plant: growing best in a habitat rich in nitrogen.

Non-motorised means of transportation: Walking, cycling and horse-riding tracks.

O Oilseed crops: Various crops grown for their seeds, rich in oil and extracted after crushing for the manufacture of margarine, cooking oil and salad oil, etc. The residues are usually processed to produce cake, rich in protein and valued for stock-feeding. Only linseed, oilseed rape and sunflower are grown in Britain.

Ombrogenous: Of moorland or marsh, needing a high rainfall for its development.

Opening: Passage.

P Palæosol: A soil horizon which was formed as a soil in the geological past.

Paludal: Marshy; pert., or growing in, marshes or swamps.

Paludicole: Living in marshes.

Pasture: To feed cattle by letting them graze.

Peat: An organic soil consisting of plant material accumulated in mainly anaerobic waterlogged conditions in which bacteria and earthworms, etc. are absent and decay is very slow. Fen peat develops when the water contains mineral salts and is slightly alkaline. It is black and well decomposed, and characteristic of the fens of eastern England. If mineral salts are absent, acid bog peat forms, which is brownish in colour and contains distinguishable plant remains (mainly sphagnum mosses). Such peat is characteristic of Blanket peat bogs.

Permitted hunter-kill ratio: Document which sets out the number of animals that hunters are allowed to kill during a hunt, after estimating the total population present.

Plant association: Term loosely applied in the classification of vegetation communities and given varying interpretations in different phytosociological traditions, with resulting confusion. The current most widely accepted usage follows the Zurich Montpellier School. In this, the association is the basic vegetation unit, an abstract entity, floristically defined from field data or relevés. Each association has a distinctive faithful species and a group of high-presence or constant species which give the community or association a cohesive structure. Often these companion species of the association form the faithful species of the next and succeeding hierarchical levels, alliances, and orders into which similar associations are grouped. In British and American traditions, 'association' has tended to imply a community with physiognomic as well as floristic unity, usually a climax community in which the species dominants are those of the upper vegetation layer. In this tradition an association usually has several co-dominant species. The term 'consociation' is reserved for single species dominance.

Plastic: A species of animal or vegetable able to adapt to a wide variety of situations and which can tolerate a varied range of environmental conditions. They do not, therefore, have any highly pronounced ecological requirements.

Platiary: Rocky platform.

Pollinator: A tree planted in an orchard to provide pollen for the fertilization of surrounding trees. Pollinators are usually of a different variety to the rest of the trees in the orchard. Insects provide pollen as well.

Praticultural: Something which lives in the fields.

Psammophilous: Growing and seeking out fine sand.

R Reed: A tall grass (*Phragmites communis*) which grows extensively in thick reed-beds in swampy conditions. The dried stems are used in East Anglia for thatching.

Regurgitation pellet: Ball containing indigestible food parts (bones, fur...) regurgitated via the beak.

Relevé: In phytosociology the basic field unit recorded. The area should be uniform in floristic composition, and of uniform relief and soil type. The unit size varies with the type of community, but at least should embrace the minimal area. Site and soil data as well as vegetation form, composition, and species, are noted.

Relict: Applied to organisms that have survived while other related ones have become extinct. Often the term refers to species that have survived periods of unfavourable conditions by existing in regions called refugia, while becoming extinct elsewhere. It may also refer to a surviving species of a group the other species of which have become extinct (e.g. coelacanth fish).

Riparian: Frequenting, growing on, or living on the banks of streams or rivers.

Ruderal: Growing among rubbish or debris.

S **Salmon-breeding** : To do with salmon (salmon breeding river : place where salmon live).

Shrubbery : A plantation of shrubs; a plot planted with shrubs perennial woody plant whose branches spring from the roots or at ground level. It is distinguished from a tree by its lower height and multiple stems. It may be deciduous (e.g. hawthorn) or evergreen (e.g. holly).

Silvical : Of or pertaining to silvics.

Soil improver : Product to be added to the soil mainly to improve its physical and/or biological condition without causing harmful effects.

Splinter development : Destruction of farming or natural space by increasing the number of locations designated for building.

Spur : A ridge that descends towards a valley floor from the higher ground above. It may be due to an outcrop or resistant rock, or it may develop on the concave side of a winding stream as a result of incision.

Stratotype : Stratum or facies used to define a geological period.

Stump shoot : The portion of the trunk of a felled tree that remains fixed in the ground; also, a standing tree trunk from which the upper part and the branches have been cut or broken off.

Syncline : A basin with a concave upper relief.

T **Tawing** : The action or process of preparing whiter leather.

Thalweg : Line joining the lowest points of successive cross sections, either along a river channel or, more generally along the valley that it occupies.

Thermophilic : Thriving at relatively high temperatures.

Tidal amplitude : The difference between the height of high water and the following height of low water.

Toponym : The name of a place or region; a name designating the place of origin of a plant or animal.

U **Ubiquist** : That can be found everywhere.

V **Vernal** : Pert. or appearing in mid or late spring.

Vetches (or vicia) : Family Leguminosae. Genus of herbs, most of which climb by means of leaf tendrils. The leaves are usually pinnate, in several pairs, with no terminal leaflets. The flowers are in axillary racemes, and have an obliquely truncate stamens tube. The style is normally cylindrical, and either hairless or downy all round, and bearded below the stigma (in the similar genus *Lathyrus* the style is flattened, and bearded on its upper side). The pods are two-valved, flattened, and contain several seeds in each. *Vicia faba* (bread bean) is an important vegetable and *Vicia sativa* (common vetch) an important fodder plant.

W **Windfall** : Any area on which (many of) the trees have been thrown or broken by the wind or storms.

Wintering : The action of passing the winter in a particular place.

Wood : The substance of which the roots, trunks, and branches of trees or shrubs consist; trunks or other parts of trees collectively (whether growing or cut down ready for use).

X **Xeric** : Dry, arid, tolerating, or adapted to, arid conditions.

Xerophilous : Able to withstand drought. Plant adapted to a limit water supply.

Z **Z.N.I.E.F.F. (areas of ecological, wildlife and floral interest)** : Not legally enforceable, the Z.n.i.e.f.f. inventory lists habitats worthy of protection, either because they conceal habitats or protected species, or because they are ecological entities indispensable to the preservation of the latter.



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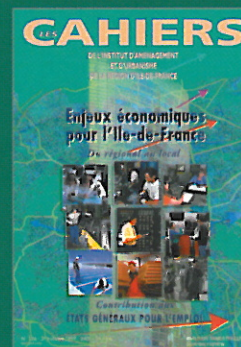
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