

LES SYNTHÈSES

de l'Office International de l'Eau

The « Trame Verte et Bleue » in
three neighboring countries

Maxime SABOURET

February 2016



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SYNTHESIS

The « Trame Verte et Bleue » in three neighboring countries

Maxime Sabouret
sabouretmaxime@gmail.com

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AgroParisTech
Centre de Montpellier
648 rue Jean-François Breton – BP 44494
34093 MONTPELLIER CEDEX 5
Tél : (33) 4 67 04 71 00
Fax : (33) 4 67 04 71 01
www.agroparistech.fr

Office International de l'Eau
Service gestion et valorisation de
l'information et des données
15 rue Edouard Chamberland
87 065 LIMOGES CEDEX
Tél : (33) 5 55 11 47 74
www.oieau.org

ABSTRACT:

In order to follow and establish guidelines for biodiversity protection at several levels, numerous directives and strategies have appeared since the signing of the Convention on Biological Diversity (CBD) in 1992. The newly defined concept of « Green Infrastructure » (GI) in Europe aims to establish an ecologic network which is based on both quality and long-term preservation of the services rendered by ecosystems. It takes town and country planning into account and encourages the subdivision laws and is implemented at different scales (national, regional, local). Large part of this concept is taken up in the 'Trame Verte et Bleue' (TVB) in France. This is broken down regionally by the Regional Plan of Ecological Coherence (SRCE: Schéma Régional de Cohérence Ecologique) and aims to complete existing tools but also to use those already in effect. In line with this, the TVB includes in its SRCE recommendations for the Water Development and Management Master Plan (SDAGE: Schémas Directeurs d'Aménagement de Gestion des Eaux) which have been established in order to meet the Water Framework Directive (WFD).

What if other European countries are taken into account? This synthesis aims to compare the French system with the neighboring countries. In a nutshell, this report is looking at the European directive for 'Green Infrastructure' which presents new guidelines for the biodiversity protection. It wants to know if GI in other countries, notably the water part, is similar to structures that already exist in France.

Key words : Trame Verte et Bleue, Green Infrastructure, ecological network, environmentalism, policies, nature conservation, law, multilevel governance, subsidiarity, coherence, nature, national strategy, European strategy, biodiversity, Europe, ecosystem, urbanism, spatial planning

RESUME :

Depuis la signature de la Convention sur la Diversité Biologique (CDB) à Rio en 1992, des directives et des stratégies sont apparues pour suivre et cadrer la protection de la biodiversité à plusieurs échelles. En Europe, le concept d'Infrastructure Verte (IV) a récemment été défini. Celui-ci vise à établir un réseau écologique de qualité et à maintenir sur le long terme les services rendus par les écosystèmes. Il prend en compte l'aménagement du territoire et incite à la subdivision des lois et des mises en place du réseau à différentes échelles (nationales, régionales, locales). En France, une grande partie de ce principe est repris au niveau national dans la Trame Verte et Bleue (TVB). Celle-ci est déclinée au niveau régional par le Schéma Régional de Cohérence Ecologique (SRCE). Elle vise à compléter les outils existants et à utiliser les outils administratifs déjà en place. Dans cette logique, la TVB inclut dans ses SRCE, les recommandations des Schémas Directeurs d'Aménagement de Gestion des Eaux (SDAGE) pour répondre à la Directive Cadre européenne sur l'Eau (DCE).

Mais en est-il de même dans les autres pays européens ? Quelles sont les organisations semblables à la TVB dans d'autres pays ? Cette synthèse vise à décrire certains modèles transfrontaliers existants.

Mots clés : Trame Verte et Bleue, Infrastructure Verte, réseau écologique, environnement, politiques, conservation de la nature, loi, échelles de gouvernance, subsidiarité, cohérence, nature, stratégie nationale, stratégie européenne, biodiversité, Europe, écosystème, urbanisme, aménagement du territoire

GLOSSAIRE :

AONB : Area of Outstanding Natural Beauty
AMP : Asset Management Plan
ARE : Office Fédéral de Développement Territorial
ASBL : Association Sans But Lucratif
BIC : Bureau d'Information et de Communication de l'Etat de Vaud
CaBA : Catchment Based Approach
CAMS : Catchment Abstraction Management Strategies
CBD : Convention on Biological Diversity
CCFN : Centre de Conservation de la Nature
CCPIE : Comité de Coordination de la Politique Internationale de l'Environnement
CFMP : Catchment Flood Management Plan
CID : Carte Indicative des Dangers
CoDT : Code du Développement Territorial
CrLBAP : Cheshire Local Biodiversity Action Plan
CrLNP : Cheshire Local Nature Partnership
CRoW : Countryside and Rights of Way Act
CWAC : Cheshire West and Chester
CWATUP : Code Wallon de l'Aménagement du Territoire, de l'Urbanisme et du Patrimoine
CWEDD : Conseil Wallon de l'Environnement pour le Développement Durable
DCLG : Department of Communities and Local Government (Ministère des Communes et de l'Administration Locale)
DECC : Department of Energy and Climate Change
DEFRA : Department for Environment, Food and Rural Affairs
DETEC : Département fédéral de l'Environnement, des Transports, de l'Energie et de la Communication

NRA : National Rivers Authority
OACE : Ordonnance sur l'Aménagement des Cours d'Eau
OEaux : Ordonnance sur la protection des Eaux
OFAG : Office Fédéral de l'Agriculture
OFEFP : Office Fédéral de l'Environnement, des Forêts et du Paysage
OFEN : Office Fédéral de l'Energie
Ofwat : Water Services Regulation Authority
OIEAU : Office International de l'Eau
OPD : Ordonnance sur les Paiements Directs
OPN : Ordonnance sur la Protection de la Nature et du paysage
PARIS : Programme d'Action sur les Rivières par une gestion Intégrée et Sécurisée
PCA : Plan Communal d'Aménagement
PCDN : Plan Communal de Développement de la Nature
PCDR : Plan Communal de Développement Rural
PDCn : Plan Directeur Cantonal
PEDD : Plan d'Environnement pour le Développement Durable
PEEN : Pan-European Ecological Network
PER : Prestation Ecologique Requise
PGDA : Programme de Gestion Durable de l'Azote
PGDH : Plan de Gestion par District Hydrographique
PGEE : Plan Général d'Evacuation des Eaux
PGRI : Plan de Gestion des Risques d'Inondation
PPG : Planning Policy Guidance Note
PPS : Planning Policy Statement
PREE : Plan Régional d'Evacuation des Eaux
PSW : Public Service of Wallonia
PWDR : Programme Wallon de Développement Rural

DGE : Direction Générale de l'Environnement
 DGE-DIRNA : Direction des Ressources et du Patrimoine Naturel
 DGO3/DGARNE : Direction Générale Opérationnelle de l'Agriculture, des Ressources naturelles et de l'Environnement
 DGO4 : Direction Générale Opérationnelle de l'Aménagement du territoire, du Logement, du Patrimoine et de l'Energie
 DNF : Département de la Nature et des Forêts
 DPR : Déclaration de Politique Régionale
 DTE : Département du Territoire et de l'Environnement
 DWI : Drinking Water Inspectorate
 EA : Environment Agency
 EU : European Union
 FEDER : Fonds Européen de Développement Régional
 FEADER : Fonds Européen Agricole pour le Développement Rural
 FOEN (OFEV) : Federal Office for the Environment
 FWMA : Flood and Water Management Plan
 GI : Green Infrastructure
 GIP : Green Infrastructure Partnership
 HMIP : Her Majesty's Inspectorate of Pollution
 IFP : Inventaire Fédéral du Paysage
 IMNS : Inventaire de Monuments Naturels et de Sites
 LACE : Loi sur l'Aménagement des Cours d'Eau
 LAgr : Loi sur l'Agriculture
 LAT : Loi sur l'Aménagement du Territoire
 LBAP : Local Biodiversity Action Plan
 LDF : Local Development Framework
 LEaux : Loi sur la protection des Eaux
 LNR : Réserve Naturelle Locale (Local Nature Reserve)
 LPA : Local Planning Authority
 LPN (Suisse) : Loi fédérale pour la Protection de la Nature et du paysage
 LWS : Local Wildlife Site

PWRP : Programme Wallon de Réduction des Pesticides
 RAP : Ressource Strategy Regional Action Plan
 RBMP : River Basin Management Plan
 REC-VD : Réseau Ecologique Cantonal (Vaud)
 REN : Réseau Ecologique National
 RPT : Réforme de la Péréquation financière et de la répartition des Tâches entre la Confédération et les cantons
 RSA : Restoring Sustainable Abstraction
 RSPB : Royal Society for the Protection of Birds
 RSWT : The Royal Society of Wildlife Trust
 RU : Royaume-Uni
 SAC : Special Areas of Conservation
 SAGE : Schéma d'Aménagement et de Gestion des Eaux
 SAU : Surface Agricole Utile
 SBS : Stratégie Biodiversité Suisse
 SDAGE : Schéma Directeur d'Aménagement et de Gestion des Eaux
 SDER : Schéma de Développement de l'Espace Régional
 SDT : Service du Développement Territorial
 SEP : Structure Ecologique Principale
 SGIB : Site de Grand Intérêt Biologique
 SPA : Special Protection Areas
 SPB : Surface de Promotion de la Biodiversité
 SRCE : Schéma Régional de Cohérence Ecologique
 SREP : Sandstone Ridge EConet Partnership
 SSC : Schéma de Structure Communal
 SSSI : Sites of Special Scientific Interest
 TEN-G : Infrastructure Verte Transeuropéenne
 TIBP : Territoire d'Intérêts Biologiques Prioritaires
 TIBS : Territoire d'Intérêts Biologiques Supérieurs
 TVB : Trame Verte et Bleue
 UK : United-Kingdom
 WFD : Water Framework Directive
 WG : Walloon Government

MAE : Mesure Agroenvironnementale
MDB-CH : Monitoring De la Biodiversité
(Suisse)
MSFD : Marine Strategy Framework
Directive
NBS : National Biodiversity Strategy
NDPB : Non-Departmental Public Body
NE : Natural England
NEA : National Ecosystem Assessment
NERC : Natural Environment and Rural
Communities Act
NEWP : Natural Environment White
Paper
NFC : National Forest Company
NGO : Non Governmental Organization
(ONG: Organisme Non
Gouvernemental)
NIA : Nature Improvement Area
NNR : Réserve Naturelle Nationale
(National Nature Reserve)
NPPF : National Planning Policy
Framework

WOC : Water Only Company
WRA : Waste Regulation Authority
WRBP : Water Resource Business Plan
WRMP : Water Resource Management
Plan
WSC : Water and Sewerage Company
WWP : Water White Paper
ZC : Zone Centrale
ZD : Zone de Développement
ZL : Zone de Liaison

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I. INTRODUCTION

Demographic changes and human activities have manifold impacts on biodiversity. Humanity realizes gradually that its protection is important for its own well-being and economy. In 1992, the first determining international meeting was the Rio Earth Summit. It led to the signature of the CBD (Convention on Biological Diversity) (Primack and al., 2012) and allowed the appearance of new biodiversity strategies.

In France, a new National Biodiversity Strategy (NBS) is launched in 2011. This one includes the "Trame Verte et Bleue" (TVB). **TVB is a national ecological network** defined in Grenelle laws. It pays particular attention to ecosystem services promotion and **regional-sector cohesion**. It is broken down regionally by the Regional Plan of Ecological Coherence (SRCE) and includes the Water Framework Directive (WFD). This order, set up in 2000, allowed a great step for water protection notably with the good ecological status of water bodies. In line with this, the TVB includes in its SRCE recommendations for the Water Development and Management Master Plan (SDAGE : Schéma Directeur d'Aménagement et de Gestion des Eaux) which have been established in order to meet the WFD (Ministère de l'Écologie, du Développement durable et de l'Énergie, 2014) (Appendix 2). These SDAGE protect water and halieutic quality. They are redefined at a smaller scale by the Water Development and Management Plan (SAGE : Schéma d'Aménagement et de Gestion des Eaux).

But **TVB is a French principle**. What if other European countries are taken into account?

II. METHODOLOGY

This document is achieved for the International Office for Water (OIEAU). It aims to answer several questions:

- Which structures look like TVB in other countries?
- Which links can be made between earth and water protection in these countries?

This document allows a better understanding of neighboring systems on nature conservation and water protection. Indeed, **there are few comparative documents on TVB**. Only one complete analysis was made in 2001 on European ecological networks (Jongman and Kristiansen, 2001). But this document does not include the evolutions since the Nagoya Conference (2010) which defines new international objectives for 2020. Indeed, since 2011, the European Union (EU) has established a new strategy for biodiversity: **the Green Infrastructure** (GI).

Therefore, this synthesis describes this new concept, close to the TVB, and **analyses its application through three neighboring countries** (Belgium, Switzerland and England). These countries are compared at organizational levels (national, regional, local) and on water management. Countries have been chosen for territorial, temporal and material reasons. Indeed, knowing the policies of neighboring countries can allow projects and programs at a larger scale. During the investigations of this synthesis, it has been necessary to focus on specific countries/regions/cantons to have a better analyze. So, **there is only one region/canton/county for each country** and the document is divided into countries and scales. Moreover, each country is divided into two sub-sections (organization for nature conservation, links with water management). First parts present organizations through several points (laws, roles, responsibilities, ecological networks, spatial planning...). Second parts describe water management and different links that may exist with the first parts. Finally, further information (in French) on each country is in the appendix.

III. GREEN INFRASTRUCTURE, DEFINITION AND STAKES

1) DEFINITION OF GREEN INFRASTRUCTURE

One of the aims of the new European strategy (2011) is « *by 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems* » (Commission Européenne, 2014). **In 2013, the European Commission published its strategy to promote this Green Infrastructure.** The memorandum establishes a roadmap and incites each member to “*plan and manage a network of natural or semi-natural areas and take account of natural process in spatial planning at different scales.*” (« *concevoir et gérer un réseau connecté d’espaces naturels ou semi-naturels et à prendre en compte systématiquement les processus naturels dans le cadre de l’aménagement du territoire à différentes échelles.* ») (Antoine and al., 2014).

For this purpose, GI “**incorporates green spaces (or blue if aquatic ecosystems are involved) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings.**” (Commission Européenne, 2013). GI is composed of several elements like hedgerows, fish ladders, green roofs, alluvial forests, bog or even wild rivers. Therefore, GI is opposed to grey infrastructure (roads, concrete...) having a multifunctional goal on one single geographical area (Commission Européenne, 2014).

2) STAKES OF GREEN INFRASTRUCTURE

2.1) Biodiversity stakes

GI creation contributes to restore lost connections between natural spaces (due to corridors, stepping stones...) (Union Européenne and al., 2010) and improves ecological quality of environment as a whole (Appendix 3).

2.2) Socio-economic stakes

Ecosystems offer several **free goods and services to the society with an important economic value**. Therefore, a structure like GI can play a significant role to restart industry, job market, tourism development, recreational activities and public health (Commission Européenne, 2014) (Appendix 3).

2.3) Political stakes which include water

The new EU strategy for biodiversity rests on GI promotion in other European political fields. It is also based on project support, financial access improvement, innovations’ research and information improvement (Commission Européenne, 2014). Some European funds exist in order to work in this direction (Appendix 3). For water, “*integrating GI considerations into river basin management can contribute significantly to delivering good water quality, mitigating the effects of hydro-morphological pressures and reducing the impacts of floods and droughts*” (Commission Européenne, 2013). Hence, **GI is a useful tool for the existing guidelines such as the WFD**, the Marine Strategy Framework Directive (MSFD) or directives that concern the impact assessment on the environment (Union Européenne and al., 2010).

IV. GREEN INFRASTRUCTURE ORGANIZATION IN THREE NEIGHBORING COUNTRIES

For at least a century, ideas to protect biodiversity are growing and people try to reduce their impact on nature. **In Europe, there are several similarities (objectives, national strategies...) but also huge differences between countries (scales, tradition, allocation of tasks, funding...)** (Jongman and Kristiansen, 2001).

1) BELGIUM (Wallonia)

1.1) Federal structure

In Belgium, federal level is mostly involved in international agreements (CCPIE). Therefore, in 2006, a NBS talks about GI in its objectives (Institut royal des Sciences naturelles de Belgique, 2013). However, this NBS does not reorganize internal policies. **Federal has just a symbolic role** and is not really involved in nature conservation or water management (Appendix 4).

1.2) Regional Structure

Belgian regions (Wallonia, Flanders and Brussels) have the nature conservation role. In Wallonia, transboundary area of France, a conservation law is adopted in 1973 and is still valid (Jongman and Kristiansen, 2001). This law shall be enlarged by other legal tools (Appendix 4) which are managed by the Public Service of Wallonia (PSW) poles. For conservation, the regional pole is the DGO3/DGARNE (Appendix 4).

As regards the ecological networks, **a Main Ecological Structure (SEP: Structure Ecologique Principale) was created.** This one uses the same kind of areas as the Pan-European Ecological Network (PEEN) (Appendix 4). Moreover, some SGIB (sites with a huge biological interest) are integrated in this structure and are documented (Dufrêne, 2015). **Unfortunately, despite several attempts, the structure has never been adopted** (Alain Peeters and al., 2014). Actions for conservation in Wallonia have only targeted sites with a strong protective status but **financing has been limited** (Dufrêne, 2015) (Appendix 4).

Furthermore, about spatial planning, even if lot of plans exist (Appendix 4), **the reference document is the Regional Spatial Development Strategy (SDER: le Schéma de Développement de l'Espace Régional).** This one is a guidance document which “*expresses planning and sustainable development options for the entire Wallonia territory*” (“*exprime les options d’aménagement et de développement durable pour l’ensemble du territoire de la Wallonie*” (DGO4, s. d.)). Therefore, the SDER guides some communal initiatives as sectors plans or PCA (Plan Communal d’Aménagement) (Appendix 4). **In its last versions, the SDER describes a concept which may look like the French TVB** (Service Public de Wallonie, 2013). However, the Belgian TVB is less defined and requires some changes (Conseil supérieur wallon de la Conservation de la Nature, 2014) (Appendix 4).

Nevertheless, an interesting initiative exists at the municipal level: the PCDN (Plan Communal de Développement de la Nature). This one gathers local actors but has a lack of funding (Alain Peeters and al., 2014) (Appendix 4). Otherwise, other municipal plans exist as MAYA plan for bees and bigger projects (LIFE +) are co-financed by the UE in Natura 2000 networks (Service Public de Wallonie, s. d.).

1.3) Water and Green Infrastructure at regional level

In Wallonia, the implementation of TVB is not clearly defined and is considered exclusively through the SDER. However, plans and programs are established to meet the need of the WFD in the region (Appendix 4).

Therefore, four River Basin Management Plans (PGDH: Plans de Gestion par District Hydrographique), the equivalent of French SDAGE, have been adopted belatedly (2013) by the Walloon Government (WG). These are accompanied by Measurement Programs (PDM: Programmes De Mesure) ordered by the WFD (Alain Peeters and al., 2014). In agriculture, beneficial solutions for water resources are defined in the “Programme Wallon de Développement Rural” (PWDR) (notably the agri-environmental measures (MAE) (Service Public de Wallonie, 2015). Other plans like PWRP (Programme Wallon de Réduction des Pesticides) and PGDA (Programme de Gestion Durable de l’Azote) exist. Regarding the

hydromorphology, important notion to achieve good water status, River Action Programs using an Integrated Sector-specific Approach (PARIS) have been defined (Appendix 4).

In addition to PGDH, some **river contracts are developed on sub-basin** scale (Appendix 4). Nonetheless, **they do not have regulatory scope** and are submitted to a moral commitment (Rosillon, 2015). This often leads to **power struggles with hydraulic sector** and does not permit to focus on environmental concerns (Rosillon, 2015). Otherwise, it exists the « piscicultural and halieutic management plan in sub-basins » which organizes relations between fishermen and aquatic environment (Service Public de Wallonie, 2015).

2) SWITZERLAND (Vaud)

2.1) Federal Structure

Switzerland is a federal state which delegates a portion of the conservation tasks at a more local scale. So, **under the Constitution, twenty six cantons have to implement environmental legislation for nature protection**. Federal system is based on a close cooperation between government (Confederation), cantons, and municipalities (Jongman and Kristiansen, 2001). The Confederation designates the biotopes of national importance, finance conservation measures and brings research staff (Jongman and Kristiansen, 2001). It also legislates on flora, fauna and habitat protection (Confédération Suisse, 2012) (Appendix 5). **Swiss Confederation owns two competence centers for environment and planning aspects**: the Federal Office for the Environment (FOEN) and the Federal Office for Spatial Development (ARE). These entities are part of the Federal Department of Environment, Transport, Energy and Communications (DETEC). In 2009, the DETEC has been commissioned to elaborate a Swiss Biodiversity Strategy (SBS). This strategy contained Ecological Infrastructure notion (close to GI concept) and had resulted on an action plan (Conseil Fédéral and Secrétariat général DETEC, 2015g) (Appendix 5).

In 2004, the Confederation presents its **National Ecological Network (REN: Réseau Ecologique National)** (Appendix 5). This network has areas which look like PEEN areas (core areas, development areas, corridors...) but with some national specificity (collection methods, interpretations, continuums, unexplorable high altitudes...). The REN also determines specific networks for each type of landscape (mountain forest network, extensive agricultural network...) (OFEFP, 2004). It takes into account aquatic and terrestrial aspects. Today, the update of the REN should determine “*the exact surface requirements for networking*” (« *les besoins exacts de surface pour la mise en réseau* ») in the SBS (Confédération Suisse, 2012).

In agriculture, the Confederation created “**Proof of Ecological Performance**” (**PER: Prestations Ecologiques Requises**), **allowing direct payments for farmers** who establish SPB (Surface de Promotion de la Biodiversité) (Appendix 5).

2.2) Cantonal Structure

Each canton has its own government, laws and decrees. In Vaud, the supreme authority is the Grand Council. This one nominates a State Council which takes care of the canton affairs. Environment part is managed by the Department of Environment and Territorial Planning (DTE: Département du Territoire et de l'Environnement). This department is subdivided in several parts which include the Directorate General of Environment (DGE: Direction Générale de l'Environnement) and the Territorial Development Service (SDT : le Service du Développement Territorial) (BIC, s. d.). The « Centre de Conservation de la Faune et de la Nature » (CCFN), a DGE section, allows practices in the cantonal perimeter and manages the Cantonal Ecological Network (REC-VD) (Appendix 5).

Even if the REN is not a legally binding instrument (Birard, 2007), the canton has **set up a REC-VD which is the cantonal translation of the REN**. This one **is addressed to local actors who work in spatial planning** (BIC, s. d.). It completes the REN with local data (Appendix 5) and is used as a “red wire” to create a coherent network in spatial planning documents.

However, requirements for biodiversity in spatial planning are not satisfying (Confédération Suisse, 2012). **Sectoral plans, cantonal masters plans (PDCn: Plans Directeurs Cantonaux) and shift plans are not adapted to a sustainable development** (Confédération Suisse, 2012) even if some efforts are made concerning the funding. Indeed, since the reform of financial equalization (RPT) in 2008, the Confederation and the cantons have defined budgets to achieve environmental objectives through “program agreements” (“conventions-programmes”) (Conseil Fédéral and Secrétariat général DETEC, 2015e). Furthermore, since 2012, **the Swiss territory Project aims to put in place some spatial spaces for biodiversity**. It is important that partners (Confederation, cantons, and towns) implement this project to alleviate the lack of efficiency of existing tools and create a real Ecological Infrastructure (Confédération Suisse, 2012).

Finally, a local initiative from 2007 is interesting. In Freiburg, a “Biotope Network” was created for the renaturation of wetlands, hedgerows and groves (Birard, 2007).

2.3) Water and Green Infrastructure at federal level

In Switzerland, cantons are also in charge of water management. As stated in the Constitution, they have the responsibility of water resources. However, some institutions exist at the federal level (FOEN, ARE...) (Appendix 5).

Switzerland is not an EU member and is not submitted to the WFD. Nevertheless, water protection has a solid legal protection (LEaux, OEaux, LACE, OACE) (Appendix 5).

In 2011, **the “Guidance Ideas” (« Idées directrices ») arise for an integrated river basin management** in the brochure « Agenda 21 for water ». Principles are similar to WFD guidelines (Appendix 5). The best example for integrated management in Swiss is the “Plan Régional d’Evacuation des Eaux (PREE)” (Appendix 5).

2.4) Water and Green Infrastructure at cantonal level

There is no PREE in Vaud canton. Main documents about water quality are the « Plans Généraux d’Evacuation des Eaux » (PGEE). However, these don’t take into account biodiversity aspects (Appendix 5). **Therefore, the canton has elaborated a renaturation plan for watercourses in 2014** (BEB SA, 2014) (Appendix 5).

Moreover, it exists some other documents for water management. Notably for flood prevention where Indicative Danger Map (CID: Cartes Indicatives des Dangers) were produced (BIC, s. d.). Concerning spatial planning, the cantons shall ensure that **local plans take an “adequate space for water” (“espace réservé aux eaux”) into account by 2018**. This space needs to be adapted and operated extensively (Conseil Fédéral and Secrétariat général DETEC, 2015c). In agriculture, the space areas correspond to the SPB. These are compensated by the PER and protect water and biodiversity at the same time. Finally, in the hydraulic sector, residual water flows imposed by the Confederation are difficult to reach. Meanwhile, consolidation measures are carried out on these flows (Conseil Fédéral and Secrétariat général DETEC, 2015a). In 2014, Vaud canton has underestimated the work that should have been done on this consolidation (OFEV, 2015).

3) ENGLAND (“Cheshire-West and Chester” County)

3.1) National Structure

The United Kingdom (UK) is politically and economically complicated (Jongman and Kristiansen, 2001). It is a constitutional monarchy with parliamentary government which does not form a federal state (Elections en Europe, 2014). In England, different laws and policies from the British Parliament have continuously modified the organization of nature conservation (Appendix 6).

Since 2001, in the UK, the Ministry in charge of the environment and agriculture is the “Department for Environment, Food and Rural Affairs” (DEFRA). **This one may ask NDPB (Non-Departmental Public Body) managing specific domains but it keeps the responsibility at the Parliament.** Therefore, **this is the NGO Natural England (NE)**, created in 2006 by the NERC (Natural Environment and Rural Communities Act), **which helps the DEFRA on nature conservation in England** (Appendix 6). NE works with all stakeholders (government, local authorities, NGO, universities, farmers...) to deliver the best protection for biodiversity (Appendix 6).

Regarding to the national documents, the DEFRA publishes the “**Natural Environment White Paper – The Natural Choice**” (NEWP) in 2011 (Great Britain and DEFRA, 2011a). This document recognizes the inherent value of the nature and presents some national tools for its protection. In the same year, another document is printed: the « Biodiversity 2020 » (DEFRA, 2011a) (Appendix 6). These **two documents insist on an integrated action at a bigger scale (landscape-scale), on the maintenance of partnership (as the Biodiversity Partnership) and on the creation of coherent ecological network** (DEFRA, 2011a).

One of the NEWP objectives is to put in place a GI. The **GI definition in England is quite the same as the European definition** and the TVB meaning (urban and rural context, sensitive ecological links, multiple scales, ecosystem services...) (CEEweb for Biodiversity et CEEweb academy, 2014). However, the GI word is more used for the urban part and recreational activities. So, GI represent a little part of existing partnerships in England (Appendix 6).

In 2010, following a request from the government, an important document on ecological network is published: the Sir John Lawton’s “**Making Space for Nature**” (Natural England, 2014a). **This paper explains the long tradition of nature conservation in England and the focus which was established on isolated sites protection** (Appendix 6). This kind of document allowed, with the NEWP, the implementation of twelve « Nature Improvement Areas » (NIA) in 2012 (Appendix 6). NIA are national ecological networks which were developed in the entire country by partnerships between local authorities, communities, land owners, private sector and conservation organizations (Appendix 6). Now, the three years of funding (DEFRA and NE) for NIA are finished. Therefore, **the twelve NIA have to be followed and other ecological networks have to be developed locally** (Natural England, 2015b).

Since the « Town and Country Planning Act” in 1947, England has known orderly development of spatial planning. In 2006, this is the Department of Communities and Local Government (DCLG) which take the responsibility of territory development (Van den Berg and al., 2006) (Appendix 6). In 2012, DCLG simplifies the national policy in a short note: the NPPF (National Planning Policy Framework). NPPF replaces and consolidates older guidance documents (Planning Policy Statements (PPS) and Planning Guidance Notes (PPG)) (Great Britain and Department for Communities and Local Government, 2012) (Appendix 6). There are several references to ecological networks in the NPPF which demonstrate a will to implement these networks (Great Britain and Department for Communities and Local Government, 2012).

3.2) Local Structure

Since 2010, there has no longer been regional level in England and all the decisions at this scale have disappeared (Quartermain, 2010) (Appendix 6). Therefore, the local organization of “Cheshire West and Chester” (CWAC) was chosen. The CWAC is a merger of county and district competences (this type of government is called unitary authority) (Appendix 6). CWAC unitary authority (the Council) asks an expert team (Total Environment Team) dealing with nature, archeology and landscape matters. This crew does projects, provides plans and has an advising role with other external structures (NE, Mersey Forest, English Heritage and Cheshire Wildlife Trust) (CWAC, 2015e). Finally, the Council can take some advice from the « Cheshire Local Nature Partnership » (CrLNP) about environment and planning questions (Beth Chinn, s. d.) (Appendix 6)

The Council is a “Local Planning Authority” (LPA). This means it has the regulatory power for spatial planning. It must respect NPPF orientations and determine local policies in a “Local Development Framework” (LDF). In CWAC, the LDF elaboration is in process (Appendix 6).

Cheshire County was the first British land to implement an ecological network with European funding. This ecological network has been developed during four years and was internationally recognized (Appendix 6). However, there have been some political issues since 2009 (Cheshire was divided into two parts). Nowadays, the Council is developing other plans (as the Cheshire Local Biodiversity Action Plan (CrBAP)) which allow habitat and endangered species protection (CWAC, 2015a).

3.3) Water and Green Infrastructure at national level

At national level, **water management looks like nature conservation management**. Indeed, the DEFRA has the water responsibility at the Parliament and take some advices from an NDPB (Environment Agency (EA)) which it sponsored (Appendix 6).

Since the 1973 “Water Act”, England gradually centralized its water management (Appendix 6) and in 2003, the WFD is reported in national laws. **The EA has in charge new standards respect and begins to establish River Basin Management Plans (RBMP)**. However, these one are not enough for water good status (DEFRA and al., 2015) (Appendix 6).

Therefore, **DEFRA and other partners (EA, NE...) have launched national strategies to solve main water issues and reaching WFD objectives**. In 2008, the “Future Water” document highlights all the points the country has to focus and describes a strategy by 2030. It shows the importance of customs modifications in industry, household and agriculture. It also reminds the importance to fight against flooding and droughts (DEFRA, 2008) (Appendix 6). In 2011, the « Making Space for Nature », the NEWP and the « Biodiversity Strategy 2020 » recommend a water protection through concerted actions for the natural environment and ecological networks. Lastly, another “White Paper” is published the same year (Water White Paper – Water for Life (WWP)). It incorporates all future challenges in water sector (water quality and quantity, water price...). Therefore, like the NEWP, the WPP defines a framework for actions in the water domain (Environment Agency, 2013).

However, national strategies are not efficient without appropriated action plans. Hence, **EA and water companies are developing quality and quantity preservation plans** (Appendix 6). NE works on compliance with regulatory obligations for protected sites and verifies the concordance between water projects and biodiversity plans (BAP). In 2016, **it also publishes a guidance manual for farmers, land owners and foresters: the “Countryside Stewardship”**. This document encourages to environment protection and wants to improve natural environment as a whole (biodiversity, water quality...) (Natural England, 2015a).

All these plans allow a water protection and a water regulation. However, in 2011, England suffers from a lot of criticisms by NGO and Europe on the lack of local implication in water management. Then, the government launches the « Catchment Based Approach » (CaBA) which should enable new partnerships at a sub-basin scale (Jacquin, 2014). The map of the 83 partnerships is available since August 2015 (Environment Agency, 2015).

3.4) Water and Green Infrastructure at local level

In the CWAC, the Council is also responsible for water management and protection (Appendix 6). For this purpose, the actual LDF takes different national documents (Making Space for Water, Future Water, Water for Life, Biodiversity 2020...) into account, the local and regional studies (Cheshire West and Chester Water Cycle Strategy (2010), Green Infrastructure Framework for North East Wales, Cheshire and Wirral (2011)), documents from water companies (Dee Valley WRMP 2015) and the North West River Basin Management Plan (RBMP in the territory) (CWAC, 2015d). Therefore, Cheshire LPA works with the EA, NE, water companies and other organizations to establish a better approach for environment and water issues. **Thus, the LDF constitutes the major local plan for water.** As regards the sub-basins partnerships, their consequences cannot be analyzed for the moment. Indeed, maps are too recent and the setback is not sufficient (Jacquin, 2014).

V.DISCUSSION

1) Summary

Following this synthesis, several major points are to be raised. First of all, **these three countries have developed a national biodiversity strategy in accordance with the European and international strategies.** The recently established concept of GI is usually **present** in those national strategies, **although often misinterpreted and/or without any well-defined applications.** For instance, in England, the definition of the GI is very similar to the real one, but in the town planning documentation, only both the urban aspect and recreational activities stand out. In addition, the government does not shoulder the responsibility of this principle any more. An Ecological Infrastructure is defined but remains an objective in Switzerland. Finally, this concept is primarily outlined in the national strategy but does not often bring out in the documents in question in Belgium.

Thus, it is not always necessary to analyze a country's GI to compare the setting up of the TVB in the others. For this, it is better to **return to the TVB concept and to see on which points it is akin to the GI principle.** Those points can be: **the consistency between the organizations at different scales, the setting up of ecological networks or the introduction of effective spatial planning tools.** Then, one is aware of **the variability of each country's view** of those issues as a whole.

Another TVB interesting point deals with the potential links between both land and aquatic organizations. **What emerges from all this synthesis is that there is not always any incontrovertible link and that the « land » and « water » organizations often work separately although close.** However, the WFD allowed an advance in water quality, which has beneficial consequences on the land environment. Finally, some strategic documents (NEWP, WWP...) or planning ones (REN, REC, LDF...) enable linkages between land and water.

2) Discussion board and summary outline of the organizations

A simplified diagram of the following table stands in Appendix 1:

	France	Belgium	Switzerland	England
National organization	TVB (2010) : the state arranges the working environment (TVB framework documentation) and attends to its overall consistency in the territory, the TVB is an ecological network that combines land and water aspects	The federal level only deals with international agreements so it does not act upon the biodiversity issue	Under the Constitution, the State legislates on nature conservation laws. This constitutes a framework for cantonal laws. REN (2004) : National Ecological Network realized by the FOEN but without regulatory obligation for the regional level (Birard, 2007) Program agreements : Confederation finances the cantons for 4 years (ecological networks are in these conventions) (Conseil Fédéral and Secrétariat général DETEC, 2015e)	12 NIA : national ecological networks, developed from the NEWP, tested during 3 years (end in 2015) NPPF : simplification of national orientations for spatial planning, the document advises directly the local authorities Natural England is the biodiversity NGO, it gives some advices to the government (DEFRA), bring together different actors and finances projects with the government
Regional / cantonal organization	SRCE : regional plan that should respect the national TVB directions The state and the regions work out the SRCE together in cooperation with a regional committee « trame verte et bleue » that gathers local players	The region shoulders the responsibility of habitat conservation (SPW) SEP : ecological structure plan has not been adopted (Alain Peeters and al., 2014) SDER : regional land planning framework that follows the French TVB concept. However, this one remains woolly and does not affect the other management plans (Conseil supérieur wallon de la Conservation de la Nature, 2014)	Nature conservation is delegated to the cantons. REC-VD: Vaud Ecological Network. It transcribes the REN in more details for the region (BEB SA, 2012) The REC are not obligated to take into account the REN (Birard, 2007)	Regional strategies have disappeared in 2010 (Quartermain, 2010)
Territorial / local organization	SCoT, PLU : local planning documentation subject to the SRCE directions The TVB changed the Article L. 110 of the town planning code in order to introduce the biodiversity preservation notion (conservation, rehabilitation and creation of ecological continuities)	PCA, SSC, RUE and other local plans do not take into account the ecological networks PCDN : Local projects to protect nature but with a lack of funding (Alain Peeters and al., 2014)	Land use plans as PDCn seems to not enough take biodiversity aspects into consideration (Confédération Suisse, 2012) PER : direct money from the Confederation for farmers	LPA : local authority for spatial planning LDF : local plan which take into account the national strategic documents, always in process in the CWAC Life ECONet : test of an ecological network financed by the Europe between 1999 and 2003 LNP, LBAP : local partnerships for nature preservation, LNP developed from the NEWP
Land-water national organization	TVB : the state arranges the working environment (TVB framework documentation) and attends to its overall consistency in the territory, the TVB is an ecological network that combines land and water aspects		The same entities take care of water management (FOEN, ARE...). The Constitution also squares water acts (Conseil Fédéral and Secrétariat général DETEC, 2015c) The Guidance Ideas are not restrictive. It seems like the WFD objectives with a basin integrated management The REN has water elements on its maps	National strategic documents: Future Water 2008, WWP... The NEWP and its NIA take into account water aspects The EA take care of water quality and quantity control, it advises the DEFRA, bring together different actors and finances projects with the government, it works with Natural England too
Land-water regional / hydrographical organization	SRCE must take into account the SDAGE of the area SDAGE (ensuing from the DCE) should consider the SRCE	PGDH (2013) : equivalent of the SDAGE (WFD application), four years later to adopt PARIS : hydromorphological plans which combine the PGRI and the PGDH	The water revitalization fall to the cantons. Vaud canton putted in place a joint effort (COPIL) for the renaturation The REC-VD has water elements on its maps Flood barriers: Consolidation measures are carried out on residual water flows (Conseil Fédéral and Secrétariat général DETEC, 2015a)	RMBP (2009) : SDAGE equivalent, they gives some directives for water protection at a basin scale Water companies manage quality (discharges) and quantity (extraction) aspects, they are subject to EA licenses

Local land-water organization	SCoT, PLU : local planning documentation subject to the SRCE directions	River contracts are at the sub-basin scale, they do not have regulatory scope and are submitted to a moral commitment (Rosillon, 2015). This often leads to power struggles with hydraulic sector and does not permit to focus on environmental concerns (Rosillon, 2015).	Farmers' SPB can have waterways or wetlands Spatial planning: the cantons shall ensure that local plans take into account an "adequate space for water" by 2018 (Conseil Fédéral and Secrétariat général DETEC, 2015c)	LDF : local plan take into account national water documents (Future Water, WWP...) and the RBMP Countryside Stewardship (2016): gives some advices to land owners for environment protection (land-water), it provides for subsidies
Advantages of the overall organization	State consistent implementation The town planning code must necessarily take into account the ecological network National-regional consistency between the TVB and the SRCE Joint implementation of the SRCE The SDAGE are taking the SRCE into account and vice versa (land-water consistency) The planning documents should respect the SRCE (regional-local consistency)	The PCDN are encouraging even if there is a lack of funding Some programs as LIFE + projects (in Natura 2000 areas) take into account the land and water considerations. They are co-financed by the Europe and could serve as an example (Alain Peeters, 2014) for a better coherence in Wallonia	Solids Federal laws (Convention) allow a guiding line for the lower levels (national-regional coherence). The REN (national scale) gives some directives for smaller ecological networks (REC). The social cohesion is important and it exists lot of actors meeting. Thus, Switzerland is highly effective compare to other European countries (Van den Berg and al., 2006). The country is ahead of monitoring methods (MDB) (Confédération Suisse, 2012). It exists direct subsidies for farmers (PER) which protect a part of the biodiversity. The nature organization is coherent with water management (the FOEN takes care of both domain, ecological networks take into account the water, the canton has a big department which work on all environment problematics). Integrated management planned (Guidance Ideas). Additional step for treatment in sewage plants (Conseil Fédéral and Secrétariat général DETEC, 2015b).	No Constitution as in Switzerland but many documents are produced by the government and allow to square the objectives, notably since the Nagoya summit. NGO are independent, maybe they are more objective about environment needs, they play a big role in England. Natural England and the EA work together (land-water) Lot of partnerships allows different actors meetings. Some national ecological networks (NIA) take into account the water part. Spatial planning guidance has been simplified (NPPF), notably for the LDF. The LDF take into account all national documents (national-local coherence) Funding from water companies (Great Britain and DEFRA, 2011b) to reduce the environmental impact. The RBMP will be taken in account in the local plan (LDF)
Drawbacks of the overall organization	The TVB system is still new, the results cannot be properly assessed yet	The absence of federal level does not allow a national orientation as the TVB. Everything is about the regions but Wallonia does not seem to create a real biodiversity protection (the SEP is not included in regulatory documents, TVB is unclear in the SDER...) (Conseil supérieur wallon de la Conservation de la Nature, 2014). The last version of the SDER does not yet allow a real translation of strategic directives and the mobilization of Europe funding (Conseil supérieur wallon de la Conservation de la Nature, 2014) Without a new territorial department, links between land and water are rare (Conseil supérieur wallon de la Conservation de la Nature, 2014)	Confederation financing seems to be not sufficient and the non-compliance is rarely penalized (Confédération Suisse, 2012). Spatial planning plans are not entirely adapted to a sustainable development (lack of local initiative) (Confédération Suisse, 2012). The extreme power fragmentation may restrict the possibilities to solve some problems at higher levels. Politicians "do not want to interfere" in the local business and it often results in a diversity of objectives, opinions and cultures (Van den Berg and al., 2006).	National level was deleted in 2010. It exists a critical need to work at multiple scales in England. Partnerships and spatial planning are important tools to create a GI which correspond to the European definition (CEEweb for Biodiversity and CEEweb academy, 2014). It is tough to assess direct effects which can have the sub-basins (CaBA) on global and local implementation (Jacquin, 2014).

Concerning the national organization, **a state framework allows a better coherence for lower levels.** Indeed, in countries with a national framework (France, Switzerland, England), the directives are followed at each scale and the organizations seem to be more coherent. Moreover, state control is important on the ground. **In Belgium, the lack of framework and control leads to a poor regional/intraregional cohesion.** Furthermore, in each country, **it is rare to find a national guidance document like TVB which gives advice to the regional scale.** The closest concept is the Swiss REN which serves as a basis for the REC. However, this one has no obligation to be considered at lower scales. Finally, some points are interesting to be highlighted. **In Switzerland, the Confederation establishes “program agreements” with the cantons for biodiversity projects.** The country also created **direct payments for farmers.** In England, national orientations for urbanism were simplified (NPPF) to have a better inclusion in local documents. The country also has **several partnerships** at different scales enabling a lot of actors meeting.

Regional level does not always exist (England). When this level is implemented, **the region/canton often takes the responsibility of nature conservation** (France, Belgium, and Switzerland). Specific laws and appropriate plans (SRCE, REC...) allow a good environment protection at this scale and facilitate the cross-scale cohesion. For example, in Belgium, the TVB notion in the SDER is very unclear and the SEP is not adopted. These issues do not ease regional/local coherence.

At the local level, spatial planning documents play a major role. If these ones include directives from upper levels, as in France, they can be even more efficient. **Most of the time, spatial plans do not really include biodiversity** (Belgium, Switzerland). However, the new local plans (LDF in England) begin to talk about ecological network. Some local initiatives (PCDN in Belgium) are stimulating and prove a local will to biodiversity protection.

As regards the land-water link, **there are no systems which are perfectly similar to the French TVB.** The nearest concept is localized in Switzerland. Indeed, this country includes water in its ecological networks (REN, REC). In England, the NIA also takes the water into account but they are just established at the national level.

Therefore, several complex factors are involved in nature conservation. A good coherence at each scale and between each scale is necessary to fight against the biodiversity loss. Moreover, efforts (funding, implication, partnership creation...) from each nation need to be pursued on long-term to have real environment benefits.

3) To complete the study

This synthesis describes policies, plans and projects about ecological networks and spatial planning at different scales. The document reminds how water management is implemented and tries to establish some links with nature conservation tools. However, for materials, temporal and linguistics reasons, it cannot be completely exhaustive. Moreover, the descriptions of regional/cantonal organizations cannot be representative of other regional operating. Therefore, **the synthesis allows a better comprehension of neighboring systems and can be used as a basis for future thorough analyses.**

It is important to pursue studies on many European countries to refine the comparison of existing systems. Other regions have also to be analyzed to determine if the aspects are generalizable. Afterwards, it could be interesting to take demographic, topographic, economic and cultural aspects into account in each country. More detailed analyses of these points could enable a better comprehension of actual implementations. In addition, certain ecological networks criteria (species, habitats...) could be examined and it would be interesting to compare assessment methods, modeling methods and tracking approaches concerning these

biodiversity criteria. Finally, a profound knowledge of socio-economic aspects could ensure an improvement of the global comprehension.

VI.CONCLUSION

The purpose of this synthesis was to know if it could exist some similar concepts to the TVB in neighboring countries (Belgium, Switzerland, and England). TVB system being exclusively French, it had been necessary to look at the closest European concept (GI) and to combine the two definitions to establish any connections. In this way, the comparison was established on organization coherence, ecological network existence and spatial planning implementation. It appears that countries visions differ considerably on each topic and that the number of factors in TVB and GI concepts does not allow an exhaustive comparison. Indeed, the ways to deal with an issue for a country can be based on its history, culture, or whether geography (Jongman and Kristiansen, 2001). It would be interesting to do more analyses (demographic, topographic, cultural...) on other European countries in order to achieve efficient cross-border projects in the future. It is also important to broaden the spectrum studying other European countries (Netherlands, Estonia, Poland...) which have already implement ecological networks (Jongman and Kristiansen, 2001).

Beyond the comparisons, biodiversity loss is not just a challenge for Europe. Demographic changes and growing anthropogenic pressure is a world problematic. The new GI strategy is interesting because, contrary to the PEEN, it tries an anthropocentric approach placing human at the center of environment issues. This may lead to a growing awareness about environment and enable bigger funding for nature conservation.

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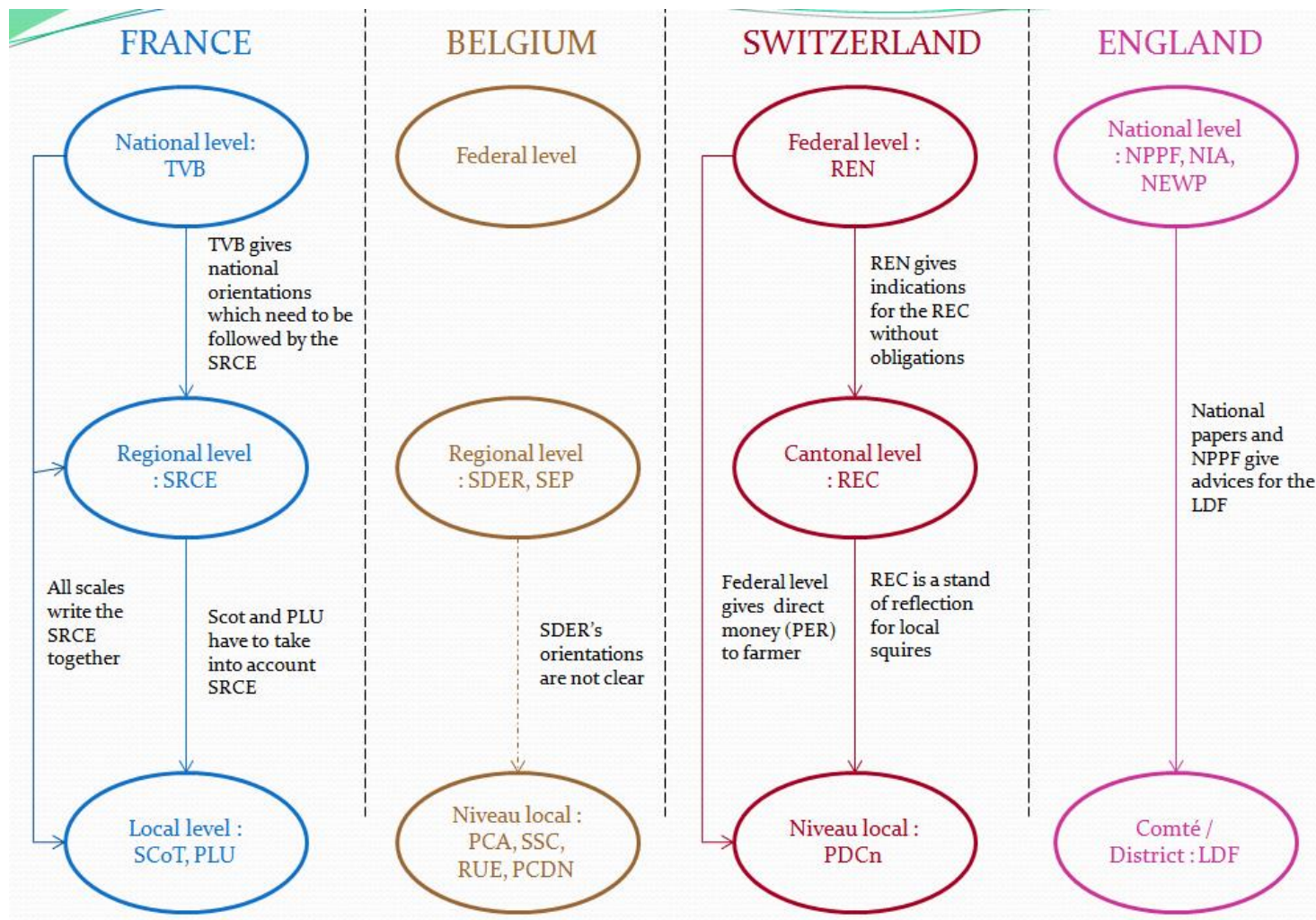
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APPENDIX

Concerning Appendix 3-6, the highlighted elements provide clarification in relation to the previous synthesis.

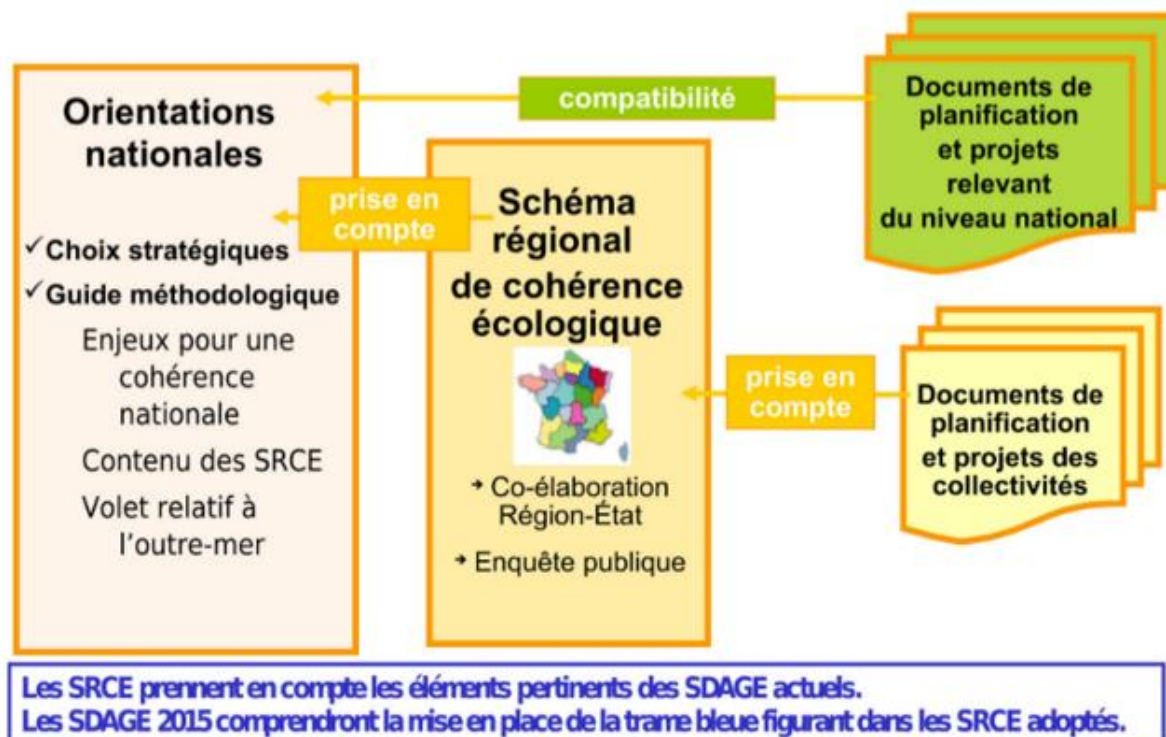
Appendix 1: Summary outline of the organizations



Appendix 2: TVB implementation in France

<http://www.trameverteetbleue.fr/presentation-tvb/dispositif-tvb> (MEDDE et al., 2015) :

La mise en place de la Trame verte et bleue, un dispositif à trois échelles emboîtées



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International
de l'Eau*

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87065 Limoges Cedex

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