



European Union
European Regional
Development Fund
Investing in your future



THE CONNECTICUT RIVER BASIN

Integrating Water Quality Improvements
with Regional Land Use Plans

Linda Shi, John Driscoll



Front Cover Photo:

This image, taken from Mount Sugarloaf in South Deerfield, Massachusetts, depicts the Connecticut River flowing through a wide valley of rich farmlands, with the Mount Holyoke Range in the far distance.

© Mr. Chris Curtis, Pioneer Valley Planning Commission

Table of Contents

	Page
Acknowledgments	5
About the Authors	6
Executive Summary	7
Chapter I: Overview of Challenges on the Island of Ireland in Bridging Spatial Planning and Water Resource Management	11
Chapter II: The Connecticut River Basin Case Study	14
Chapter III: Lessons for Managing River Basins on the Island of Ireland	28
References	32
Appendix I: The International Centre for Local and Regional Development	34
Appendix II: 2001 Connecticut River Strategic Plan (Massachusetts)	36
Appendix III: Interviewee List	39

Disclaimer

The information and opinions expressed in this document have been compiled by the authors from sources believed to be reliable and in good faith. However, no representation or warranty, express or implied, is made to their accuracy, completeness or correctness. All opinions contained in this document constitute the authors judgment as of the date of publication and are subject to change without notice.

This document is intended to provide general information on the subject matter of this publication. It is not intended to provide a comprehensive statement of the subject matter and does not necessarily reflect the views of the constituent partners of ICLRD. Unless otherwise agreed, no other party may copy, reproduce, distribute or make use of the contents of this publication.

This research on inter-jurisdictional and cross-border river basin management has been undertaken as part of the International Centre for Local and Regional Development's (ICLRD) EU-Funded initiative, CroSPlaN. Funded under INTERREG IVA, and administered by the Special EU Programmes Body, this three-year programme promotes the development of a cross-border planning network by enhancing and promoting the opportunities that exist for collaboration and addressing identified areas of need

Acknowledgements

The ICLRDR would like to thank the CroSPlaN Steering Committee for their assistance, advice and guidance throughout the course of this research. We also convey our sincerest thanks to the numerous interviewees who were consulted during the course of this study, including officials from the Pioneer Valley Planning Commission and associated local authorities. The views and opinions expressed contributed significantly to this report.

The research team also takes this opportunity to thank the ICLRDR partners for their support during this study.

About the Authors

Linda Shi is an urban environmental planner at the Institute for International Urban Development, Cambridge, Massachusetts with a focus on water and climate change adaptation. Previously, she worked for Rocky Mountain Institute, Snowmass, Colorado on the environmental regeneration of industrial river corridors, and in Bangkok on the implementation of water / sanitation regional programmes.

John Driscoll is Director of the International Centre for Local and Regional Development and Vice President of the Institute for International Urban Development, Cambridge, Massachusetts. He has over 35 years experience of cross-regional planning, urban regeneration and economic development in the United States, the EU, Central and Eastern Europe, the Middle East, Sub-Saharan Africa and Asia.

Executive Summary

A decade ago, the European Union adopted frameworks on integrated approaches to water resource management and spatial development planning. The *European Spatial Development Perspective* (ESDP), published in 1999, serves as a non-binding policy framework that guides member states in creating balanced and sustainable spatial development plans. The ESDP emphasises the importance of cross-sectoral planning and service delivery that transcends national and regional boundaries. The 2000 *Water Framework Directive* (WFD), which aims for all waters to achieve 'good status' by 2015, advocates an integrated approach to water resource management. It symbolises a new generation of water resource management that emphasises a broader base of responsibility that requires more effective multi-level governance.

The WFD and ESDP not only challenge governments to meet higher standards, but also increase the complexity of implementation by requiring the incorporation of an expanded set of stakeholders. In compliance with these frameworks, and specifically the WFD, the island of Ireland has established eight river basin districts – four in the Republic of Ireland, one in Northern Ireland and three that span both jurisdictions (see Figure 1). As of 2011, all have adopted river basin management plans – with each jurisdiction developing a distinct management plan for its portion of the cross-border river basins. Looking to the future, the island of Ireland now faces the daunting task of coordinating implementation across sectors (particularly between those managing water and those managing spatial development), across domestic political jurisdictions, and across national boundaries.

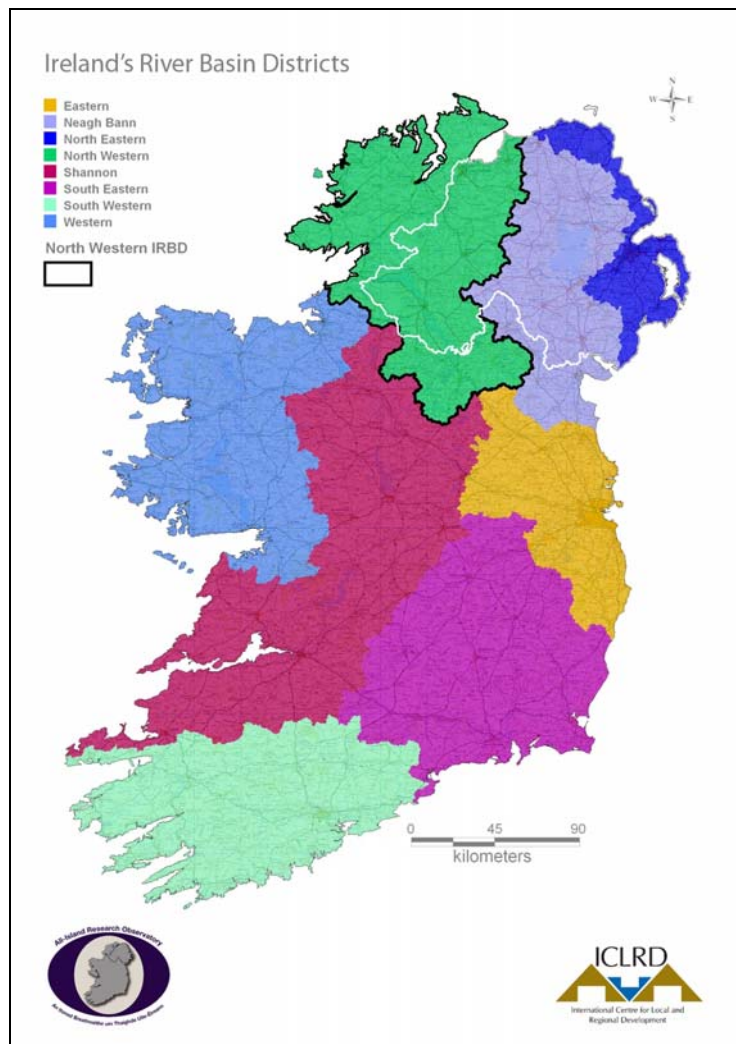
As both jurisdictions begin to implement their respective water frameworks and county / area development plans, a number of challenges have emerged, including the lack of integration between land and water planning – despite the clear linkages between the two – the limited priority for North-South plan harmonisation, and the lack of funding and capacity at the local levels. This is despite planning policies in both jurisdictions following the ESDP in the form of the non-statutory *National Spatial Strategy 2002-2020* (NSS) for Ireland, and the statutory *Regional Development Strategy 2000-2025* (RDS) for Northern Ireland.

The Purpose of this Research

To assist the designated implementing agencies in meeting this challenge, the International Centre for Local and Regional Development (ICLRD – see Appendix I for further information) has developed a set of international case studies that document good practices in bridging the scales and sectors of river catchment / watershed governance. This case study on the Connecticut River Basin in the United States demonstrates how one watershed applied both regulatory and non-regulatory measures to integrate water quality improvements with regional land-use plans. This document provides a brief overview of the challenges being faced in Ireland (Chapter I), details the experience of the Connecticut River Basin in responding to some

similar difficulties (Chapter II), and concludes with policy implications for the island of Ireland (Chapter III).

Figure 1: The River Basin Districts on the Island of Ireland



(Source: All-Island Research Observatory).

The strongest message from the Connecticut River case study is that regional partnerships and, in particular collaboration with civic society, is instrumental to managing river basins that span multiple jurisdictions. A second key message is that, while Directives and legislation are important in setting the regulatory parameters, individual river basins need champions to drive regional partnerships that bring together officials, politicians, civil society, recreational users, environmental organisations, land owners and the private sector to improve water quality and

enhance opportunities for (re)connecting with the river through recreational uses. One example of such a 'championing' initiative is that since 2009, volunteers have been taking water samples twice a week and posting their findings on a website managed by the University of Massachusetts Water Resources Center and the regional planning commissions¹.

This case demonstrates how this combination of regional partnerships and persistent leadership can sustain integrated watershed planning in the face of changing political and funding priorities. As state-funded programmes ended, more permanent regional organisations took up the task of integrating elements of the river basin plans into their ongoing activities or applying for funding, thereby allowing water quality improvements to continue, even if on an incremental basis.

Image 1: Historic and picturesque New England villages – such as Sunderland, Massachusetts shown here - line the Connecticut River Valley



(Copyright: Mr. Chris Curtis, Pioneer Valley Planning Commission).

These regional structures also filled an important organisational and delivery gap by providing planning tools, capacity building, technical assistance and mechanisms for voluntary cooperation to mobilise local governments to implement strategic and / or vision plans. In the case of the Connecticut River, these included the 2001 *Connecticut River Strategic Plan* and the two *Valley Vision Plans* from 1997 and 2007; both of which are good examples of linked strategies for water quality, environment and land management.

Practical 'on the ground' initiatives have included amending local zoning and land-use practices, updating regional spatial plans to promote more compact development and open space preservation, and seeking funding for specific projects such as eliminating combined sewer

¹ See http://www.cesd.umass.edu/TWI/TWI_Projects/Water_Quality_Monitoring/index.html for further information.

overflows and improving riparian buffers². Regional efforts have led to new designations such as the Silvio B. Conte Wildlife Refuge, American Heritage River, the Connecticut River Farm Byway and the New England National Scenic Trail, all of which have helped to reinforce the concept of an environmentally integrated river basin.

Summary

The Connecticut River case study offers a number of interesting approaches and lessons for cross-border river management on the island of Ireland. The Irish cross-border region could adapt the Connecticut River basin's project cooperation model as it seeks to raise funding from the respective central governments, North and South, and the European Union. Generating alternative local revenue sources through user-fees such as the stormwater utilities, while not necessarily a transferable practice, demonstrates the importance of local initiatives and an understanding of the often hidden costs of development.

In shaping an implementation strategy for Irish cross-border river basins, governments could also consider the three elements of capacity building, technical assistance and voluntary cooperation – strategies that go to the heart of harnessing individual local government actions for collective impact.

² Riparian buffers are vegetated areas next to water resources that protect water resources from non-point source pollution and provide bank stabilisation and aquatic and wildlife habitat (<http://www.soil.ncsu.edu/publications/BMPs/buffers.html>).

Chapter I: Overview of Challenges on the Island of Ireland in Bridging Spatial Planning and Water Resource Management

With the River Basin Management Plans (RBMPs) having only been recently adopted across the island of Ireland, attention now turns to how the objectives of these plans can be implemented – effectively, efficiently and in a coordinated manner – across both jurisdictions. In parallel to this, there is a growing recognition among practitioners, particularly among policy-makers and planners, that the implementation of the RBMPs must be married to the spatial planning policies and practices that impact on the overall development, scale and function of the cities, towns and villages that characterise the island of Ireland. This is a key challenge for the range of stakeholders involved in the governance of RBMPs, specifically in terms of:

- What are the RBMPs' implications for future spatial planning policy and development?
- Who decides the relative priorities between RBMPs and other spatial policy objectives?
- What opportunities exist for cross-border cooperation in the delivery of good water quality and how can policies be aligned for these inter-jurisdictional RBMPs?

Interviews with key stakeholders in both jurisdictions clearly noted that both administrations have been working together, even prior to the transposition of the WFD into national legislation, to ensure that their activities did not negatively impact each other's water quality and, in this context, were working to put in place shared targets and standards (Northern Ireland Environment Agency; Murphy & Glasgow, 2009). The benefit of the RBMPs in terms of collaborative working is that they have encouraged stronger intra- and inter-jurisdictional coordination and formalised these arrangements (*Interview, Cross-Border Agency*). The International River Basin Management Plans are, for example, linked by a 'Working Together' document jointly prepared by both jurisdictions.

On paper, both governments appear to recognise that river basin planning must engage, and work, with other planning processes – as well as key stakeholders – to provide effective environmental protection (OECD, 2010; Murphy & Glasgow, 2009; Environment Agency, 2006; Northern Ireland Environment Agency). This requires creating 'a framework for holistic cross-sectoral thinking and policy making' (Carter, 2007: 332) from national planning frameworks down to County Development or Area Plans, which in turn must incorporate key aspects of RBMPs into plans for housing, transport, retail and climate change.

The national planning and development frameworks for both jurisdictions, the RDS and NSS, have begun to take the lead in this regard, responding as they have been in recent years to the emerging and ongoing development challenges that were not envisaged at the time of their original adoption in 2001/2002. Nevertheless, a number of geographic, political and institutional challenges remain which make it difficult to merge water and land-based planning, particularly for the cross-border river basins. It is important that these challenges be clearly understood before seeking out international good practice and experiences for lessons learned.

Challenge 1: Integrating Planning, North and South, for Cross-Border River Basins

Planning on the island of Ireland is characterised by two very separate systems, North and South; the former being very centralised in nature albeit currently considering mechanisms to decentralise a range of powers to local government including planning, while the latter works to a decentralised model of planning where elected representatives hold a lot of the power (ICLRD, 2010). Although the goal of spatial planning policy across both jurisdictions is largely the same – to ensure balanced social, economic and environmental development – the harmonisation of RBMPs and associated policies and implementation arrangements does not appear to be a high priority issue (*Interview, Republic of Ireland*).

Challenge 2: Land and Water Management Processes are not Integrated

Despite the conceptual and operational benefits of stronger linkages between the two planning processes, RBMPs currently operate in parallel to the spatial planning systems of both jurisdictions on the island of Ireland (Kidd and Shaw, 2007). RBMPs and local development plans tend to be consistent only by accident rather than conscious effort. Yet, by concentrating development and harmonising environmental management objectives with planning policy, spatial planning can be a cost effective way to improve water quality and reduce flood risks over the long-term (OECD, 2010).

Challenge 3: Reshaping the Spatial Landscape Involves Difficult Political Decisions

The WFD places an emphasis on stakeholder involvement in processes of decision-making in implicit recognition of the fact that water resource management involves making decisions which effectively reshape the landscape in relation to future options and scenarios for development. The adoption of separate plans for the International River Basin Districts, and the delay in the adoption of the plans in the Republic of Ireland, demonstrate the complexity of inter-jurisdictional efforts to implement and monitor environmental quality on both a cross-sectoral and cross-jurisdictional basis. This is particularly acute when competing interests and varying agencies are involved in the processes of framework development and delivery in both jurisdictions.

Challenge 4: Institutions are often Fractured and Lack Capacity

The island of Ireland's historic abundance of water supply has restricted the development of a coherent institutional landscape in this sector. There continues to be limited emphasis on implementation at the local level due to a lack of capacity among local councils to implement plans; lack of regional and local funding resources; and lack of data. Furthermore, institutional responsibility tends to be highly fragmented. For example, 34 local authorities in the Republic of Ireland, working in near isolation of each other, are responsible for the infrastructure, delivery and treatment of water (*Irish Times*, 22 March 2010) while in Northern Ireland, the Department for Regional Development provides policy and resources, but devolves the operations of infrastructure and delivery to Northern Ireland Water, an arm's length body. These very different operational structures and reporting arrangements hinder greater alignment between the policies and practice of RBMPs and local development plans.

Challenge 5: Inadequate Funding to Achieve Needed Results

The evolution of land-use planning into a more integrated spatial planning system with its 'complex multi-dimensional and inter-related issues' (Daly, 2011: 8) has not been matched by the adequate resourcing and training of planners and elected officials. Although the most cost effective solutions invariably receive the greatest priority, there is a pervasive sense of frustration that decisions are made based on sectoral interests in the context of available resources rather than shared strategic goals (*Interview, Northern Ireland*). It remains difficult to convince councillors, especially in the Republic of Ireland where they play a key role in the planning decision-making process, to instigate change (*Interview, Republic of Ireland*), particularly given the increased evidence-base surrounding the links between water quality and the location and density of housing.

Concluding Comments

Looking to the future, it is evident that environmental considerations will play an increasingly critical and decisive role in spatial planning policy and practice. In particular, the pace of climate change, and the need for adaption, may bring new challenges, which may interact with water policy objectives and building codes and standards in unexpected ways (European Commission, 2009). Integration between river basin management and spatial planning must be seen as part of a wider process of integrating spatial planning, urban development and environmental policy objectives. In this regard, it is useful to consider the experience of other cross-border river basins that have worked to integrate river catchment / watershed and spatial planning.

Chapter II: The Connecticut River Basin Case Study

Following the implementation of the *Clean Water Act* in 1972, the United States Environmental Protection Agency recognised that non-point source pollution was a significant contributor to water pollution in U.S. waterways. This led to the promulgation of watershed-based management policies in the early 1990s that, for the first time, forced public agencies to address environmental protection issues at the level of the river catchment / watershed. At the same time, citizens were becoming increasingly active in environmental movements, and post-industrial cities were rediscovering and reclaiming urban waterfronts and seeking new development strategies to improve economic and social conditions for their residents. The convergence of these trends led to new partnerships being formed throughout the 1990s to improve water quality and bolster economic development. The roughly ten-year lead time of U.S. implementation of watershed plans provides an opportunity to examine the challenges and strategies of drafting plans, integrating water quality and spatial plans, and taking action, particularly in inter-jurisdictional river catchments.

This case study examines river catchment / watershed management of the Connecticut River (hereafter Conn. River), the longest river in New England which flows through four U.S. States. The Conn. River Valley is a largely agricultural and forested watershed with a few major cities and substantial suburban developments. Figure 2.1 helps to visualise the linkages among Federal and State regulations, the Connecticut River Valley Events and corresponding organisations and activities to manage the river basin.

2.1 Spatial Development Patterns in the Pioneer Valley



The Conn. River starts near the Canadian border and drains 29,000 square kilometres in four states: Vermont (VT), New Hampshire (NH), Massachusetts (MA) and Connecticut (CT). In MA, the Conn. River is known as the *Pioneer Valley* and traverses 106km, draining an area of 1,709km² (Figure 2.2).

Growing populations and industrial development in the first half of the 1900s generated increasing volumes of domestic and industrial wastewater that were discharged untreated into the river. In the 1960s, the *New York Times* famously dubbed it “the nation’s best landscaped sewer”.

**Figure 2.1: Watershed Timeline
Central and State Regulations**

Connecticut (CT) River Valley Events

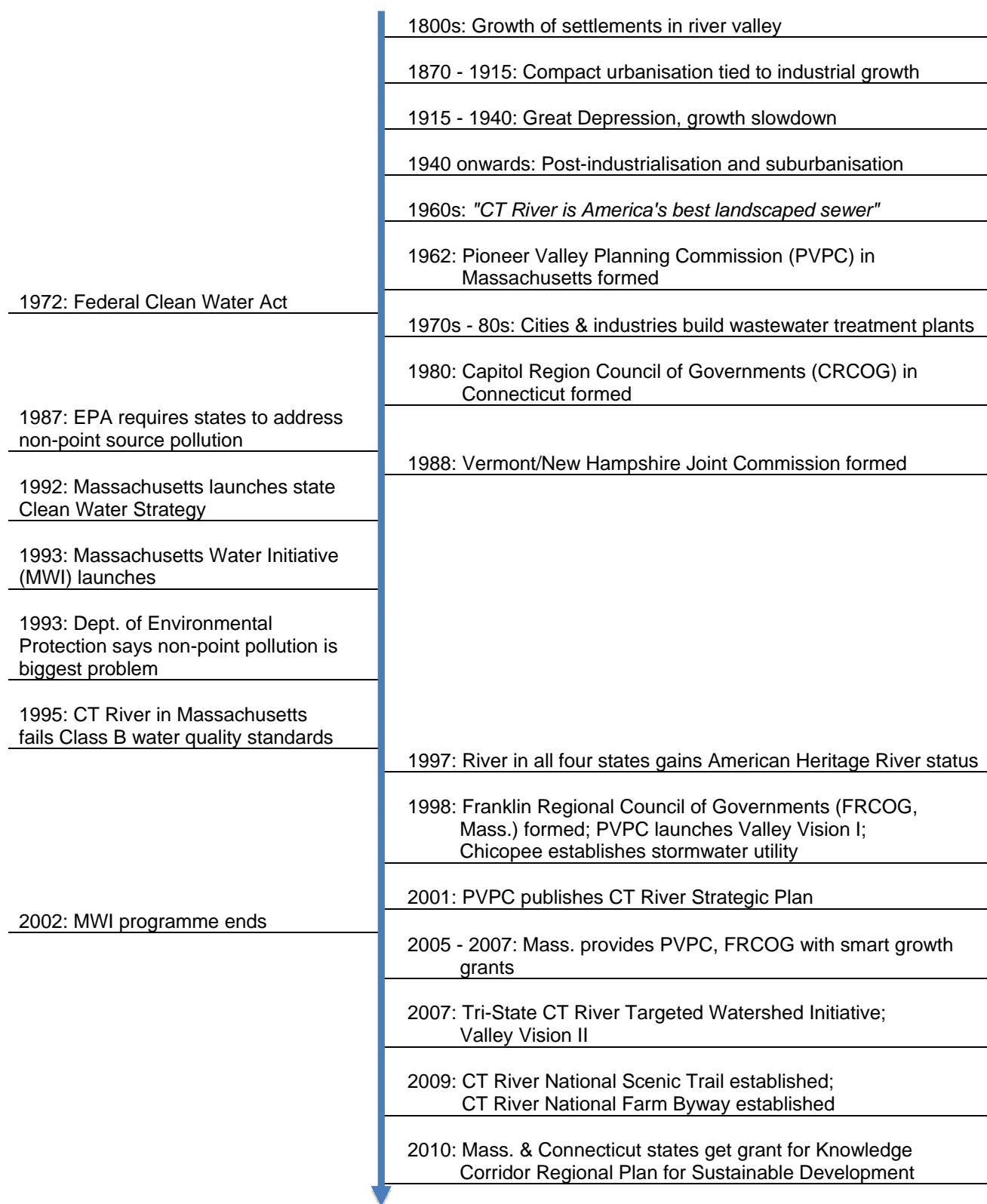
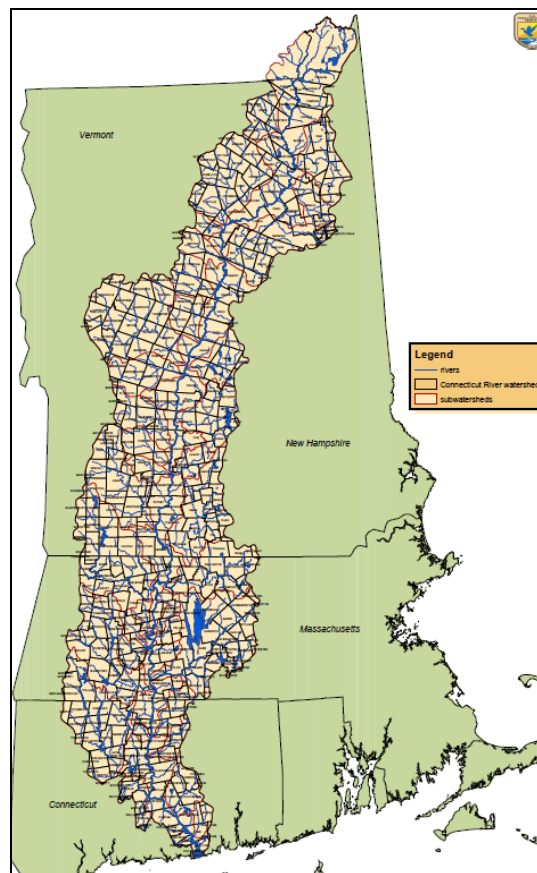


Figure 2.2: The Connecticut River Watershed



(Source: U.S. Fish and Wildlife Service, 1996).

From 1970 to 2000, the population in Pioneer Valley grew by only 4.4 percent, while developed land increased by 49.3 percent, a peculiar form of “sprawl without population growth”. For example, from 1971 to 1999, Hampshire and Hampden Counties, which comprise roughly two-thirds of the Pioneer Valley, lost over 12,000 hectares of farmland and forests to development (see Figures 2.3 and 2.4).

Following the passage of the 1972 *Clean Water Act*, twenty-three Massachusetts municipalities discharging domestic wastewater into the Conn. River provided at least secondary wastewater treatment. By the mid-1980s, public agencies had spent US\$333 million on cleanup and infrastructure improvements, and private companies in Hampshire and Hampden Counties spent US\$22 million on building their own wastewater treatment facilities.

While these investments improved water quality, the Massachusetts Department of Environmental Protection determined in 1995 that the entire length of the Conn. River had failed to achieve its designated Class B (“fishable and swimmable”) water quality standards. The river

tested positive for particularly high priority organics such as PCBs, which ceased to be discharged as of the 1970s, but persisted in sediments and became concentrated in fish. South of the Holyoke Dam, the river had high levels of pathogens and suspended solids due to combined sewer overflows or CSOs (see Figure 2.5).

Figure 2.3: Percent Change from 1970-2000

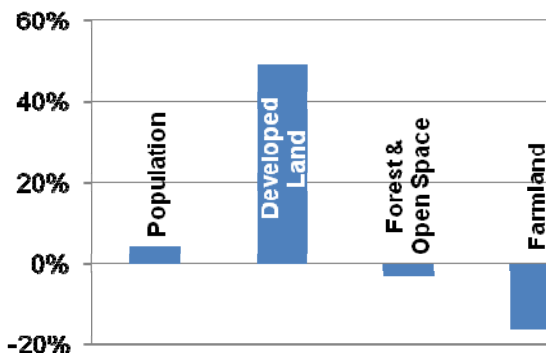
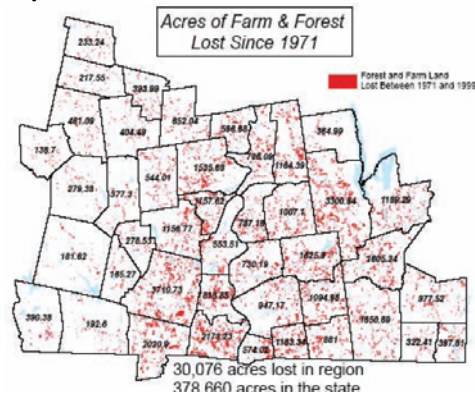


Figure 2.4: Farms and Forests Lost to Development 1971 to 1999 in Hampden and Hampshire Counties



(Source: PVPC Valley Vision 2, 2006).

Additionally, 49% of lakes in the Pioneer Valley suffered from severe eutrophication. Relevant to downstream impacts, Massachusetts recognised the need to document its nitrogen loading levels as part of a multi-state effort to reduce eutrophication in Long Island Sound.

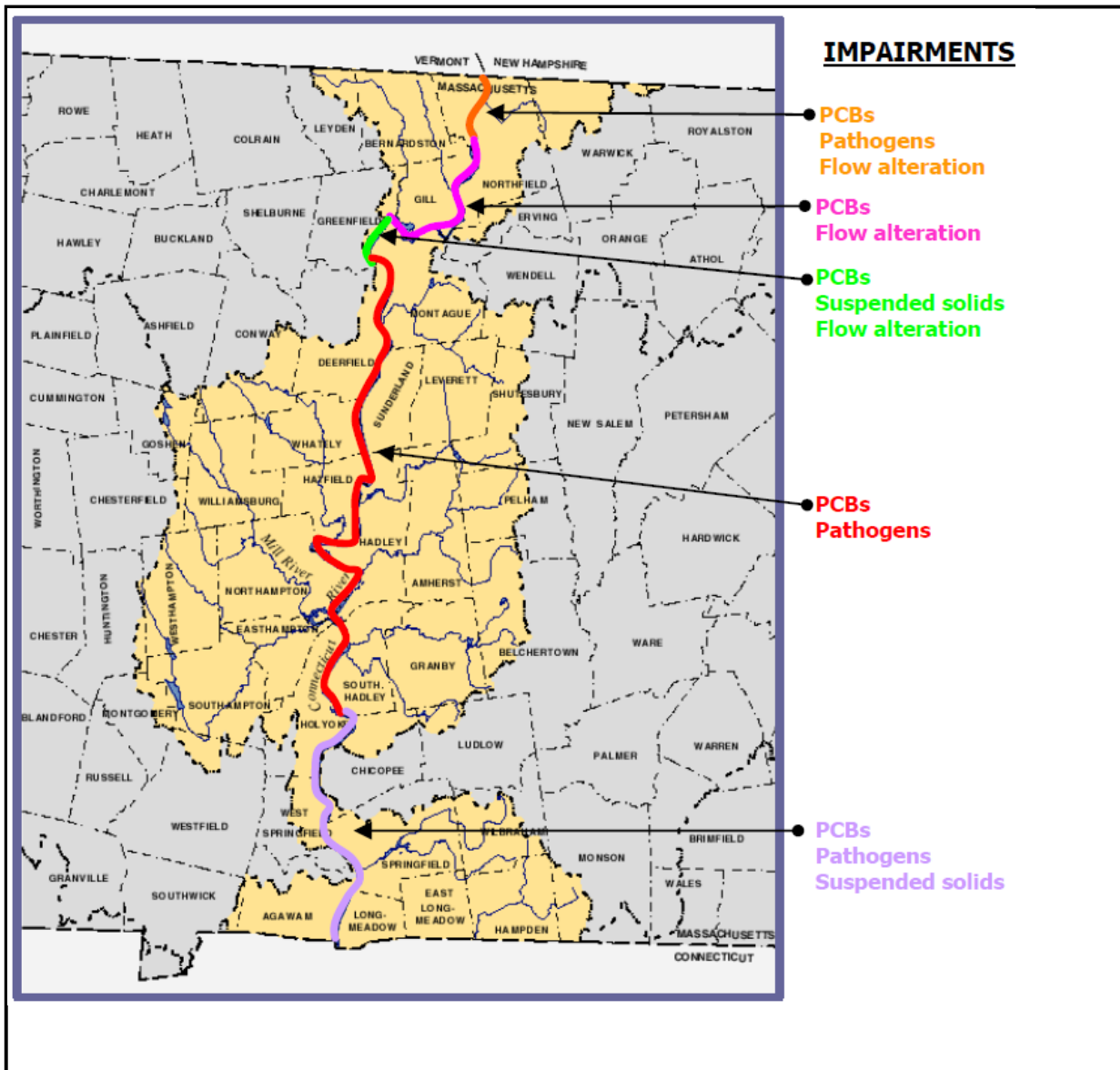
2.2 Regional Models of Watershed Management in the Conn. River Valley

In 1987, the *Clean Water Act* passed by the US Congress required states to provide the Environmental Protection Agency (EPA) with plans to address non-point source pollution. Given that these pollution sources converge on a watershed scale without respect for political or sectoral boundaries, the EPA began to advocate a watershed (or River Basin District) approach to water protection in 1991.

Broadly speaking, watershed management in the Conn. River valley takes place on three levels:

- National/state;
- State/regional; and
- Local.

Figure 2.5: Impairments along the Main Stem of the Conn. River, 2006



(Source: Connecticut River Watershed Council, Volunteer Water Quality Monitoring Program Annual Report, 2008).

2.2.1 National/State Regulatory Agencies

In the U.S. context, central government agencies such as the Environmental Protection Agency issue regulations either as funded or unfunded mandates that are implemented by each State. Federal regulations on water quality, and the limits on discharges permitted – first by point and later by non-point sources – are used by each State to develop their own regulations. In certain cases, some Federal agencies play a strong role in fostering an inter-jurisdictional approach.

For example, in the Conn. River valley, the National Park Service established 'heritage corridors' that cross four State boundaries and encourage river catchment / watershed planning and management across state boundaries.

2.2.2 State-backed Watershed Initiatives and Regional Commissions

Responding to Federal requirements, states developed various frameworks to address river catchment / watershed management. The States of New Hampshire and Vermont, which share the Conn. River as their boundary are, for example, both accountable for the discharges into the river. In this context, the State legislatures in New Hampshire and Vermont created state commissions in 1987 and 1988 respectively for the management of the Conn. River on a volunteer basis. The governors in each State appointed 15 members to the respective state commissions, drawing on representatives of regional planning commissions, business groups, conservation organisations, riverfront landowners and citizens at large.

These two volunteer commissions have met since 1989 as the Connecticut River Joint Commission (CRJC), which hired its first professional staff member in 1990. Though the Commission has no regulatory powers, it plays an important role in advocating for the watershed's ecological health, leading planning processes, and ensuring public involvement. For instance, it divided the Conn. River watershed spanning the two States into five sub-watersheds and created a committee for each watershed drawn from the elected town officials.

Under the direction of the Joint Commission, these sub-watershed committees provide advice about permit applications for projects that could affect the river; advise the Commission as well as State and Federal agencies on issues of local concern; prepare a river corridor management plan for the local segment of the river; and assist their towns and neighbours in adopting its recommendations (<http://www.crjc.org/localaction.htm>). In 2009, the five local river subcommittees updated and expanded the water resource plans for their five regions.

Unfortunately in 2010, due to loss of grant funding, the Joint Commission reduced its staff. While it is anticipated that their work will be partially taken up by the various regional planning commissions, the Joint Commission will continue to play an important role in providing coordination and outreach at the river catchment / watershed-scale.

In Massachusetts, the Executive Office of Environmental Affairs (EOEA) brought together a coalition of local, state and federal government agencies, nonprofits and businesses to form the Massachusetts Watershed Initiative (MWI). In existence from 1993 to 2002, the objective was to create regional partnerships to improve the State's 27 watersheds. Under the programme, watershed teams served as a forum to set goals, discuss, and make decisions within their respective watersheds. This provided a mechanism to bring together municipalities and local land-use and zoning officials, regional planning agencies, existing river catchment / watershed associations and land trusts, businesses and chambers of commerce. Efforts were also made to engage community volunteers to gather information, note potential problems, take pictures and conduct visual monitoring to help to identify problems.

Under the MWI programme, the Pioneer Valley developed its own watershed team drawing on central government, State and local agencies, academic institutions and civic members. In 2001, the team published MA's *Connecticut River Strategic Plan* (discussed in depth below; see also Appendix II). Said one former state participant of the watershed team,

'That time was like Camelot. The roundtable discussions between all the different groups led to such great partnerships and cooperation'.

During the period that the MWI programme was in operation, the Department of Environmental Protection reorganised itself to work in watershed teams. However in 2002, with a new administration in State government and a shift in priorities within the Department, the MWI programme and associated grant programmes ended. Without the support of the Department, the local watershed initiatives and plans were either picked up by other organisations or became inactive. In the Pioneer Valley, the Pioneer Valley Planning Commission (PVPC) which was established in 1962 to conduct regional planning for Hampshire and Hampden Counties' 43 cities and towns became the lead agency in the region, coordinating with other state agencies upstream and downstream, providing technical assistance and coordination among municipalities, and applying for every possible grant to implement the project – albeit on a piecemeal basis. As one PVPC senior planner noted, the watershed teams were very useful; although the programme's short existence makes its impact difficult to evaluate.

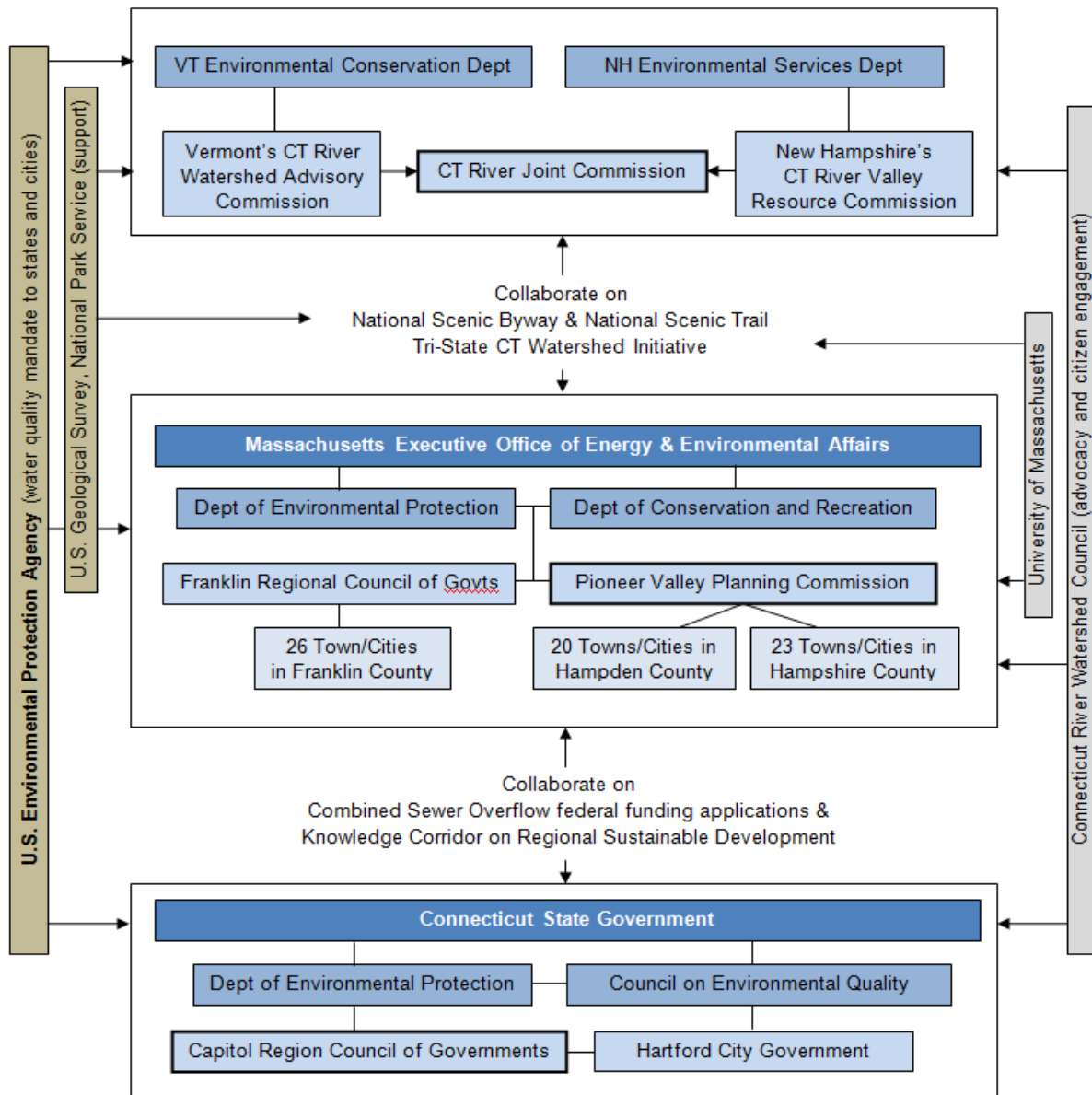
A further type of regional cooperation is represented by *ad hoc* partnerships among key regional players. In 1997, in the first partnership to engage all States, public officials in Conn. River Valley sought national designation of the river as an American Heritage River; and through this process, the Conn. River became one of 14 rivers to receive the designation. The application was submitted under the Connecticut River Watershed Council (CRWC), a non-profit advocacy organisation dedicated to the entire length of the Conn. River. The initiative resulted in the national designation and the funding of a watershed coordinator for five years. It was the first time agencies across the four States had collaborated on a river-wide project and the experience established an important precedent for future partnership efforts. For example, in 2010, a consortium of regional stakeholders obtained federal grant of US\$4.2 million to develop and implement a bi-state (Massachusetts and Connecticut) "Knowledge Corridor Regional Plan for Sustainable Development". The idea of the corridor first surfaced from the business community which felt that it had to be collaborative in order to be competitive and effective; from there, it has grown into a 40-organisation consortium. The grant provides funding for numerous activities including: land-use and transportation planning, climate change and green infrastructure, work force development, funding for selected projects and monitoring of results.

In implementing these *ad hoc* partnerships both between counties and between States, the regional planning commissions have played a critical role.

- In Massachusetts, it is the Pioneer Valley Planning Commission (PVPC) and the Franklin Regional Council of Governments (FRCOG), which provides regional planning services for communities in Franklin County, the State's most rural county.

- In Connecticut, this role fell to the Capitol Region Council of Governments (CRCOG), which is the State's largest regional planning agency and serves the State's capitol, Hartford, and 29 surrounding counties.

Figure 2.6: Conn. (CT) River Basin – Linkages Among Inter-Jurisdictional Partners



(Source: I2UD - based on various sources).

Although these agencies have no regulatory authority they lead river basin-wide planning, create platforms for partnerships, and assist municipalities in obtaining grants and Federal loans and in developing local land-use plans (see Figure 2.6). This non-statutory regional collaboration means that effective planning commissions use consensus-building approaches in their work with local governments (see Section 2.3.1 below).

2.2.3 Local Authorities

In the third tier, local authorities and their planning boards are responsible for implementing projects that achieve the goals of the watershed plans. This includes working directly with adjoining communities to acquire land for preservation or sharing information. Funding and personnel constraints for some of these local authorities are an ongoing issue; for example, in Hampden and Hampshire counties, only 10 out of 43 municipalities have any planning staff. Providing these communities with technical assistance through a regional organisation such as the Pioneer Valley Planning Commission means that the necessary coordination, advisory and funding support is available to coordinate projects that contribute to improving the river basin.

Image 2: The placid Connecticut River flows through farmlands, and makes a dramatic bend at a sandstone outcrop of red rocks at North Hadley, Massachusetts.



(Copyright: Mr. Chris Curtis, Pioneer Valley Planning Commission).

2.3 Implementation Strategies in the Pioneer Valley

The Pioneer Valley Planning Commission continues to lead regional activities in implementing the 2001 *Connecticut River Strategic Plan*³. The plan identified five major programme areas:

³ The Pioneer Valley watershed includes the main stem of the Connecticut River in Franklin, Hampden and Hampshire Counties with the four major sub-watersheds each having their own river catchment / watershed plans.

- Improving water quality and quantity;
- Preserving streams and wildlife habitat;
- Managing land-use, growth trends and economic development;
- Planning public access, recreation and greenways; and
- Coordinating watershed management partnerships.

The approach in the Pioneer Valley is twofold: a targeted programme to address the legacy of combined sewer overflows; and an integrated development strategy that addresses infrastructure improvements and changes in land management practices. The 2001 plan introduces a host of programmes that include smart growth planning, preserving rural character and open space, assisting local boards to review zoning bylaws and stormwater requirements for developers, facilitating redevelopment in existing urban areas, and enhancing economic development in tourism and agriculture. Given the oversupply of zoned residential land – a phenomenon now facing the island of Ireland and specifically the Republic of Ireland – the plan encourages reuse (i.e. brownfield) and higher density development in existing urban areas as one way of reducing development pressures on farmland and forests.

Taken together, these strategies address long-term spatial growth management to improve environmental conditions that influence water quality. An ongoing challenge is how to measure the potential impacts of these broader strategies in eliminating non-point source pollution.

2.3.1 Water Quality Management

Initiatives to improve water quality in the Pioneer Valley, some of which predate the establishment of river catchment / watershed plans, can be grouped into three major categories:

- Voluntary cooperation to reduce combined sewer overflows;
- Stormwater utility charges; and
- Supportive actions and measures.

Voluntary Cooperation to Reduce Combined Sewer Overflows

In 1993, the Connecticut River Cleanup Committee was established to address combined sewer overflows, a major pollution source. The Committee included the Pioneer Valley Planning Commission and the Department of Public Works of seven municipalities that were under EPA orders to address their combined sewer overflows.

An innovative feature of this cooperation was the use of a Memorandum of Agreement signed by the City Mayors and the Director of PVPC. Non-voting members to the Agreement include the Massachusetts Executive Office of Environmental Affairs, the regional U.S. Environmental Protection Agency office, Hartford Metropolitan District Commission and Capital Region Council of Governments. While the MOA is not legally binding, it committed the parties to cooperate with each other and with counterparts in other States in:

- lobbying for funding;
- adopting municipal policies to correct combined sewer overflows;
- collaborating on educational efforts; and
- agreeing on a priority list of mitigation projects.

The MOA became an effective instrument for the Pioneer Valley Planning Commission, as a regional agency with no statutory authority, to secure cooperation and action on a consensus basis.

The Committee has been instrumental in securing Federal and State funding that has reduced combined sewer overflows by half⁴. As such, this initiative, using the Memorandum of Agreement, was later expanded to 60 towns to address stormwater drainage. The remaining combined sewer overflows are, however, located in the largest three cities and require a level of investment which will be difficult to generate from Federal sources alone – particularly given the current budgetary crisis.

Generating Fees – Stormwater Utility Charges

In 1998, Chicopee, a city of 54,650 residents, created a stormwater utility that charges property owners a fee based on their impervious surface coverage. For instance, parking lots that pay no sewer fees are charged a fee for generating stormwater runoff. In the past 25 years, the city's stormwater management has cost US\$150 million, most of which has been funded through the stormwater utility⁵. Chicopee is the only city in the valley that does not consider funding to improve stormwater drainage to be a challenge. Other cities, for example, accumulate grant monies for as long as five years before they have enough funding to do one project. Despite the advantages of a separate stormwater utility, very few municipalities have considered the approach due to the political difficulty of introducing new user charges⁶.

Supportive Actions and Measures

In 2007, the States of Vermont, New Hampshire and Massachusetts together obtained a two-year grant from the EPA to improve water quality in the Conn. River. The grant, totalling US\$1.34 million, including 29% local match funding, has supported ten projects on

- water quality monitoring with real-time data available online;
- agricultural runoff control, including low impact development tools to control agricultural runoff;
- riverbank erosion control;
- stormwater rebates for property owners installing on-site stormwater retention systems;
- innovative financing for controlling stormwater;
- smart growth tools to protect public water supplies;
- the establishment of stormwater utilities, and
- public outreach.

⁴ By 2009, thirty-one dry weather overflows had been entirely eliminated, and wet weather CSOs were reduced from 134 in 1988 to 67 in 2009.

⁵ In the beginning, the utility charged US\$10 per quarter or US\$40 per year; today it charges US\$25 per quarter or US\$100 per year on the sewer bill.

⁶ The PVPC published a guide for municipalities on how to establish their own stormwater utility in 1998. They have also created an online toolkit for households to improve groundwater infiltration on-site.

The project was led by the Pioneer Valley Planning Commission and has successfully brought together other key stakeholders and the University of Massachusetts Water Resources Research Centre.

2.3.2 Zoning and Local Land Use Plans

Since the early 2000s, efforts have been underway to implement various spatial proposals originally cited in the Connecticut River Initiative and Strategic Plan (CRISP) and Valley Vision, the non-statutory development strategies for the Pioneer Valley. From 2005 to 2007, the State of Massachusetts provided funding to the Pioneer Valley Planning Commission to provide assistance to municipalities to update their local land-use plans, implement zoning bylaws and develop strategies for smart growth. Similar initiatives were undertaken by the Franklin Regional Council of Governments (FRCOG). At the end of the programme, a total of 33 out of 43 communities had a new community development plan; with the technical assistance that was made available providing an effective means to build consensus around smart growth and valley-wide initiatives.

Valley Vision 2, launched in 2007, establishes locations for low and high density growth, sites for brownfield redevelopment, areas that will become smart growth communities with State funding support, and protected open space corridors. The strategy also aims to strengthen riparian buffers, amend stormwater bylaws for developers, promote low-impact development, and establish zoning bylaws for floodplains, steep slopes and environmentally sensitive areas. The concept of providing assistance to each municipality continues through an 'online toolbox' focused on smart growth strategies. Importantly, the regional plan is supported by a Memorandum of Agreement endorsed by 40 out of the 43 municipalities who have committed to implementing the regional plan.

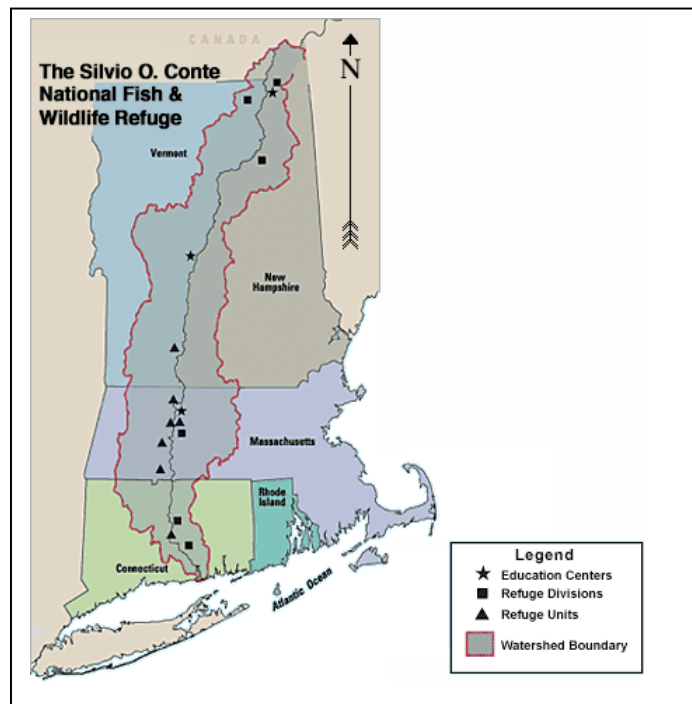
2.3.3 National Status Designation and Protection

Since the late 1990s, various parts of the Conn. River valley have become protected through national designations; these include refuges, scenic farm byways and scenic trails. These designations sometimes come with Federal funding to support land purchases and authority to regulate land use; more often, these designations allow managing agencies to work with private and public land owners to voluntarily improve land management practices; work with conservation groups such as the Trust for Public Land and The Nature Conservancy to purchase and protect land; and create opportunities for recreation and public education.

The largest protection designation is the 29,000km² Conn. River watershed known as the Silvio B. Conte National Wildlife Refuge since 1997 (see Figure 2.7)⁷. The Fish and Wildlife Service has purchased important tracts of land for protection in the Conte National Wildlife Refuge, and today operates three cooperative visitor centres in the valley and works with landowners to support habitat protection.

⁷ The trail, established over half a century ago, was threatened in sections by encroachment of new development.

Figure 2.7: The Silvio B. Conte National Fish & Wildlife Refuge



(Source: U.S. Fish and Wildlife Service).

In 2009, the U.S. Congress recognised the Conn. River Farm Byway, a State highway running alongside the Conn. River from Vermont and New Hampshire down to Massachusetts, as a National Scenic Farm Byway. The National Scenic Farm Byway Programme recognises routes for their archaeological, cultural, historic, natural, recreational and/or scenic qualities and provides funding towards the preservation of such valued characteristics. The designation also requires a corridor management plan to be put in place to conserve existing resources, and guide future development.

Also in 2009, Federal legislation established the 220 mile New England National Scenic Trail; this is maintained by volunteers of the Connecticut Forest & Park Association and the Appalachian Mountain Club Berkshire Chapter. The original trail, established over half a century ago was experiencing threats from subdivision development. Although entirely voluntary and discretionary, the trail's status provides some leverage in preserving the land-use and landscape along the Conn. River.

2.4 Concluding Comments

The Conn. River Basin illustrates that successful river basin management should adopt an approach that goes beyond ‘enforcing regulations’ – the approach should be multi-sectoral and build upon the practical linkages that take place within a river basin district between water quality and preserving habitat, managing land uses, planning public access and recreation, and coordinating watershed management plans.

This case also offers insights to the challenges of implementing water quality regulations and related programmes across a tiered governance structure that involves Federal, State and local governments. In an ideal scenario, the Federal government sets out the regulations; the State government translates the regulations into operational measures and programmes across different sectors including agriculture and forestry; and local governments are then responsible for aligning their individual spatial plans, land uses and environmental enforcement (e.g. waste water) to support improved water quality. Yet in reality, as shown in this case, implementing inter-jurisdictional river basin management is much more complex and less straightforward due to the vagaries of political and funding commitments.

As the case illustrates, it is not unusual for local governments to directly lobby the Federal government for funding or important designations such as a wildlife byways to protect the landscape and habitat. Regional entities such as the Pioneer Valley Planning Commission (PVPC) and the Franklin Regional Council of Governments (FRCOG) have been essential to building and sustaining cooperation among local governments on joint activities within the river basin. These non-statutory regional groups have also filled a significant ‘capacity gap’ among local governments by providing technical assistance and planning tools.

Cooperation among the State governments is also essential as illustrated by the successful model of the Connecticut River Joint Commission that linked the two State governments of Vermont and New Hampshire. In addition, there are structures and processes that actively engage civic society and key stakeholders in the process of defining and implementing solutions – rather than only engaging stakeholders in a ‘consultation’.

Each of these approaches shares a common focus on the Connecticut River Basin – that of it being an environmental asset shared across multiple jurisdictions. Through these regional partnerships and, in particular their collaboration with civic society, there is a broad understanding that river basin management and spatial planning are closely inter-linked.

Chapter III: Lessons for Managing River Basins on the Island of Ireland

The strongest message from the Conn. River case study is that regional partnerships and collaboration with civic society is instrumental to managing river basins that span multiple jurisdictions. This partnership and collaboration-based model underlies the main achievements of the Conn. River basin in tackling difficult challenges in water quality and spatial development through long-term growth management to improve environmental conditions that influence water quality. Despite political boundaries, differences in political parties and historic rivalries, communities in the four States realised that they shared a common experience of economic disinvestment, geographic isolation and resource degradation; and that efforts to overcome these challenges would require a unity of vision. Such a vision they recognised would strengthen appeals for external investment and funding. In this instance, collaboration swelled from the ground up, from community leaders who recognised the value of collaboration across, civic, private and public organisations.

3.1 Lessons for the Island of Ireland

A key question for the island of Ireland at present in terms of river basin management is ‘how do we implement river basin management plans (RBMPs)?’ The Conn. River case study presented a number of innovative and practical strategies to enact RBMPs in terms of technical and procedural implementation. Technically, cities and regions across the States of Vermont, New Hampshire, Massachusetts and Connecticut adopted many practical initiatives that are also proposed in the RBMPs of the island of Ireland: for example protecting riparian buffers and providing incentives for stormwater management.

But with over a decade of operational (implementation) experience behind it, the Conn. River has much international good practice to share with the island of Ireland, particularly in terms of building the capacity of key agencies involved in river catchment plans and the provision of technical assistance. The capacity building tools, coupled with the technical assistance, provided for the Pioneer Valley, for example, proved critical in implementing new initiatives, for which under-staffed and under-funded municipalities have little capacity

Drawing on this, five key lessons for the island of Ireland are as follows:

(1) Develop Regional Champions

While Directives and regulations were set centrally, it was at the sub-regional management of the river basin that official, civic, business and environmental leadership came together in a meaningful way. Regional groups such as the Connecticut River Joint Commission and the Pioneer Valley Planning Commission were critical because they not only led and sustained plan implementation, but also mobilised local authorities through joint agreements and capacity building initiatives – all based on the principle of subsidiary.

It is important to recognise the catalytic role of state funding and support for collaborative initiatives, which undoubtedly germinate interest in participatory approaches to river catchment / watershed management – and if operationalised correctly (and inclusively), the emphasis on collaborative participatory approaches will remain even after the funding has disappeared.

(2) Use Targeted Non-Statutory Cooperation Strategies to Promote Watershed Health

As demonstrated by the Conn. River experience, good river basin management practices should move towards non-statutory cooperation and engagement rather than relying solely on compliance measures or regulatory enforcement. By coordinating river basin management with planning, agriculture, landscape assessment, ecological measures, business and development groups, and environmental management and conservation stakeholders, the broader community is afforded the opportunity to identify interests that converge and subsequently proactively manage these for mutually desired outcomes. To target the energy of such cross-cutting initiatives, partners must develop distinct project areas and, where relevant use tools such as Memoranda of Understanding (MOUs) to bring different agencies together around a common theme – regardless of their wider remit or operational scale.

(3) Public Participation

The achievements in the Conn. River basin suggest that projects that enhance amenity value and improve environmental quality are important for fostering public support. River basin management and the public's perception of the benefits of environmental stewardship were reinforced through recreation and public access initiatives. Individual attachment to riverscapes allowed local NGOs and universities to draw on citizen monitoring teams to help systematically monitor river water quality.

There is significant scope for such initiatives across the island of Ireland. In the case of the Northwest International River Basin District, for example, greater opportunities for collaboration and cooperation in the context of the environmental and land-use management of the Glenveagh National Park should be explored with the National Parks and Wildlife Service.

(4) Deliver Practical Solutions

The Conn. River case also provides a number of practical approaches to implementing watershed plans that are similar to the Irish context, including: reducing point and non-point pollution, protecting riparian buffers, providing incentives for stormwater management, and improving agricultural and animal husbandry management. The Pioneer Valley Planning Commission in particular has been innovative and forward thinking in this regard; with its initiatives including:

- **Capacity Building** through manuals and on-line toolkits for local authorities and planning boards on model zoning bylaws, subdivision regulations and reducing the impact and amount of impervious surfaces through new stormwater practices;
- **Technical assistance**, particularly for rural communities that lack resources for integrated planning, to develop local land-use plans, strategies for smart growth initiatives, and open space protection; and

- **Voluntary Cooperation** through Memoranda of Agreement, which is an effective way to bring together local authorities and non-signatory partners to agree on joint actions.

(5) Jointly Seek External Funding

In spite of national and State mandates on water quality and river catchment / watershed management in the United States, Federal and State funding proved to be inadequate and uncertain. This funding shortfall required local stakeholders to constantly package and lobby for multiple funding sources. Over time, regional partnerships became stronger and joint projects became more complex and ambitious. Successful efforts included a group of local authorities obtaining federal funding to eliminate combined sewer overflows; a tri-state initiative which enacted measures such as real-time monitoring of water quality; and a 40-group consortium to improve a regional development corridor.

Across the island of Ireland, the dependency of local councils on the distribution of national/ regional funds can stymie worthwhile local initiatives, and promote political patronage that does not necessarily have environmental considerations at its core. In this context, greater emphasis needs to be placed on the adoption of a strategic approach to environmental management and spatial planning – based on clusters of councils (and associated stakeholders) and / or sub-regions coming together around identified needs and with a commitment to jointly source funding for shared collaborative action.

Conclusion

As attention turns towards the implementation of the RBMPs across the island of Ireland, a main challenge will be integrating water governance not only internally within each jurisdiction but also on a cross-border basis. The number of stakeholders involved in such a cross-cutting effort makes it challenging for people to understand the system as a whole and to become personally engaged. The current involvement of the local authorities in the Republic of Ireland is an added layer of complexity both in terms of their capacity to implement the RBMPs as well as its divergence with the North's implementation structures, which are generally more centralised.

In this context, developing an integrated water management planning approach across the island of Ireland will require central governments, and their respective Departments, to find ways to cut across 'institutional silos' and act upon the value added of collaboration – as demonstrated by this case study from the United States.

It is increasingly evident that there is a clear need to enhance opportunities to 'connect the dots' linking water planning with spatial planning especially for cross-border areas. Managing and monitoring the cumulative impact of pressures from a range of sectors will be key to guiding future initiatives.

The experience of the Connecticut River basin suggests that there is no easy or straightforward solution for mapping out the new institutional landscape in response to emerging needs for cross-sectoral and cross-border collaboration; particularly in the Republic of Ireland where there has been a large degree of uncertainty as to who will deliver on the RBMPs since their adoption in mid-2010. Merging these complex interests and politics will require both bottom up participation and leadership at the top. Short of dedicated, long-term funding and legislative commitment for implementation, the surest – if incremental and imperfect – way to sustain long-term action may be through broad-based partnerships that integrate mutually reinforcing pieces of spatial and river catchment / watershed management action plans into ongoing activities.

References

Carter, J. (2007). 'Spatial Planning, Water and the Water Framework Directive: insights from theory and practice' in *The Geographical Journal*, Vol. 173(4), pp.330-342.

Connecticut River Watershed Council (2009). *Volunteer Water Quality Monitoring Program, Annual Report 2008*. Greenfield, MA: CRWC.

Connecticut River Watershed Council (1997). *American Heritage Rivers Application*. Application packet submitted to the American Heritage Rivers Program, December 9, 1997. Available online at: <http://1.usa.gov/wxacMq>.

Daly, G (2011). *The Planning System and River Basin Management Planning*, Unpublished paper.

Environmental Agency (2006). *The Water Framework Directive and Planning: Initial Advice to Planning Authorities in England and Wales*. Published with the RTPPI, WLGA-CLILC & Local Government Association.

European Commission (2009). *White Paper on Adapting to Climate Change*. (COM/2009/0147).

Franklin Regional Council of Government website, available at: <http://www.frcog.org>.

Hall, B, et al. (2002). "Three Hundred Years of Forest and Land-Use Change in Massachusetts, USA" in *Journal of Biogeography*, Vol. 29. pp.1319-1335.

ICLRD: International Centre for Local and Regional Development (2011). *Responding to the Environmental Challenge? Spatial Planning, Cross-Border Cooperation and River Basin Management*. Armagh: International Centre for Local and Regional Development. Available online at: <http://iclr.org/2012/02/21/responding-to-the-environmental-challenge-spatial-planning-cross-border-cooperation-and-river-basin-management-2/>

ICLRD. (2010). *All Change But Any Alignment? The Impact of the Proposed Governance and Planning Reforms Across the Island of Ireland on Inter-Jurisdictional Planning*. Armagh: International Centre for Local and Regional Development. Available online at: <http://iclr.org/2010/06/06/all-change-but-any-alignment-the-impact-of-the-proposed-governance-and-planning-reforms-across-the-island-of-ireland-on-inter-jurisdictional-planning/>

Irish Times (2010). 'Call for 'inadequate' river basin plans to be deferred', Article by Frank McDonald, 22 March 2010.

Kidd, S. & Shaw, D. (2007). 'Integrated water resource management and institutional integration: realising the potential of spatial planning in England' in *The Geographical Journal*,

Vol. 173(4), December 2007, pp.312-329.

Michaels, S. (1999). "Configuring Who Does What in Watershed Management: the Massachusetts Watershed Initiative" In *Policy Studies Journal*, Vol. 27(3): pp.565-577.

Murphy, K. & Glasgow, G. (2009). 'North-South Coordination in Ireland's International River Basin Districts' in *Biology and Environment: Proceedings of the Royal Irish Academy*, 109B, pp.139-150.

National Park Service (2006). *Metacomet Monadnock Mattabesett Trail System: National Scenic Trail Feasibility Study and Environmental Assessment*. Boston: National Park Service.

OECD: Organisation for Economic Cooperation and Development. (2010). *Environmental Performance Review: Ireland*. Paris: Organisation for Economic Cooperation and Development.

Pioneer Valley Planning Commission. (2010). *The Region's Comprehensive Economic Development Strategy: 2010 Annual Report*. Available online at: <http://bit.ly/xl0Bqm>.

Pioneer Valley Planning Commission (2010). "Pioneer Valley Planning Commission Lands \$4.2 Million HUD Sustainable Communities Regional Planning Grant" in *Press Release, 20 October 2010*. Available online at: <http://bit.ly/wKYoYN>.

Pioneer Valley Planning Commission (2006). *Valley Vision 2: the New Regional Land Use Plan for the Pioneer Valley*. Available online at: <http://bit.ly/wRomSd>.

Pioneer Valley Planning Commission (2001). *The Connecticut River Strategic Plan: Volume 1*. Available online at: <http://1.usa.gov/wfRPvQ>.

Pioneer Valley Planning Commission (1998). *How to Create a Stormwater Utility*. Available online at: <http://bit.ly/wqT88Z>.

Zimmerman, S., et al. (1984). *Historic and Archaeological Resources of the Connecticut River Valley: a Framework for Preservation Decisions*. Boston: The Massachusetts Historical Commission.

Appendix I: The International Centre for Local and Regional Development

A registered charity based in Armagh, Northern Ireland, the International Centre for Local and Regional Development (ICLRD) is a North-South-US partnership established in 2006 to explore and expand the contribution that planning and the development of physical, social and economic infrastructures can make to improve the lives of people on the island of Ireland and elsewhere. The partner institutions began working together in 2004 and currently include: the National Institute for Regional and Spatial Analysis (NIRSA) at the National University of Ireland, Maynooth; the School of the Built Environment at the University of Ulster; the Institute for International Urban Development in Cambridge, Massachusetts; and the Centre for Cross Border Studies in Armagh.

Each of these partners brings together complementary expertise and networks on both a North-South and East-West basis – creating a unique, all-island and international centre. The ICLRDR continues to expand its collaboration with other institutions and has built up close working relationships with individual faculty and researchers from Harvard University, Queens University Belfast and Mary Immaculate College Limerick. It is also developing its international linkages, particularly with those organisations that have an interest in cross-border cooperation and collaboration; for example, Mission Opérationnelle Transfrontalière (MOT) in France and Groundwork Northern Ireland.

What does the ICLRDR do?

- Provides independent joined-up research and policy advice on cross-border and all-island spatial planning and local and regional development issues (economic development, transport, housing, the environment, service provision, etc.);
- Offers professional education and capacity building programmes for communities and local, regional and national government representatives and officials;
- Assists local governments / communities in translating policy into ‘on the ground’ action;
- Acts as a catalyst to bring relevant public and private actors, North and South, together to work on common goals;
- Promotes international cooperation and exchanges.

The ICLRDR uses a variety of strategies to undertake this work, including engaging in action research with local governments, communities and central agencies; undertaking and publishing case study research to evaluate and develop good practice models; hosting conferences and workshops on key themes; and developing and delivering training modules for key stakeholders in the physical, social and economic development of the island of Ireland.

Why is this work important?

The ICLRDR’s work is important in relation to four key processes on the island of Ireland:

- Cross-jurisdictional commitment to spatial planning and infrastructure projects;
- Peace and reconciliation, and the regeneration of local communities in the Border area;
- Economic competitiveness and growth on the global stage;

International Centre for Local and Regional Development

- Multi-level governance and compliance with planning, economic and environmental directives from the European Union.

CroSPlaN

In cooperation with the Centre for Cross Border Studies, the ICLRD has for the past three years been involved in an exciting new programme to develop a cross-border planning network. This initiative has been made possible through funding from the EU's INTERREG IVA Programme; administered through the Special EU Programmes Body. Having commenced in 2009, the network (CroSPlaN) has undertaken the following activities:

- Two action research projects per year which enhance emerging cross-border activities and expertise in the vital area of spatial planning;
- One executive training programme per year for at least 20 central and local government officials, councillors and community leaders to assist them in both delivering and supporting these activities;
- An annual conference and technical workshop; the dual function of which has been to facilitate networking and address identified areas of need.

Appendix II: 2001 Connecticut River Strategic Plan (Massachusetts)

Challenges & Goals	Strategies	Recommended Actions
Water Quality and Quantity		
<p>Challenges: 1. Stormwater (SW) runoff from developed areas 2. Combined sewer overflows (CSOs) 3. Riverbank erosion and sedimentation</p> <p>Goals: 1. Improve water quality 2. Increase state and federal funding for water quality 3. Bring all segments up to Class B quality</p>	1. Adopt a comprehensive CSO control program	<ul style="list-style-type: none"> Seek Congressional action to continue and increase funding appropriations in the federal budget for CT River CSO cleanup Encourage municipalities to apply for low-interest state revolving fund loans for CSO projects Seek EPA support for Connecticut River CSO Cleanup Initiatives under American Heritage Rivers designation Develop state enabling legislation for SW utilities to create significant new revenue stream to fund CSO clean up
	2. Develop a consistent water quality monitoring program	<ul style="list-style-type: none"> Set up a multi-organization consortium to establish ongoing regional water quality sampling and monitoring program Encourage DEP and volunteer monitors to establish a cooperative, ongoing river sampling program in the CT River and tributaries
	3. Reduce urban, suburban and rural nonpoint source pollution	<ul style="list-style-type: none"> Implement improved street sweeping programs in every community to reduce pollutants in SW Identify demonstration sites for innovative SW BMPs Pass local SW ordinances/bylaws that require developments to comply with DEP SW standards Reduce pollutants in agricultural runoff
	4. Reduce soil erosion and sedimentation	<ul style="list-style-type: none"> Identify and map severe erosion sites in the watershed Assist communities with the adoption of erosion and sediment control bylaws Encourage streambank restoration projects
	5. Reduce toxins in fish tissue	<ul style="list-style-type: none"> Undertake a program of PCB investigation and remediation Increase public awareness of public health fish advisories by posting advisories in fishing and recreation areas
	6. Promote water conservation and efficient water supply in local communities	
	7. Protect watershed & aquifer recharge lands to prevent development & contamination	<ul style="list-style-type: none"> Provide technical assistance to water suppliers in efforts to acquire watershed or aquifer recharge-lands Minimize herbicide spraying along highways, utility corridors, and other right-of-way, especially within 100 feet of wetlands, rivers, and other surface waters

Challenges & Goals	Strategies	Recommended Actions
Preservation of Streams and Wildlife Habitat		
<p>Challenges: 1. Loss of riparian buffer areas and wildlife habitat along streams 2. Introduction of non-native, invasive species to riverine areas 3. Physical barriers block river connectivity</p> <p>Goals: 1. Increase public recognition & protection of important wildlife habitat 2. Identify & safeguard terrestrial & aquatic wildlife habitats 3. Preserve & restore vegetated riparian buffers</p>	1. Encourage & support the establishment of Stream Teams on tributaries & mainstem	<ul style="list-style-type: none"> Organize stream teams, where necessary, through outreach efforts, meetings, and training sessions Support existing sub-watershed organizations by providing technical assistance.
	2. Ensure adequate fish passage in mainstem and subwatershed branches	<ul style="list-style-type: none"> Advocate, through the hydroelectric relicensing process, for all facilities to operate on a “run of the river” basis Continue to support the return of Atlantic Salmon to the Connecticut River Support and work to ensure that both upstream and downstream fish passage is installed at non-licensed dams and or river obstructions
	3. Prevent the introduction/spread of non-native, invasive species, especially nuisance aquatic species	<ul style="list-style-type: none"> Support agency and non-governmental organizations that are working to educate the public about the spread of exotics When possible, prevent the spread of existing invasive species
	4. Reduce the impact of water withdrawals downstream of public reservoirs and withdrawal points	<ul style="list-style-type: none"> Make modifications to the timing and rates of public water supply pumping to reduce impacts on stream flows and water levels Establish ecologically-based streamflow requirements
	5. Restore vegetated riparian buffers	<ul style="list-style-type: none"> Map priority areas for protection or restoration of vegetated riparian buffers Preserve, protect, and improve vegetated riparian buffers
	6. Restore river connectivity	<ul style="list-style-type: none"> Develop strategies for the removal of barriers to river connectivity Upgrade driveway, road, highway, and railroad stream crossings to promote greater fish and wildlife passage
Land Use, Growth Trends and Economic Development		
<p>Challenges: 1. Loss of farmland and forestland to development 2. Environmental impacts from poor development practices, such as SW runoff 3. Low density urban sprawl and its impacts on community character, open space and water quality.</p>	1. Promote “Smart Growth” in the watershed	<ul style="list-style-type: none"> Identify the Connecticut River as a model or pilot for a Smart Growth initiative Promote compact growth in and around existing urban centres
	2. Preserve rural character of watershed by planning development based on understanding of town’s natural resources	<ul style="list-style-type: none"> Create watershed-based open space plans Work with towns to develop or update open space plans
	3. Improve SW management in watershed communities	<ul style="list-style-type: none"> Assist community boards with the review and regulation of development to improve stormwater management Minimize development impacts through better site design
	4. Identify and protect	<ul style="list-style-type: none"> Secure federal TEA-21 Enhancement grants and state transportation bond

International Centre for Local and Regional Development

<p>Goals:</p> <p>1. Encourage good development practices that do not adversely affect environment</p> <p>2. Help communities protect open space (e.g. open space planning, zoning guidelines)</p> <p>3. Complete Master Plans and revise zoning regulations</p>	valuable open space in the watershed	<p>funds to acquire farmland (APRs) to help preserve rural character</p> <ul style="list-style-type: none"> • Encourage communities to adopt provisions of the Community Preservation Act
	5. Promote and facilitate brownfield redevelopment	<ul style="list-style-type: none"> • Create an inventory of brownfields in region that can be redeveloped • Develop a model for a regional brownfield industrial park
	6. Promote environmentally sustainable economic development, such as tourism and agriculture	<ul style="list-style-type: none"> • Seek designation of a National Heritage Corridor for the Connecticut River corridor • Promote agricultural tourism within the Connecticut River Scenic Farm Byway • Support increased funding for the APR program
	7. Identify a location and process for developing an “eco-industrial” park	
Public Access, Recreation and Greenways		
<p>Challenges</p> <p>1. Lack of connected greenways of protected open space and wildlife corridors</p> <p>2. Lack of public access along the river</p> <p>3. Over-use of sections of the river for recreation</p> <p>Goals</p> <p>1. Create connected greenways & trails</p> <p>2. Expand the purchase of development rights to protect farmland and open space</p> <p>3. Clean up and improve the aesthetics of the riverbank</p>	1. Continue and Support the Establishment of a Network of Greenway Corridors	<ul style="list-style-type: none"> • Develop a regional network of greenways along the Connecticut River and its tributaries
	2. Use the river as a tourism destination point and an agricultural economic development tool	<ul style="list-style-type: none"> • Support the completion of design and construction plans for the Connecticut River Walk and Bikeway and the development of the Franklin County Bikeway
	3. Enhance the visual aesthetic of the Connecticut River in urban areas	<ul style="list-style-type: none"> • Organize annual trash clean-up days
	4. Balance increased water related activities and interests with environmental concerns	<ul style="list-style-type: none"> • Identify and evaluate options to reduce the adverse impacts of over-use of the river • Work with the Public Access Board to develop additional public access sites, particularly for universal access
Coordination and Watershed Management Partnership		
	1. Integrate the five-year cycles, work and plans of the five major tributary basins – Farmington, Westfield, Deerfield, Millers, Chicopee – and the Connecticut River	
	2. Develop a River Corridor Management Plan with the 19 riverfront towns long the main stem of the CT River and the riverfront towns along the Farmington, Westfield, Deerfield, Millers and Chicopee Rivers	

Appendix III: Interviewee List

The Connecticut River Basin

1. Albertson, Douglass. Town Planner, Belchertown. 9th March 2011.
2. Cohen, Russ. Rivers Advocate, Massachusetts Department of Fish and Game. 18th March 2011.
3. Curtis, Christopher. Chief Planner, Pioneer Valley Planning Commission. 27th January 2011 and 17th February 2011.
4. Feiden, Wayne. Director of Planning and Development, City of Northampton. 9th March 2011.
5. Fuqua, William. General Superintendent, Holyoke Department of Public Works. 9th March 2011.
6. Garrigan, Trish. Regional Coordinator, U.S. Environmental Protection Agency, Region 1. 21st March 2011.
7. Kietner, Joseph. Environmental Compliance Supervisor, Chicopee Department of Public Works. 9th March 2011.
8. Kulig, Stanley. Superintendent, Chicopee Department of Public Works. 9th March 2011.
9. Mulligan, Adair. Former Conservation Director, Connecticut River Joint Commission. 18th March 2011.

River Basin Management in the Republic of Ireland

1. Allen, Damien. Water Quality section, Department of Environment, Community & Local Government. 23rd March 2011.
2. Cussen, Niall. Spatial Planning Unit, Department of Environment, Community & Local Government. 6th April 2011.
3. Daly, Donal. Groundwater Section, Environmental Protection agency. 14th April 2011.
4. Green, Allana. Planner, Donegal County Council. 10th March 2011.
5. McCartney, John. Director of Conservation and Protection, Loughs Agency. 11th April 2011.
6. McNally, Dr. Tony. Coordinator, North Western International River Basin District. 10th March 2011.
7. Maguire, Pádraig. RPG Implementation Officer, Border Regional Authority. 4th November 2010.
8. Murphy, Dr. Conor. ICARUS, NUI Maynooth. 14th March 2011.
9. O' Brien, Sinead. Project Coordinator, Sustainable Water Action Network (SWAN). 6th April & 15th April 2011.
10. Quinn, Eunan. Senior Planner, Donegal County Council. 10th March 2011.

River Basin Management in Northern Ireland

1. Christie, Dr. Sue. Director, Northern Ireland Environmental Link. 1st April 2011.
2. McMurray, Phillip. Water Policy Team, Department for Environment (NI). 18th March 2011.
3. Nelson, Gabriel. Head of Water Management Unit, Northern Ireland Environment Agency. 6th April 2011.
4. Raphael, Ian. Deputy Director, Regional Planning and Transportation Division, Department for Regional Planning (NI), 18th March 2011.
5. Thompson, Jim. Planning Manager, Strategic Planning Division, Planning and Local Government Group, Department of Environment (NI). 1st March 2011.

Published by International Centre for Local and Regional Development (ICLRD)
39 Abbey Street
Armagh BT61 7EB
Northern Ireland

2011

The International Centre for Local and Regional Development is part-financed by the European Union's European Regional Development Fund through the EU INTERREG IVA Programme managed by the Special EU Programmes Body



European Union
European Regional
Development Fund
Investing in your future



Special EU Programmes Body
Foras Um Chláir Speisialta An AE
Boord O Owre Ocht UE Projects

Copyright © ICLRD

ISBN No: 978-1-906879-10-5