



The Legal Aspects of Connectivity Conservation

Case Studies

David Farrier and Melissa Harvey, Solange Teles da Silva and
Márcia Diegues Leuzinger, Jonathan Verschuren and
Mariya Gromilova, Arie Trouwborst, Alexander Ross Paterson

Project Director: Françoise Burhenne



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The Great Eastern Ranges Initiative, Australia

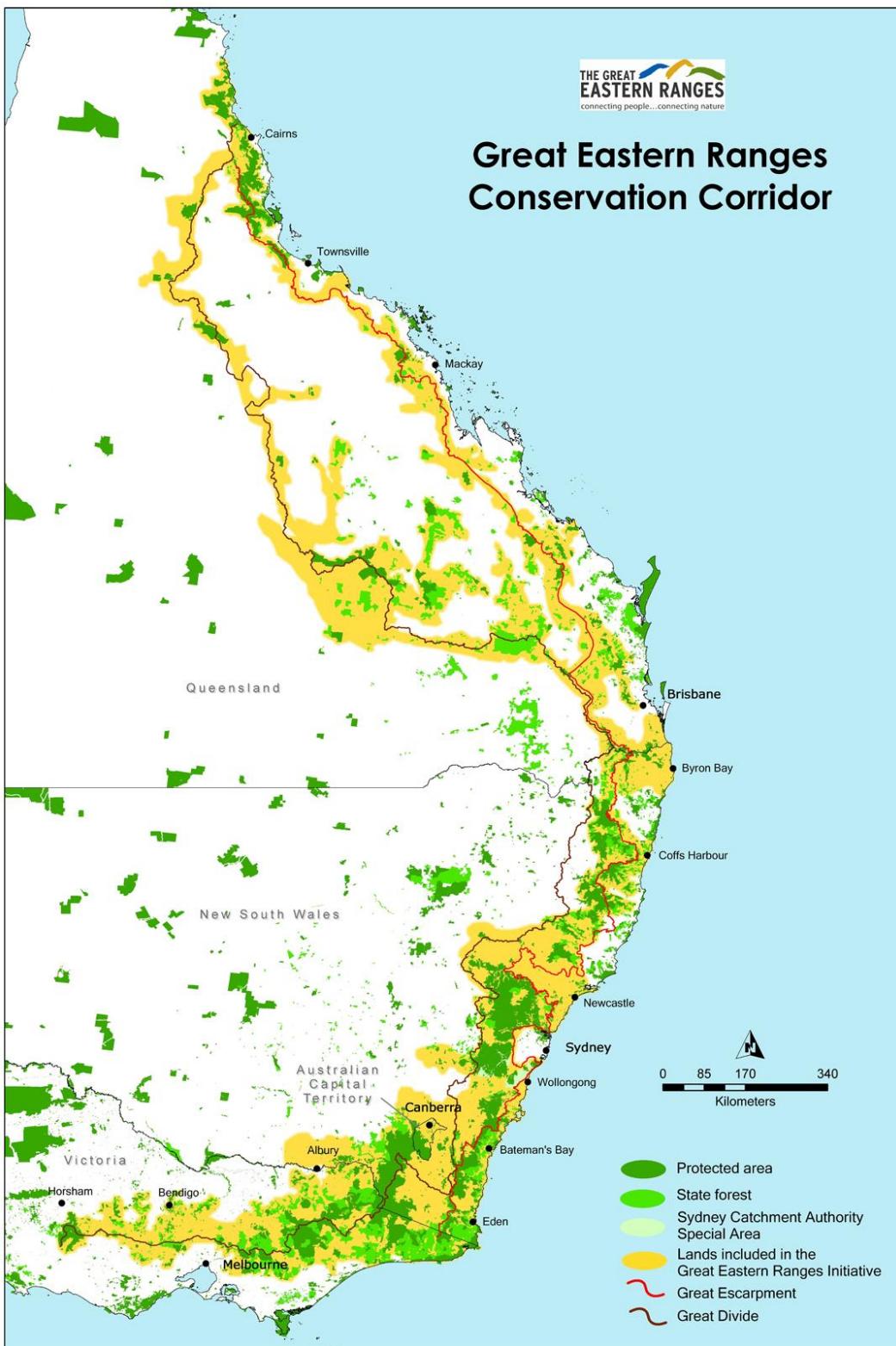
David Farrier and Melissa Harvey*

1 Introduction

- 1 The Great Eastern Ranges (GER) conservation corridor is located along the eastern side of Australia and extends from the state of Victoria, through the Australian Capital Territory and New South Wales (NSW) to far northern Queensland (Great Eastern Ranges, n.d.). It is primarily defined by two geographic features, the Great Dividing Range and the Great Escarpment of Eastern Australia (Mackey, Watson and Worboys, 2010, p. 5) (see Figure 1). It is recognised as one of seven continental-scale conservation connectivity areas in Australia (Worboys and Pulsford, 2011, p. 6).
- 2 The GER corridor contains areas of significant tropical, subtropical and temperate forest and woodland ecosystems, including three World Heritage Areas and three Ramsar-listed wetlands (Mackey, Watson and Worboys, 2010, p.19). It contains a high proportion of fauna and flora species listed under legislation as vulnerable or endangered.
- 3 The GER Initiative began in 2007 with the aim of conserving and managing a “3,600km *continental lifeline* of habitats, landscapes and people” primarily to improve landscape and habitat resilience and to halt any further decline and loss of species (Great Eastern Ranges, *Vision and goals*, n.d.). The main drivers for the Initiative were habitat loss and habitat fragmentation resulting from intensive land use (mainly land clearing for urbanisation and intensive agriculture, as well as forestry and mining) plus the threat of climate change (Mackey, Watson and Worboys, 2010, pp. 7, 29-32). Other contributors to habitat and species loss include altered fire and hydrological regimes due to human activity and modern land management and the problem of introduced plant and animal species. (Mackey, Watson and Worboys, 2010, pp. 31-32).
- 4 In addition to the economic significance of the various intensive land use activities the corridor also provides a major recreational resource for nearby major urban centres, including numerous protected areas. The water catchments in the GER supply clean water to 93% of the population of eastern Australia (Whitten et al 2011, p. 63).
- 5 A significant challenge is posed for connectivity conservation by the variety of land tenures. The precise mix varies between the States. In New South Wales 41% of the area is privately owned and the remainder public land (39% protected areas and 20% other public lands, such as State forests, unalienated Crown land and travelling stock routes) (Great Eastern Ranges, 2012). Until a recent extension to the GER corridor into Western Victoria, these figures contrasted with Victoria where nearly 100% of the corridor was naturally interconnected public land, including protected areas and State forests (Pulsford et al 2012). In the Australian Capital Territory the land is primarily public land held under private long-term leasehold tenure, while the corridor in Queensland is comprised of significant areas of privately leased public land or private land.

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Figure 1: Great Eastern Ranges Initiative



2 International and National Legal Context

2.1 Division of federal and state legislative powers

- 6 Australia is a signatory to a number of international conventions relevant to nature conservation, including the UN Convention on Biological Diversity (Biodiversity Convention), the Convention on Wetlands of International Importance (Ramsar Convention), the Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention), the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), bilateral agreements on the conservation of migratory birds and the Convention on International Trade in Endangered Species.
- 7 Under the Australian Constitution, the federal parliament does not have a specific power to legislate relating to the environment, but it can enact legislation relevant to environmental issues under other heads of power. One of these is the power to make legislation relating to “external affairs” (*Commonwealth of Australia Constitution Act*, s 51(xxix)). This enables the federal parliament to implement Australia’s obligations under international conventions (*Commonwealth v Tasmania* (1983) 158 CLR 1). However, in practice, the Australian states have traditionally undertaken responsibility for natural resource management. This stems from their role in holding and allocating land in Australia on behalf of the British Crown, originating from a time when the states were separate colonial entities. In the Intergovernmental Agreement on the Environment (1992), the federal government conceded that the Australian states had responsibility for legislation relating to living and non-living resources, except that it would take overriding responsibility for ensuring that Australia’s international obligations are met. Consequently, apart from threatened species legislation, which has been enacted by both federal and state governments, most Australian legislation relevant to nature conservation, including protected areas, natural resource management and land use planning legislation, has been made by the states. Protected areas within the states of Victoria, New South Wales and Queensland are, for example, set up and managed by state governments. However, the federal government has enacted the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), one of the objects of which is to “assist in the co-operative implementation” of Australia’s environmental obligations with the states and territories (EPBC Act, s 3(1)(e)). There is currently no legislation at a state or federal level specifically dealing with connectivity conservation. However, in 2012 the federal government finalised a non-statutory National Wildlife Corridors Plan (see Box 1).

2.2 Environment Protection and Biodiversity Conservation Act 1999

- 8 The EPBC Act identifies a number of “matters of national environmental significance”. Any activity likely to have a significant impact on one of these matters requires prior assessment and approval by the federal government, in addition to any approvals required under state law (EPBC Act, Part 3, Division 1). What this means is that the federal government can impose more demanding conditions on the same development that is approved at a state level, and even veto it completely.
- 9 A number of matters of national environmental significance are particularly relevant to the GER Initiative:
- Species and ecological communities listed as threatened on an Australia wide basis under the federal listing process set out in the EPBC Act. An ecological community is an assemblage of native species, usually flora, inhabiting a particular area (EPBC Act, s 528).
 - The World Heritage values of areas listed under the World Heritage Convention (for example, the Gondwana Rainforests of Australia, the Blue Mountains, the Wet Tropics of Queensland).
 - The ecological character of wetlands listed under the Ramsar Convention (for example, the Hunter wetlands).
- 10 These regulatory ‘triggers’ offer another line of protection against development proposals that affect existing connectivity to that afforded by state legislation. For nationally listed species and ecological communities, the EPBC Act also provides an opportunity for ongoing management through recovery

and threat abatement plans. Management of world heritage areas and Ramsar wetlands located in the states, on the other hand, is left to state governments. The EPBC Act simply provides that the Commonwealth must do its best to see that a management plan that meets obligations under the Conventions is prepared and implemented in cooperation with the states, including by offering financial or other assistance (EPBC Act, ss 320-324, 332-336).

2.3 Federal policies relevant to connectivity conservation

- 11 To further fulfill obligations under the Biodiversity Convention, the federal government has constructed a policy framework for guiding biodiversity conservation, *Australia's Biodiversity Strategy 2010-2030* (Commonwealth of Australia, 2010). This identifies a number of threats to biodiversity in Australia, including climate change and habitat loss, fragmentation and degradation. Five year measurable targets have been set, including:
- 1,000 sq km of fragmented landscapes and aquatic systems are being restored to improve ecological connectivity
 - four collaborative continental-scale linkages are established and managed to improve ecological connectivity.
- 12 Another federal initiative that has no basis in legislation is the *National Reserve System* (NRS), which ultimately aims to identify a comprehensive, adequate and representative system of protected areas (Boer and Gruber, 2011: 11-13; 30-31). It includes not only protected areas controlled by the federal government but also areas of public land protected under state legislation, indigenous protected areas and private protected areas (Commonwealth of Australia, 2009a). Currently the NRS covers about 13% of the continent (Commonwealth of Australia, 2012, p. 24)

Box 1: Draft National Wildlife Corridors Plan

In 2012, the federal government finalised the National Wildlife Corridors Plan (NWCP) following a public consultation process (Commonwealth of Australia, 2012). One of the principal aims of the NWCP is to coordinate strategic investment. It advocates the development of a network of wildlife corridors at continental, regional and local scales. The NWCP recognises that connectivity is a crucial function of corridors and that they are a vital tool for enhancing the resilience of Australia's biodiversity and its adaptability to climate change. Another objective is to protect stores of carbon in native ecosystems. The Plan establishes a process for community nomination of corridors to be recognised at a national level, assessment by an independent Council against defined criteria, and declaration by the federal minister. There is a significant emphasis on monitoring, evaluation and reporting. The GER Initiative would be a possible candidate for National Wildlife Corridor status.

The NWCP advocates a partnership approach that includes collaborative governance arrangements. It acknowledges the rights of landholders to control and enjoy their property, emphasising that its approach depends on voluntary cooperation across multiple tenures between NGOs, regional bodies, the private sector, the community and government agencies.

2.4 Institutions relevant to connectivity conservation

- 13 Local government in Australia, set up under state legislation, is responsible, along with state governments, for planning land use and regulating development under land use planning legislation. Consequently, it has a potential role to play in strategic planning for connectivity as well as protecting existing connectivity from development where regulation is an appropriate strategy. Regional natural resource management bodies on the other hand, such as catchment management authorities (CMAs) set up under New South Wales legislation, play a predominantly facilitative, rather than regulatory, role in advancing connectivity conservation objectives. CMAs prepare and implement catchment action plans that set biodiversity targets to be achieved, guiding investment in natural resource management. These plans have the potential to play an important role in identifying opportunities to establish corridors. Another function of CMAs is to provide loans, grants, subsidies and other financial

assistance for natural resource management purposes (*Catchment Management Authorities Act 2003 (NSW)*, s 15(b)). They receive funding from both state and federal governments.

- 14 Many rural landholders are involved in the *Landcare* movement, a grass roots network of thousands of locally-based community groups. *Landcare* was originally concerned with promoting initiatives to improve agricultural productivity through sustainable land management, but it has broadened this focus to embrace sustainable management of natural resources. *Landcare* groups form when community members come together in response to a particular environmental issue and form a small committee, setting their own agenda. They can apply for funding to local, state and federal governments, as well as to *Landcare Australia Ltd*. This is a private, non-profit company receiving core funding from the federal government. It aims to raise corporate sponsorship for the *Landcare* movement and to increase community awareness of the *Landcare* brand and volunteering (*Landcare Australia Ltd*, n.d.).

2.5 Funding

- 15 *Caring for Our Country* is a federal government program that funds natural resource management initiatives by a range of stakeholders, including regional natural resource management bodies, local governments and *Landcare* groups. It focuses on six national priority areas. These include: the National Reserve System, biodiversity and natural icons, coastal environments and critical aquatic habitats and community skills, knowledge and engagement. One of the strategic outcomes for *Caring for Our Country* is to “increase, by at least one million hectares, the area of native habitat and vegetation that is managed to reduce critical threats to biodiversity and to enhance the condition, connectivity and resilience of habitats and landscapes” (Australian Government, *Caring for our Country*, 2011).
- 16 *Environmental Stewardship* is a component of *Caring for Our Country*. Each funding round targets a particular matter of “national environmental significance” under the EPBC Act (see above, section 2.2) in selected areas of the country. Private land managers, including farmers and Indigenous communities, can then apply for funding for a range of management activities (for example, reducing grazing intensity and fertiliser use, replanting and expanding weed management) and, if successful, are contracted to carry them out for up to 15 years (Australian Government, *Caring for our Country*, 2011).
- 17 Regional natural resource management bodies, such as CMAs in New South Wales, receive secure annual base level funding direct through the *Caring for Our Country* program, bypassing state governments. They can also make applications to fund specific projects through an open-call process, perhaps partnering with NGOs and community groups.
- 18 The federal government has more recently established a *Biodiversity Fund* under its *Clean Energy Future* program to assist landholders to carry out projects that establish, restore, protect or manage biodiverse carbon sinks in targeted areas of the landscape. In particular, funding will be available to “establish new environmental plantings that create wildlife corridors and improve landscape connectivity” (Australian Government, *Clean Energy Future Biodiversity Fund*, 2012).

3 Governance of the GER Initiative

- 19 The GER Initiative was initially championed by the New South Wales government in 2006 and, following support for the concept from the Environment Protection and Heritage Council (an intergovernmental council of federal and state environment ministers), an interstate working committee was formed to progress it (Department of Environment and Climate Change (NSW), 2007, p. 14). In 2007 the New South Wales government allocated a \$6.7 million budget over three years

(2007-2010) to establish the GER Initiative in New South Wales (Rob Dunn pers comm). Governance of the Initiative was structured to be undertaken at four levels:

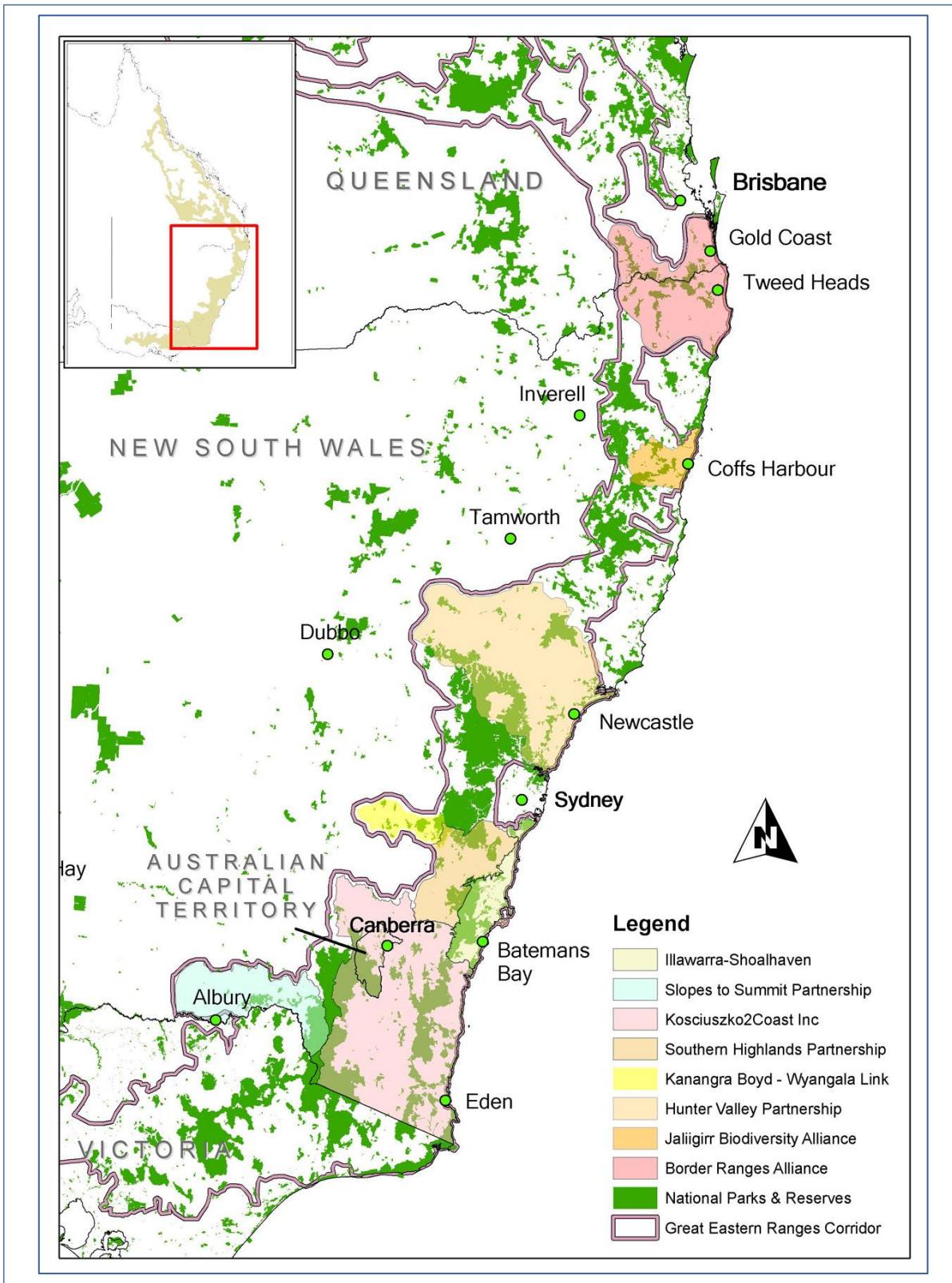
- National governance through the Environment Protection and Heritage Council to be supported by a Memorandum of Understanding (MoU) that “facilitates a co-operative and integrated approach” by the Australian Capital Territory, New South Wales, Queensland, Victoria and Commonwealth governments (Department of Environment and Climate Change (NSW), 2007, p. 10). To date, no MoU has been entered into due to changing political circumstances, but a regional agreement does exist between the New South Wales and Australian Capital Territory governments which commits them to collaborative land use planning (Australian Capital Territory and New South Wales, 2011).
- State governance, to provide broad project direction and support In New South Wales this was through a subcommittee of the New South Wales Environmental Trust (a statutory funding body) which advises on spending and broad project direction, and a small dedicated project team (Department of Environment and Climate Change (NSW) 2007, pp. 15-16).
- Regional partnerships (partner and other stakeholder organisations) established to guide and implement project plans within priority landscapes and led by Regional Partnership Steering Committees. Partner and stakeholder organisations include CMAs, Landcare groups, conservation groups, state and federal governments, state agencies, local government, industry and research organisations (Department of Environment and Climate Change (NSW) 2007, pp. 16-17).
- State-wide working groups (for example, a Science and Technical Reference Group, an Aboriginal Cultural Heritage Reference Group; a Communications Working Group).

- 20 In 2010 there was a change in governance arrangements for the Initiative which saw a movement away from government to community leadership. Governance was handed over to an unincorporated group of five leading organisations (referred to as the Lead Partners Group, with an independent chairperson), comprising three conservation NGOs (Greening Australia, OzGREEN, National Parks Association), a semi-independent statutory body (Nature Conservation Trust of New South Wales) and the New South Wales environmental agency (Office of Environment and Heritage: OEH) (Whitten et al, 2011, p. 64). Currently Greening Australia (NSW) is the host organisation and holds the licence to use the GER trademark, which is owned by the NSW government. It employs two members of the GER Secretariat (the GER CEO and a Communications Officer), while a Senior Partnerships and Implementation Officer is jointly funded by the OEH and the GER Initiative. While the Secretariat administers the GER Initiative, the Lead Partners Group provides leadership with respect to purpose, direction, principle and intent. It agrees upon a national business plan and an operational plan, making decisions via modified consensus.
- 21 The Lead Partners are bound by an MoU (*Great Eastern Ranges, Memorandum of Understanding between the Lead Partners*, September 2012) which outlines their leadership role and expected contribution (including seeking funds to support the GER Initiative) as well as addressing co-ordination and management requirements. It makes provision for other organisations that share the same vision to become Lead Partners or Partners, depending on their capabilities and level of contribution and commitment. Notably the MoU stipulates that “the parties are a partnership in ‘spirit’, not in law” and that Lead Partners have no authority to bind each other to any expenditure or obligation. Incorporation of the GER is currently being considered. This would better facilitate fund raising for the GER Initiative by allowing it to enter into funding contracts in its own right rather than through a partner organisation.
- 22 The MoU makes it clear that implementation of the GER Initiative will be principally through Regional Partnerships. At the commencement of the GER Initiative five focus landscapes located primarily in New South Wales were identified as priority areas for improving overall connectivity (Whitten et al, 2011, p. 63). The five priority areas (as shown in Figure 2), each with their own Regional Partnerships, comprise the Border Ranges Alliance (which includes part of south-east Queensland), Hunter Valley, Southern Highlands Link, Slopes to Summit (which includes north central Victoria) and Kosciuszko to Coast (which includes parts of the Australian Capital Territory). Recent additions to the list are the Jaliigirr Biodiversity Alliance, Illawarra to Shoalhaven, Hinterland Bush Links and Kanangra Boyd to Wyangala Dam region (see Figure 2).
- 23 The Regional Partnerships involve from 10-35 organisations and are supported by a Partnership Facilitator whose role is to bring together stakeholders, co-ordinate and facilitate projects that have been identified in regional conservation action plans, and engage and inform the community about the

GER Initiative (Whitten et al, 2011, p. 65). Each Regional Partnership has its own approach with respect to governance and methods for implementing connectivity conservation. While the Southern Highlands Link is more project focused and driven by specific issues and opportunities the remaining four of the original priority landscapes operate under principles of collaboration that express a shared commitment and willingness to further landscape connectivity (Whitten et al, 2011, p. 66). This collaborative approach is facilitated by regular meetings and web-based tools for sharing information. The *Great Eastern Ranges-Border Ranges Alliance Terms of Reference* (2010) is one example of how such a collaborative approach is implemented.

- 24 Recent revisions to the Lead Partners MoU facilitate GER Partner Agreements being reached with other national and state-wide organisations, including NGOs like Birds Australia and Conservation Volunteers. This arrangement is proving extremely successful in expanding the reach of the GER Initiative more quickly and incurs minimal costs compared to the regional partnership model. With the Partner identifying value in the GER brand and entering into the agreement, the Initiative can benefit from the alignment of the Partner's existing funded programs and communications channels with the GER Initiative. The Partner Agreement covers the GER brand policy, including use of the logo, core values and the commitments of both parties to each other. This ensures the value of the brand is protected, which is vital as an increasing number of multi-sector organisations become part of the Initiative.

Figure 2: Priority Landscapes in New South Wales



4 Legal Mechanisms

- 25 The GER Regional Partnerships rely on a range of legal mechanisms at the levels of strategic planning and on-ground implementation to further connectivity conservation. The following sections explore the way in which these mechanisms are being applied to influence land management regimes in three of the GER priority landscapes. It will become apparent that at the strategic level, Regional Partnerships are prepared to utilise a number of different planning processes as vehicles for furthering connectivity conservation even where this is not the primary objective of a particular planning process. When it comes to implementation, the GER Initiative places significant emphasis on voluntary mechanisms, particularly agreements with private landholders, rather than direct regulation (Great Eastern Ranges, *How is the Great Eastern Ranges Initiative Connecting Nature?* n.d.). However, it is important to bear in mind that the GER Initiative is not taking place within a regulatory vacuum. In many contexts, land use controls relating to vegetation clearance, forestry and urban development are already in place and provides a crucial, but rarely acknowledged regulatory context within which voluntary mechanisms can be vigorously pursued.

4.1 Border Ranges Alliance

- 26 The Border Ranges region spans north-eastern New South Wales and south-eastern Queensland and supports wet sclerophyll forests, mountain top heathlands and both cool temperate and subtropical rainforests (Great Eastern Ranges, *Border Ranges*, n.d and figure 2). In 2003 the Border Ranges region was identified as one of fifteen national biodiversity hotspots by the federal government (Commonwealth of Australia, 2009b) while more recently the Forests of Eastern Australia (which include the Border Ranges region) have been identified as the 35th Global Biodiversity Hotspot (Williams et al 2011).
- 27 The region covers nearly 1.5 million hectares, with 76% of the total land area being privately owned and 15% in protected areas on public land. Of the latter, half is within the Gondwana Rainforests of Australia World Heritage Area (Department of Environment, Climate Change and Water (NSW), 2010a, pp. 11-12). Historically a major cause for habitat loss and fragmentation was clearing for agriculture and timber harvesting, while today urban, industrial, rural, rural-residential and infrastructure development are the major factors, with contributions from mining, agriculture, horticulture, native forestry and plantation forestry (Department of Environment, Climate Change and Water (NSW), 2010a, pp. 11, 52).
- 28 The Border Ranges Alliance (the Alliance) is a GER Regional Partnership consisting of around 30 different groups from New South Wales and Queensland. They include NGOs, state and local governments, catchment authorities and universities. The Alliance is facilitated and led by the Nature Conservation Trust of New South Wales.

4.1.1 Strategic planning

- 29 The The Alliance works towards implementing the *Great Eastern Ranges – Border Ranges Alliance Terms of Reference* (2010) and is guided by two regional recovery plans (see Box 2): the Border Ranges Rainforest Biodiversity Management Plan (Border Ranges Recovery Plan) (Department of Environment, Climate Change and Water (NSW), 2010a), which deals with rainforest and related vegetation in the Border Ranges, and the Northern Rivers Regional Biodiversity Management Plan (Department of Environment, Climate Change and Water (NSW), 2010b), which deals with other types of vegetation. Neither of the two plans was specifically designed to pursue connectivity conservation objectives, but they can be harnessed to achieve connectivity conservation objectives because enhancing habitat connectivity is a key strategy for maintaining species' dispersal capacity and viability in the context of climate change (Department of Environment, Climate Change and Water (NSW), 2010a, p. 42).
- 30 Many recovery plans focus on individual species, but these two plans represent an attempt to develop a regional multi-species/ecological community approach which also attempts to integrate recovery

planning with threat abatement planning, including climate change. The Border Ranges Recovery Plan covers 58 fauna species, 134 flora species and 25 ecological communities associated with rainforest or related vegetation that are listed as threatened at either a national or state level. In addition, the plan includes 49 fauna and 33 flora species of conservation significance (Department of Environment, Climate Change and Water (NSW), 2010a, p. 3).

- 31 The Border Ranges Recovery Plan emphasises the need to work with landowners to manage weeds, pest animals, grazing and fire, and to protect and restore identified priority areas, including vegetation corridors. For example, in seeking to achieve the objective of minimising the effects of climate change on biodiversity, it proposes to promote voluntary conservation agreements, market-based instruments and other incentives within identified linkages, as well as land purchase. However, it also recognises the need to regulate proposed development under other legal regimes. This includes encouraging local governments to protect existing linkages through zoning in land use plans, to integrate climate change mitigation measures into these plans and to promote compliance with legal controls over the clearing of native vegetation (Department of Environment, Climate Change and Water (NSW), 2010a, pp. 51-54).

Box 2: Recovery plans and connectivity conservation

A recovery plan is a discretionary response to the listing of a species or ecological community as threatened (EPBC Act, s 269AA), setting out the research and management actions necessary to stop the decline and support the recovery of the listed species/ecological community concerned so that the chances of their long-term survival in nature are maximised (EPBC Act, s 270). In Australia, the federal government lists species and ecological communities that are threatened at the national level (EPBC Act Part 13). The states also have listing processes which focus on species threatened at a state level, but there are inevitable overlaps that demand a cooperative response. The federal legislation specifically provides for joint federal/state recovery plans (EPBC Act, s 269A(3)). While the Border Ranges Recovery Plan is a collaborative effort involving federal and state government agencies and regional natural resource management bodies, it was prepared by the New South Wales environment agency and the catchment management authority, with financial assistance from the federal government. It was made exclusively under the federal legislation but it satisfies the requirements of both federal (EPBC Act) and New South Wales legislation (*Threatened Species Conservation Act 1995*). Queensland legislation (*Nature Conservation Act 1992*) does not require the preparation of recovery plans (Department of Environment, Climate Change and Water NSW, 2010a)

Under the federal legislation, a recovery plan has regulatory force in that federal agencies must implement it in areas within federal jurisdiction and must not take actions that breach it or make inconsistent decisions that have a significant impact on threatened species/communities (EPBC Act, ss 268-269). However, this has little significance in practice because the area is primarily within the jurisdictions of state governments. Under the New South Wales legislation state and local government agencies can make discretionary decisions (for example, approving development under land use plans) in ways that are inconsistent with a recovery plan, although they must at least consider it (*Threatened Species Conservation Act 1995*, s 69).

4.1.2 Private land management

- 32 Pursuant to the Border Ranges Recovery Plan, the Border Ranges Alliance makes use of a broad range of conservation instruments to implement connectivity conservation objectives in relation to private land.
- 33 **Land purchase.** The New South Wales Nature Conservation Trust is not a government agency. Neither is it an NGO because it was constituted under legislation and must report to the environment minister, who also appoints the Board and approves the Trust's conservation priorities (*Nature Conservation Trust Act 2001* (NSW), ss 16, 18, 22-25). In addition to entering into voluntary land management agreements with landholders, it operates a 'revolving fund'. Properties with high conservation value are purchased and, following attachment of a conservation covenant, are resold to a new owner (Lausche et al., 2013, Box II(3)-18, p. 128). All sale proceeds are returned to the fund for future acquisitions. A number of private properties have been protected in this way in the Border Ranges. In other parts of the GER corridor, private conservation NGOs, such as Bush Heritage Australia, have bought land and set it aside for conservation (Bush Heritage Australia, 2007).

- 34 **Voluntary land management agreements.** Pursuant to the GER Initiative's emphasis on voluntary mechanisms, agreements with private landholders have been a particular focus for the Alliance. This is also true in other GER priority landscapes. While agreements providing legal protection in perpetuity are preferred by the Alliance, medium term agreements (15-20 years) are also negotiated. So too are short-term (1-5 years) incentive agreements to manage grazing, weeds and pests, and even agreements that are primarily symbolic and offer no long-term security (see Box 3) (Great Eastern Ranges, 2012, p. 17; Gary Howling pers comm).
- 35 The New South Wales Nature Conservation Trust has entered into 17 *trust agreements* in the Border Ranges region, 7 of them supported through the GER Initiative (Great Eastern Ranges, *Nature Conservation Trust of New South Wales*). These agreements bind owners of the land in perpetuity if landholders agree to register them. Some landholders who are willing to make this long-term commitment prefer to make it with the Trust because of its perceived distance from government. But others are prepared to have their commitment recognized by entering into a *voluntary conservation agreement* with the New South Wales environment minister (*National Parks and Wildlife Act 1974 (NSW)*, ss 69A-69K) under the *Conservation Partners Program* (Gary Howling pers comm). Voluntary conservation agreements also run with the land. However, both trust and voluntary conservation agreements are vulnerable insofar as they can be set aside by land use plans to allow development to proceed, if the environment minister agrees (*Environmental Planning and Assessment Act 1979 (NSW)*, s 28; *National Parks and Wildlife Act 1974 (NSW)*, s 69K; *Nature Conservation Trust Act 2001 (NSW)*, s 38A).
- 36 In Queensland, a *Nature Refuges Program* provides for voluntary conservation agreements between landholders and the Queensland government. A nature refuge is a class of protected area (*Nature Conservation Act 1992 (Qld)*, s 14) and a nature refuge agreement is legally binding and perpetual, being attached to the land title and binding future purchasers (*Nature Conservation Act 1992 (Qld)*, ss 45, 51). Agreements "acknowledge a commitment to manage and preserve land with significant conservation values while allowing compatible and sustainable land uses to continue." (Department of Environment and Heritage Protection (Qld) (2011a)). Landholders who enter into an agreement are eligible to tender for financial assistance to undertake on-ground management activities via the *NatureAssist* incentive program (Department of Environment and Heritage Protection (Qld) (2011b)).
- 37 Where land is not of such high conservation value as to merit a trust or voluntary conservation agreement, New South Wales landholders may be able to enter into an agreement with a catchment management authority (CMA) to implement an *incentive property vegetation plan* (PVP) (*Native Vegetation Act 2003 (NSW)*, ss 26-27, 28(d)). Guided by priorities set out in their catchment action plans, CMA's provide funding to assist conservation activities such as fencing off sensitive habitats and planting to improve biodiversity. However, a PVP attracts none of the tax and rate exemption benefits associated with trust and voluntary conservation agreements (Environmental Defender's Office, 2011, pp. 24-25). The term of a PVP is flexible, but it binds future landholders during the period to which the parties agree (*Native Vegetation Act 2003 (NSW)*, s 30). They can agree to protection in perpetuity, and the first in perpetuity conservation PVP in the Border Ranges area was agreed at the end of 2011 (Nagle, 2011).
- 38 **Landholder management agreements** are simply legally binding contracts to carry out small conservation project works over a 5 or 10 year period. Depending on the source of funding, they are made between the current landholder and a conservation NGO, a state government agency, a CMA or a local council (Environmental Defender's Office, 2011, p. 27). They do not bind future purchasers of the land.

Box 3: Agreements that can be terminated at any time

At the other extreme to agreements in perpetuity, there are agreements that can be terminated at any time. For example, with the landholders agreement, private land can be declared a wildlife refuge under NSW legislation. While this is noted on the land title, it can be revoked at the request of the landholder (*National Parks and Wildlife Act 1974 (NSW)*, s 68). Landholders become members of the Conservation Partners Program and get signage to display. A wildlife refuge is compatible with multiple land uses. A 'scheme of operations' identifies and describes areas of high habitat value plus other land uses carried out on the property, such as agriculture (Department of Environment, Climate Change and Water (NSW), 2010c, p. 24).

The Land for Wildlife program in NSW is simply a voluntary property registration scheme, with no legal implications. Registration ceases upon sale of the property. The program is coordinated by an NGO in collaboration with the NSW environment agency operating under the Conservation Partners Program. It provides for conservation management advice and information (Land for Wildlife, n.d.).

While agreements that can be terminated at any time are clearly not ideal, the aim is to get people involved sufficiently to change their behavioural and management practices, with the ultimate goal being to obtain longer-term commitments (Gary Howling, pers comm.).

4.1.3 Regulation

- 39 In New South Wales, vegetation clearance in urban areas is regulated by environmental planning instruments made under land use planning legislation (*Environmental Planning and Assessment Act 1979 (NSW)*). In rural areas, it is regulated under the *Native Vegetation Act 2003 (NSW)* (Farrier et al., 2007). While those seeking development approval under the planning legislation *may* be required to offset harm to biodiversity resulting from their proposals (Lausche et al, 2012, p. 22), they have no choice when they are seeking approval to clear remnant native vegetation under the native vegetation legislation. The general position is that, before being allowed to clear, landholders must prepare a draft property vegetation plan which will only be approved if it will "improve or maintain" environmental values, including biodiversity values. Whether or not it does so is determined by the *Environmental Outcomes Assessment Methodology* (Office of Environment and Heritage (NSW), 2011). This relies heavily on the landholder carrying out management actions on other areas of their property to enhance biodiversity values in order to offset damage caused by the clearing.
- 40 Native forestry operations carried out on private land are a particular problem in the Border Ranges region. While they are regulated under the *Native Vegetation Act 2003*, special arrangements apply. A proposal is legally presumed to satisfy the legislative requirements to "improve or maintain" environmental values if it complies with the *Private Native Forestry Code of Practice for Northern NSW (Native Vegetation Regulation 2005, cl. 29B; Department of Environment and Climate Change (NSW), 2008)*. There is no requirement for biodiversity offsets, but logging is prohibited in some sensitive areas, including old growth forest, rainforest, wetlands and heathland, and restricted in listed ecological communities. Specified numbers of habitat trees (eg feed trees and those with nesting hollows) must be retained. Specific requirements – ecological prescriptions – are set out to protect listed species where there is a known record of presence or site evidence (eg exclusion and buffer zones).

4.2 Hunter Valley Regional Partnership

- 41 The Hunter Valley priority landscape in New South Wales (see figure 2) represents a significant east-west linkage of natural vegetation, with the potential for north-south 'stepping stones' of vegetation to allow species movement (Great Eastern Ranges, *Hunter Valley*, n.d.). It is one of the most challenging landscapes for the GER Initiative due to existing and expanding agricultural, mining, industrial and urban development, which have disrupted north-south connectivity. As a result, the area is highly fragmented and degraded. Since it contains 40% of New South Wales's coal reserves, it is under particular pressure from future open cut coal mining, coal seam gas exploration and supporting infrastructure. Only 18% of the original vegetation remains along the Hunter Valley floor and mainly exists as small patches, 40% of which are covered by mining leases (Anderson, 2011, p. 22). The region also contains parts of the Gondwana Rainforest and Greater Blue Mountains World Heritage Areas. Eighty animals, 58 plants and 17 terrestrial ecological communities are listed as endangered

under New South Wales legislation, and 18 animals, 37 plants and 2 ecological communities are nationally listed under the federal EPBC Act. The two ecological communities listed as nationally threatened and 13 of those listed under New South Wales legislation are likely to be impacted by mining operations (Department of Planning and Infrastructure (NSW), 2012, pp. 63-64).

- 42 The Hunter Valley Regional Partnership, under the leadership of OzGreen (an NGO), has brought together a diverse group of over 30 organisations to work towards achieving GER objectives. These represent industry (including coal, power, equine, agricultural, viticultural and tourism groups), community and Indigenous groups, and the university sector, as well as state and local governments (Great Eastern Ranges, *Hunter Valley*, n.d.).

4.2.1 Strategic planning

- 43 The NSW government has recently produced an *Upper Hunter Strategic Regional Land Use Plan* that addresses a wide range of issues in addition to the natural environment, with a particular focus on resolving the tension between agriculture and mining development (Department of Planning and Infrastructure (NSW), 2012). The plan is designed to facilitate mining development. Under the plan, all land is potentially open to mining, although there is a rigorous assessment process *before* a proposal involving strategic agricultural land can be submitted, including examination of impact on water resources. There is no equivalent ‘gateway process’ for land of high nature conservation value.
- 44 However, the federal government has a direct interest in the likely impact of proposed development on biodiversity. Coal mining is likely to have a significant impact on nationally listed threatened species and ecological communities and these are matters of national environmental significance, requiring assessment and approval under the federal EPBC Act (see above section 2.2). While individual development applications could be assessed by the federal government on a case-by-case basis, the EPBC Act also provides for strategic assessment at a landscape scale (see Box 4) (Lausche et al. 2013, paras 383-385, p. 112). A strategic assessment of a number of proposed new coal mines and mine expansions covering an area of approximately 30,000 ha has been agreed to and is to be completed by 2014 (Department of Planning and Infrastructure (NSW), 2012, p. 65). This will attempt to reconcile state and federal interests in biodiversity conservation and will facilitate assessment of cumulative impacts on threatened species and ecological communities. Strategic biodiversity conservation planning in the Upper Hunter Valley section of the GER is coalescing around this strategic assessment.

Box 4: Strategic assessment under the EPBC Act

The EPBC Act empowers the federal environment minister to reach agreement with those responsible for a plan, such as state agencies, to carry out a strategic assessment of all actions under the plan likely to have a significant impact on matters of national environmental significance. The draft report must be made available for public comment before being finalised (s 146). Following the assessment of the plan, the federal environment minister must decide whether to endorse it, after any recommended modifications to the plan have been made. If it is endorsed, a blanket federal approval can then be given to specified development under the plan (s 146B). In making a decision on whether to grant approval, the federal minister must balance economic, social and environmental matters, taking into account the principles of ecologically sustainable development (s 146F(2)). However, the decision must not be inconsistent with Australia’s obligations under the Biodiversity Convention or with the provisions of a threatened species recovery plan (s 146K).

4.2.2 Regulation

- 45 If, following the strategic assessment, federal approval is given to some or all of the mining proposals, conditions will be attached. These will include requirements for developers to offset the impacts of mining proposals on nationally listed threatened species and ecological communities. The federal government is currently (2012) drafting a new quantitative methodology to support a draft offsets

policy which it released in 2011 (Commonwealth of Australia, 2011). Offsetting may also be required under New South Wales legislation (Lausche et al., 2013, Box II(3)-16, p.123), although the formal requirement under the *Native Vegetation Act 2003* to “improve or maintain” biodiversity values through offsets (see above, para 2.1.3) does not apply to clearance of native vegetation which has been authorised under the mining legislation (s 25(l)). However, at this point, the New South Wales government will have to reconcile its interests with those of the federal government.

- 46 One of the aims of the strategic assessment which has positive implications from a connectivity conservation perspective is to improve the process of finding and securing biodiversity offsets and to target them so as to deliver gains at a *regional* level (Department of Planning and Infrastructure (NSW) 2012, p. 65). This is likely to include the development of landscape-scale corridors which will contribute to the GER Initiative.
- 47 One way of securing offsets is through conservation banking, known as “biobanking” in New South Wales. This allows landholders to enter into in perpetuity biobanking agreements with the New South Wales government to manage their land in perpetuity so as to create biodiversity credits. These credits can then be purchased by those required to offset damage caused by development (Lausche et al., 2013, paras 499-205, p. 138-139). Conservation banking has considerable potential as a tool for achieving connectivity if offsets are appropriately configured and strategically located, in contrast to the retention of small isolated fragments on the development site. The first biobanking agreement in the Hunter Valley was recently signed. It is the first Aboriginal owned and managed biobank in Australia (*Wonnarua Nation Aboriginal Corporation*, n.d.). The area is owned by the Wonnarua nation and covers 75 hectares, part of which is an endangered ecological community. The biobanking agreement resulted from a \$900,000 negotiation with several companies that are involved in building new rail track for the transport of coal (Nichols, 2012).

4.2.3 Funding

- 48 Connectivity conservation in the Hunter Valley area has recently attracted \$5.7 million funding over six years from the federal *Biodiversity Fund* (see above, para 2.5), including a \$2.6 million grant to OzGreen, acting as project proponent on behalf of the Hunter Valley Regional Partnership. Much of the total funding will go towards decreasing fragmentation by entering into partnerships with landholders as well as developing new technologies to enhance landholder engagement in connectivity conservation and carbon farming. Funding has also been provided for production of a Biodiversity Investment Prospectus to leverage and stimulate public and private investment in large-scale connectivity conservation through carbon plantings (Australian Government, *Clean Energy Future Biodiversity Fund*, Round One, NSW, 2012).

4.3 Jaliigirr Biodiversity Alliance

- 49 The Jaliigirr Biodiversity Alliance was formed as a GER regional partnership in mid-2012. It covers an area along the mid-north coast of NSW that includes Coffs Harbour, Bellingen and the Upper Nymboida-Dorriga Plateau (see figure 2). The Alliance is led by a regional natural resource management body (see above, para 2.4), the Northern Rivers Catchment Management Authority, and includes local community and Aboriginal groups, individuals, government agencies and NGOs, as well as business and education institutions (Great Eastern Ranges, *Jaliigirr Biodiversity Alliance*, n.d.).
- 50 Part of the context in which the Alliance developed includes an earlier attempt by Coffs Harbour City Council, now one of the local government partners in the Alliance, to address connectivity conservation issues by using regulatory provisions in its local land use plan. In 2009 the Council produced a draft *Priority Habitat and Corridors Strategy* to inform the preparation of a new, legally binding land use plan which would adjust zonings in the local government area. The *Strategy* used new vegetation mapping data and other data sets to provide an environmental zoning map based on a matrix of environmental values that included priority habitats and corridors. If incorporated into the proposed land use plan, critical areas of some corridors would have been rezoned from a rural

agricultural zoning to an environmental conservation zoning, with consequent restrictions on future development.

- 51 At the same time, a Landholder Incentives Guide was produced, identifying a range of possible incentives for landholders who had Priority Habitats and Corridors mapped over their property. Proposed council incentives included rate rebates (taxes levied by local government based on land values), and payments from a proposed Coffs Harbour Future Fund (Environment Trust) funded by an additional environmental levy on all ratepayers to the one already in place. Voluntary acquisition of some land was also proposed.
- 52 Upon public exhibition the draft *Strategy* met with a negative response, primarily from rural landholders who were concerned that it was “an immediate and potential threat to legitimate property management and property asset values” (Scott, 2010). As a result, the *Strategy* was redrafted with substantially reduced environmental zonings and greater use made of a *natural resources sensitivity* overlay. Under the redrafted *Strategy*, while development mapped under the overlay would not be prohibited altogether, it would be subject to additional scrutiny in relation to any potential adverse impact on biodiversity including connectivity conservation, before approval could be considered. The revised draft emphasised that existing agricultural land uses would not be affected by the proposed plan (Lausche et al., 2013, paras 386-387, p. 112).
- 53 The current position in 2012 is that the finalisation of the land use plan is on hold until improved mapping data is obtained. The *Strategy* is to be subject to further community consultation in mid-2013 after taking into consideration the 600+ submissions previously received (Nigel Cotsell pers comm).
- 54 The Jaliigirr Biodiversity Alliance does not regard the Coffs Harbour strategic planning and regulatory initiative as playing a significant part in the formation of the Alliance. However, important corridor planning information obtained during the land use planning process assisted a successful *Biodiversity Fund* application by the Alliance (Australian Government, *Clean Energy Future Biodiversity Fund*, Round One, NSW, May 2012). This funding (AUD\$3 million over 6 years) will be used to provide incentives for landholders to establish corridors over a catchment area of 337,000 hectares.

5 A Critical Reflection

- 55 The GER Initiative aims to establish a conservation corridor inland of the east coast of Australia, stretching 3,600 kilometres from north to south through the states of Queensland, New South Wales and Victoria, and the Australian Capital Territory. The Initiative only commenced in 2007 and is still in its early stages of development. However, it has gone far beyond a paper vision. Most activity is currently directed at pilot programs in a number of priority landscapes, primarily in New South Wales. In addition to core areas within the protected areas system, there are other significant areas of public land in these sections of the corridor, including land managed for forestry purposes, but at present the main concern is with private land management.
- 56 Apart from the tenure situation, governance of the GER Initiative is challenged by a complex institutional environment. There are five different legal jurisdictions involved. While the federal government has jurisdiction over the whole length of the corridor, its powers are limited by both the constitutional division of power and historical understandings. Local government has traditionally played a major role in planning land use and controlling development but when it comes to large-scale connectivity conservation it is inhibited by narrow, historically determined boundaries which bear little relationship to ecosystems or catchments. The strong association between all three levels of government and direct regulation is also a significant barrier when it comes to developing the cooperative relationships with private landholders which active land management requires. In these circumstances it is not surprising that government, after initially taking a leadership role, has more recently taken a backseat when it comes to governance directly related to connectivity conservation. A division of labour has developed, with government providing much of the funding to enable a number of NGOs to take the lead in governance, at both central and regional levels. In the absence of top-

down government direction, the governance arrangements that have emerged are flexible, relatively informal and still evolving. They are based on MoUs rather than legally binding legislation. There is, however, a gradual move towards putting in place more formal arrangements through the creation of a corporate entity.

- 57 This case study has explored three of the pilot programs in different sections of the corridor. They were chosen to illustrate the range of strategic planning and land management mechanisms that are now being adapted to serve connectivity conservation objectives although they were originally developed for different purposes. There is at present no legislation in Australia at state or federal level that specifically recognises connectivity conservation as an objective and provides mechanisms for its realisation. A federal advisory committee recently proposed a National Wildlife Corridors Act as part of the *Draft National Wildlife Corridors Plan* (National Wildlife Corridors Advisory Group, 2012). This would have been largely symbolic, providing a process for formal recognition of National Wildlife Corridors to enhance the profile of connectivity conservation as a legitimate focus for public and private funding. It would not have provided instruments for planning, protection and management. When the Plan was finalised by the Minister, even this limited proposal for legislation was abandoned in favour of a non-statutory process for nomination and declaration of National Wildlife Corridors (see Box 1).
- 58 The legal mechanisms that are being employed are diverse. In the broader landscape, outside of protected areas with their special legislation, they are found in a wide range of legislation, including legislation relating to land use planning and development control, wildlife protection, threatened species conservation, native vegetation clearance and catchment management.
- 59 At the strategic level, the instruments employed include land use planning, strategic environmental assessment and threatened species recovery planning. At the level of land management, they range from direct regulation of development to voluntary instruments. Voluntary instruments include outright purchase of land by NGOs and conservation agreements with landholders. A conservation agreement that runs with the land in perpetuity remains the holy grail of biodiversity conservation. Between 2007 and 2011, 86 of these agreements were concluded in the GER, covering an area of 9526 hectares (Great Eastern Ranges, 2012, p. 18). However, one of the significant lessons coming out of this case study is that a wide range of different types of agreement are being employed, some offering security for a specified period and others lasting only as long as the landholder chooses. A survey conducted in another of the Regional Partnership areas (Southern Highlands: see Figure 2), to determine how best to engage with landholders to gain interest and involvement in the GER Initiative, found that there was greater interest in contracts to carry out one-off activities (61%), five year management agreements (48.5%) and non-binding property registration schemes (41%) than in conservation agreements that ran with the land (23.5%) (Morrison, Lockwood and Greig, 2011, p. 32). In these circumstance, the aim in the short-term is to at least secure an initial commitment from landholders in the hope of extending the depth of this commitment over time. When it comes to the choice of legal instrument, pragmatism reigns and the risk that agreements may fail to give long-term protection is tolerated.
- 60 In approaching the issue of private land management, the GER Initiative places a strong emphasis in all of its literature on voluntary commitment and collaboration. Direct regulation does not rate a mention. The *National Wildlife Corridors Plan* emphasises that its approach is based on voluntary cooperation and that it has no effect on the “rights which landholders have under the law to control and enjoy their property” (Commonwealth of Australia, 2012, p. 1). NGOs must necessarily rely on voluntarism, but even where government plays a role, it emphasises the voluntary instruments at its disposal rather than the regulatory ones (Great Eastern Ranges, *Office of Environment and Heritage NSW*, n.d.).
- 61 A voluntary rather than regulatory approach is essential for securing the cooperation of private landholders in ongoing active management for connectivity conservation, including adjustment of existing harmful land uses. Yet it is clear from the pilot programs discussed in this case study that direct regulation also plays a crucial role. A regulatory backdrop, controlling development that threatens existing connectivity, is an essential precursor to making arrangements for active management. For example, controls over the clearance of native vegetation fundamentally improve the bargaining position of NGOs seeking to negotiate management agreements with landholders.

Regulation may also trigger strategic planning initiatives. In the Hunter Valley, the need to reconcile federal legislation requiring the assessment of impacts on nationally listed species and ecological communities with state regulation of coal mining, has led to a strategic assessment which is intimately associated with a regulatory regime. These regulatory processes are not, however, advertised by government or NGOs as advancing the GER Initiative. They were established long before connectivity conservation loomed on the horizon. Connectivity conservation is not their objective, but they have become vital building blocks when it comes to achieving it.

- 62 Regulation also underpins biodiversity offset requirements. Offsetting assumes that development will be allowed to proceed, and relatively pristine areas lost, but that it will be regulated through the imposition of conditions. While there will continue to be legitimate concerns about the idea that offsets can improve or maintain biodiversity values to replace those lost to development, offsetting at least ensures that developers make some attempt to pay for loss of biodiversity in situations when government is not prepared to prohibit development altogether. The provision of offsets from conservation banks has much to offer to connectivity conservation because of the potential to consolidate offsets and locate them strategically in the landscape.
- 63 As the Coffs Harbour example shows, resort to direct land use regulation will often be a very sensitive issue, particularly for rural landholders on the fringe of urban areas who see the potential to reap profits from rezonings. However, the response to regulation is likely to vary according to who is doing the regulating, who is being regulated (the demographic profile of a particular area) and what is the object of the regulation. It is likely to be easier for more remote federal or state governments to put crucial regulatory back-drops in place than local governments. Rural landholders in the Hunter Valley fearing for their vineyards and horse-studs will ally themselves with regulation of mining development. City-dwellers who have moved to the Border Ranges in search of a lifestyle change will also welcome regulation that restricts development. Not so those on neighbouring blocks who want to engage in private forestry.
- 64 What this case study shows is that even where there is no legislation specifically committed to connectivity conservation, there is likely to be a wide range of legal mechanisms that can be adapted to advance this objective. It is crucial that managers adopt a flexible and pragmatic approach, taking advantage of existing strategic planning mechanisms and reorientating them to ensure that connectivity conservation is a salient value. While emphasising the voluntary nature of landholder participation in managing their land for connectivity conservation they must recognise the important role that direct regulation can play in setting the context in which negotiations take place.

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BIODIVERSITY AND CONNECTIVITY CONSERVATION IN BRAZILIAN LAW¹

Solange Teles da Silva and Marcia Leuzinger

1 Introduction

- 1 Brazil, with a total land area of 850 million hectares, has one of the world's five largest forest areas and is one of the 17 mega-biodiverse countries. The plant cover is still largely intact on 537 million hectares (Sparovek et al, 2010) in six different biomes: the Amazon (tropical rainforest), Cerrado (savannah), Atlantic Forest, Caatinga (semi-arid), Pampa (prairies) and Pantanal (wetlands). Publicly-owned conservation units and indigenous land on those land biomes account for 175 million hectares, of which 170 million have natural plant cover. The other 367 million hectares of natural plant cover are on private or undeeded land (Sparovek et al, 2010). Privately-held land, therefore, plays a vital role for the conservation of biodiversity and connectivity. Completing Brazil's biodiversity picture is its marine biome, made up of coastal and marine zones, with a variety of ecosystems such as mangroves, sandbanks, islands, dunes and others. There are 3,676,840 million hectares of federal marine conservation units (ICMBio).

Figure 1: Brazilian biomes and natural plant cover



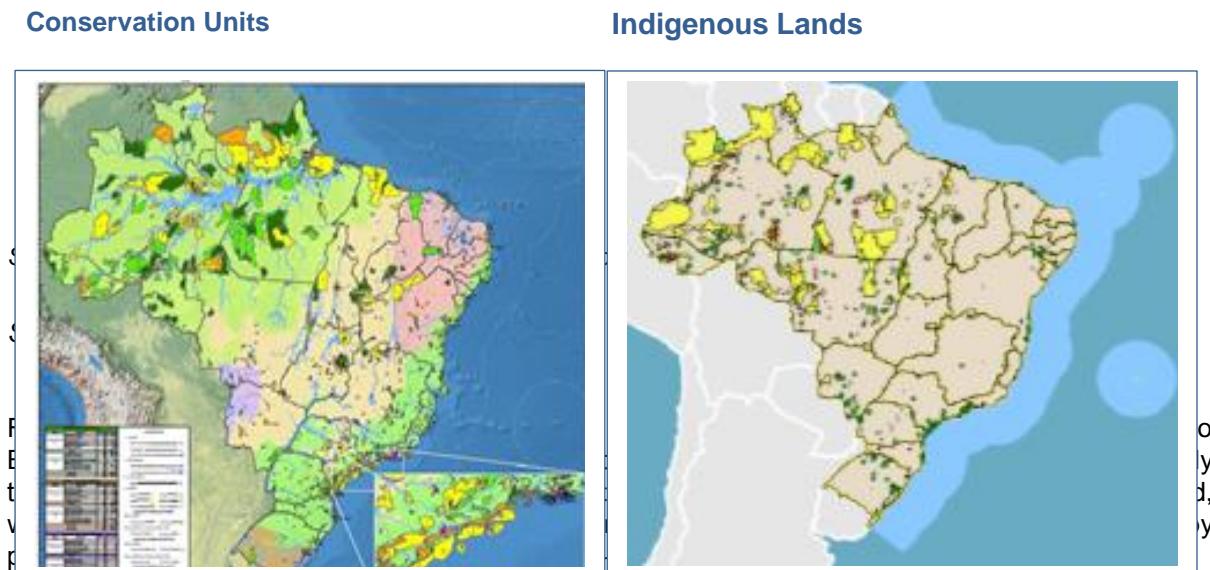
Source: Brazilian biomes (MMA); Natural plant cover (Sparovek et al, 2010)

¹ Research Project Law and Sustainable Development: forests and water resources protection in the Amazon region, considering climate change (National Council for Scientific and Technological Development - CNPq, Brazil)

- 2 All these features have naturally led students of connectivity to look at the Brazilian case. Yet other reasons as well brought us to carry out this study, such as distinctive features of Brazilian law – both its constitution and implementing legislation – which lay the groundwork and provide tools for policies to conserve biodiversity and implement connectivity.
- 3 The 1988 Constitution assures that all people have a right to an ecologically balanced environment and, in so doing, bestows duties on federal, State and municipal authorities and on their decentralized agencies to give effect to that right. Those duties include the creation, in all States and the Federal District, of “Specially Protected Territorial Spaces” (ETEPs), which can only be altered or terminated by law (Art. 225, § 1º, III). The Constitution also makes it the duty of public authorities to preserve and restore essential ecological processes – such as biological, physical and chemical processes that sustain ecological systems and life – alongside the duty to preserve the diversity and integrity of the country’s genetic heritage (Art. 225, § 1º, I e II).
- 4 The Specially Protected Territorial Spaces – as one strategy to preserve biodiversity and implement connectivity – encompass conservation units as well as other specific protected areas, including ecological corridors, biodiversity conservation corridors, buffer zones and areas provided by the Forest Code such as Permanent Preservation Areas (APPs) and Legal Reserve (RL) areas. The APPs are fundamental for the preservation of areas along rivers, which provide connectivity with other ETEPs and preserved areas and assure essential ecological processes. These Specially Protected Territorial Spaces, depending on the specific regulations ruling them and their specific characteristics, may be created on public, private or publically and privately owned land holdings.
- 5 Looking at land ownership and tenure in Brazil, we see three major categories: public, private and “devolute” (undeeded but publically-owned) lands, each of them with a variety of settlement patterns. On public land, we find: (i) full-protection (uninhabited) conservation units and (ii) sustainable-use conservation units, which allow human settlement; (iii) indigenous lands, inhabited by indigenous populations who hold permanent, collective rights of possession over the land; (iv) settlement projects for family farmers and farmworkers, who hold collective rights of possession on public land until they are given deeds after a settlement is emancipated. On the second category of public land, we can have as sustainable-use conservation units: extractive reserves and sustainable-development reserves², aimed at conciliating protection of traditional residents with biodiversity conservation, those groups hold public land collectively, and based on contracts they sign granting them real rights of use. On private land, in addition to private property, there may be *quilombola* territories, held under collective deeds, as well as conservation units that may be for “integral protection” (natural monuments and wildlife refuges) or for sustainable use (environmental protection areas, areas of major ecological interest and private natural-heritage reserves). On publically-owned but undeeded land we find areas occupied by farmworkers and small farmers, as well as land illegally taken over by land-grabbers (known colloquially as *grileiros*) with no legal deed, and also undeeded land with no actual inhabitants. The regularization of land tenure and the consolidation of rural property, along with respect for the social function of property and for social and environmental norms, in this context, are major steps both to uphold people’s status as full citizens and to protect the environment.
- 6 Brazil’s Constitution recognizes legitimate possession. On the one hand, it identifies groupings who are part of Brazilian society and whose ways of life and livelihoods are aligned with the conservation of biodiversity: indigenous peoples and *quilombola* communities (the 1988 Constitution [Art. 68/ADCT] guarantees full ownership over the land on which *quilombolas* have lived). On the other hand, the Constitution also allows uninterrupted, good-faith possession to give rise to the acquisition of land through the civil-law method of ‘usucaption’ (acquisition of the title or right to property by the uninterrupted possession of it for a certain term prescribed by law, similar to squatters’ rights). This may apply so long as certain conditions are met: more than five years of possession and specific rules pertaining to urban and rural areas, regarding the size and purpose of the real estate.

² Extractive Reserves and Sustainable Development Reserves are very similar management categories of Conservation Units. They both share the purpose of reconciling conservation of the natural environment with protection of traditional cultures. The basic difference between the two has to do with the nature of the traditional populations involved. On Extractive Reserves, the traditional groups’ livelihoods depend predominantly on extractives. Sustainable Development Reserves, meanwhile, are settled by a broader range of traditional populations, especially those who do not rely on extractives.

Figure 2: Conservation Units and Indigenous Lands



2 International and Regional Context

- 8 International instruments that affect the implementation of connectivity include, first of all, the multilateral environmental conventions: the Convention on Biological Diversity (CBD), the Convention on Climate Change (UNFCCC), the Ramsar Convention, the Convention Concerning the Protection of the World Cultural and Natural Heritage and the Convention on the Conservation of Migratory Species of Wild Animals (CMS). In addition, there are regional environmental conventions in the Americas, including the Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere and The Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC). Brazil has ratified all of these conventions except for the CMS⁴, and thus taken on international commitments favorable to the creation, implementation and maintenance of connectivity, through the protection of landscapes, habitats, ecological connectivity and even considering the evolutionary process of connectivity.
- 9 On a regional scale, key aspects include strategies to develop cooperation around protected areas and biodiversity conservation in border zones. For example, there is the Continental Amazon proposal, under the 2008-2013 Regional Action Plan for Amazonian Biodiversity (PARBA), developed by the Permanent Secretariat of the Amazon Cooperation Treaty Organization (ACTO) for countries around the Amazon that are parties to the Amazon Cooperation Treaty (Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Surinam and Venezuela). In the Southern Cone, the Mercosur's Framework Agreement on the Environment, in effect since 2001, deals with the need to analyze the region's environmental problems, with a special focus on border zones. Those two cases are examples of

³ Since Brazil is a federal state in which the Union, States and municipalities all have the power to legislate on environmental issues (the latter two, however, only on matters of local interest and without countering federal law), our approach to the creation and implementation of connectivity will consider the more general federal standards set by laws passed by the National Congress, in conformity with the 1988 Constitution's Article 24, on subject matter over which the power to legislate is concurrent.

⁴ While still not a party to the Convention on the Conservation of Migratory Species of Wild Animals (CMS), signed in Bonn on June 23, 1979, Brazil has signed two agreements reached under the aegis of that convention: the Agreement on the Conservation of Albatrosses and Petrels (ACAP) and the Memorandum of Understanding on the Conservation of Southern South American Migratory Grassland Bird Species and Their Habitats. On June 5, 2012, President Dilma Rousseff sent Message nº 246 to the National Congress, to consider and approve the text of the Convention (as per Articles 49-I and 84-VIII of the Constitution), for Brazil to be able to accede to the Convention. This will be one more chance to implement and maintain connectivity, particularly the connectivity of habitats.

activities by international agencies in the region, and illustrate the growing concern over biodiversity conservation and the implementation of connectivity in South America, through a cooperation treaty and as part of a regional economic bloc.

- 10 It is important, in this context, to highlight how treaties are incorporated into domestic law as well as their hierarchy. Under Brazilian law, treaties that have been incorporated into national law have legal parity with federal laws, and all public authorities – in the executive, legislative and judicial branches – must use their respective powers to assure the treaties' full implementation. The only exception to this parity rule is for treaties on human rights which, when approved by a 60% majority, in two rounds of voting, by each house of the National Congress, gain the standing of amendments to the Constitution (Constitutional Amendment 45/2004). Most Brazilian legal doctrine also holds that human rights treaties internalized before the adoption of that Constitutional Amendment are also on a par with constitutional amendments, as determined by Article 5, §2 of the 1988 Constitution. Nonetheless, the position of Brazil's constitutional court, the Federal Supreme Court (STF) regarding human rights treaties is that if they were not enacted by a 60% majority, their status in the hierarchy is above normal laws, but below the Constitution, although in the past the STF had ruled that such treaties also had the same standing as normal laws. The impact of internalizing treaties into the domestic legal order and its hierarchy is relevant here, since it has to do both with the potential for their possible jurisdictional prevalence over laws, recalling the relationship between the environment and human rights, and with the possibility of direct enforcement of treaties and the duty of public authorities to ensure their implementation (STJ, Resp 840918/DF).

3 Domestic Context

- 11 The preservation of biodiversity and the fight against fragmentation of habitats require that we find ways to increase the total area of protected spaces, either by expanding their borders – which is difficult and expensive – or by using the concept of connectivity.
- 12 The best strategy developed to do that has been connectivity among conservation units and other forms of preserved environmental spaces or plant-cover fragments. This strategy often ends up protecting larger areas with no public spending and no restrictions on economic activities. A strategy of corridors for connectivity has been implemented in Brazil through three different approaches: (i) ecological corridors (ECs), in compliance with the National System of Conservation Units (SNUC), Law 9,985/2000; (ii) biodiversity conservation corridors (BCCs), implemented by the Ministry of the Environment, with no specific legal provision; and (iii) generic corridors, made up of plant-cover strips whose preservation is mandated by laws such as the Forest Code or the Atlantic Forest Law.

3.1 Conservation legislation

- 13 The legal basis for the creation and management of all types of corridors lies ultimately in the 1988 Federal Constitution, as further elaborated by several laws and a variety of administrative measures that provide specific regulations for the creation of protected areas and for the protection and sustainable use of biodiversity resources. We will now discuss the constitutional provisions that speak directly to these topics and then look point-by-point at the various types of protected areas that play roles in connectivity, and their respective regulations. We emphasize the role of permanent riparian protection areas, located along rivers, as a specific feature of Brazil's connectivity legislation. Complementing this analysis of how connectivity is implemented, we will also analyze norms on biodiversity.

3.1.1 Constitutional Basis

- 14 Brazil's 1988 Federal Constitution achieved a broad recognition of all dimensions of human rights, reflecting a clear influence of the 1966 international covenants on a range of human-related rights. The 1988 Constitution established a long list of fundamental individual and collective rights in Article 5, in addition to other economic, social, cultural and diffuse rights assured by other provisions beyond its Title II, on Fundamental Rights and Guarantees (Leuzinger, 2009).
- 15 On environmental protection, the right to a balanced environment was written into Brazilian law through the National Environmental Policy (PNMA, Law 6,938) in 1981. The PNMA defines its purpose (in Article 2) as the preservation, enhancement and recovery of life-supporting environmental quality, to provide the country with conditions for social and economic development, national security and protection of the dignity of human life. The tie drawn between environmental quality and the dignity of human life links, at least implicitly, the right to a balanced environment to the right to life. It is thus a fundamental right, as provided earlier by the 1972 Stockholm Declaration. When the 1988 Constitution devoted an entire chapter (Art. 225, its paragraphs and items) to the environment, that right finally achieved constitutional standing (Leuzinger, 2009).
- 16 As a 3rd-generation, diffuse, fundamental right, the right to the environment affirms the ideal of fraternity or solidarity and breaks with ownership criteria, leaving behind traditional ideas of a subjective right dependent on the individual right-holder, to define itself by the collective rights of the people. Its defense rests on solidarity over time and space, assuring environmental quality for present and future generations (Silva, 2007a).
- 17 Article 225 begins by asserting that environmental right and then links it to a wholesome quality of life, thus indicating its essentiality. It then allocates the state's and the collective obligations to protect and preserve the environment, launching the idea of shared management over natural resources and the need for cooperation and participation by society, in a broader context of environmental governance. There is also a general duty not to degrade the environment, to be observed both by public authorities and by the community in general, thereby implying both concrete acts as well as abstentions in the course of human actions.
- 18 The same constitutional provision then lists obligations incumbent upon public authorities responsible for enforcing that environmental right. The Federal Constitution has set *ex ante* priorities for activities or actions that the state must implement as public obligations it cannot relinquish. The public authorities (or "*Poder Público*") to which it refers are the executive, legislative and judiciary institutions, which must, within their respective remits, carry out those obligations in order to enforce the right of all to a balanced environment. Amongst the obligations listed under paragraph 1 of Article 225, we find the basis for the preservation of biological diversity and strategies to achieve that preservation, particularly through the creation of protected spaces.
- 19 In Article 225, paragraph 1-I, the Constitution makes it the duty of public authorities to preserve and restore essential ecological processes and to foster the ecological management of species and ecosystems. Essential ecological processes are those required for the maintenance of ecosystem functions and processes and for the ecological balance (spanning genetic, species, and ecosystem diversity) that sustains life. Connectivity is thus held to be essential and public authorities must act to preserve, recover and restore degraded ecosystems, as well as to halt or to deny authorization for private-sector activities or projects that may cause degradation harmful to those processes.
- 20 According to paragraph 1-II of Article 225, the state is responsible for preserving the diversity and integrity of the country's genetic heritage. This involves both enforcement and monitoring of activities related to the manipulation of genetic material. This raises the issue of biosafety, particularly through Law 11,105/2005 and the obligation of public authorities to take precautionary measures *vis-à-vis* threats of contamination by genetically-modified organisms, which represent an irreparable risk to the conservation of cultivated biodiversity.
- 21 Paragraph 1-III of Article 225 holds public authorities responsible for the creation of territorial areas and their component parts that require special protection (the ETEPs). Any alteration or elimination of

such ETEPs may only be done by law, while any use that might compromise the integrity of features that justify their protection is forbidden. In addition, paragraph 1-VII of the same Article makes protecting the fauna and flora another obligation imposed on public authorities, although – from a broader standpoint – this is already part of maintaining ecological processes.

- 22 The Constitution also sets certain biomes aside as national heritage areas – Brazil's Amazon Forest, the Atlantic Forest, the Coastal Mountains (*Serra do Mar*), the Mato Grosso Wetlands (*Pantanal*) and the Coastal Zone – and stipulates that their use must be controlled by specific laws, under conditions that assure environmental protection, including the use of natural resources (paragraph 4 of Article 225). This national heritage status does not deprive owners or holders of areas located inside those biomes of the ability to use, enjoy and dispose of their holdings. It simply allows general limitations on their use to be adopted, considering the importance of conserving those biomes. The national heritage status overlaps the real estate's deed or possession rights, and other specific laws must set forth conditions for them to be used that guarantee the preservation of these areas' natural resources and the essential features of the biomes to promote the collective good for the entire population, both present and future generations (Silva, 2007a: 234).

3.1.2 Specially protected territorial spaces

- 23 There is no legislation that specifically addresses connectivity in Brazil. Rules and regulations that have created protected environmental areas, however, do make reference to implementing and maintaining connectivity. A discussion on the emergence and evolution of legislation for protected spaces, and on the use in Brazil of terminology such as “specially protected territorial spaces” and “protected areas,” is fundamental for us to comprehend their reach for the conservation of biodiversity and for the implementation of connectivity, and is thus the starting point for this analysis. We will then turn to some of those categories that allow for connectivity: ecological corridors, biodiversity corridors and buffer zones, to begin with, and then the generic corridors, made up of permanent-preservation and legal-reserve areas required by the Forest Code and also by the fragments of native vegetation protected by the Atlantic Forest Law.
- 24 **Genesis and evolution of legislation on Specially Protected Territorial Spaces⁵.** In Brazil, an immense variety of environmental spaces began to emerge following the creation of the Rio de Janeiro Botanical Garden in 1808. The first parks were created in the 1930s. Several types of environmental spaces were established, but with no systematic policy to govern them until the late 1970s. In 1979, the Brazilian Forest Development Institute (IBDF) proposed its “Stage-1” Plan for Brazil’s System of Conservation Units, identifying the Amazon as its priority for creating new conservation units (UCs) and establishing the need to use technical and scientific criteria to choose both the areas where UCs would be created and the management category to be adopted for each (Brito, 2000). In that Plan, only certain types of environmental spaces were classified as conservation units, thus conferring a narrower meaning to the term than that of the Specially Protected Territorial Spaces (ETEPs). Thus establishment of ETEPs, following the enactment of Law 6938/1981, became a tool for the National Environmental Policy.
- 25 When the 1988 Constitution came into force, the creation of ETEPs became one of the obligations incumbent upon public authorities. Actually, when the Constitution was concluded, there were already legal tools to create certain environmental areas qualified by the National Environmental Council (CONAMA) as “conservation units,” and there was a nationwide Plan for the System of Conservation Units, which listed as conservation units only those environmental areas already created at the time. This shows how the term is more restrictive than “specially protected territorial spaces.”⁶
- 26 Even so, the drafters of the new Constitution, in the chapter on the environment, chose the broader term – specially protected territorial space – instead of conservation unit. This reflects their intention to

⁵ This item is reproduced *ipsis literis* from Leuzinger (2009).

⁶ The Plans for the Conservation Units System did not include as conservation units, for example, botanical gardens, zoos or forest nurseries which, under CONAMA Resolution 11/1997, did come to be treated as conservation units. Ecological parks, quite common in the Federal District, are not covered by any federal standard as conservation units.

confer maximum protection upon the environmental spaces to be created by public authorities. This fact is entirely coherent with the provision that everyone has the “right to an ecologically balanced environment, an asset for the common use of all and essential to the wholesome quality of life,” found in the *chapeau* of Article 225. In the words of Benjamin (2001:36), “*At no time does the Constitution refer to Conservation Units, but only to Specially Protected Territorial Spaces. This is not a random vernacular expression nor was it any accident that legislators in 1988 adopted the appropriate scientific standard on this point, according to which ‘conservation’ is not a genus, much less a genus of which ‘preservation’ might be a species.*”

- 27 The law that established the National System of Nature Conservation Units came later, as Law 9,985, in 2000. Also known by its acronym SNUC, the law lists 12 different management categories, divided into two groups: integral protection units, which allow for no direct use of natural resources, and sustainable use units, which allow for the rational use, within established limits, of environmental resources. The former include ecological stations, biological reserves, national parks, natural monuments and wildlife refuges. Sustainable use units cover environmental protection areas (APAs), areas of relevant ecological interest, national forests, extractive reserves, sustainable development reserves, fauna reserves and private natural heritage reserves.
- 28 Conservation units (UCs, in Portuguese), therefore, are simply those environmental areas expressly provided for by Law 9,985/2000, subject to a specific – more restricted and determined – legal framework (Benjamin, 2001; Silva, 2002). As exceptions to the rule, as provided by Article 6 of the law, and subject to criteria set by the CONAMA, the SNUC may also encompass “*State and municipal conservation units, designed to respond to regional or local peculiarities, whose management objectives do not fit into any of the categories provided by this Law and whose characteristics allow them to be clearly distinguished from the former.*”
- 29 We must also refer to the term “Protected Areas” (PAs), often used by writers on environmental law, in treaties and by international organizations, as a synonym for Specially Protected Territorial Spaces. The IUCN, for example, defines a protected area as an “*area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.*” Meanwhile, the Convention in Biological Diversity has a concept of PAs that is “*a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives*” (Art. 2).
- 30 The term “protected areas” adopted internationally has been used in a more restrictive sense in Brazil, as one type of specially protected territorial space (ETEP), referring only to conservation units, indigenous lands and *quilombola* territories. This happened because Brazil, as a party to the Convention on Biological Diversity (CBD), began to produce a series of documents in compliance with its international commitments such as the Protocol of Intentions to Implement the Program of Work on Protected Areas under the Convention on Biological Diversity (February 10, 2002) and the National Protected Areas Plan (PNAP), mandated by Decree nº 5,758/2006 (see separate section 3.1.3, herein, on Biodiversity). In both of those documents, protected areas refer basically to conservation units, indigenous lands and *quilombola* territories, a field of action that is smaller than that of Specially Protected Territorial Spaces (ETEPs). The National Protected Areas Plan does in some provisions mention other types of protected spaces recognized as “integral parts of the landscape” (for example the Permanent Preservation Areas and Legal Reserve areas required by the Forest Code), but it deals specifically only with those three categories – conservation units, indigenous lands and *quilombola* territories – with regards either to principles or to major themes. For that reason, we now prefer to use the expression “protected areas” for just one type of a specially protected territorial space, adopting the more restrictive connotation conferred upon the term by the PNAP.
- 31 Based on those considerations, we define a specially protected territorial space as any environmental space, established by a public authority, which has full or partial legal protection for its natural features. An ETEP therefore is broad category, including conservation units, protected areas and other areas with specific forms of protection. These latter spaces include environmental areas covered by a variety of legal instruments, such as botanical gardens, zoos, forest nurseries, Permanent Preservation Areas, Legal Reserve areas, buffer zones around conservation units, ecological corridors, biodiversity conservation corridors, generic corridors, biosphere reserves as well as indigenous land and *quilombola* territories which, though classified as protected areas by documents

produced by Brazil for the CBD, are actually specific protection spaces.⁷ The 1988 Federal Constitution guarantees special protection for all these areas, as substantiated in the need to approve a specific law in order to alter or eliminate them (Leuzinger, 2002; Leuzinger et al, 2008).

- 32 **Ecological corridors, biodiversity corridors and buffer zones.** Brazil's ecological corridors between conservation units were modeled, in the late 1970s, after Marcio Ayres' ideas about "green belts" that "would provide continuity between smaller units in biogeographic provinces set off by major rivers, so as to protect the genetic and ecological diversity of the native biota" (Nogueira Neto: 2005: 10). The new SNUC Law, in addition to creating 12 different management categories for conservation units, mentioned above, also enacted buffer zones and ecological corridors which, even when not part of any given conservation unit, are subject to compulsory zoning requirements, under which certain activities are either forbidden or severely restricted (Leuzinger, 2011).
- 33 Buffer zones are defined in the SNUC Law as "the surroundings of a conservation unit, where human activities are subject to specific rules and restrictions, in order to minimize negative impacts on the unit" (Art. 2-XVIII). The same law also defines Ecological Corridors as: "portions of natural or semi-natural ecosystems, linking conservation units, which allow genes to flow and the biota to move between them, facilitating the dispersion of species and the recolonization of degraded areas, as well as the maintenance of populations whose survival requires larger areas than that of individual units" (Art. 2º, XIX).
- 34 Buffer zones, by law, must be created around all conservation units except for environmental protection areas (APAs) and private natural heritage reserves (RPPNs), and their borders and land-use restrictions are set by the UC's management authority. Ecological corridors, on the other hand, are only to be created "when convenient" (Art. 25 of Law 9,985/2000). Although the SNUC Law recognizes the importance of connectivity between conservation units – in order to expand the area under protection and, more than just protect them, make the survival of certain species viable at all – it does not require the creation of corridors, as it does for buffer zones (Leuzinger, 2011).
- 35 In addition to the ecological corridors provided for by the SNUC Law, and included in each conservation unit's management plan, biodiversity conservation corridors (BCCs) are another breed of specific protection area. They take a broader approach than the ecological corridors and, although they are essential in containing the impacts of habitat fragmentation, they have no legal standing (Leuzinger, 2011).
- 36 While ecological corridors connect conservation units, BCCs are specific geographic areas set up "with the basic function of promoting the maintenance of natural ecological processes while, at the same time, keeping biodiversity conservation compatible with a region's social-economic development." They do not just link one UC to another, but are regional planning units aimed at consolidating a network of protected areas and at the regional management of a mosaic of multiple land uses (Machado et al, 2003).
- 37 The strategic purpose of BCCs, in other words, is environmental conservation on a regional scale. They encompass a cluster of protected areas separated by other areas with varying degrees of human settlement, over which the managers' conservation objectives cover both public and private areas (Ganem, 2007). Integrated management of larger areas helps preserve biological diversity, maintain ecological processes and develop local economies, based on the sustainable use of natural resources (Aliança para a Conservação da Mata Atlântica). Implementing biodiversity corridors is thus one of the main strategies to conserve biological diversity in hotspots⁸ and in major natural regions (Conservation International do Brasil). The scale of a BCC must be greater than ecological corridors, in order to guide the composition of landscapes within a patchwork of ecosystems (Brito, 2006).

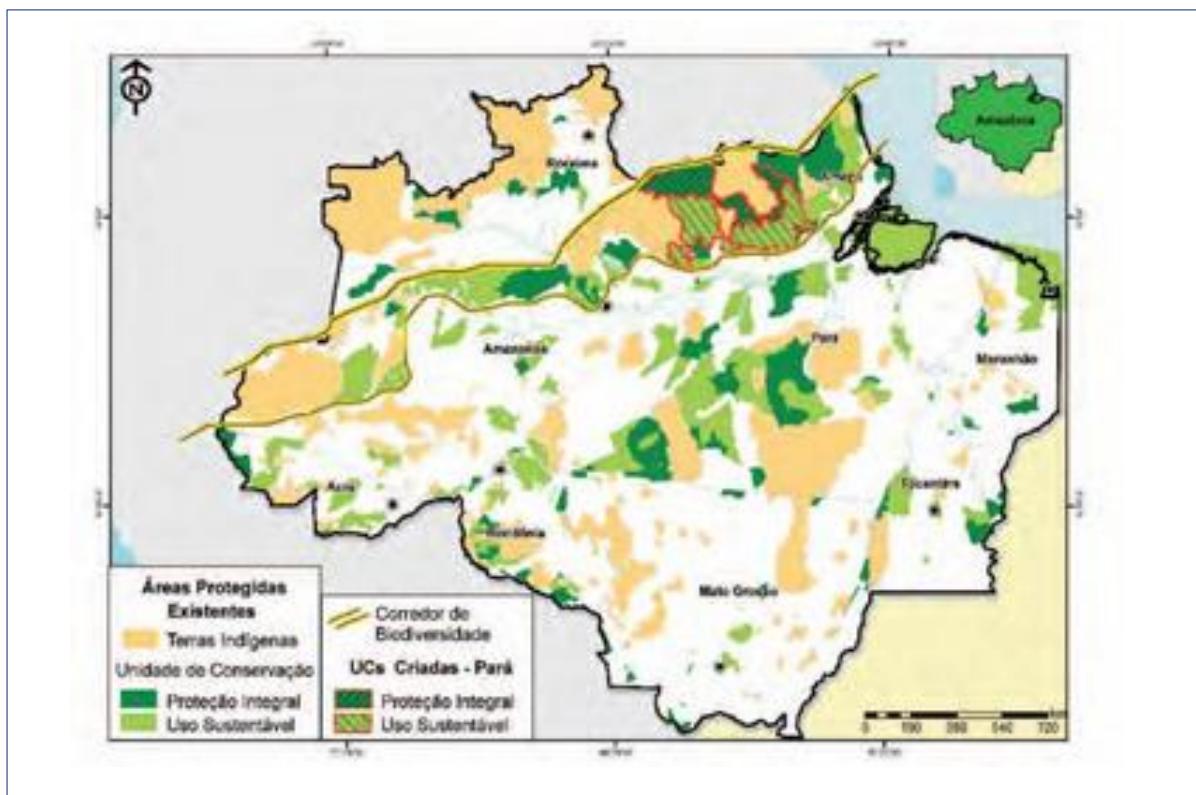
⁷ There is an overlap, therefore, between protected areas and other types of ETEPs – which include Conservation Units and Specific Protection Spaces – regarding the latter, in terms of indigenous lands and *quilombola* territories. These are simply examples of specific protection spaces, since any other area whose environmental features are totally or partially protected by law will also be classified as an ETEP and, accordingly, as a specific protection space, unless it is listed as a conservation unit. Barros (2000), in a lengthy study, attempted to list all existing environmental spaces.

⁸ "Hotspots" are biodiversity-rich areas that are also seriously threatened, making them priorities for conservation. The concept was developed by Norman Myers in the 1980s.

- 38 According to Ganem, in 2006 Brazil was setting up 20 biodiversity corridors: Amapá, Araguaia/Bananal, Santa Catarina Atlantic Coast, Caatinga Ecological Corridor, Amazon, Atlantic Forest, Cerrado/Pantanal, Southern or Central Amazon Ecotones, Espinhaço, Guaporé-Itenez/Mamoré, Jalapão, Northeast, Northern Amazon, Paraná/Pirineus, Paraná River, Serra da Capivara/Serra das Confusões Ecological Corridor, Serra do Mar, Southern Amazon and Uruçuí-Uma-Mirador. The actual implementation of biodiversity corridors began in Brazil in 1997, with the Amazon and Atlantic Forest Corridors, under the Pilot Program for the Protection of the Brazilian Tropical Forests (PPG-7) by the Ministry of the Environment, with support from the World Bank (IBAMA, 2007).
- 39 These corridors are somewhat similar to the mosaics provided by the SNUC Law setting up the National System of Conservation Units, whose purpose is the joint, integrated and participatory management of different categories of conservation units along with other public and/or private protected areas. The goal is to make the presence of biodiversity, the appreciation of social diversity and regional sustainable development all compatible with each other (Art. 26 of the SNUC Law) (Leuzinger, 2011).
- 40 Biosphere reserves, also part of the SNUC Law (Art. 41), are an internationally-recognized model for integrated, participatory and sustainable management in protected spaces and also share commonalities with the BCCs. The main objectives of biosphere reserves are: preservation of biodiversity, research, environmental monitoring, sustainable development and enhancement of local populations' quality of life. They are different from the BCCs, however, in that one of the BCCs' most important purposes is to assure the natural movement and dispersion dynamics of species by connecting protected areas. The mosaics provided by Brazil's conservation units and biosphere reserves, on the other hand, essentially work for the integrated management of environmental spaces (Leuzinger, 2011).⁹
- 41 In addition to the SNUC-based ecological corridors and to the biodiversity corridors, another kind of corridor was provided for by Law 11,842 (Dec. 22, 2006), on the use and protection of native vegetation in the Atlantic Forest biome. Previous to that law, the term "corridor between remnants" of Atlantic Forest, as used by Decree 750 (Feb. 10, 1993), was defined by CONAMA Resolution 9/1996. These corridors were defined as a "strip of plant cover in place between remnants of primary vegetation in medium to advanced stages of regeneration, capable of providing habitat or transit areas for fauna living in such remnants" (Art. 1). They were made up of (a) riparian vegetation along their entire length and marginal strips defined by law; and (b) strips of existing plant cover which make it possible to interconnect remnants, particularly to conservation areas and Permanent Preservation Areas. That Decree was revoked by Decree 6.660/2008.

⁹ Under the SNUC law, a grouping of conservation units of one or more categories, which are nearby, juxtaposed or overlaying each other, together with other public or private protected areas, makes up a mosaic. When a mosaic has been identified, that grouping must be managed in an integrated and participatory manner, considering their diverse conservation objectives, in order to make compatible the presence of biodiversity, the appreciation of socio-diversity and sustainable development in the regional context (Art. 26 of the SNUC Law).

Figure 3: Biodiversity Corridor: Central Amazon Corridor and Amapá Biodiversity Corridor



Existing Protected Areas

- Indigenous Lands
- Conservation Units
- Full Protection
- Sustainable Use

Biodiversity Corridor

UCs Created – Pará State

- Full Protection
- Sustainable Use

Source: Imazon

- 42 Today, Article 11 of the Atlantic Forest Law forbids the authorization of cutting or suppression of primary and secondary vegetation in advanced and medium stages of regeneration when the area whose vegetation is to be cut or suppressed is a corridor between fragmented remnants of the Atlantic Forest. In this case, the prohibition of cutting or suppression refers not only to ecological corridors between two or more conservation units, but also to any arrangement in which the vegetation is a corridor uniting fragments of primary or secondary (in an advanced or medium stage of regeneration) Atlantic Forest.
- 43 Although part of the Atlantic Forest Law, this latter provision may be used by authorities to create corridors in any other biome as well, thus turning an area into a specific protection space. In other words, corridors that link fragments of native vegetation in all biomes must be preserved, due to the ecological importance of their role, so long as Article 225-1-III of the 1988 Constitution is respected, that is, that they be formally established by the state. These generic corridors normally include Permanent Preservation Areas (APPs) and Legal Reserve areas (RLs), which are still recognized by the recently revised Forest Code, (Law 12.651/2012) and are also a specific category of ETEPs.
- 44 **Permanent preservation and Legal Reserve areas.** Permanent Preservation Areas (APPs) and Legal Reserve (RL) areas are specific protection areas that were first established by Law 4,771/1965. Following 12 years of debate in the National Congress, that law was revoked and replaced by a new Forest Code (Law 12,651, May 25, 2012). Following its publication and the issuance of a

complementary Provisional Measure, more discussions and further alterations ensued in Congress. In the end, on October 18, 2012, the final text of the new bill (PLV 21/2012, derived from MP 571/2012) was sent to the President of Brazil, who enacted it (albeit with nine specific vetoes) as Law 12,727 on October 17, 2012. The new Forest Code is thus a negotiated “patchwork” whose provisions have eased the obligation to restore preservation and Legal Reserve areas whose vegetation has been cut or removed, even when that suppression was illegal.

- 45 The new law regulates the protection of native vegetation and sets general rules grounded on the protection and sustainable use of forests and other forms of vegetation. It changed the definitions, objectives and possibilities for suppressing vegetation, as well as the obligation to restore those two kinds of environmental spaces (APPs and RLs). This is a setback for environmental protection in Brazil, because the changes allow the physical area covered by these two types of specific protection spaces to be reduced.
- 46 A permanent protection area (APP) is defined by Article 3 of the new Forest Code as: “*a protected area, whether or not covered by native vegetation, whose environmental function is to preserve water resources, landscapes, geological stability and biodiversity, to facilitate the gene flow of fauna and flora, protect the soil and assure the well-being of human populations.*”
- 47 An APP is made up of a strip of vegetation that may not be suppressed or used, located on urban or rural, public or private land: a) along rivers or any waterways, around springs, lakes, ponds or reservoirs; b) on slopes steeper than 45 degrees; c) on coastal sandbanks (fixing dunes or stabilizing vegetation) and mangroves; d) on the sides of tablelands or plateaus and the tops of hills, mountains and mountain ranges, with a minimum height of 100 m and an average slope greater than 25°; or e) in palm swamps and at altitudes above 1,800 meters. Besides the APPs specifically defined by law, the head of the Executive Branch may decide that certain locations will become APPs for the following reasons: protection of sandbanks, palm swamps or floodplains, shelter for specimens of fauna or flora threatened with extinction, protection of sites of exceptional beauty or scientific, cultural or historical value, as well as protection of wetlands, especially those of international importance (Art. 6, items II, III, IV, V and IX). These are called administrative APPs.
- 48 APPs along rivers or other waterways (riparian APPs) are the Permanent Preservation Areas that best perform the connection function, interlinking different types of protected spaces and plant-cover fragments. These protected spaces facilitate gene flow for fauna and flora and make possible the existence, evolution and development of living organisms. See Box 1 below for a legal elaboration of the ecological functions of APPs.
- 49 Riparian APPs must have the minimum width needed to perform their functions adequately. As Metzger (2010: 2) has said, “The importance of riparian forests has been proven in different Brazilian biomes and for different taxonomic groups. (...) There is no doubt that, whatever the biome or taxonomic group at issue, all landscapes must maintain riparian corridors, due to their benefits for the conservation of species.” Riparian APPs are thus natural corridors par excellence.
- 50 Under the 1965 Forest Code (revoked by Law 12,651/2012), the exact width of those APPs was proportional to the width of the river and – where there had been illegal cutting or suppression of vegetation – it would have to be entirely restored, with no allowance for any direct use of natural resources located inside the area, unless expressly authorized by the environmental authority.
- 51 Under the new Forest Code (Law 12,651/12), however, there has been a significant easing of the legal regime for these areas, starting with how the width of riparian APPs is to be calculated. In the past, it was done during high-water season, but now it will be a function of the normal size of the riverbed. For rivers that normally flood, this will mean an unjustifiable reduction in the APP. Moreover, the obligation to replant riparian APPs was also eased through the new notion of consolidated rural area, defined in Art. 3-IV of the new law as “the area of a rural estate with anthropic occupation prior to July 22, 2008, with buildings, improvements or agroforestry activities, including – in this latter category – land left to fallow.” For consolidated rural areas, the width of the APP to be restored due to prior illegal clearing will now be calculated based on the size of the entire rural estate and, in some cases, may be as little as five (5) meters. That is not enough, in many cases, to fit even the roots or canopies of trees. In other words, the rural landowner who cut or suppressed vegetation in an APP

without authorization, prior to July 22, 2008 – in an act qualified as an environmental crime – not only will not be punished but will only have to restore an area much smaller than what the law had required him to maintain.

Box 1: APPs and essential ecological processes

Brazil's Higher Court of Justice (STJ) ruled in 2008 (published in 2009) on a special appeal filed by the Federal Prosecutor's Office in a class-action suit, which accused the Joinville city government (in southern Brazil) of having violated environmental law by suppressing vegetation without preserving the strip along a stream on its property, as required by 1965 Forest Code (riparian permanent preservation area). The illegality of the clearing left null and void the licenses that had been granted, and the affected area's environment would have to be recovered and restored.

The rapporteur of that case, Justice Herman Benjamin, asserted that “(...) *the legal regime of riparian Permanent Preservation Areas is universal, in the dual sense that it applies to all waterways in the entire country – whatever their flow or hydrological features – and to all riversides still covered by ciliary, riparian, gallery or floodplain vegetation as well as those already cleared and which, for that very reason, need to be restored. 4. It is not in the judge's power to ease the legal requirement to respect the preservation of a Ciliary Forest, arguing that it is merely a “brooklet,” since such a line of reasoning might ultimately lead one also to forego responsibility for springs (mere bubbly marshes). Even more than on major rivers, it is precisely the Ciliary Forests along these smaller waterways that play a vital role in thermal stabilization, so important to aquatic life, by intercepting and absorbing solar radiation. (...)*”

Justice Benjamin then went on to say, “*The Federal Constitution safeguards essential ecological processes, including ciliary Permanent Preservation Areas. They are essential because of their ecological functions, particularly to conserve soil and water, including (a) protection of water supply and quality, both by facilitating its infiltration and storage in the water table and by safeguarding the physical-chemical integrity of water bodies from mouth to headwaters, as a cover and a filter, above all by blocking erosion and silting, as well as contaminants and waste; and (b) the maintenance of habitats for fauna and the formation of biological corridors, whose value grows with the fragmentation of territory caused by human settlements. 6. It would be of little use to care only for the most voluminous waterways and their headwaters, leaving out – between them – all protection precisely for smaller and slower courses. No river lives without its springs and multifaceted tributaries, even the smallest and most tenuous of them, whose narrowness does not make them any less essential for maintaining the integrity of the whole. 7. The municipal government, in disregard for the law and for the conditions of the license, cut down the Ciliary Forest. 8. The illegality of the deforestation caused by the Prefecture of Joinville is patent.*” (STJ, Resp 199800405950, Resp – Recurso especial 176753).

In that ruling, both the Constitution and Federal legislation provide grounds for protecting Ciliary Forests, and weight is given to their essential ecological functions, most notably in the creation of ecological corridors which help implement and maintain connectivity.

- 52 The Legal Reserve (RL) is the “area located inside a rural property or possession, delimited as provided by Art. 12, whose function is to assure economic use in a sustainable fashion of natural resources on the rural estate, to aid in the conservation and the rehabilitation of ecological processes and to promote the conservation of biodiversity along with shelter and protection for wild fauna and the native flora.” The Legal Reserve, therefore, must maintain minimum percentages of native plant cover, as detailed in Article 12 of the new Forest Code: (a) for estates located in the Legal Amazon region¹⁰, 80% (eighty percent) in forest areas, 35% (thirty five percent) in Amazonian savannah areas and 20% (twenty percent) in grasslands (campos gerais) areas; (b) for estates located in other regions of the country, 20% (twenty percent) of the area must be kept as native plant cover.
- 53 Art. 14 of the new Forest Code provides that the location of the Legal Reserve must take into account studies and criteria on – among other variables – the formation of ecological corridors linking it to another Legal Reserve, to a Permanent Preservation Area, to a Conservation Unit or to some other legally protected area. In this regard, the term “ecological corridors” as used in Law 12,651/2012 is broader than in Law 9,985/2000, the latter referring only to connections between conservation units. The new law provides for the formation of generic corridors, as does the Atlantic Forest Law, with the

¹⁰ The “Legal Amazon” region encompasses the territory of the States of Acre, Pará, Amazonas, Roraima, Rondônia, Amapá and Mato Grosso, plus the area located north of parallel 13° S, in the States of Tocantins and Goiás, and to the west of meridian 44° W, in the State of Maranhão.

purpose of linking different protected spaces or even areas with fragments of vegetation that are not (or not yet) official protection spaces.

- 54 The new Forest Code has also significantly eased legal requirements for Legal Reserve areas, allowing the surface area of APPs, for example, to be counted as part of the RL percentage, a practice that was entirely forbidden under the previous law. The new law has granted the owners or possessors of rural estates who, on July 22, 2008, had smaller Legal Reserves than required by Article 12, up to 20 years to restore them (Art. 66). When replanting the reserve area, the law now allows them to plant up to 50% of the area with exotic species. It also allows them to regularize their situation by regeneration through natural grow-back and by means of compensation on another estate. This off-estate compensation must be done on areas the same size as the area to be compensated, located in the same biome and – when located in another State – located in a designated priority area for conservation by the federal or State government.
- 55 Priority areas for conservation were designated by the Ministry of the Environment, through its Project for Sustainable Conservation and Use of Brazil's Biological Diversity (PROBIO). This action was based on broad consultations. The first Map of Protected Areas identified 900 areas, which were recognized by Decree 5,092/2004 and implemented by Portaria (Ministerial Order) 126/2004 (Ministry of the Environment MMA), with the requirement that the list be periodically reviewed by the National Biodiversity Commission (CONABIO). The updating of priority conservation areas, for all biomes, began in 2006, along with work to implement the findings. A new map was recognized by the MMA, through Portaria (Ministerial Order) 9/2007. While the designation of priority areas has been done by the federal government, there is nothing to keep States, within their respective territories, from also designating priority conservation areas and creating mechanisms to effectively implement their protection. In any case, off-estate compensation of one's Legal Reserve raises countless difficulties, including the weakness of any enforcement system, especially when the compensation is done out-of-state.
- 56 By providing a legal basis for corridors, APPs and Legal Reserve areas can collaborate both in the formation of SNUC-grounded ecological corridors and in connecting other types of protected spaces and native vegetation fragments. With such action, they can become part of what we have called generic corridors, which are extremely important for the expansion of Brazil's total area protected.

3.1.3 Biodiversity

- 57 Initially, to implement its commitments under the CBD, the Brazilian government created the National Program on Biological Diversity (PRONABIO), through Decree 1,354/1994, to coordinate among federal government institutions and organizations. Specific funding mechanisms and biodiversity conservation initiatives were launched, often with international support, giving rise to the Project for Sustainable Conservation and Use of Brazil's Biological Diversity (PROBIO) and to the Brazilian Biodiversity Fund (FUNBIO).
- 58 Nonetheless, it took Brazil ten years after the signing of the CBD to publish its National Biodiversity Policy, through Decree 4,339/2002, which finally established a framework for biodiversity management. As the result of a two-year process of consultations and discussions, the methodology used to structure the biodiversity policy "sought to break with the tradition of top-down policy making" (Medeiros, 2006:5). The policy is structured upon seven components representing the CBD's core themes and pays close attention to the need to plan, promote, implement and consolidate ecological corridors in order to integrate protected environmental spaces (specific objective 11.1.3).
- 59 In 2006, the National Biodiversity Plan (Plan-Bio) published guidelines and priorities for a Plan of Action to implement the National Biodiversity Policy. Brazil then committed itself to protecting at least 10% of each biome, and 30% of the Amazon biome. The National Protected Areas Strategic Plan (PNAP) was then created by Decree 5,758/2006, including among its general objectives the integration of conservation units with broader landscapes and seascapes, in order to maintain their structure and their ecological and social-cultural functions (general objective 3.3). This objective required, on the one hand, the adoption of policy, legal, administrative and other measures to enhance the integration of conservation units with broader landscapes and with continental and deep-

water seascapes. On the other hand, this meant guaranteeing the establishment and maintenance of connectivity amongst ecosystems.

- 60 The National Biodiversity Commission (Conabio), in December 2006, approved biodiversity goals for 2010, in line with the Global Goals approved by the CBD (Conabio Resolution 3/2006). Although not all of those goals were met, there was significant progress, including an expansion in the area of conservation units (Weigand Jr., 2011), which no doubt helps to conserve biodiversity and to implement connectivity. Conabio's Resolution 4/2007, on the ecosystems considered most vulnerable to climate change, included among appropriate responses for the adaptation of Brazil's biodiversity in its most vulnerable ecosystems the creation and implementation of ecological corridors and of mosaics of protected areas. Amongst the ecosystems considered to be particularly vulnerable to climate change, for example, are those located in the Cerrado, the Amazon, the Caatinga and the Atlantic Forest, particularly the mangroves and the sandbanks, in addition to ecosystems in aquifer recharge areas and at the headwaters of rivers.

3.2 Sustainable Use Legislation

- 61 Brazil has even more laws and regulations, in addition to those we have discussed for the conservation of biodiversity, forests and conservation units, which also provide a foundation to help promote connectivity. They deal with fauna, water resources, forest management and the sustainable development of aquiculture and fisheries, and contain provisions that can help connectivity, through their principles, guidelines and objectives and also through policy instruments.
- 62 Some of the mechanisms provided by those regulations include, for example: (a) the protection of habitats by creating protected environmental spaces¹¹ on publicly or privately owned or held land; (b) lists of animal species threatened with extinction, produced by IBAMA (Brazil's environmental federal protection agency), which help guide proposals for new conservation units and for measures to mitigate environmental impacts; (c) water use grants regulated by Law 9,433/1997, which established the National Water Resource Policy (PNRH); (d) the National Water Use Plan, which stipulates the adoption of a systemic approach to assure both quantity and quality of Brazil's water and proposes the adoption of the concepts of aquatic eco-regions and environmental flows; (e) integration mechanisms between the conservation of biodiversity and of sociodiversity, such as community and family-based forest management; (f) fishing licenses that are granted with the requirement to protect ecosystems and maintain ecological balance, using the principles of preserving biodiversity and making sustainable use of natural resources, as provided by Law 11,959/2009, which created the National Policy for the Sustainable Development of Aquiculture and Fisheries.
- 63 Those laws and regulations have great potential for promoting the implementation and maintenance of connectivity.

3.3 Land Use/Spatial Planning Legislation

- 64 Planning can be defined as “*a technical process instrumentalized to transform the present reality towards previously established objectives*” (Silva, 2000: 85), and expressed through a plan. One of the components of Master Plans, as basic tools for development policies and urban expansion, is urban zoning. Although zoning is a tool developed for planning cities, in the 1970s it was taken on by conservation unit planners and came to be known as environmental zoning. Later, on a smaller scale, States and municipalities also introduced ecological-economic zoning into their planning processes. These were the circumstances that gave rise to the notion of a social function of property, which also refers to the social-environmental function of both public and private property and conditions the very exercise of property rights (separately from any other legal constraints on its use). Planning, zoning and the social function of property can all help connectivity.

¹¹ In addition to ecological stations, biological reserves and national parks – enabled under the SNUC Law as full-protection units – it is also possible to set up wildlife refuges for the preservation of migratory species or resident communities.

3.3.1. Master plans, urban areas and rural areas

- 65 With the 1988 Constitution, master plans became the basic tool for local governments' development and urban expansion policies. It is compulsory for municipalities with more than 20,000 inhabitants and must be approved by the City Council. The 2001 Law of the Cities (Law 10,257/2001) requires master plans to cover the municipality's entire territory, both urban and rural (Art. 40, paragraph 2). Urban planning becomes more necessary with the denser occupation of urban areas.
- 66 The plans produced in the 1960s and 1970s and, particularly, those published in the following two decades, according to Schasberg (2006), were excessively normative and conservative, conceptualizing a city idealized by technicians, without including the territory and its players as a complex social space involving conflicts, contradictions and alliances. When put into practice, moreover, they helped intensify an urban development model rooted in exclusion and segregation, which has made cities increasingly precarious for the poor majority (Schasberb, B., 2006; Leuzinger et al, 2010).
- 67 According to Brazil's Institute of Geography and Statistics (IBGE), 1,622 municipalities (29.16% of the country's total) had more than 20,000 inhabitants in 2008 and therefore were obliged to draw up a master plan. Many of these municipalities, however, have not yet complied. The following table, based on the constitutional cut-off of 20,000 inhabitants (also found in Art. 41-I of the Law of the Cities), shows us the 2005 and the 2008 compliance rates (IBGE, 2009).

Table 1: Municipalities obliged to have a Master Plan and municipalities with over 20,000 inhabitants that had not adopted a Master Plan – 2005 and 2008

Year	Municipalities		
	> 20,000 inhabitants	With Master Plan adopted	With no Master Plan
2005	1.594	526	1.068
2008	1.622	1.303	319

Source: IBGE (Brazil's Geography and Statistics Institute), 2009.

- 68 According to the IBGE (2009, p. 38), of the "total of Brazilian municipalities, i.e., including those that are not obliged to have a Master Plan, 1,878 stated that they have such a Plan, 372 are reviewing theirs and 1,263 municipalities are drafting one." In terms of geographic distribution, the South (43.6%) and North (40.8%) have the largest number of municipalities with master plans and also had the largest growth rate of municipalities with master plans (30.3%) from 2005-2008 (Leuzinger et al, 2010). While still short of 100% compliance with the constitutional requirement for master plans, year by year a larger share of cities adopts this tool.

3.3.2. Ecological-Economic Zoning

- 69 Under Brazilian law, zoning is an urban planning procedure whose purpose is to regulate the use of land ownership and of natural resources in the collective interest. It is applied to specific sectors in order to give guidelines for public policies, particularly agrarian and industrial policies. While it still maintains its functional features of designating possible uses for urban and rural land (urban and agroecological zoning), zoning has evolved and today is used more broadly as a tool for organizing

the country's territory in the direction of integrated environmental management over available resources, to achieve sustainable development (Silva, 2007b).

- 70 Since 1981, environmental zoning has been a National Environmental Policy tool (Art. 9-II, Law 6,938/1981), as detailed in the current enabling Decree 4,297/2002. This Decree defines ecological-economic zoning (EEZ) as: “*a tool for territorial organization, which must necessarily be followed during the execution of public and private plans, works and activities, which stipulates environmental-protection measures and standards designed to ensure the quality of the environment and of water and soil resources and the conservation of biodiversity, in order to guarantee sustainable development and enhance the population’s living conditions.*” In 1990, the Ecological-Economic Zoning Program was launched, but only for the Legal Amazon. In 1992, it was given nation-wide coverage. In 2002, that Decree published criteria for EEZ and the participation of State governments in the EEZ process for the Legal Amazon region. The Decree also allows the federal government to recognize state, regional and local EEZs, so long as they comply with certain requirements: (a) ratified by the State EEZ Commission; (b) approved by the respective state legislative assembly; and (c) for regional or local EEZs, compatible with the State EEZ (Silva, 2007b).
- 71 Ecological-economic zoning has updated environmental zoning, to expand its reach and comply with the new Constitution (Articles 3-II, 3-III and 3-IV; 21-IX; 174, paragraph 1; and 225 of the 1988 Federal Constitution). It now requires more than just setting criteria to qualify zones as special protection areas or having ecological criteria considered in zoning methodologies. When environmental zoning becomes ecological-economic zoning, its general objective is to organize and interlink the decisions made by public and private agents regarding plans, programs, projects and activities that make direct or indirect use of natural resources, ensuring the full maintenance of an ecosystem's environmental assets and services (Silva, 2007b). This involves dividing territory into zones based on the need to protect, conserve and restore natural resources and sustainable development and therefore it has the potential for aiding in the implementation and maintenance of connectivity.
- 72 The new Forest Code provides that land holdings in the Legal Amazon may reduce their Legal Reserve from 80% to 50% of the area when the State has approved its EEZ and over 65% of its territory is occupied by duly regularized, publicly-owned nature conservation units and fully-registered indigenous lands. In addition, if the State EEZ so provides, federal authorities may either reduce or expand the Legal Reserve areas. In the former case, it is possible to reduce from 80% to 50% the area of the Legal Reserve located in forest areas of the Legal Amazon region, in order to regularize rural land holdings through the restoration, regeneration or compensation of the Legal Reserve on estates with a consolidated rural area. That reduction excludes priority areas for biodiversity and water-resource conservation, as well as ecological corridors. In the latter case, a Legal Reserve may be expanded by up to 50% of the percentages set by the law in order to achieve national biodiversity protection goals or to reduce greenhouse gas emissions. The new Forest Code also provides that States lacking an EEZ drawn up under the unified methodology, established as a federal standard, will have five years, following the publication of the new law, to draft and approve one.

3.3.3. Private property and the concept of the socio-environmental function of property

- 73 The right to property was enshrined as a fundamental right by the 1988 Constitution, which also established the need for property to fulfill its social function. This means that rural or urban property must be used to promote the welfare of all in society. For rural property, the Constitution stipulates that its social function is fulfilled when it meets the following conditions: (a) rational and appropriate use, (b) proper use of available natural resources and preservation of the environment, (c) compliance with legislation governing labor relations, and (d) exploitation that favors the well-being of owners and workers (Art. 186). Urban property, to fulfill its social function as provided by the Constitution, must comply with basic urban-planning requirements expressed in the city's master plan (Art. 182).
- 74 Failure to comply with the landowner's obligation to preserve the environment – an obligation that legal doctrine has termed the socio-environmental function of property or the environmental aspect of the social function of property (Figueiredo, 2008) – will cause the loss of a full guarantee of rights over

that property and subject the proprietor to various possible sanctions, including expropriation with payment in Agrarian Debt Bonds (TDAs), redeemable after 20 years. For urban real estate, although the Constitution is not so clear regarding compliance with the socio-environmental function, this condition is also present. Article 225 of the 1988 Constitution stipulates that it is a collective obligation of society as a whole to protect and preserve the environment, for present and future generations, and that the Union and the Member States have original powers to legislate on the environment. Master Plans, therefore, as municipal laws, must necessarily comply with federal and state environmental rules, and they may only establish local environmental norms on a more restrictive basis. Furthermore, all higher-level environmental regulations of urban real estate must be respected. There is thus no way to ignore their socio-environmental function (Leuzinger, 2002).

- 75 In step with the Federal Constitution, the 2002 Civil Code provides that the exercise of property rights is dependent upon their social and economic objectives "*to ensure the preservation, in accordance with specific legal provisions, of the flora, fauna, natural beauty, ecological balance and historical and artistic heritage, and the prevention of air and water pollution*" (Art. 1,228, paragraph 1). Thus, there are ecological functions of property that must be safeguarded, that is, essential ecological processes that allow property to fulfill its social function. The legal provisions on APPs and RLs (whose boundaries are set forth, in general terms, respectively in Articles 4 and 12 of the new Forest Code), oblige all landowners and holders to preserve vegetation in these areas. This obligation amounts to internal limits on property rights. There is no need to talk about compensation in this context. However, in the case of administrative Permanent Preservation Areas established by an act of the Chief Executive, in accordance with Article 6 of the new Forest Code, which imposes restrictions on a specific estate, there is a possibility that the landowner or holder may be compensated.
- 76 Regarding conservation units, as provided by the SNUC Law, there are certain categories in the public domain: ecological stations, biological reserves, national parks, national forests, extractive reserves, sustainable development reserves and fauna reserves. When private land is located inside the borders of such conservation units, at the time of their creation, it must be expropriated, an act that requires a just and prior compensation in cash. However, despite constitutional provisions in this regard, this compensation is not always paid in advance, since part of these conservation units must first go through a process of tenure regularization.
- 77 Other management categories of conservation units, with the exception of Private Natural Heritage Reserves of (RPPNs), may contain areas of both public and private domain and, when they do, are subject to legally-established environmental restrictions. There is the possibility of compensation if such restrictions are specific and affect possibilities for economic exploitation, exclusive rights over or use to be made of the area.
- 78 RPPNs, it should be noted, can only be established on private land at the request of the owner, and must be registered in perpetuity as having the sole purpose of conserving biological diversity. They are not eligible for compensation.
- 79 In buffer zones and ecological corridors (Leuzinger, 2011), the existence of environmental constraints on the property rights of people located inside these environmental spaces does not make them eligible for compensation so long as the impact of such constraints is truly general in nature and does not substantially reduce the possibility of economic use of the area, exclusive rights and free disposal of the owner's assets (Benjamin, 1993, p. 73). These constraints are characterized as internal limits on property rights arising from the necessary care, by proprietors, for the constitutionally provided socio-environmental function. That is, compensation is not required because the dominion over the affected estate has not changed and it continues to allow for legitimate economic uses. The only difference, as is the case in all environmental planning and zoning areas, is the existence of general constraints, which affect all owners who find themselves in the same situation (Benjamin, 2001).

3.4 Development Control Legislation

- 80 Other development-control policy instruments that may help implement connectivity include environmental licensing, environmental impact studies and environmental compensation.

- 81 Environmental licensing, an instrument of the National Environmental Policy (PNMA), is “the administrative procedure for licensing activities or projects that use environmental resources and that effectively or potentially pollute or are able, in any form, to cause environmental degradation” (Art. 2-I, Complementary Law 140/2011, as well as definitions of licensing in the PNMA Law, Art. 10 and CONAMA Resolution 237/97, Art. 1-I). Thus, the placement, installation, expansion and operation of such activities or projects require an environmental license. Each member of the federation has the power to approve the management and suppression of vegetation, forests and succeeding formations or generations in their respective forests and conservation units, as well as in projects licensed by them. The Union must also approve such activities for the management and suppression of vegetation on federal “devolute” lands, and the states, on rural estates. The exploitation of native forests and succeeding formations must be licensed and receive prior approval of the sustainable forestry management plan, with the exception of the gathering of non-timber forest products and occasional, non-commercial sustainable forestry management. Environmental licensing for sustainable forest management plans on small farms or rural family settlements, including traditional communities and populations, is carried out through a simplified licensing process.
- 82 There are interesting rulings by Brazil's higher courts on environmental licensing. These include imposing the suspension of activities harmful to the environment, the full restoration of damage to APPs – perpetrated without prior environmental licensing by a proper authority – the demolition of buildings, and an explicit court order to refrain from any further anthropic activity lacking a prior environmental license (TRF-1 AC 2004.38.003142-1 / MG; Civil Appeal – Rapp. Fed. Appeals Judge Souza Prudente, 26/09/2012).
- 83 Some of the activities subject to environmental licensing procedures will necessarily require a prior environmental impact study, when there is a risk of major impacts on the environment. Prior environmental impact studies are one kind of environmental impact assessment, a tool created by the PNMA, and enshrined in the 1988 Constitution. An environmental impact study seeks to ensure an analysis of the execution of works and activities when there may be significant degradation. It raises questions about whether such works or activities are really needed in the face of positive and negative impacts, as well as the risks arising from their implementation. Brazil's higher courts have ruled in favor of the need to perform prior environmental impact studies, and some of their rulings relate to the obligation to complete these studies before any license can be granted, even suspending other procedures until environmental impact studies are performed (STJ, Resp 200902083147, Resp - Special Feature 1163939. Rapp. Justice Mauro Marques Campbell, 08/Feb/2011).
- 84 Environmental compensation is allowed by the SNUC law, as part of environmental licensing for projects which environmental authorities have deemed to represent significant environmental impacts, based on prior environmental impact studies and environmental impact reports (EIS/EIR). In such cases, the entrepreneur is required to support the creation and maintenance of full-protection conservation units (ecological stations, biological reserves, national parks, natural monuments or wildlife refuges). The competent environmental agency shall then establish the degree of impact caused by the project, based on specific technical evidence, and designate which protected areas will be benefited. In addition, if the project affects a specific conservation unit and its buffer zone, the license can only be granted with the authorization of the agency responsible for that unit and, even if the conservation unit affected is not in the full-protection category, it should be one of the beneficiaries of this environmental compensation. Moreover, proprietors located in buffer zones of full-protection conservation units are eligible to receive technical and financial support through environmental compensation in order to restore and maintain priority areas for management of that unit (Art. 41, paragraph 6 of the Forest Code).

3.5 Voluntary Contractual Arrangements

- 85 Environmental easements and forest easements were written into Brazilian law, respectively, by Provisional Measure 2,166-67/2001 (which amended the 1965 Forest Code) and by Law 11,284/2006 (on the concession of public forests). These are tools for proprietors to limit their own use of the land, in favor of environmental preservation and conservation, and qualify them for tax incentives and easier access to funds to invest in these areas.

- 86 The new Forest Code put those two easements on the same footing when it allowed proprietors or holders to limit use on either part or the whole of their estates in order to preserve, conserve or restore existing environmental resources. This environmental easement may be applied to areas for environmental preservation, conservation or restoration, and will be subjected to the same limitations on use or exploitation as a legal reserve area. Not eligible for this easement designation are Permanent Preservation Areas and Legal Reserve areas required by law (Art. 9-A, paragraph 2 of Law 6,938/1981).
- 87 An environmental easement is granted through either a public or a private document, or it may be registered before an environmental agency. It has a minimum term of 15 years, and may be perpetual. In this latter case, for credit or tax purposes or to qualify the owner for access to public funds, it is equivalent to the conservation unit management category known as a "Private Natural Heritage Reserve" (RPPN). So long as the easement is in effect, it is forbidden to change the use of the area when the estate is transferred for any reason, or subdivided or has its boundaries rectified or ascertained. The holder of the environmental easement may alienate, assign or transfer it, totally or partially, for a specified period, or permanently, to another owner or to a public or private entity whose social purpose is environmental conservation (Art. 9-B, paragraph 3 of Law 6,938/1981).
- 88 The legal duties of the proprietor of a servient or subordinate estate, in addition to any contractual obligations, include the following: (a) maintain the area under environmental easement, which involves duties to conserve biodiversity and connectivity; (b) report to the holder of the environmental easement regarding the conditions of natural or artificial resources; and (c) allow inspection and control visits by the holder of the environmental easement (Art. 9-C, paragraph 2 of Law 6,938/1981). The holder of the easement, meanwhile, also has the following duties, in addition to any contractual obligations: (a) document the environmental features of the estate; (b) periodically monitor the estate to verify that the environmental easement is being maintained; (c) provide the necessary information to any parties interested in the purchase of or to the successors of the estate; (d) store up-to-date reports and files with the activities in the easement area; and (e) defend the environmental easement in court (Art. 9-C, paragraph 3 of Law 6,938/1981).
- 89 The recourse to an environmental easement may be used, in economic terms, for the off-estate compensation of a Legal Reserve. In this case, it must be recorded on the title of all estates involved. In addition, areas subject to environmental easement may be included in the environmental reserve quota, which is a concept relating to an area with native vegetation or where the native vegetation is being restored (see further discussion below in item 3.6 on environmental reserve quotas and the carbon market).
- 90 Although involving contractual issues in an urban context – 'Loteamento City Lapa' – it is relevant here to highlight a ruling by the Higher Court of Justice (STJ) on the matter of conventional versus legal restrictions. In this case, the original contractors obtained the approval of authorities (through prior urban-environmental licensing, recorded in the deed registry office) to set contractual urban-environmental restrictions which are inseparable from and conveyed along with the property. As Justice Herman Benjamin stated in his decision (STJ, Recurso Especial nº 302.906 - SP 2001/0014094-7, 26/Oct/2010), the urban-environmental restrictions signify a simultaneous public and private interest and "*incorporate a proper rem nature, in their relationship with the property and in their impacts on non-contractors, a true stipulation in favor of third parties (speaking both individually and collectively), without the succeeding owners and the original real estate entrepreneur losing their power or the legitimacy to command respect for them.*" Later legislative alterations that ease the urban-environmental restrictions are allowed, so long as they are exceptions and are grounded in and supported by the public interest. The exercise of that power, which is the responsibility of public authorities, Justice Benjamin continues, is subject to the principle of standstill in environmental law (known as "non-regression" principle), which means "*the assurance that urban-environmental progress made in the past will not be diluted, destroyed or denied by the current or following generations.*"

3.6 Incentive-based Mechanisms

- 91 Economic incentives to conserve biodiversity and implement connectivity are used to carry out the protector-receiver principle, which speaks to the need to compensate those who protect the environment. The new Forest Code (Law 12,651/2012) created economic and financial tools to achieve sustainable development through biodiversity conservation. They may also help ensure connectivity.
- 92 Under the Forest Law, programs providing support and incentives for environmental conservation may work through three modalities: (a) payment or incentives for environmental services as monetary or non-monetary retribution for activities to conserve and enhance ecosystems and which generate isolated or cumulative environmental services, such as biodiversity conservation and the maintenance of APPs, Legal Reserves and restricted-use areas; (b) compensation for environmental conservation measures required to comply with standards for the protection of native vegetation – for example, credit lines to cover initiatives for the voluntary preservation of native vegetation; (c) incentives for the marketing, innovation and sustainable use of forests and other forms of vegetation.
- 93 It provides that the priority in payment or incentives for environmental services should be to family farmers, traditional populations, indigenous peoples and *quilombo* remnants (Art. 41, paragraph 7). The new Forest Code states that the objective of the environmental services program is to create a market for environmental services, to make activities such as the maintenance of APPs, Legal Reserves and restricted-use areas eligible for any payments or incentives for environmental services and represent additionalities for the purpose of national and international markets of certified reductions of greenhouse gas emissions (Art. 41, paragraphs 4 and 5). In order to issue an Environmental Reserve Quota (CRA) – a nominal bond representing an area with native vegetation or in a restoration process (Art. 44) – the owner must present documents including an ID card (for physical persons) or the formal designation of the person responsible (for legal persons). While traditional populations, indigenous peoples and *quilombola* communities have fought to be recognized as collective players, the “traditional” representation of a legal person is not always fitting for such populations, peoples and communities. The issue of representation leads us to wonder whether the priority set in the letter of the law will actually be used.

4 A Critical Reflection

- 94 Although the best strategy for conserving biodiversity *in situ* is to create specially protected territories encompassing not only conservation units but also any other publicly-designated area that confers full or partial legal protection to its natural components (Leuzinger, 2009), islands of preservation do not ensure positive outcomes. Just like with ocean islands, the isolation of protected areas ends up reducing the size of local populations and interrupting the gene flow of flora and fauna, and makes the long-term preservation of many species unsustainable (Ganem, 2007). This happens because, as Bensusan (2006. p. 62) has put it, less genetic variability leads to a reduction in a species' plasticity and makes it harder to adapt to climate changes. She explains that fragments “are more susceptible to the demographic and genetic risks associated with the small size of a population, such as the edge effect of habitats, and with the dangers faced by organisms as they move between the fragments.” In other words, simply setting aside environmental spaces does not mean that biodiversity will be preserved, because conservation islands in the middle of a sea of devastation generally lead to the extinction of species that require larger areas for their reproduction.
- 95 This study reveals that Brazilian law has many tools that can promote the implementation and maintenance of connectivity, one of which is to create and maintain Specially Protected Territorial Spaces. These spaces may encompass ecological corridors, biodiversity conservation corridors (BCCs) and buffer zones around conservation units. The first two, ecological and biodiversity corridors, seek to contain the negative impacts of habitat fragmentation by conserving connectivity among protected spaces, thus increasing their effective area and, as a result, making more species

viable. Buffer zones, meanwhile, seek to contain the edge effects of conservation units by restricting the anthropic activities allowed inside them.

- 96 There are problems, however, in the SNUC Law's enabling Decree 4,340/2002, particularly regarding ecological corridors. Article 11 stipulates that the corridors must be recognized by an act of the Ministry of the Environment and become part of mosaics, for management purposes. That Article's single paragraph provides that, in the absence of a mosaic, the ecological corridor will be treated like a conservation unit's buffer zone. The first impropriety we can identify in this Article is that Article 25 of the SNUC Law determines that the borders and norms for ecological corridors may be defined in the act that creates the conservation unit or afterwards, and does not mention the need for recognition by the Ministry of the Environment. This is so because, if the corridor is created in the same act that creates the UC (generally a Decree issued by the head of the Executive Branch), there is no reason for a separate ministerial act of recognition
- 97 Another problem is that, since there will not always be a mosaic (patchwork of conservation units and other protected areas) the enabling Decree's provision that corridors be treated like buffer zones is inappropriate, since the two have different purposes and therefore must be treated differently.
- 98 As for the Forest Code's new treatment of Specially Protected Territorial Spaces, the narrowing of APPs due to changes in how their width is calculated contradicts recent science. As Metzger (2010: 2) has put it, recent scientific knowledge "*allows us not only to defend the values used by the 1965 Code for the width of Permanent Preservation Areas, but actually reveals the need to increase those values to minimum thresholds of at least 100 m (50 m on each side of the river), whatever the biome, taxonomic group, soil type or topography.*"
- 99 We can conclude that the legal requirements for corridors allow both APPs and Legal Reserves to contribute to the formation of ecological corridors under the SNUC Law, while also helping connect other kinds of protected areas and fragments of native vegetation, coming together into so-called generic corridors, which are extremely important to increase Brazil's total protected area. Moreover, in a broader outlook, the creation of major biodiversity conservation corridors will allow for the protection of natural environments on a regional scale based on strategies to conserve biological diversity both in hotspots and in large natural regions. The connectivity approach cannot be divorced from a strategy to preserve territory.

5 Acronyms and Abbreviations

ACTO	Amazon Cooperation Treaty Organization
APAs	Environmental Protection Areas
APPs	Permanent Preservation Areas
BCCs	Biodiversity Conservation Corridors
CBD	Convention on Biological Diversity
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CNPq	National Council for Scientific and Technological Development, Brazil
CONABIO	National Biodiversity Commission
CONAMA	National Environmental Council
ECs	Ecological Corridors
EEZ	Ecological-Economic Zoning
EIR	Environmental Impact Reports
EIA	Environmental Impact Assessment
ETEPs	Specially Protected Territorial Spaces
FUNBIO	Brazilian Biodiversity Fund
IAC	Inter-American Convention for the Protection and Conservation of Sea Turtles
IBAMA	Brazilian Institute of Environment and Renewable Natural Resources
IBGE	Brazilian Institute of Geography and Statistics
IUCN	International Union for Conservation of Nature
IBDF	Brazilian Forest Development Institute
MMA	Brazilian Ministry of the Environment
PAs	Protected Areas
PARBA	Regional Action Plan for Amazon Biodiversity
PNAP	National Protected Areas Plan
PNMA	National Environmental Policy
PNRH	National Water Resource Policy
PROBIO	Project for Sustainable Conservation and Use of Brazil's Biological Diversity
PRONABIO	National Program on Biological Diversity
RL	Legal Reserve (areas)
RPPNs	Private Natural Heritage Reserves
SNUC	National System of Conservation Units
STF	Federal Supreme Court
STJ	Brazil's Higher Court of Justice
TDAs	Agrarian Debt Bonds
UCs	Conservation Units
UNFCCC	United Nations Framework Convention on Climate Change

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CONSERVAÇÃO DA BIODIVERSIDADE E DA CONECTIVIDADE NO DIREITO BRASILEIRO¹

Solange Teles da Silva and Marcia Leuzinger

1 Introdução

O Brasil, com uma área continental de 850 milhões de hectares (ha), é um dos 5 países mais ricos em florestas no mundo e está entre os 17 países megabiodiversos. São 537 milhões de ha de terras que possuem parte considerável de sua cobertura vegetal preservada (Sparovek et al, 2010), em 6 biomas em terra firme – Amazônia, Cerrado, Mata Atlântica, Caatinga, Pampa e Pantanal. As unidades de conservação e as terras indígenas de domínio público somam, nesses biomas terrestres, 175 milhões de ha, dos quais 170 milhões de ha são de vegetação natural, o restante dessa vegetação encontra-se em áreas privadas ou sem titulação, somando 367 milhões de ha (Sparovek et al, 2010). As áreas privadas tem, portanto, um papel essencial em matéria de conservação da biodiversidade e da conectividade. Completando os dados em relação à biodiversidade brasileira, ela também está presente no bioma marinho que, constituído pela zona costeira e marinha, possui diversos ecossistemas como manguezais, restingas, ilhas, dunas entre outros. As unidades de conservação federais marinhas somam 3.676.840 milhões de ha (ICMBio).

Figura 1: Biomas brasileiros e Vegetação natural



Fonte: Biomas brasileiros (MMA) ; Vegetação natural (Sparovek et al, 2010)

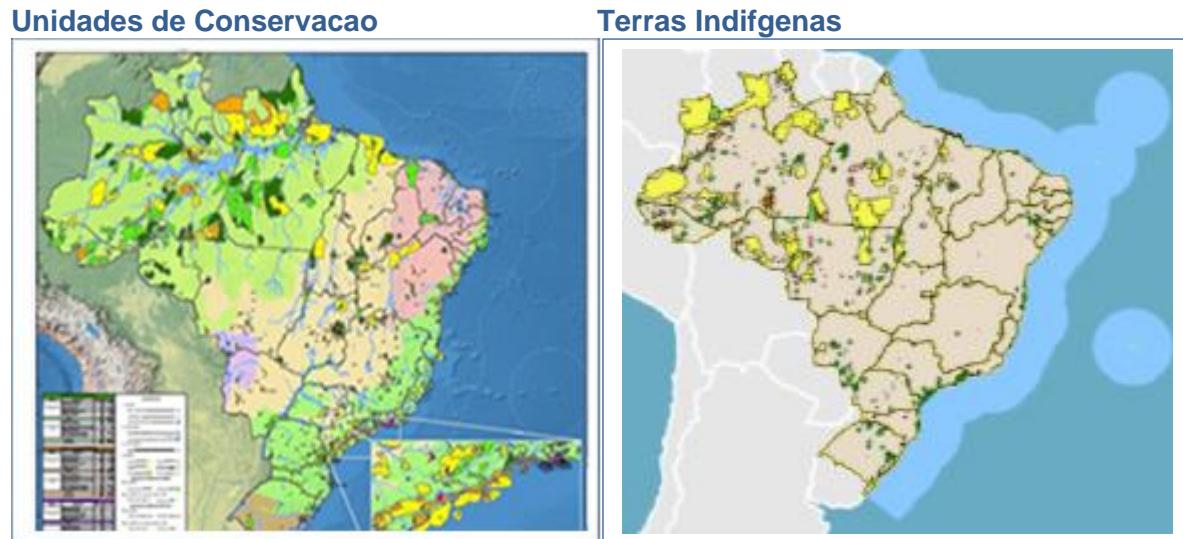
¹ Projeto de Pesquisa Direito e Desenvolvimento sustentável: a proteção das florestas e dos recursos hídricos na Região Amazônica em face da mudança climática (Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq, Brasil)

- 2 Todas essas características já fariam com que, ao discutirmos conectividade, naturalmente olhássemos para o exemplo brasileiro. Entretanto, não são apenas essas características que nos conduzem a realizar esse estudo, mas igualmente a singularidade das normas jurídicas brasileiras constitucionais e infraconstitucionais, que fornecem fundamentos e instrumentos para uma política de conservação da biodiversidade e implementação da conectividade.
- 3 A Constituição de 1988, ao consagrar o direito de todos ao meio ambiente ecologicamente equilibrado, atribuiu alguns deveres ao Poder Público – União, Estados e Municípios e seus entes descentralizados – para concretizar esse direito, dentre os quais se destaca o dever de criar, em todas as unidades da federação, espaços territoriais especialmente protegidos (ETEP), que somente por lei poderão ser alterados ou extintos (art. 225, § 1º, III). Além disso, o texto constitucional estabeleceu o dever do Poder Público de preservar e restaurar os processos ecológicos essenciais – quer dizer, os processos biológicos físicos e químicos que sustentam os sistemas ecológicos e a vida –, como também instituiu o dever de preservar a diversidade e a integridade do patrimônio genético do país (art. 225, § 1º, I e II).
- 4 Os espaços territoriais especialmente protegidos – que constituem uma das estratégias de preservação da biodiversidade e de implementação da conectividade – englobam tanto as unidades de conservação, como os demais espaços de proteção específica, dentre os quais se destacam os corredores ecológicos, os corredores de conservação da biodiversidade, as zonas de amortecimento e os espaços estabelecidos pelo Código Florestal – áreas de preservação permanente e áreas de reserva legal. Nesse contexto, são fundamentais as áreas de preservação permanente ao longo dos rios – áreas de preservação ripárias – para garantir a conectividade entre os demais ETEPs e outras áreas ainda preservadas e assegurar os processos ecológicos essenciais. Tais espaços territoriais especialmente protegidos, de acordo com as normas que os regem e com as suas características, podem ser criados em propriedades públicas, privadas ou em ambas.
- 5 Ao analisarmos a propriedade e a posse das terras no Brasil, é possível destacar que há no Brasil três grandes categorias fundiárias: terras públicas, terras privadas e terras devolutas, dentro das quais se identificam diferentes categorias de ocupação. Nas terras públicas, há: (i) unidades de conservação de proteção integral (sem população residente); (ii) unidades de conservação de uso sustentável, que admitem populações residentes; (iii) terras indígenas, com populações indígenas que detêm a posse coletiva permanente dessas terras; (iv) projetos de assentamentos com agricultores familiares e trabalhadores rurais, que tem a posse coletiva de terras públicas e titulação apenas quando tais assentamentos foram emancipados. No caso da segunda categoria de terras públicas, como unidades de conservação de uso sustentável há as reservas extrativistas e reservas de desenvolvimento sustentável², cuja finalidade é compatibilizar a proteção de populações tradicionais residentes e conservação da biodiversidade, esses grupos detêm a posse coletiva em terras públicas, a partir da assinatura de contratos de concessão de direito real de uso. Nas terras privadas podem existir, além das propriedades particulares, territórios quilombolas – cujo título é coletivo – e unidades de conservação de proteção integral (monumentos naturais e refúgios da vida silvestre) e de uso sustentável (áreas de proteção ambiental, áreas de relevante interesse ecológico, reservas particulares do patrimônio natural). Já nas terras devolutas – de domínio público – é possível observar a existência de terras apossadas por trabalhadores rurais e pequenos produtores, ou ainda de terras “griladas”, ou seja, ocupadas ilegalmente (sem título legitimado), e terras devolutas sem ocupação efetiva. Na realidade, a regularização fundiária e a consolidação da propriedade rural, o respeito à função social da propriedade e às normas socioambientais constituem um passo importante tanto para o fortalecimento da cidadania como para a proteção ambiental.
- 6 O texto constitucional reconhece a posse legítima. Por um lado, destaca-se a parcela de grupos formadores da sociedade brasileira, cujos modos de ser e de viver estão em harmonia com a conservação da biodiversidade: os povos indígenas e as comunidades quilombolas (para essas

² Reservas extrativistas e reservas de desenvolvimento sustentável são categorias de manejo de unidades de conservação muito similares. Ambas tem como finalidade conciliar conservação do ambiente natural e proteção de culturas tradicionais. A diferença básica entre elas consiste na natureza da população tradicional beneficiária. No caso das reservas extrativistas, os grupos tradicionais vivem, predominantemente, do extrativismo. Já as reservas de desenvolvimento sustentável albergam populações tradicionais de um modo geral, em especial as não-extrativistas.

últimas a CF/88 garante, no art. 68 do ADCT, a propriedade definitiva das terras quando as estiverem ocupando). Por outro lado, o texto constitucional prevê igualmente a possibilidade de que uma posse ininterrupta e de boa fé conduza à aquisição de terras pela via da usucapião, observadas determinadas condições: lapso temporal da posse de mais de cinco anos e condições específicas para área urbana e rural em relação à extensão e à destinação do imóvel.

Figura 2: Unidades de Conservação e Terras Indígenas



Fonte: Cadastro Nacional de Unidades de Conservação (CNUC)

Fonte: Fundação Nacional do Índio (Funai)

- 7 Realizadas essas considerações preliminares, iniciaremos esse estudo observando o contexto internacional e regional, e, em seguida, analisaremos as normas jurídicas brasileiras, constitucionais e infraconstitucionais, em especial as normas gerais federais³, que possibilitam a implementação da conectividade. Nesse sentido, destacaremos, notadamente, o papel das áreas de preservação permanente ripárias – espaços protegidos previstos pelo Código Florestal (Lei nº 12.651/2012) – que conformam verdadeiros corredores naturais.

2 Contexto Internacional e Regional

- 8 No contexto internacional, em matéria de implementação da conectividade, destacam-se, por um lado, as convenções multilaterais ambientais – a Convenção sobre Diversidade Biológica (CDB); a Convenção sobre Mudança Climática (CQNUMC); a Convenção Ramsar; a Convenção para a Proteção do Patrimônio Mundial, Cultural e Natural e; a Conservação das Espécies Migratórias de Animais Silvestres (CMS) – e, por outro lado, as convenções regionais ambientais no continente americano – Convenção para a Proteção da Flora, da Fauna e das Belezas Cênicas Naturais dos Países da América e a Convenção Interamericana para a Proteção e Conservação das Tartarugas Marinhas. O Brasil ratificou essas convenções, com exceção da CMS⁴, e assim assumiu

³ Tendo em vista que o Brasil é um Estado federal, no qual União, Estados e municípios possuem competências para legislar em matéria ambiental (estes últimos, desde que presente interesse local e respeitadas as normas federais e estaduais), realizaremos uma abordagem sobre a criação e a implementação da conectividade, considerando as normas gerais federais, quer dizer, as normas adotadas pelo Congresso Nacional, conforme disposto pelo art. 24 da Constituição Federal de 1988, que dispõe sobre as matérias cuja competência para legislar é concorrente.

⁴ Apesar de ainda não ser Parte da Convenção sobre a Conservação das Espécies Migratórias de Animais Silvestres (CMS), assinada em Bonn, em 23 de junho de 1979, o Brasil é signatário de dois acordos firmados

compromissos internacionais que podem propiciar a criação, implementação e manutenção da conectividade, seja através da proteção da paisagem, do *habitat*, da conectividade ecológica, ou ainda considerando o processo evolucionário de conectividade.

- 9 No contexto regional, podemos destacar estratégias para o desenvolvimento da cooperação em matéria de áreas protegidas e conservação da biodiversidade em zonas de fronteiras, como, por exemplo, na Amazônia Continental, a proposta de Plano de Ação Regional para a Biodiversidade Amazônica (PARBA) 2008-2013, elaborada pela Secretaria Permanente da Organização do Tratado de Cooperação Amazônica (OTCA) para os países amazônicos, partes do Tratado de Cooperação Amazônica (TCA) (Bolívia, Brasil, Colômbia, Equador, Guiana, Peru, Suriname e Venezuela) ; e, no Cone Sul, o Acordo-Quadro sobre Meio Ambiente do Mercosul, de 2001, considerando a necessidade de uma análise dos problemas ambientais da região e com especial atenção às áreas fronteiriças. Esses dois exemplos, no contexto regional de uma atuação dos organismos internacionais, não são os únicos, mas permitem ilustrar a crescente preocupação com a conservação da biodiversidade e a implementação da conectividade na América do Sul, seja por meio de um tratado sobre cooperação, seja no seio de um bloco econômico regional.
- 10 Nessa seara, é importante destacar os efeitos da internalização dos tratados na ordem jurídica nacional e sua hierarquia. Para o direito brasileiro, os tratados que foram internalizados tem paridade normativa com as leis ordinárias e todas as autoridades públicas – Poder Executivo, Legislativo e Judiciário –, no âmbito de suas competências, devem garantir a sua plena execução. A exceção, em termos de paridade normativa, diz respeito aos tratados sobre direitos humanos que, se aprovados por maioria qualificada de 3/5 nas duas casas do Congresso Nacional, em dois turnos, serão equivalentes às emendas constitucionais (Emenda Constitucional n. 45/2004). A maior parte da doutrina considera, ainda, que os tratados de direitos humanos internalizados antes da aprovação dessa Emenda Constitucional tem *status* de emenda constitucional, por força do disposto no art. 5º, § 2º, da CF/88. Todavia, de acordo com o posicionamento da Corte Constitucional brasileira, o Supremo Tribunal Federal (STF), em matéria de tratados de direitos humanos, se esses tratados não tiverem sido aprovados por maioria qualificada, o seu *status* será supralegal e infraconstitucional, embora antes o STF entendesse que tais tratados teriam paridade normativa com as leis ordinárias. O interesse dessa discussão sobre os efeitos da internalização dos tratados na ordem jurídica nacional e de sua hierarquia reside tanto na possibilidade de controle jurisdicional da convencionalidade das leis, considerando-se a relação entre meio ambiente e direitos humanos, como na possibilidade de aplicação direta dos tratados e na afirmação do dever de o Poder Público assegurar a sua execução (STJ, Resp 840918/DF).

3 Direito Brasileiro

- 11 A preservação da biodiversidade e o combate à fragmentação dos *habitats* tem como eixo central a busca de formas de aumentar a área total dos espaços protegidos, seja por meio da ampliação de seus limites, o que é mais difícil e oneroso, seja a partir da utilização do conceito de conectividade.
- 12 A melhor estratégia desenvolvida com essa finalidade foi a conectividade entre unidades de conservação e outras formas de espaços ambientais ou de fragmentos de vegetação preservados, o que, muitas vezes, possibilita o aumento das áreas protegidas sem a necessidade de indenização pelo Estado ou limitação de atividades econômicas. Essa conectividade é realizada por meio de corredores que, no Brasil, dividem-se em 3 categorias distintas: (i) corredores ecológicos (CE), que encontram previsão na Lei do Sistema Nacional de Unidades de Conservação, Lei nº 9.985/00

ao abrigo dessa convenção: o Acordo para a Conservação de Albatrozes e Petréis (ACAP), e o Memorando de Entendimento sobre a Conservação de Aves Campestres do Sul da América do Sul e de seus Habitats. Aos 05 de junho de 2012, a Presidenta Dilma Rousseff encaminhou a mensagem n. 246 ao Congresso Nacional, submetendo a sua consideração o texto da convenção (art. 49, I e 84, VIII da Constituição), com o objetivo de adesão do país a esse texto. Aqui, mais uma possibilidade implementação e manutenção da conectividade, considerando-se a conectividade dos *habitats*.

(SNUC); (ii) corredores de conservação da biodiversidade (CCB), que vêm sendo instituídos pelo Ministério do Meio Ambiente, sem que haja, todavia, previsão normativa específica; (iii) corredores genéricos, formados por faixas de vegetação que devem se manter preservadas em razão de disposição legal (Código Florestal, Lei da Mata Atlântica).

3.1 Legislação de proteção da natureza

- 13 A base legal para a criação e a gestão de todas as categorias de corredores encontra-se, inicialmente, na própria Constituição Federal de 1988, assim como em diversas leis e atos normativos infraconstitucionais que regulam, de forma mais específica, seja a criação de espaços protegidos, seja a proteção e o uso sustentável dos recursos da biodiversidade. Analisaremos os dispositivos constitucionais que diretamente estão relacionados a essa temática e, em seguida, realizaremos um estudo pontual dos diferentes espaços protegidos que desempenham a função de conectividade e as respectivas normas que os regulam. Destacaremos notadamente o papel das áreas de preservação permanente ripárias, que se localizam ao longo dos rios e constituem uma especificidade da legislação brasileira em matéria de implementação da conectividade. Complementando essa análise da implementação da conectividade, analisaremos as normas em matéria de biodiversidade.

3.1.1 Fundamentos constitucionais

- 14 No Brasil, foi com a atual Constituição Federal, promulgada em 1988, que se alcançou uma ampla previsão dos direitos humanos em todas as suas dimensões, com nítida influência dos Pactos Internacionais de 1966. Traçou o texto constitucional de 1988 um vasto rol de direitos fundamentais individuais e coletivos, em seu art. 5º, além de outros, econômicos, sociais, culturais e difusos, cuja previsão encontra-se em diferentes dispositivos, não se restringindo àqueles enunciados nos artigos contidos no Título II, que trata dos Direitos e Garantias Fundamentais (Leuzinger, 2009).
- 15 Relativamente à proteção ambiental, a positivação do direito ao meio ambiente equilibrado operou-se, no Brasil, com a edição da Lei nº 6.938/81, que instituiu a Política Nacional do Meio Ambiente (PNMA). Nos termos do seu art. 2º, a PNMA tem por objetivo a preservação, melhoria e recuperação da qualidade ambiental propícia à vida, visando assegurar, no país, condições ao desenvolvimento sócio-econômico, aos interesses da segurança nacional e à proteção da dignidade da vida humana. Quando a norma em questão vincula a qualidade do meio ambiente à dignidade da vida humana, está declarando, ainda que implicitamente, existir um direito ao meio ambiente equilibrado, direito este que, por estar relacionado à qualidade de vida, é, necessariamente, um direito fundamental, conforme já havia sido anteriormente afirmado pela Declaração de Estocolmo, em 1972. Com a inserção, pela Constituição de 1988, de um capítulo destinado especificamente ao meio ambiente, consubstanciado no art. 225, seus parágrafos e incisos, alcançou este direito, finalmente, a categoria de direito constitucional (Leuzinger, 2009).
- 16 Direito fundamental difuso, de terceira dimensão, o direito ao meio ambiente expressa o ideal de fraternidade ou solidariedade, e se desvincula de critérios patrimoniais, abandonando a ideia tradicional de direito subjetivo, que demanda a individualização de um titular, caracterizando-se, assim, por sua transindividualidade. Sua defesa fundamenta-se em uma solidariedade no tempo e no espaço, garantindo-se a qualidade do meio ambiente às gerações presentes e futuras (Silva, 2007a).
- 17 Começa o art. 225 do texto constitucional declarando o direito e vinculando-o a uma sadia qualidade de vida, o que demonstra a sua essencialidade. Em seguida, reparte a obrigação de proteger e preservar o meio ambiente entre Estado e coletividade, inaugurando a ideia de gestão compartilhada dos recursos naturais e da necessidade de cooperação e participação da sociedade, o que se insere dentro de um contexto mais amplo de governança ambiental. Há, igualmente, um dever geral de não degradar o meio ambiente, a ser observado tanto pelo Poder Público como pela coletividade, o que implica tanto condutas positivas como abstenções no desenvolvimento de atividades humanas.

- 18 Passa o artigo 225, então, a estabelecer expressamente algumas das obrigações do Poder Público necessárias à concretização desse direito. Isso significa que, para o Estado, a Constituição Federal já determinou, de antemão, quais as atividades ou ações mais importantes a serem realizadas, que constituem obrigações públicas e não podem ser negligenciadas. E, ao referir-se ao Poder Público, isso significa que Executivo, Legislativo e Judiciário, no âmbito de suas competências, tem obrigações para concretizar o direito de todos ao meio ambiente equilibrado. Dentre tais obrigações, dispostas nos incisos que conformam o parágrafo 1º do art. 225, encontram-se a base para a preservação da diversidade biológica e as estratégias para alcançá-la, em especial a criação de espaços protegidos.
- 19 No inciso I do § 1º do art. 225, a Constituição estabelece ser dever do Poder Público preservar e restaurar os processos ecológicos essenciais e prover o manejo ecológico das espécies e ecossistemas. Esses processos ecológicos essenciais são os necessários para a manutenção da dinâmica dos ecossistemas, bem como para o equilíbrio dinâmico (abrangendo os genes, as espécies e a diversidade dos ecossistemas) da manutenção da vida. Verifica-se, assim, a essencialidade da conectividade, e ao Poder Público cabe a implementação de ações de preservação, recuperação e restauração dos ecossistemas degradados, assim como de ações que determinem a cessação de atividades ou que não concedam autorização para a realização de atividade ou implantação de empreendimento por particulares que possam causar degradação capaz de prejudicá-los.
- 20 Cabe, ainda, ao Estado, nos termos do inciso II do § 1º do art. 225 da CF/88, preservar a diversidade e a integridade do patrimônio genético, o que envolve ações de fiscalização e de monitoramento de atividades que disponham sobre manipulação de material genético. Aqui ganha destaque a questão da biossegurança e notadamente, a Lei nº 11.105/05 e a obrigação de o Poder Público adotar medidas de precaução em relação às ameaças de contaminação por transgênicos, que representam um risco irreparável à conservação da diversidade biológica cultivada.
- 21 O inciso III do § 1º do art. 225 da CF/88 determina que incumbe ao Poder Público a criação de espaços territoriais e seus componentes a serem especialmente protegidos (ETEP). A alteração ou supressão de tais ETEP somente pode ser realizada através de lei, vedada qualquer utilização que comprometa a integridade dos atributos que justifiquem sua proteção. Além disso, o inciso VII do § 1º deste mesmo artigo trata da proteção de fauna e flora como outra obrigação imposta ao Poder Público, o que, na realidade, já está contido, numa perspectiva mais ampla, na manutenção dos processos ecológicos.
- 22 O texto constitucional também erige como patrimônio nacional alguns biomas – a Floresta Amazônica brasileira, a Mata Atlântica, a Serra do Mar, o Pantanal Mato-Grossense e a Zona Costeira – e estabelece que sua utilização deverá ser realizada na forma da lei e dentro de condições que assegurem a preservação do meio ambiente, inclusive quanto ao uso dos recursos naturais (§ 4º do art. 225). Essa qualificação de patrimônio nacional não retira daqueles que detenham a propriedade ou a posse das áreas localizadas em tais biomas a possibilidade de usar, gozar e dispor de suas propriedades, mas torna possível a adoção de limitações gerais de seu uso em virtude da importância da conservação desses biomas. Essa qualificação de patrimônio nacional se superpõe ao título de propriedade ou de posse do bem e a lei deve assim determinar as condições de uso que assegurem a preservação dos recursos naturais nessas áreas e das características essenciais desses biomas em prol do bem coletivo de toda população, gerações presentes e futuras (Silva, 2007a: 234).

3.1.2 Espaços territoriais especialmente protegidos

- 23 Apesar de não existir uma legislação específica sobre conectividade no Brasil, observa-se que há uma referência à implementação e à manutenção da conectividade por meio das normas que regulam a criação de espaços ambientais protegidos. O estudo da gênese e da evolução legislativa em matéria desses espaços protegidos, analisando-se a utilização da terminologia “espaços territoriais especialmente protegidos” e “áreas protegidas”, no Brasil, são fundamentais para compreendermos o seu alcance para a conservação da biodiversidade e implementação da conectividade e isso será objeto de nossa análise em um primeiro momento. Em uma segunda etapa,

aprofundaremos o estudo de algumas dessas categorias que permitem a conectividade: corredores ecológicos, corredores de biodiversidade e zonas de amortecimento, por um lado e, por outro lado, corredores genéricos, formados por as áreas de preservação permanente e áreas de reserva legal, previstas pelo Código Florestal, e pelos fragmentos de vegetação de Mata Atlântica, conforme disposto pela Lei da Mata Atlântica.

- 24 **Gênese e evolução das normas sobre espaços territoriais especialmente protegidos⁵** No Brasil, uma vasta variedade de espaços ambientais começou a ser instituída a partir da criação do Jardim Botânico do Rio de Janeiro, em 1808, sendo que os primeiros parques foram criados na década de 1930. Diversas espécies de espaços ambientais foram sendo instituídas, sem que houvesse, até o final da década de 1970, uma preocupação com a sua sistematização. Em 1979, é proposta pelo Instituto Brasileiro de Desenvolvimento Florestal (IBDF) a Primeira Etapa Plano do Sistema de Unidades de Conservação para o Brasil, que apontava a Amazônia como prioritária para a criação de novas unidades de conservação (UCs) e determinava a necessidade do uso de critérios técnicos e científicos para a escolha das áreas onde seriam criadas as UCs e da categoria de manejo a ser adotada (Brito, 2000). Nesse Plano, apenas algumas espécies de espaços ambientais foram consideradas unidades de conservação, o que confere à expressão, assim, uma acepção mais restrita que espaço territorial especialmente protegido (ETEP), cuja instituição, a partir da edição da Lei nº 6.938/81, foi elevada à condição de instrumento da Política Nacional de Meio Ambiente.
- 25 Com a promulgação da Constituição de 1988, a criação de ETEPs passou também a ser uma obrigação imposta ao Poder Público. Aliás, quando foi promulgada a nossa atual Constituição, já havia previsão legal de determinados espaços ambientais que eram considerados pelo Conama como unidades de conservação, bem como um Plano do Sistema de Unidades de Conservação para o Brasil que arrolava, como espécies de unidades de conservação (UCs), apenas alguns dos espaços ambientais à época existentes. Isso demonstra que o termo é mais restritivo do que espaços territoriais especialmente protegidos.⁶
- 26 Ainda assim, optou o constituinte originário por utilizar, no capítulo dedicado ao meio ambiente, a expressão mais ampla – espaço territorial especialmente protegido –, ao invés de unidade de conservação. Isso demonstra a clara intenção de conferir aos espaços ambientais instituídos pelo Poder Público o máximo de proteção. Esse fato, aliás, é plenamente compatível com a previsão de terem todos ‘direito ao meio ambiente ecologicamente equilibrado, bem de uso comum de todos e essencial à sadia qualidade de vida’, encontrada no *caput* do art. 225 da Constituição. Nas palavras de Benjamin (2001: 36) ‘Em nenhum momento o texto constitucional refere-se à expressão *Unidades de Conservação*, usando, isso sim, de forma correta, o termo *Espaços Territoriais Especialmente Protegidos*. Não se trata de uma expressão vernacular aleatória ou acidental do legislador de 1988, que, nesse ponto, seguiu o **standard científico** apropriado, segundo o qual ‘conservação’ não é gênero, muito menos gênero do qual ‘preservação’ seria espécie’.
- 27 Posteriormente, em 2000, é editada a Lei nº 9.985, que instituiu o Sistema Nacional de Unidades de Conservação da Natureza, também conhecida como Lei do SNUC, elencando 12 categorias de manejo distintas, divididas em dois grupos: unidades de proteção integral, que não admitem utilização direta dos recursos naturais, e unidades de uso sustentável, que permitem a utilização, de forma racional e dentro dos limites previstos, dos recursos ambientais. As primeiras englobam estações ecológicas, reservas biológicas, parques nacionais, monumentos naturais e refúgios da vida silvestre. As de uso sustentável abarcam áreas de proteção ambiental, áreas de relevante interesse ecológico, florestas nacionais, reservas extrativistas, reservas de desenvolvimento sustentável, reservas de fauna e reservas particulares do patrimônio natural.
- 28 Unidades de conservação (UC) são, portanto, apenas os espaços ambientais expressamente previstos pela Lei nº 9.985/00, sujeitos a um regime jurídico específico, mais restrito e determinado (Benjamin, 2001; Silva, 2002). Excepcionalmente, nos termos do parágrafo único do art. 6º da Lei em comento, poderão integrar o SNUC, a critério do Conama, ‘unidades de conservação estaduais e

⁵ Item integralmente retirado da obra de Leuzinger (2009).

⁶ Os Planos do Sistema de Unidades de Conservação não previam, por exemplo, como categoria de UC, os jardins botânicos, zoológicos ou hortos florestais, que, segundo a Resolução Conama nº 11/97, constituiriam unidades de conservação. Parques ecológicos, muito comuns no DF, não são previstos, por qualquer norma federal, como UC.

municipais que, concebidas para atender a peculiaridades regionais ou locais, possuam objetivos de manejo que não possam ser satisfatoriamente atendidos por nenhuma categoria prevista nesta Lei e cujas características permitam, em relação a estas, uma clara distinção’.

- 29 Merece destaque, ainda, a expressão Áreas Protegidas (APs), que, muitas vezes, é utilizada pelos autores de Direito Ambiental e pelos tratados e organizações internacionais como sinônimo de espaço territorial especialmente protegido. A IUCN, por exemplo, define área protegida como ‘área de terra ou de mar definida especificamente para a proteção e a manutenção da diversidade biológica e dos recursos naturais e culturais associados, e gerida por meios legais ou outros que sejam efetivos’. A Convenção da Diversidade Biológica, por sua vez, conceitua AP como aquela ‘definida geograficamente, que é destinada, ou regulamentada, e administrada para alcançar objetivos específicos de conservação’ (art. 2º).
- 30 O termo áreas protegidas, adotado internacionalmente, tem, contudo, sido utilizado, no Brasil, de forma mais restrita, como espécie de espaços territoriais especialmente protegidos (ETEP), que engloba apenas unidades de conservação, terras indígenas e territórios quilombolas. Isso porque o país, signatário da Convenção sobre Diversidade Biológica (CDB), passou a produzir uma série de documentos para cumprir os compromissos internacionalmente assumidos tais como: o Protocolo de Intenções para Implementação do Programa de Trabalho para Áreas Protegidas no Âmbito da Convenção da Diversidade Biológica, de 10 de fevereiro de 2002, e o Plano Nacional de Áreas Protegidas (PNAP), instituído pelo Decreto nº 5.758/06 (*cf. infra* 3.1.3 biodiversidade). Nesses dois documentos, Áreas Protegidas englobam, basicamente, unidades de conservação, terras indígenas e territórios quilombolas, o que determina ter um campo de aplicação menor do que o dos Espaços Territoriais Especialmente Protegidos (ETEP). O Plano Nacional de Áreas Protegidas, embora, em alguns dispositivos mencione outras espécies de espaços protegidos reconhecidas como “elementos integradores da paisagem”, como é o caso de áreas de preservação permanente e de áreas de reserva legal (previstos pelo Código Florestal), refere-se especialmente apenas àquelas três categorias – unidades de conservação, terras indígenas e territórios quilombolas –, seja em relação aos princípios, seja em relação aos eixos temáticos. Por isso, o melhor atualmente é utilizar a expressão áreas protegidas somente como espécie de espaço territorial especialmente protegido, a partir da acepção mais restrita que lhe foi conferida pelo PNAP.
- 31 A partir desses elementos, pode-se definir espaço territorial especialmente protegido como qualquer espaço ambiental, instituído pelo Poder Público, sobre o qual incida proteção jurídica, integral ou parcial, de seus atributos naturais. ETEP é, portanto uma categoria ampla, ou seja, é gênero, que inclui as unidades de conservação, as áreas protegidas e os demais espaços de proteção específica. Esses últimos são constituídos pelos espaços ambientais cuja previsão ocorre em normas esparsas, como jardins botânicos, jardins zoológicos, hortos florestais, áreas de preservação permanente, áreas de reserva legal, zonas de amortecimento de unidades de conservação, corredores ecológicos, corredores de conservação da biodiversidade, corredores genéricos, reservas da biosfera, além de terras indígenas e territórios quilombolas que, apesar de terem sido classificados como áreas protegidas pelos documentos produzidos pelo Brasil no âmbito da CDB, não deixam de ser espaços de proteção específica⁷. A todas essas áreas, a Constituição Federal de 1988 garante proteção especial, consubstanciada na necessidade de edição de lei formal para sua alteração ou extinção (Leuzinger, 2002; Leuzinger et al, 2008).
- 32 **Corredores ecológicos, corredores de biodiversidade e zonas de amortecimento.** O modelo de corredores ecológicos entre unidades de conservação, no Brasil, teve como inspiração, já no final da década de 1970, as ideias de Marcio Ayres em relação aos ‘cinturões verdes’, que ‘dariam continuidade entre unidades menores de províncias biogeográficas delimitadas por grandes rios, de forma a proteger a diversidade genética e ecológica da biota nativa’ (Nogueira Neto: 2005: 10). Com o advento da Lei do SNUC, além da previsão de 12 diferentes categorias de manejo de unidades de

⁷ Há, portanto, uma sobreposição entre áreas protegidas e as demais espécies de ETEP, que compreendem UCs e Espaços de Proteção Específica, quanto a estes últimos, no tocante às terras indígenas e aos territórios quilombolas. Importante observar, também, que esses são apenas exemplos de espaços de proteção específica, na medida em que qualquer outra área sobre a qual se confira proteção jurídica, total ou parcial, de seus atributos ambientais, também se revestirá da condição de ETEP e, consequentemente, de espaço de proteção específica, caso não se inclua dentre as UCs. Barros (2000), em extenso trabalho, procurou relacionar todos os espaços ambientais existentes.

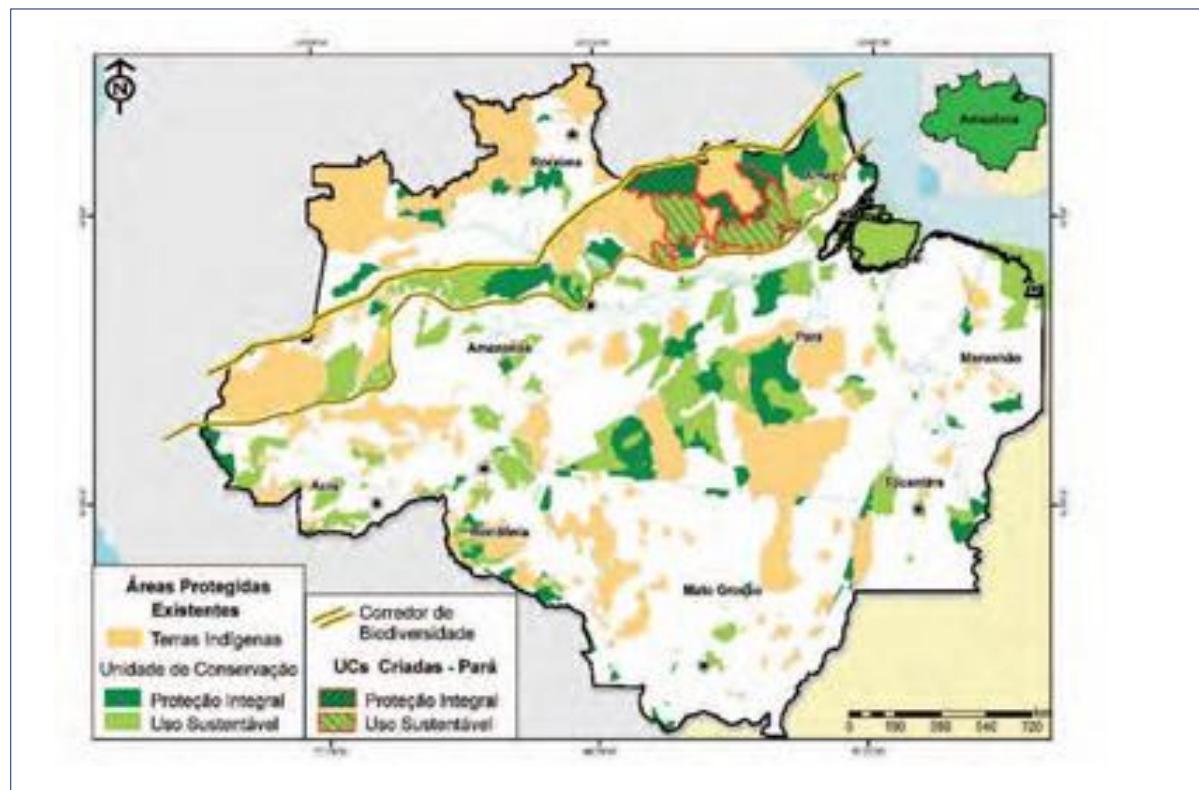
conservação, supramencionadas, também houve a instituição de zonas de amortecimento e de corredores ecológicos, que, embora não integrem a unidade de conservação, sujeitam-se a uma espécie de zoneamento obrigatório, onde certas atividades não poderão ser praticadas ou sofram severas restrições (Leuzinger, 2011).

- 33 As Zonas de Amortecimento são definidas pela Lei do SNUC como '*o entorno de uma unidade de conservação, onde as atividades humanas estão sujeitas a normas e restrições específicas, com o propósito de minimizar os impactos negativos sobre a unidade*' (art. 2º, XVIII). Os Corredores Ecológicos, por sua vez, são conceituados como '*porções de ecossistemas naturais ou seminaturais, ligando unidades de conservação, que possibilitam entre elas o fluxo de genes e o movimento da biota, facilitando a dispersão de espécies e a recolonização de áreas degradadas, bem como a manutenção de populações que demandam para sua sobrevivência áreas com extensão maior do que aquela das unidades individuais*' (art. 2º, XIX).
- 34 As zonas de amortecimento devem ser obrigatoriamente instituídas em todas as unidades de conservação, com exceção de áreas de proteção ambiental (APA) e reservas particulares do patrimônio natural (RPPN), e seus limites e restrições ao uso da propriedade serão estabelecidos pelo órgão gestor da UC; já os corredores ecológicos serão criados apenas "*quando conveniente*" (art. 25 da Lei nº 9.985/00). Apesar da Lei do SNUC reconhecer a importância da conectividade entre as unidades de conservação – o que permite aumentar a área protegida e, com isso, não apenas majorar a proteção, mas tornar viáveis algumas espécies –, ela não estabeleceu ser obrigatória a sua instituição, como o fez para as zonas de amortecimento (Leuzinger, 2011).
- 35 Além dos corredores ecológicos, previstos na Lei do SNUC, e, que devem ser abrangidos pelo plano de manejo da unidade de conservação, podem também ser citados, como espécies de espaços de proteção específica, os corredores de conservação da biodiversidade (CCB). Esses últimos possuem uma abordagem mais ampla do que os corredores ecológicos, e, embora sejam fundamentais para a contenção dos efeitos da fragmentação de *habitats*, não encontram previsão legal (Leuzinger, 2011).
- 36 Enquanto os corredores ecológicos conectam unidades de conservação (UCs), os CCB constituem áreas geográficas específicas estabelecidas '*com a função básica de promover a manutenção dos processos ecológicos naturais e, ao mesmo tempo, compatibilizar a conservação da biodiversidade com o desenvolvimento socioeconômico regional*'. Não se restringem estes, portanto, a interligar UCs, pois na realidade os CCB constituem uma unidade de planejamento regional que visa a consolidar uma rede de áreas protegidas e o manejo regional de um mosaico de usos múltiplos da terra (Machado et al, 2003).
- 37 Em outras palavras, os CCB são áreas estratégicamente destinadas à conservação ambiental em escala regional, compreendendo uma série de áreas protegidas, recortada por outras áreas com diferentes graus de ocupação humana, onde os gestores tem como objetivo a conservação não apenas adstrita a áreas públicas, mas também alcançando áreas privadas (Ganem, 2007). Desse modo, o manejo passa a ser integrado para possibilitar a preservação da diversidade biológica, a manutenção dos processos ecológicos e o desenvolvimento das economias locais, a partir do uso sustentável dos recursos naturais (Aliança para a Conservação da Mata Atlântica). E, assim, a implantação de corredores de biodiversidade conforma uma das principais estratégias para a conservação da diversidade biológica nos *hotspots*⁸ e nas grandes regiões naturais (Conservation International do Brasil). A escala adotada é diferente daquela utilizada para os corredores ecológicos, pois, para que o CCB possa conduzir à composição da paisagem dentro de um mosaico de sistemas ecológicos, ela deve ser maior (Brito, 2006).
- 38 Segundo Ganem, em 2006, o Brasil contava com vinte corredores de biodiversidade em implantação: Amapá, Araguaia/Bananal, Atlântico de Santa Catarina, Ecológico da Caatinga, Amazônia, Mata Atlântica, Cerrado/Pantanal, Ecótonos Sul/Amazônicos ou da Amazônia Meridional, Espinhaço, Guaporé-Itenez/Mamoré, Jalapão, Noeste, Norte da Amazônia, Paraná/Pirineus, Rio Paraná, Ecológico da Serra da Capivara/Serra das Confusões, Serra do Mar, Sul da Amazônia e Uruçui-Uma-

⁸ Hotspots são as áreas ricas em biodiversidade e, ao mesmo tempo, seriamente ameaçadas, o que as conduz à condição de áreas prioritárias para a conservação. O conceito foi cunhado por Norman Myers, na década de 1980.

Mirador. Na realidade, a prática de corredor da biodiversidade inicia-se, no Brasil, com os Corredores na Amazônia e na Mata Atlântica, em 1997, por meio do Programa-Piloto para a Proteção das Florestas Tropicais (PPG-7), do Ministério do Meio Ambiente, com apoio do Banco Mundial (IBAMA, 2007).

Figura 3: Corredor de Biodiversidade: Corredor Central da Amazônia e Corredor de Biodiversidade do Amapá



Áreas Protegidas Existentes

- Terras Indígenas
- Unidade de Conservação
- Proteção Integral
- Uso Sustentável

Corredor de Biodiversidade

UCs Criadas – Pará

- Proteção Integral
- Uso Sustentável

Fonte: Imazon

- 39 Esse corredores apresentam certa semelhança com os mosaicos, também previstos pela Lei do SNUC, que possuem como finalidade a gestão conjunta, integrada e participativa de diferentes categorias de UCs e outras áreas protegidas – públicas ou privadas –, de forma a compatibilizar a presença da biodiversidade, a valorização da sociodiversidade e o desenvolvimento sustentável no contexto regional (art. 26 da Lei do SNUC) (Leuzinger, 2011).
- 40 As reservas da biosfera que, da mesma forma, encontram previsão na Lei do SNUC (art. 41), e constituem um modelo, adotado internacionalmente, de gestão integrada, participativa e sustentável de espaços protegidos, trazem também certos pontos em comum com os CCBs. Os objetivos principais das reservas da biosfera são: preservação da biodiversidade, desenvolvimento de pesquisa, monitoramento ambiental, desenvolvimento sustentável e melhoria da qualidade de vida

das populações locais. Todavia, esses espaços não são idênticos, na medida em que uma das finalidades mais importantes dos CCBs é assegurar as dinâmicas naturais de movimentação e dispersão das espécies, a partir da conexão de áreas protegidas, diferindo-os, assim, dos mosaicos e das reservas da biosfera, que buscam, primordialmente, estabelecer a gestão integrada de espaços ambientais (Leuzinger, 2011).⁹

- 41 Outra espécie de corredor, além dos corredores ecológicos, previstos pela Lei do SNUC, e dos corredores de conservação da biodiversidade, é aquela prevista pela Lei nº 11.428, de 22 de dezembro de 2006, que dispõe sobre a utilização e a proteção da vegetação nativa do bioma Mata Atlântica. Destaque-se que antes da adoção dessa Lei, a expressão “corredor entre remanescentes” de Mata Atlântica, adotada pelo Decreto nº 750, de 10 de fevereiro de 1993, era definida pela Resolução Conama nº 9/96. Esses corredores se caracterizavam como ‘faixa de cobertura vegetal existente entre remanescentes de vegetação primária em estágio médio e avançado de regeneração, capaz de propiciar *habitat* ou servir de área de trânsito para a fauna residente nos remanescentes’ (art. 1º). Eles eram assim constituídos: a) pelas matas ciliares em toda sua extensão e pelas faixas marginais definidas por lei; b) pelas faixas de cobertura vegetal existentes nas quais exista a possibilidade de interligação de remanescentes, em especial, às unidades de conservação e áreas de preservação permanente. O Decreto referido foi revogado pelo Decreto 6.660/2008 .
- 42 Atualmente, nos termos do art. 11 da Lei da Mata Atlântica, o corte e a supressão de vegetação primária e secundária nos estágios avançado e médio de regeneração não poderão ser autorizados quando a área em que se pretende cortar ou suprimir a vegetação formar corredor entre fragmentos remanescentes deste bioma. Nesse caso, a vedação de supressão ou corte não ocorre apenas diante de corredores ecológicos, que ligam duas ou mais unidades de conservação, mas em qualquer circunstância em que a vegetação desempenhar a função de corredor, unindo fragmentos de Mata Atlântica primária ou secundária, esta última quando em estágio avançado ou médio de regeneração .
- 43 Tal instrumento, que não é exclusivo para a Mata Atlântica, apesar de somente existir lei específica para este caso, pode ser utilizado em qualquer outro bioma, a partir da criação de corredores pelo Poder Público, transformando-se, assim, a área em espaço de proteção específica. Em outras palavras, corredores interligando fragmentos de vegetação nativa, qualquer que seja o bioma, devem ser preservados, face à importância ecológica que desempenham, sendo necessário, todavia, para alcançar a garantia prevista no art. 225, § 1º, III, da CF/88, que sejam formalmente instituídos pelo Estado . Tais corredores genéricos são, normalmente, formados por áreas de preservação permanente (APP) e áreas de reserva legal (RL), que encontram previsão no atual Código Florestal recentemente aprovado, Lei nº 12.651/12, e que também constituem espécie do gênero de ETEP.
- 44 **Áreas de preservação permanente e reserva legal.** Áreas de preservação permanente (APP) e áreas de reserva legal (RL) são categorias de espaços de proteção específica inicialmente instituídas pela Lei nº 4.771/65 que, após 12 anos de discussões no Congresso Nacional, foi revogada, sendo aprovado, então, o atual Código Florestal, Lei nº 12.651, de 25 de maio de 2012. Após a aprovação da Lei e edição de uma Medida Provisória, seguiram-se mais discussões e novas alterações dessa norma no Congresso Nacional. Finalmente, aos 18 de outubro de 2012, o texto do Projeto de Lei de Conversão (PLV) nº 21, de 2012, da MP nº 571/2012 foi encaminhado para a Presidente da República e, então, foi sancionado com 9 vetos parciais, resultando na publicação da Lei nº 12.727, de 17 de outubro de 2012. O atual Código Florestal nasce, assim, já “remendado” e com normas que flexibilizam a obrigação de recompor as áreas de preservação e as áreas de reserva legal em casos de corte ou supressão de vegetação, mesmo quando ilegalmente realizados.
- 45 A nova Lei dispõe sobre a proteção da vegetação nativa e estabelece normas gerais com o fundamento central de proteção e uso sustentável da floresta e demais formas de vegetação. Ela altera questões relacionadas com a definição, o objetivo, as possibilidades de supressão de vegetação e a obrigatoriedade de recomposição desses dois tipos de espaços ambientais – áreas de

⁹ De acordo com o Art. 26 da Lei do SNUC, “quando existir um conjunto de unidades de conservação de categorias diferentes ou não, próximas, justapostas ou sobrepostas, e outras áreas protegidas públicas ou privadas, constituindo um mosaico, a gestão do conjunto deverá ser feita de forma integrada e participativa, considerando-se os seus distintos objetivos de conservação, de forma a compatibilizar a presença da biodiversidade, a valorização da sociodiversidade e o desenvolvimento sustentável no contexto regional”.

preservação permanente e de reserva legal – e representa um retrocesso da proteção ao meio ambiente no país. Isso porque tais alterações possibilitam a redução dessas categorias de espaço de proteção específica.

- 46 As áreas de preservação permanente (APPs) são definidas pelo art. 3º, II, da Lei nº 12.651/12, como '*área protegida, coberta ou não por vegetação nativa, com a função ambiental de preservar os recursos hídricos, a paisagem, a estabilidade geológica e a biodiversidade, facilitar o fluxo gênico de fauna e flora, proteger o solo e assegurar o bem-estar das populações humanas*'.
- 47 Constituem APP a faixa de vegetação que não pode ser suprimida ou utilizada localizada em áreas urbanas ou rurais, públicas ou privadas: a) ao longo dos rios ou quaisquer cursos d'água, ao redor de nascentes, lagos lagoas ou reservatórios; b) em encostas com declividade superior a 45 graus, c) nas restingas (como fixadoras de dunas ou estabilizadoras de mangues) e nos manguezais; d) nas bordas de tabuleiros ou chapadas e nos topo de morros, montes, montanhas e serras, com altura mínima de 100 m e inclinação media maior que 25º; e) nas veredas e em áreas com altitude superior a 1.800 metros. Além das APPs especificamente delimitadas pelo texto legal, ato específico do Chefe do Poder Executivo pode estabelecer que determinados locais passem a constituir APP pelos seguintes motivos: proteção das restingas ou veredas, das várzeas, abrigar exemplares da fauna ou da flora ameaçadas de extinção, proteção dos sítios de excepcional beleza ou valor científico, cultural ou histórico, bem como proteção das áreas úmidas, especialmente as de importância internacional (art. 6, inc. II, III, IV, V e IX). A tais espécies de APP chamamos de administrativas.
- 48 As APPs ao longo de rios e demais cursos d'água (ripárias) são as espécies de áreas de preservação permanente que melhor desempenham a função de conexão, interligando espaços protegidos de diferentes categorias e fragmentos de vegetação. Essa categoria de espaço protegido facilita o fluxo gênico da fauna e da flora e possibilita a existência, a evolução e o desenvolvimento dos seres vivos.

Box 1: APPs e os processos ecológicos essenciais

O Superior Tribunal de Justiça (STJ), em uma decisão de 2008, publicada em 2009, deu provimento a um recurso especial interposto pelo Ministério Público Federal, em ação civil pública, considerando que a Prefeitura de Joinville – na região Sul do país – descumpriu as exigências da legislação ambiental: a supressão de vegetação não observou a obrigação de preservação da faixa marginal do curso d'água existente na propriedade, de acordo com o Código Florestal de 1965 (área de preservação permanente ripária). A ilegalidade do desmatamento ensejou a nulidade das autorizações concedidas, sendo devida a recomposição ambiental da área afetada.

O Relator desse processo, Ministro Hermann Benjamin, afirmou que '(...) o regime jurídico das Áreas de Preservação Permanente ciliares é universal, no duplo sentido de ser aplicável à totalidade dos cursos d'água existentes no território nacional – independentemente da sua vazão ou características hidrológicas – e de incidência tanto nas margens ainda cobertas de vegetação (Mata Ciliar, Mata Ripária, Mata de Galeria ou Mata de Várzea), como naquelas já desmatadas e que, por isso mesmo, precisam de restauração. 4. Ao juiz descebe afastar a exigência legal de respeito à manutenção de Mata Ciliar, sob o argumento de que se está diante de simples “veio d'água”, raciocínio que, levado às últimas consequências, acabaria por inviabilizar também a tutela das nascentes (“olhos d'água”). Mais do que nos grandes rios, é exatamente nesses pequenos cursos d'água que as Matas Ciliares cumprem o papel fundamental de estabilização térmica, tão importante à vida aquática, decorrente da interceptação e absorção da radiação solar. (...)” Além disso, prossegue o Ministro, ‘A Constituição Federal ampara os processos ecológicos essenciais, entre eles as Áreas de Preservação Permanente ciliares. Sua essencialidade decorre das funções ecológicas que desempenham, sobretudo na conservação do solo e das águas. Entre elas cabe citar a) proteção da disponibilidade e qualidade da água, tanto ao facilitar sua infiltração e armazenamento no lençol freático, como ao salvaguardar a integridade físico-química dos corpos d'água da foz à nascente, como tampão e filtro, sobretudo por dificultar a erosão e o assoreamento e por barrar poluentes e detritos, e b) a manutenção de habitat para a fauna e formação de corredores biológicos, cada vez mais preciosos em face da fragmentação do território decorrente da ocupação humana. 6. Seria um despropósito tutelar apenas as correntes mais caudalosas e as nascentes, deixando, no meio das duas, sem proteção alguma exatamente o curso d'água de’.

menor volume ou vazão. No Brasil a garantia legal é conferida à bacia hidrográfica e à totalidade do sistema ripário, sendo irrelevante a vazão do curso d'água. O rio não existe sem suas nascentes e multifacetários afluentes, mesmo os menores e mais tênues, cuja estreiteza não reduz sua essencialidade na manutenção da integridade do todo. 7. O Município, contrariando a legislação vigente e os termos da licença expedida, desmatou a Mata Ciliar. 8. A ilegalidade do desmatamento provocado pela Prefeitura de Joinville é patente' (STJ, Resp 199800405950, Resp – Recurso especial 176753).

Nessa decisão, observa-se que tanto as normas constitucionais quanto as infraconstitucionais forneceram a fundamentação para a proteção das matas ciliares, ressaltando a essencialidade de suas funções ecológicas, notadamente para a formação de corredores ecológicos e, assim, para a implementação e manutenção da conectividade.

- 49 Deve ser observada uma largura mínima que seja suficiente para que as APPs ripárias desempenhem as suas funções de forma satisfatória e, como afirma Metzger (2010: 2), ‘A importância de florestas ripárias foi evidenciada em diferentes biomas brasileiros, e para diferentes grupos taxonômicos. (...) Não há dúvidas que independente do bioma ou do grupo taxonômico considerado, toda paisagem deveria manter corredores ripários, dado os seus benefícios para a conservação das espécies’. As APPs ripárias constituem, assim, corredores naturais por excelência.
- 50 A metragem dessas APPs, segundo o regime estabelecido pelo Código Florestal de 1965, revogado pela Lei nº 12.651/12, variava de acordo com a largura do rio, e, nos casos de corte ou supressão ilegal da vegetação, esta deveria ser integralmente recomposta, não sendo admitida qualquer espécie de utilização direta dos recursos naturais nela existentes, salvo diante de expressa autorização do órgão ambiental competente.
- 51 Todavia, com a edição do novo Código Florestal (Lei nº 12.651/12), houve uma significativa flexibilização do regime jurídico desses espaços, a começar pelo próprio cálculo da largura das APPs ripárias, anteriormente realizado a partir do maior período de cheia, e agora feito com base no leito regular do rio, o que conduzirá, nos rios sujeitos a cheias periódicas, a uma redução injustificável. Além disso, a obrigatoriedade de recomposição das APPs ripárias também foi tremendamente flexibilizada com a introdução do conceito de área rural consolidada, definida pelo inciso IV do art. 3º da Lei nº 12.651/12 como ‘área do imóvel rural com ocupação antrópica preeexistente a 22 de julho de 2008, com edificações, benfeitorias ou atividades agrossilvopastoris, admitida, neste último caso, a adoção do regime de pousio’. No caso de área rural consolidada, a metragem da APP a ser recomposta, e que havia sido ilegalmente desmatada, passa a ser calculada de acordo com o tamanho da propriedade rural e, em alguns casos, chega a ser de apenas 5 metros. Tal largura não é suficiente, muitas vezes, sequer para abrigar as raízes ou as copas das árvores. Em outras palavras, o proprietário rural que cortou ou suprimiu vegetação em APP sem a devida autorização, em período anterior a 22 de julho de 2008, ação essa caracterizada como crime ambiental, não apenas deixará de ser punido, como poderá recompor faixa bem menor do que originalmente deveria manter.
- 52 A reserva legal (RL) corresponde a “área localizada no interior de uma propriedade ou posse rural, delimitada nos termos do art. 12, com a função de assegurar o uso econômico de modo sustentável dos recursos naturais do imóvel rural, auxiliar a conservação e a reabilitação dos processos ecológicos e promover a conservação da biodiversidade, bem como o abrigo e a proteção de fauna silvestre e da flora nativa”. Devem, portanto, ser mantidos percentuais mínimos de cobertura de vegetação nativa, a título de reserva legal, de acordo com o art. 12 do novo Código Florestal, com os seguintes percentuais: a) se o imóvel estiver localizado na Amazônia Legal¹⁰, 80% (oitenta por cento) em área de florestas; 35% (trinta e cinco por cento) em área de cerrado amazônico; 20% (vinte por cento) em área de campos gerais; b) se o imóvel estiver situado nas demais regiões do país, o percentual a ser mantido é de 20% (vinte por cento).

¹⁰ Amazônia Legal engloba os territórios dos Estados do Acre, Pará, Amazonas, Roraima, Rondônia, Amapá e Mato Grosso e as regiões situadas ao norte do paralelo 13° S, dos Estados de Tocantins e Goiás, e ao oeste do meridiano de 44° W, do Estado do Maranhão.

- 53 Nos termos do art. 14 do novo Código Florestal, a localização da reserva legal deverá considerar estudos e critérios referentes, dentre outros, à formação de corredores ecológicos com outra Reserva Legal, com Área de Preservação Permanente, com Unidade de Conservação ou com outra área legalmente protegida. Nesse ponto, a expressão “corredores ecológicos” definida pela Lei nº 12.651/12 é mais abrangente do que aquela contida na Lei nº 9.985/00, que prevê a conexão apenas entre unidades de conservação. Trata-se, portanto, da formação de corredores genéricos, assim como ocorre na Lei da Mata Atlântica, que têm como função ligar diferentes espaços protegidos e até mesmo áreas com fragmentos de vegetação que não constituam, ainda, espaço de proteção específica.
- 54 O novo Código Florestal também flexibilizou tremendamente o regime jurídico das áreas de reserva legal, permitindo, por exemplo, o cômputo de APPs no cálculo de seu percentual, o que era absolutamente vedado segundo o regime revogado. Para os proprietários ou possuidores de imóveis rurais que detinham, em 22 de julho de 2008, área de reserva legal em extensão inferior ao previsto no art. 12, a Lei facultou a sua recomposição em até 20 anos (art. 66). Para realizar essa recomposição, a Lei considerou que será possível o plantio de até 50% da área com espécies exóticas. Há também previsão de condução de sua regeneração natural e de compensação em outra propriedade, a fim de que seja regularizada a sua situação. Neste último caso (compensação extra-propriedade), a compensação de reserva legal deverá ser realizada em áreas em extensão equivalente àquela a ser compensada, estar localizada no mesmo bioma e, se fora do Estado-membro, estar localizada em área identificada como prioritária para conservação pela União ou pelo Estado.
- 55 As áreas prioritárias para a conservação foram identificadas no âmbito de um projeto desenvolvido pelo Ministério do Meio Ambiente, o Projeto de Conservação e Utilização Sustentável da Diversidade Biológica Brasileira (PROBIO), a partir de ampla consulta. O primeiro Mapa das Áreas Protegidas identificou 900 áreas, reconhecidas pelo Decreto nº 5.092/2004, e instituídas pela Portaria nº 126/2004, do Ministério do Meio Ambiente (MMA), que indica que a lista deve ser periodicamente revista pela Comissão Nacional de Biodiversidade (CONABIO). A partir de 2006, iniciou-se, para todos os biomas, processo de atualização das áreas prioritárias para conservação, assim como as ações necessárias para sua efetivação. Novo mapa foi reconhecido pelo MMA, por meio da Portaria nº 9/2007. Embora o processo de identificação de áreas prioritárias tenha sido desenvolvido pela União, nada impede que os Estados-membros, no âmbito de seus territórios, também identifiquem áreas prioritárias para conservação e estabeleçam mecanismos para implementar sua efetiva proteção. De qualquer forma, a compensação de reserva legal em outra propriedade traz inúmeras dificuldades, dentre as quais fragilidade de um sistema de controle, em especial quando tal compensação se der em Estados-membros diferentes.
- 56 Pode-se concluir, em relação à previsão legal de corredores, que as APPs e as áreas de reserva legal tanto podem colaborar na formação de corredores ecológicos, previstos pelo SNUC, como podem servir para conectar outras espécies de espaços protegidos e fragmentos de vegetação nativa, conformando, como dito, os chamados corredores genéricos, extremamente relevantes para aumentar a área total protegida no Brasil.

3.1.3 Biodiversidade

- 57 Inicialmente, para efetivar os compromissos assumidos junto à CDB, o governo brasileiro instituiu o Programa Nacional de Diversidade Biológica (PRONABIO), por meio do Decreto nº 1.354/1994 para coordenar estruturas na esfera federal. Mecanismos específicos de financiamento e iniciativas para a conservação da biodiversidade foram criados, tendo inclusive apoio internacional, dando origem ao Projeto de Conservação e Utilização Sustentável da Diversidade Biológica (PROBIO) e ao Fundo Brasileiro para a Biodiversidade (FUNBIO).
- 58 Entretanto, passaram-se 10 anos da adoção da CDB para que o Brasil instituisse sua Política Nacional da Biodiversidade, com o Decreto nº 4.339/2002, que estabeleceu, então, o marco para a gestão da biodiversidade. Fruto de um processo de consultas e discussões realizadas ao longo de dois anos, a metodologia utilizada para a construção da estruturação da política da biodiversidade ‘procurou romper com a tradição do estabelecimento de políticas de cima-para-baixo’ (Medeiros,

2006: 5). Sete componentes que representam os eixos temáticos da CDB estruturaram essa política, com uma especial atenção à necessidade de planejar, promover, implantar e consolidar corredores ecológicos, integrando os espaços ambientais protegidos (objetivo específico 11.1.3).

- 59 Em 2006, o Plano Nacional de Biodiversidade (Pan-Bio) fixou as diretrizes e as prioridades do Plano de Ação para a implementação da Política Nacional de Biodiversidade, momento em que o Brasil assumiu o compromisso de proteger pelo menos 10% de cada bioma e 30% do Bioma Amazônia. Foi, então, instituído o Plano Estratégico Nacional de Áreas Protegidas (PNAP) pelo Decreto nº 5.758/2006, que indicou como um de seus objetivos gerais alcançar a integração das unidades de conservação a paisagens terrestres e marinhas mais amplas, de modo a manter a sua estrutura e funções ecológicas e socioculturais (objetivo geral 3.3), sendo necessário para tanto: por um lado, a adoção de medidas políticas, jurídicas e administrativas, entre outras, para aprimorar a integração de unidades de conservação a paisagens terrestres e aquáticas continentais e marinhas mais amplas; e por outro lado, a garantia do estabelecimento e da manutenção da conectividade entre ecossistemas.
- 60 Foram aprovadas pela Comissão Nacional de Biodiversidade (Conabio), em dezembro de 2006, as metas nacionais de biodiversidade para 2010, em correspondência com as Metas Globais aprovadas pela CDB (Resolução Conabio n.3/2006). Ainda que a integralidade dessas metas não tenha sido alcançada, é necessário considerar alguns avanços significativos, dentre os quais o aumento da área de unidades de conservação (Weigand Jr., 2011), o que certamente auxilia na conservação da biodiversidade e na implementação da conectividade. Destaque-se, ainda, a Resolução Conabio n. 4/2007, sobre os ecossistemas mais vulneráveis às mudanças climáticas, que prevê como respostas apropriadas de adaptação da biodiversidade brasileira nos ecossistemas mais vulneráveis a criação e a implementação de corredores ecológicos e de mosaicos de áreas protegidas. Dentre os ecossistemas considerados como particularmente vulneráveis às mudanças climáticas estão, por exemplo, aqueles situados no Cerrado, na Amazônia, na Caatinga e na Mata Atlântica, em especial os manguezais e as restingas, além dos ecossistemas em áreas de recarga de aquíferos e em nascentes de rios.

3.2 Legislação sobre uso sustentável dos recursos naturais

- 61 No Brasil, além das normas sobre conservação da biodiversidade, florestas e unidades de conservação, analisadas anteriormente, que estabelecem os fundamentos para implementação da conectividade, outras normas podem também auxiliar a promovê-la. São as normas que versam sobre fauna, recursos hídricos, manejo florestal e desenvolvimento sustentável da aquicultura e da pesca, que trazem elementos que podem auxiliar a conectividade, seja pelos princípios, diretrizes e objetivos por elas adotados , ou ainda pelos seus instrumentos.
- 62 É possível citar alguns dos mecanismos estabelecidos por essas normas que determinam, por exemplo: a) a proteção de *habitats* através da criação de espaços ambientais protegidos (além das estações ecológicas, reservas biológicas e parques nacionais, previstas na Lei do SNUC, dentre as unidades de proteção integral, há a possibilidade de instituição de refúgio da vida silvestre, cujo objetivo é a preservação de espécies ou comunidades residentes migratórias) em propriedades de posse e domínio público ou privado; b) as listas das espécies da fauna ameaçadas de extinção, a cargo do Ibama, que possibilitam orientar as propostas de implantação de unidades de conservação, bem como medidas mitigadoras de impactos ambientais; c) as outorgas pelo uso dos recursos hídricos, mecanismo estabelecido pela Lei nº 9.433/97, que instituiu a Política Nacional de Recursos Hídricos (PNRH); d) o Plano Nacional de Recursos Hídricos, que prevê a adoção de um enfoque sistêmico para assegurar a quantidade e a qualidade das águas brasileiras e propõe a adoção dos conceitos de ecorregiões aquáticas e vazões ambientais; e) os mecanismos de integração entre conservação da biodiversidade e da biodiversidade, como o manejo florestal comunitário e familiar; f) as autorizações para o exercício da atividade pesqueira, assegurando-se, entre outros, a proteção dos ecossistemas e a manutenção do equilíbrio ecológico, observados os princípios de preservação da biodiversidade e o uso sustentável dos recursos naturais, de acordo com a Lei n. 11.959/09, que dispõe sobre a Política Nacional de Desenvolvimento Sustentável da Aquicultura e da Pesca;

- 63 Há um potencial considerável dessas normas para fomentarem a implementação e manutenção da conectividade.

3.3 Legislação de Uso do Solo e Ordenamento Territorial

- 64 O planejamento pode ser definido como '*um processo técnico instrumentado para transformar a realidade existente no sentido de objetivos previamente estabelecidos*' (Silva, 2000: 85), sendo traduzido através de um plano. O plano diretor, instrumento básico da política de desenvolvimento e de expansão urbana, deve conter, dentre outros o zoneamento urbano. Embora o zoneamento seja um instrumento desenvolvido para o planejamento das cidades, ele foi incorporado, na década de 1970, no planejamento de unidades de conservação, passando a ser chamado de zoneamento ambiental, e, mais tarde, em escala menor, no planejamento de Estados e Municípios, a partir da introdução do zoneamento ecológico-econômico. Nesse contexto, surge o princípio da função social da propriedade, que inclui também a função socioambiental da propriedade pública e privada e condiciona o próprio exercício do direito de propriedade, distinguindo-se dos institutos de limitação do seu uso. Planejamento, zoneamento e função social da propriedade podem auxiliar a conectividade.

3.3.1. Plano diretor, áreas urbanas e áreas rurais

- 65 Na esfera local, de acordo com a Constituição de 1988, o plano diretor é o instrumento básico da política de desenvolvimento e de expansão urbana, obrigatório para cidades com mais de 20 mil habitantes, devendo ser aprovado pela Câmara Municipal. De acordo com o Estatuto da Cidade – Lei nº 10.257/01 –, os planos diretores devem englobar o território do Município como um todo, incluindo tanto as zonas urbanas como as zonas rurais (art. 40, § 2º). O planejamento urbano torna-se mais necessário com o adensamento populacional das áreas urbanas.
- 66 Os planos produzidos nas décadas de 1960 e 1970 e, principalmente, aqueles editados nas duas décadas seguintes, como aponta Schasberg (2006), eram excessivamente normativos e conservadores, veiculando uma concepção de cidade idealizada pelos técnicos, sem incorporar o território e seus atores como espaço social complexo que envolve conflitos, contradições e alianças. Além disso, quando aplicados, contribuíram para o aprofundamento do modelo urbanístico calcado na exclusão e na segregação, que transformavam as cidades em um local cada vez mais precário para a maioria pobre (Schasberb, B., 2006; Leuzinger et al, 2010).
- 67 No que tange à exigência de elaboração de planos diretores, segundo o IBGE, em 2008, o Brasil apresentava 1.622 municípios com mais de 20 mil habitantes. Isso significa que 29,16% dos municípios brasileiros deveriam ter planos diretores, o que, todavia, não ocorria. O IBGE demonstra, conforme se pode observar da tabela a seguir, levando-se em consideração o critério constitucional de número de habitantes (também encontrado no art. 41, inc. I, do Estatuto da Cidade), o percentual daqueles que possuíam, em 2005 e 2008, plano diretor (IBGE, 2009).

Tabela 1: Municípios com obrigatoriedade de existência de Plano Diretor e municípios, com mais de 20.000 habitantes, que necessitam elaborar o Plano Diretor - 2005/2008

Ano	Municípios		
	Com mais de 20.000 habitantes	Com obrigatoriedade de existência de Plano Diretor	Que necessitam elaborar o Plano Diretor n
2005	1.594	526	1.068

2008	1.622	1.303	319
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Fonte: IBGE, 2009.

- 68 Segundo o IBGE (2009: 38), do ‘total de municípios brasileiros, ou seja, incluindo aqueles que não obrigatoriamente necessitam ter Plano Diretor, 1.878 declararam possuir o referido Plano, 372 o estão revendo, e 1.263 municípios o estão elaborando’, e, em termos de distribuição geográfica, as Regiões Sul (43,6%) e Norte (40,8%) são aquelas que concentram o maior número de municípios que possuem planos diretores e também foram as que tiveram o maior aumento percentual de municípios com Plano Diretor (30,3%), em relação a 2005 (Leuzinger et al, 2010). Embora ainda não haja 100% de efetividade da norma constitucional que determina a elaboração de planos diretores, a cada ano, aumenta o percentual de cidades que já contam com esse instrumento.

3.3.2. Zoneamento ecológico-econômico

- 69 No direito brasileiro, o zoneamento, enquanto procedimento urbanístico, cuja finalidade é a regulação do uso da propriedade do solo e dos recursos naturais no interesse coletivo, surge de forma setorial, tendo como objetivo estabelecer diretrizes para determinadas políticas públicas – a política agrária e a política industrial. Sem perder totalmente o caráter funcional, de determinação dos usos possíveis do solo urbano ou rural – zoneamento urbano e agroecológico –, esse procedimento evoluiu e, na atualidade, ele pode ser conceituado como um instrumento mais abrangente de ordenamento territorial do país em busca de uma gestão ambiental integrada dos recursos disponíveis com vistas ao desenvolvimento sustentável (Silva, 2007b).

- 70 O zoneamento ambiental figura como instrumento da Política Nacional do Meio Ambiente (art. 9º, II da Lei nº 6.938/81) e foi regulamentado pelo Decreto nº 4.297/02, que definiu o zoneamento ecológico-econômico (ZEE) como: *‘instrumento de organização do território a ser obrigatoriamente seguido na implantação de planos, obras e atividades públicas e privadas, estabelece medidas e padrões de proteção ambiental destinados a assegurar a qualidade ambiental, dos recursos hídricos e do solo e a conservação da biodiversidade, garantindo o desenvolvimento sustentável e a melhoria de condições de vida da população’*. Ressalte-se que, em 1990, já tinha sido criado o Programa Zoneamento Ecológico Econômico, compreendendo apenas a Amazônia Legal, tendo sua abrangência ampliada, em 1992, para todo o território nacional. Em 2002, o Decreto estabelece, então, os critérios para o ZEE e a participação dos Estados no processo do ZEE no âmbito da Amazônia Legal. Além disso, esse Decreto prevê que a União poderá reconhecer os ZEE estaduais, regionais e locais, desde que tenham cumprido os seguintes requisitos: a) tenham sido referendados pela Comissão Estadual do ZEE; b) tenham sido aprovados pelas Assembleias Legislativas Estaduais; c) sejam compatíveis com o ZEE estadual, nas hipóteses dos ZEE regionais e locais (Silva, 2007b).

- 71 O zoneamento ecológico-econômico atribui contornos contemporâneos ao zoneamento ambiental, mais abrangente e em conformidade com a nova ordem constitucional (arts. 3º, II, III e IV; 21, IX; 174, § 1º e 225 do texto constitucional de 1988). Não se trata apenas de estabelecer critérios para a qualificação de zonas como áreas de proteção especial, ou levar em conta critérios ecológicos na metodologia do zoneamento. O zoneamento ambiental, enquanto zoneamento ecológico-econômico, tem como objetivo geral organizar, de forma vinculada, as decisões dos agentes públicos e privados quanto a planos, programas, projetos e atividades, que direta ou indiretamente utilizem recursos naturais, assegurando a plena manutenção do capital e dos serviços ambientais dos ecossistemas (Silva, 2007b). Trata-se de dividir o território em zonas de acordo com as necessidades de proteção, conservação e recuperação dos recursos naturais e de desenvolvimento sustentável e, nesse sentido, ele tem potencialidades de auxiliar com a implementação e manutenção da conectividade.

- 72 De acordo com o Novo Código Florestal, nas propriedades e posses da Amazônia Legal, o percentual de 80% de reserva legal poderá ser reduzido até 50% quando o Estado tiver ZEE aprovado e mais de 65% de seu território estiver ocupado por unidades de conservação da natureza de domínio público, devidamente regularizadas, e por terras indígenas homologadas. Além disso, se

o ZEE estadual indicar, o Poder Público Federal poderá tanto reduzir quanto ampliar áreas de reserva legal. No primeiro caso, há a possibilidade de redução de 80% para até 50% de área de reserva legal situada em área de floresta da Amazônia Legal para regularizar propriedades ou posses rurais, mediante recomposição, regeneração ou compensação da Reserva Legal de imóveis com área rural consolidada. Essa redução exclui as áreas prioritárias para conservação da biodiversidade e dos recursos hídricos e os corredores ecológicos. No segundo caso, de ampliação das áreas de Reserva Legal em até 50% dos percentuais previstos na Lei, isso pode ocorrer para o cumprimento de metas nacionais de proteção à biodiversidade ou de redução de emissão de gases de efeito estufa. O Novo Código Florestal ainda determinou que os Estados que não possuem seus ZEEs segundo a metodologia unificada, estabelecida em norma federal, terão o prazo de 5 (cinco) anos, a partir da data da publicação da lei, para a sua elaboração e aprovação.

3.3.3. Propriedade privada e o conceito de função socioambiental da propriedade

- 73 O direito de propriedade é consagrado como um direito fundamental pela Constituição Federal de 1988, que igualmente estabelece a necessidade de que a propriedade atenda a sua função social. Isso significa que a utilização da propriedade rural ou urbana deve realizar-se de acordo com os fins que propiciam o bem-estar de todos na sociedade. Em relação à propriedade rural, a Constituição estabeleceu que a sua função social é cumprida quando ela atende, simultaneamente, aos seguintes requisitos: a) aproveitamento racional e adequado, b) utilização adequada dos recursos naturais disponíveis e preservação do meio ambiente, c) observância das normas que regulam as relações de trabalho, d) exploração que favoreça o bem estar dos proprietários e dos trabalhadores (art. 186). Já a propriedade urbana cumprirá sua função social, conforme prevê o texto constitucional, quando atendidas as exigências fundamentais de ordenação da cidade expressas no plano diretor (art. 182).
- 74 A inobservância da obrigação de preservação do meio ambiente pelo proprietário rural – obrigação que a doutrina tem chamado de função socioambiental da propriedade ou elemento ambiental da função social da propriedade (Figueiredo, 2008) – acarreta a perda da plena garantia da propriedade e expõe o proprietário a diferentes espécies de sanção, dentre as quais a desapropriação com pagamento em títulos da dívida agrária (TDA), resgatáveis em até 20 anos. No que tange à propriedade imobiliária urbana, apesar de o texto constitucional não ser tão claro em relação à observância da função socioambiental, ela também está presente. O art. 225 da Constituição de 1988 determina ser obrigação da coletividade, de um modo geral, proteger e preservar o meio ambiente para as presentes e para as futuras gerações, além de estabelecer competir originariamente à União e aos Estados-membros legislar sobre meio ambiente. Desse modo, o Plano Diretor, que é uma lei municipal, deverá necessariamente respeitar as regras ambientais federais e estaduais, sendo-lhe facultado dispor sobre questões ambientais apenas de forma mais restritiva. Ademais, todas as normas ambientais aplicáveis à propriedade imobiliária urbana deverão ser respeitadas. Não há, assim, como desconsiderar sua função socioambiental (Leuzinger, 2002).
- 75 E, no compasso do que está estabelecido na Constituição Federal, o Código Civil de 2002 determina que o exercício do direito de propriedade está atrelado às suas finalidades econômicas e sociais “*e de modo que sejam preservados, de conformidade com o estabelecido em lei especial, a flora, a fauna, as belezas naturais, o equilíbrio ecológico e o patrimônio histórico e artístico, bem como evitada a poluição do ar e das águas*” (art. 1.228, parágrafo 1º). Assim, há funções ecológicas da propriedade que devem ser resguardadas, quer dizer, os processos ecológicos essenciais que possibilitam que a propriedade cumpra sua função social. As previsões legais de APP e RL, cujos limites estão explicitados, de forma genérica, respectivamente nos arts. 4º e 12 do Novo Código Florestal, obrigam a todos os proprietários e posseiros a preservar a vegetação nessas áreas e constituem limites internos ao direito de propriedade. Não há, portanto, que se falar em indenização nesse caso. Entretanto, no caso das áreas de preservação permanente administrativas, estabelecidas por ato do Chefe do Poder Executivo, de acordo com o art. 6º do Novo Código Florestal, que especifica restrições a determinada propriedade, há a possibilidade de o proprietário ou posseiro ser indenizado.
- 76 Em relação às unidades de conservação, que encontram previsão na Lei do SNUC, deve-se observar que há categorias que são de domínio público – estação ecológica, reserva biológica, parque nacional, floresta nacional, reserva extrativista, reserva de desenvolvimento sustentável e reserva de

fauna – e, havendo áreas particulares incluídas nos limites dessas unidades de conservação, quando de sua criação, elas deverão ser desapropriadas, o que implica uma justa e prévia indenização em dinheiro. Todavia, apesar das disposições constitucionais nesse sentido, nem sempre essa indenização é prévia, já que parte dessas unidades de conservação depende ainda da regularização fundiária.

- 77 As demais categorias de manejo de unidades de conservação, com exceção das reservas particulares do patrimônio natural (RPPN), podem ter tanto áreas de domínio público como áreas de domínio privado e, nesse caso, estão sujeitas às restrições ambientais legalmente estabelecidas, havendo possibilidade de indenização caso tais restrições sejam específicas e incidam sobre a possibilidade de aproveitamento econômico da área, o direito de exclusividade ou a possibilidade de disposição da mesma.
- 78 Com relação especificamente à RPPN, deve-se observar que ela somente pode ser instituída em área privada, a pedido do proprietário, e passa a estar gravada com perpetuidade, com o objetivo de conservar a diversidade biológica, não sendo aqui cabível falar em indenização.
- 79 No que diz respeito às zonas de amortecimento e aos corredores ecológicos (Leuzinger, 2011), as restrições ambientais impostas ao direito de propriedade daqueles que se encontram nos limites traçados para tais espaços ambientais, quando efetivamente gerais, e quando não aniquilam substancialmente a possibilidade de aproveitamento econômico da área, o direito de exclusividade e a possibilidade de disposição da mesma (Benjamin, 1993: 73), não ensejam, a princípio, indenização, por se caracterizarem como limites internos ao direito de propriedade, decorrentes do necessário atendimento, pelo proprietário, de sua função socioambiental, constitucionalmente prevista. Ou seja, não seria cabível indenização porque o imóvel afetado não vê sua dominialidade afetada e continua a aceitar os usos econômicos legítimos, apenas sofrendo, como de resto em todo e qualquer esforço de planejamento ambiental e zoneamento, restrições gerais, que incidem sobre todos os proprietários que se encontram na mesma situação (Benjamin, 2001).

3.4 Legislação de Controle do Desenvolvimento

- 80 Há igualmente normas de controle do desenvolvimento que estabelecem instrumentos que podem auxiliar na implementação da conectividade, tais como o licenciamento ambiental, o estudo prévio de impacto ambiental e a compensação ambiental.
- 81 O licenciamento ambiental, instrumento da Política Nacional do Meio Ambiente (PNMA), é ‘*o procedimento administrativo destinado a licenciar atividades ou empreendimentos utilizadores de recursos ambientais, efetiva ou potencialmente poluidores ou capazes, sob qualquer forma, de causar degradação ambiental*’ (art. 2º, I, da Lei Complementar 140/2011, cf. igualmente as definições do licenciamento da Lei da PNMA, art. 10º e Resolução 237/97 do Conama, art. 1º, inc. I). Assim, a localização, a instalação, a ampliação e a operação de tais atividades ou empreendimentos necessitam de uma licença ambiental. Cada ente federado é competente para aprovar o manejo e a supressão de vegetação, de florestas e de formações sucessoras em suas respectivas florestas e unidades de conservação, como também em empreendimentos por eles licenciados. Além disso, serão aprovadas pela União também essas atividades de manejo e supressão de vegetação em terras devolutas federais, e pelos Estados, em imóveis rurais. No que diz respeito à exploração de florestas nativas e formações sucessoras, há a necessidade de licenciamento e prévia aprovação de plano de manejo florestal sustentável, com exceção da coleta de produtos florestais não madeireiros e manejo sustentável para exploração florestal eventual sem propósito comercial. No caso de licenciamento ambiental de plano de manejo florestal sustentável da pequena propriedade ou posse rural familiar, incluindo aqui as comunidades e populações tradicionais, aplica-se procedimento simplificado de licenciamento ambiental.
- 82 Há decisões interessantes dos tribunais superiores brasileiros em matéria de licenciamento ambiental, impondo a suspensão das atividades agressoras ao meio ambiente, conjuntamente com a reparação integral dos danos causados em APP nas quais não fora realizado o prévio e competente licenciamento ambiental e a demolição das edificações, como também a imposição da obrigação de

não-fazer, que se consubstancia pela inibição de qualquer atividade antrópica sem o prévio licenciamento ambiental (TRF-1 AC 2004.38.02.003142-1 / MG; Apelação Cível – Rel. Des. Federal Souza Prudente, 26/09/2012).

- 83 Algumas das atividades sujeitas ao procedimento de licenciamento ambiental necessariamente dependerão da realização de um estudo prévio de impacto ambiental, quando existir risco de que causem significativo impacto ao meio ambiente. O estudo prévio de impacto ambiental é uma das modalidades da avaliação de impacto ambiental, erigida como um dos instrumentos da PNMA, e que foi consagrado pela Constituição de 1988. Na realidade, o estudo de impacto ambiental tem como objetivo garantir que seja realizada uma análise da implantação de obras e atividades nos casos de significativa degradação ambiental, indagando-se sobre a sua real necessidade em face dos impactos positivos e negativos, como também dos riscos decorrentes de sua concretização. Os tribunais superiores brasileiros tem decidido pela necessidade da realização dos estudos prévios de impacto ambiental e, algumas dessas decisões dizem respeito à realização previa desses estudos, quer dizer, a obrigatoriedade de sua realização antes do licenciamento, até mesmo suspendendo o trâmite de procedimentos e exigindo a realização de estudos de impacto ambiental (STJ, Resp 200902083147, Resp – Recurso Especial 1163939. Rel. Min. Mauro Campbell Marques, 08/02/2011).
- 84 No que diz respeito à compensação ambiental nos casos de licenciamento ambiental de empreendimentos de significativo impacto ambiental que assim foram considerados pelo órgão ambiental competente, com fundamento no estudo prévio de impacto ambiental e relatório de impacto ambiental (EIA/RIMA), ela é prevista na Lei do SNUC. Nesses casos, o empreendedor é obrigado a apoiar a implantação e a manutenção de unidade de conservação de proteção integral (estaçao ecológica, reserva biológica, parque nacional, monumento natural ou refúgio da vida silvestre). O órgão ambiental competente estabelecerá, então, o grau de impacto causado pela implantação de cada empreendimento, com fundamento em base técnica específica, bem como definirá as unidades de conservação a serem beneficiadas. Cabe ainda salientar que, caso o empreendimento afete unidade de conservação específica e a sua zona de amortecimento, o licenciamento só poderá ser concedido mediante autorização do órgão responsável pela administração dessa unidade e, mesmo que a unidade de conservação afetada não pertença ao grupo de proteção integral, deverá ser uma das beneficiárias dessa compensação ambiental. Ademais, os proprietários localizados em zonas de amortecimento de UC de Proteção Integral são elegíveis para receber apoio técnico-financeiro da compensação ambiental com a finalidade de recuperação e manutenção de áreas prioritárias para gestão da unidade (art. 41, § 6º do Código Florestal).

3.5 Modalidades contratuais voluntárias

- 85 A servidão ambiental e a servidão florestal foram respectivamente instituídas, no direito brasileiro, pela Medida Provisória nº 2166-67/2001, que alterou o Código Florestal de 1965, e pela Lei nº 11.284/06, que dispõe sobre concessão de florestas públicas. Trata-se de instrumentos de autolimitação do uso de terras, por parte dos proprietários, para preservação e conservação ambiental, obtendo-se benefícios como incentivos tributários e facilidades para arrecadar recursos para investir nessas áreas.
- 86 O Novo Código Florestal equiparou esses dois tipos de servidão, ao estabelecer a possibilidade de o proprietário ou possuidor de imóvel limitar o uso de parte de sua propriedade ou da totalidade dela para preservar, conservar ou recuperar os recursos ambientais existentes. Trata-se do instituto da servidão ambiental, que pode contemplar áreas para preservação, conservação ou recuperação ambiental, submetendo-se essa área às mesmas restrições de uso ou exploração a que se submete a área de reserva legal. Não podem ser objeto de servidão ambiental as áreas de preservação permanente e a reserva legal exigida por lei (art. 9º-A, § 2º da Lei 6.938/81).
- 87 Estabelecidas por instrumento público ou particular ou ainda perante órgão ambiental, a servidão ambiental terá o prazo mínimo de 15 anos, ou poderá ser perpétua, e, nesse último caso, equivale, para fins creditícios, tributários e de acesso aos recursos de fundos públicos, à categoria de manejo de unidade de conservação denominada “Reserva Particular do Patrimônio Natural” – RPPN. Proíbe-se, durante o prazo de sua vigência, a alteração da destinação da área, nos casos de transmissão do

imóvel a qualquer título, de desmembramento ou de retificação dos limites do imóvel. O detentor da servidão ambiental pode aliená-la, cedê-la ou transferi-la, total ou parcialmente, por prazo determinado, ou em caráter definitivo, em favor de outro proprietário ou de entidade pública ou privada que tenha a conservação ambiental como fim social (art. 9º-B, § 3º da Lei 6.938/81).

- 88 Entre os deveres legais do proprietário do imóvel serviente estão, além de outras obrigações contratuais, as seguintes: a) manter a área sob servidão ambiental, o que implica em deveres de conservação da biodiversidade e da conectividade; b) prestar contas ao detentor da servidão ambiental sobre as condições dos recursos naturais ou artificiais; c) permitir a inspeção e a fiscalização da área pelo detentor da servidão ambiental (art. 9º-C § 2º da Lei 6.938/81). Já o detentor da servidão tem os seguintes deveres legais, além das obrigações estipuladas no contrato: a) documentar as características ambientais da propriedade; b) monitorar periodicamente a propriedade para verificar se a servidão ambiental está sendo mantida; c) prestar informações necessárias a quaisquer interessados na aquisição ou aos sucessores da propriedade; d) manter relatórios e arquivos atualizados com as atividades da área objeto da servidão; e) defender judicialmente a servidão ambiental (art. 9º-C § 3º da Lei 6.938/81).
- 89 Em termos econômicos, a instituição de servidão ambiental pode ser utilizada para compensar reserva legal extra propriedade e, nesse caso, requer-se a averbação na matrícula de todos os imóveis envolvidos. Além disso, áreas sob o regime de servidão ambiental podem gerar cota de reserva ambiental, que é um título nominativo, representativo de área com vegetação nativa existente ou em processo de recuperação (cf. item 3.6.2 cota de reserva ambiental e mercado de carbono).
- 90 Interessante destacar que, embora envolvendo a questão contratual em um contexto urbano – Loteamento City Lapa –, decisão do Superior Tribunal de Justiça (STJ) enfrentou a questão da restrição convencional *versus* restrição legal. Nesse caso, contratantes originais, com a chancela do Poder Público – prévio licenciamento urbanístico-ambiental, com o consequente registro imobiliário – estabeleceram restrições urbanístico-ambientais contratuais, restrições essas que são transmitidas junto e inseparavelmente com o imóvel. Como relata nesse Acórdão o Ministro Herman Benjamin (STJ, Recurso Especial nº 302.906 - SP 2001/0014094-7, 26/10/2010), as restrições urbanístico-ambientais denotam a um só tempo interesse público e interesse privado e '*incorporam uma natureza propter rem, no que se refere a sua relação com o imóvel e aos seus efeitos sobre os não-contratantes, uma verdadeira estipulação em favor de terceiros (individual e coletivamente falando), sem que os proprietários sucessores e o próprio empreendedor imobiliário original percam o poder e a legitimidade de fazer respeita-las*'. Alterações posteriores via legislativa, flexibilizando as restrições urbanístico-ambientais, são permitidas se fundamentadas e lastreadas no interesse público e tendo um caráter excepcional. O exercício de tal faculdade de que é titular o Poder Público, prossegue o Ministro Benjamin, submete-se ao princípio da não-regressão ou princípio da proibição do retrocesso, que consiste '*na garantia de que os avanços urbanístico-ambientais conquistados no passado não serão diluídos, destruídos ou negados pela geração atual ou pelas seguintes*'.

3.6 Mecanismos de incentivo

- 91 Os instrumentos de incentivo econômico para a conservação da biodiversidade e implementação da conectividade visam dar efetividade ao princípio do protetor-beneficiário, que se traduz pela necessidade de compensar aqueles que protegem o meio ambiente. Assim, a Lei nº 12.651/2012, Novo Código Florestal, prevê instrumentos econômicos e financeiros para alcançar o desenvolvimento sustentável em matéria de conservação da biodiversidade e que podem assegurar igualmente a conectividade.
- 92 Os programas de apoio e incentivo à conservação do meio ambiente, de acordo com o art. 41 da Lei nº 12.651/2012, poderão contemplar as seguintes modalidades: a) o pagamento ou incentivo a serviços ambientais como retribuição monetária ou não, às atividades de conservação e melhoria dos ecossistemas e que gerem serviços ambientais, isolada ou cumulativamente – tal como a conservação da biodiversidade e a manutenção de APPs, de reserva legal e áreas de uso restrito; b) compensação pelas medidas de conservação ambiental, necessárias ao cumprimento das normas sobre proteção da vegetação nativa – como, por exemplo, linhas de financiamento para atender iniciativas de preservação voluntária de vegetação nativa; c) incentivos para comercialização, inovação e uso sustentável das florestas e demais formas de vegetação.

- 93 Há a previsão de que o pagamento ou o incentivo a serviços ambientais sejam prioritariamente destinados a agricultores familiares, populações tradicionais, povos indígenas e remanescentes de quilombos (art. 41, § 7º). O Novo Código Florestal estabelece que o programa de serviços ambientais tem como objetivo a criação de um mercado de serviços ambientais, considerando-se que as atividades de manutenção das APPs, reservas legais e áreas de uso restrito são elegíveis para quaisquer pagamentos ou incentivos por serviços ambientais e configura adicionalidades para fins de mercados nacionais e internacionais de reduções de emissões certificadas de gases de efeito estufa (art. 41, §§ 4º e 5º). Para a emissão da Cota de Reserva Ambiental (CRA), título nominativo, representativo de área com vegetação nativa ou em processo de recuperação (art. 44), o proprietário deve apresentar, entre outros documentos, a cédula de identidade (pessoa física) ou o ato de designação do responsável (pessoa jurídica). Ora veja-se, se as populações tradicionais, povos indígenas e comunidades quilombolas tem lutado pelo seu reconhecimento como sujeitos coletivos, a representação “tradicional” de pessoa jurídica nem sempre corresponde a uma realidade para tais populações, povos e comunidades. Essa questão da representação pode conduzir a nos indagarmos se a prioridade estabelecida na legislação lhes será efetivamente conferida.

4 Uma Análise Crítica

- 94 Muito embora a melhor estratégia para a preservação da biodiversidade *in situ* seja a criação de espaços territoriais especialmente protegidos, que abarcam não apenas as unidades de conservação, mas qualquer outra área, instituída pelo Estado, que confira proteção jurídica, integral ou parcial, de seus elementos naturais (Leuzinger, 2009), ilhas de preservação não garantem bons resultados. Assim como ocorre nas ilhas oceânicas, o isolamento das áreas protegidas acaba reduzindo o tamanho das populações locais e interrompendo o fluxo gênico de fauna e flora, o que tem como consequência a insustentabilidade da preservação de muitas espécies a longo prazo (Ganem, 2007). Isso porque, como aponta Bensusan (2006: 62), a redução da variabilidade genética conduz a uma diminuição da plasticidade da espécie e gera dificuldades para a adaptação a mudanças ambientais. Pontua a autora que os fragmentos ‘são mais suscetíveis aos riscos demográficos e genéticos associados com o pequeno tamanho da população, com o efeito das bordas do habitat e com os perigos enfrentados pelos organismos ao se moverem entre os fragmentos’. Em outras palavras, a simples instituição de espaços ambientais não significa que a biodiversidade será preservada, pois ilhas de conservação em meio a um mar de devastação em geral conduzem à extinção de espécies que necessitam de áreas maiores para sua reprodução.
- 95 O estudo que realizamos permitiu constatar que a legislação brasileira tem instrumentos que podem promover a implementação e a manutenção da conectividade, dentre os quais, a criação e a manutenção dos espaços territoriais especialmente protegidos. Entre esses se encontram os corredores ecológicos, os corredores de conservação da biodiversidade (CCB) e as zonas de amortecimento de unidades de conservação. Os dois primeiros, corredores ecológicos e corredores de conservação da biodiversidade, visam a conter os efeitos nefastos da fragmentação de *habitats*, a partir da conservação da conectividade dos espaços protegidos, o que proporciona um aumento de sua área e, consequentemente, torna viáveis diferentes espécies. As zonas de amortecimento, por outro lado, buscam conter os efeitos de borda das unidades de conservação, por meio de restrições às atividades antrópicas que nelas podem ser praticadas.
- 96 Entretanto, é necessário ressaltar algumas impropriedades que podem ser apontadas no Decreto que regulamenta a Lei do SNUC e, particularmente, no que tange ao instituto dos corredores ecológicos. A regulamentação da Lei do SNUC foi realizada pelo Decreto nº 4.340, de 2002 que, em seu art. 11, estabeleceu que os corredores devem ser reconhecidos em ato do Ministério do Meio Ambiente e integram os mosaicos para fins de sua gestão. O parágrafo único deste artigo previu ainda que, na ausência de mosaico, o corredor ecológico terá o mesmo tratamento da zona de amortecimento da UC. Há impropriedades que podem ser apontadas nesse dispositivo. Inicialmente, o art. 25 da Lei do SNUC determina que os limites e as normas referentes aos corredores ecológicos podem ser definidos no ato de criação da unidade de conservação ou posteriormente, não sendo mencionada a necessidade de reconhecimento pelo Ministério do Meio Ambiente. Isso porque, caso seja o corredor instituído pelo próprio ato de criação da UC, em geral Decreto expedido pelo Chefe do Poder Executivo, não há razão para novo ato de reconhecimento, que, por sua vez, não teria qualquer

espaço para juízo de conveniência ou oportunidade ou para o desempenho de qualquer outra função relevante.

- 97 Por outro lado, como nem sempre haverá a constituição de mosaicos (conjunto de unidades de conservação e outras áreas protegidas), a atribuição, conforme estabelece o Decreto regulamentador, de tratamento semelhante aos corredores daquele dispensado às zonas de amortecimento também é inadequada, pois trata-se de institutos com finalidades distintas e que requerem, por essa razão, tratamento também diferenciado.
- 98 No que diz respeito aos espaços territoriais especialmente protegidos pelo Código Florestal, a diminuição da largura das APPs em razão da alteração da forma de seu cálculo contraria o próprio conhecimento científico obtido nos últimos anos. Aliás, como afirma Metzger (2010:2), tal conhecimento científico '*permite não apenas sustentar os valores indicados no Código de 1965 em relação à extensão das Áreas de Preservação Permanente, mas na realidade indicam a necessidade de expansão destes valores para limiares mínimos de pelo menos 100 m (50 m de cada lado do rio), independentemente do bioma, do grupo taxonômico, do solo ou do tipo de topografia*'.
- 99 No que tange à previsão legal de corredores, pode-se concluir no sentido de que as APPs e as áreas de reserva legal tanto podem colaborar na formação de corredores ecológicos, previstos pelo SNUC, como podem servir para conectar outras espécies de áreas protegidas e fragmentos de vegetação nativa, conformando os chamados corredores genéricos, extremamente relevantes para aumentar a área total protegida no Brasil. Além disso, numa perspectiva mais ampla, a criação dos grandes corredores de conservação da biodiversidade permitirão a proteção do ambiente natural em escala regional, a partir de estratégias para a conservação da diversidade biológica nos *hotspots* e nas grandes regiões naturais. A abordagem da conectividade não pode estar dissociada de uma estratégia de preservação de espaços.

5 Siglas e Abreviaturas

OTCA	Tratado de Cooperação Amazônica
APAs	Áreas de Proteção Ambiental
APPs	Áreas de Preservação Permanente
CCB	Corredores de Conservação da Biodiversidade
CDB	Convenção da Diversidade Biológica
CMS	Convenção sobre a Conservação das Espécies Migratórias de Animais Silvestres
CONABIO	Comissão Nacional de Biodiversidade
CONAMA	Conselho Nacional do Meio Ambiente
CNPq	Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brasil
CEs	Corredores Ecológicos
ZEE	Zoneamento Ecológico Econômico
RIMA	Relatório de Impacto do Meio Ambiente
EIA	Estudo de Impacto Ambiental
ETEPs	Espaços Territoriais Especialmente Protegidos
FUNBIO	Fundo Brasileiro para a Biodiversidade
IAC	Convenção Interamericana para a Proteção e Conservação das Tartarugas Marinhas
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis
IBGE	Instituto Brasileiro de Geografia e Estatística
UICN	União Internacional para a Conservação da Natureza
IBDF	Instituto Brasileiro de Desenvolvimento Florestal
MMA	Ministério do Meio Ambiente
APs	Areas Protegidas
PARBA	Plano de Ação Regional para a Biodiversidade Amazônica
PNAP	Plano Nacional de Áreas Protegidas
PNMA	Política Nacional de Meio Ambiente
PNRH	Política Nacional de Recursos Hídricos
PROBIO	Projeto de Conservação e Utilização Sustentável da Diversidade Biológica Brasileira
PRONABIO	Programa Nacional de Diversidade Biológica
RL	Reserva legal (áreas)
RPPNs	Reservas Particulares do Patrimônio Natural
SNUC	Sistema Nacional de Unidades de Conservação
STF	Supremo Tribunal Federal
STJ	Superior Tribunal de Justiça
TDAs	Títulos da Dívida Agrária
UCs	Unidades de Conservação

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Connectivity Conservation in the European Union

Jonathan Verschuuren and Mariya Gromilova

1 Introduction

- 1 This case study deals with connectivity in the European Union (hereafter: EU). We will mainly focus on the EU level, as it is impossible within the scope of the case study to deal with the implementation of all of the relevant EU law within 27 different domestic legal systems. Section 5, however, gives an overview of selected connectivity examples in a variety of EU Member States across the continent. A more in-depth analysis of one EU Member State is presented in the separate case study on the Netherlands.

2 International and Regional Context

- 2 The EU presents a unique legal setting. While EU law is based upon international treaties, its Member States have transferred part of their sovereignty to the institutions of the EU. That is why the EU legislature is able to set rules and regulations that may immediately and directly apply within the territory of its Member States. Domestic authorities have the obligation to implement these provisions, and citizens and NGOs may invoke them before national courts, either through the implemented provisions, or directly where the provision of the Directive has direct effect (which, basically, is the case when a provision was not implemented and is specific enough to be applied directly). Citizens and NGOs may also lodge complaints with the European Commission against the authorities of a Member State. The Commission investigates these complaints and may decide to start an infringement procedure on the basis of such complaints. Currently (2013), the EU has 27 Member States: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom. Nine more countries are in the process of accession: Albania, Bosnia and Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, Iceland, Kosovo, Montenegro, Turkey and Serbia.
- 3 EU nature conservation law has to be considered in an international context. The EU, as an international organization, is a party to the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention).¹ This convention aims to protect certain species of wild flora and fauna, both through species conservation measures and through the protection of natural habitats of the listed species. The convention pays particular attention to migratory species, hence the involvement of some African states. The EU implemented the convention through the Birds and Habitats Directives, which will be dealt with below. It must be noted that the EU Member States also signed and ratified the Bern Convention individually. Therefore, the EU Member States are bound by the convention through international law, and have to implement the EU Directives under EU law. Generally speaking, EU law implementing international conventions tends to be more specific and more strict than the underlying international conventions. As a consequence Member States usually focus their attention on the relevant EU law, and thus comply more or less automatically with the relevant international convention. This is also true for the Bern Convention.

¹ Bern, 19 September 1979, CETS no. 104.
See http://www.coe.int/t/dg4/cultureheritage/nature/Bern/default_en.asp.

3 EU Connectivity Law

3.1 Conservation Legislation

- 4 The two basic instruments through which the EU's biodiversity is protected are the EU Birds Directive² and the Habitats Directive.³ These Directives together institute an ecological network through a legally binding set of rules for all of the 27 EU Member States. All of these Member States have to designate the most important terrestrial and marine areas within their jurisdiction for
- a) the species of birds listed in Annex I of the Birds Directive;
 - b) all regularly occurring migratory species of birds not listed in Annex I, particularly those occurring in wetlands;
 - c) the more than 200 habitat types (various types of forests, wetlands, meadows, mountainous areas etc.) listed in Annex I of the Habitats Directive;
 - d) the species of animals and plants listed in Annex II of the Habitats Directive.
- 5 By 2011, a total of 26,106 sites had been designated, totalling 949,910 km², which equals 17,51% of the EU's terrestrial area and 21% of the EU's marine area.⁴
- 6 Once designated, a series of legal obligations apply:
- For each site, EU Member States have to establish necessary conservation measures to maintain, or where appropriate, restore relevant habitat types and species.⁵ It is clear that the conservation status of many habitat types and species is less than favorable. As the conservation status, for the whole of the EU, of 40%-85% of terrestrial habitats listed in Annex I of the Habitats Directive is unfavourable,⁶ far-reaching restoration measures are necessary
 - Where a site is deteriorating or where there is a threat of deterioration, EU Member States have to take appropriate steps to protect these sites.⁷ On the basis of this provision, many court proceedings are successfully initiated against Member States that have not taken adequate measures.⁸
 - Projects that potentially have a significant effect on a Natura 2000 site may proceed only after an assessment has shown that the site's ecological integrity will not be adversely affected.⁹ The EU Court of Justice has made it very clear that the precautionary principle plays an important role here: where doubt remains as to the absence of adverse effects on the integrity of the site, that is, on the site's conservation objectives, the competent authority cannot authorize the project.¹⁰ As a consequence, in most EU member states, the judiciary now usually tests whether an appropriate assessment has been

² Directive 79/409/EEC of the European Council of 2 April 1979 on the conservation of wild birds, (1979) OJ L 103 (Birds Directive). In 2009, a codified version was adopted as Directive 2009/147/EC, (2009) OJ L 20/7.

³ Directive 92/43/EEC of the European Council of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, (1992) OJ L 206 (Habitats Directive).

⁴ Data available from http://ec.europa.eu/environment/nature/natura2000/db_gis.

⁵ Article 4(1) of the Birds Directive and Article 6(1) of the Habitats Directive.

⁶ EEA 2009. The only positive exceptions seem to be some species of birds, Donald et al. 2007.

⁷ Article 6(2) of the Habitats Directive, which also applies to Natura 2000 sites designated under the Birds Directive.

⁸ Such as the famous case in which the EU Court of Justice ordered the Polish authorities to immediately suspend several road projects connected to the construction of the Via Baltica highway (*Commission v. Poland*, case no. C-193/07 R, 18 April 2007). Spain was condemned for authorizing irrigation inside the perimeter of two sites that created a negative impact on steppe-land bird species (*Commission v. Spain*, case no. C-186/06, 18 December 2007), and Ireland for not sufficiently addressing overgrazing in a blanket bog site, causing a decline in the number of Greenland white fronted-geese (*Commission v. Ireland*, case no. C-117/00, 13 June 2002).

⁹ Article 6(3) of the Habitats Directive, which also applies to Natura 2000 sites designated under the Birds Directive (through Article 7 of the Habitats Directive).

¹⁰ *Landelijke Vereniging tot Behoud van de Waddenzee v. Staatssecretaris van Landbouw*, case no. C-127/02, 7 September 2004; J. Verschuren, Shellfish for Fishermen or for Birds? Article 6 Habitats Directive and the Precautionary Principle, (2005) *Journal of Environmental Law* 17:2, p. 265-283.

carried out and, if not, is prepared to stop projects. Another consequence, especially interesting for the issue of connectivity, is the fact that mitigation measures are increasingly designed into projects. Developers and authorities often argue that because of the mitigation measures, the overall impact of the project is not negative. The appropriate assessment has to show that this indeed will be the case. A recent example in the Netherlands where this practice will be applied on a huge scale is the development of the Markermeer-IJmeer shallow-lake ecosystem, a project that combines housing, recreation, water surplus storage (to combat one of the consequences of climate change for this area: increased supply of river water), and nature conservation. The plan entails the construction of some 60,000 houses on islands, as well as the creation of wetland habitats. With the latter, it is hoped that the conservation status of both these Natura 2000 sites will improve, not just toward the legally required minimum, but beyond. This “ecological surplus” is anticipated to function as a buffer and enable the site to support the planned economic and social developments.¹¹ This development opens the opportunity for connectivity measures to be included in big infrastructure and other projects.

- The Habitats Directive has a derogation clause that offers a “way out” in case an assessment of a project deemed of high public interest and utility reveals that it will harm the integrity of a Natura 2000 site, and hence the authorities will not be able to authorize the project. In these circumstances, a project can still be approved if the following criteria are met:¹² there are no alternative solutions, the project must be carried out for imperative reasons of overriding public interest, all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected are taken, and the European Commission is informed of the compensatory measures. Again, these compensatory measures may very well include measures aimed at creating or enhancing connectivity between Natura 2000 sites and/or other protected areas.

7 Although the Habitats Directive is explicitly aimed at establishing a ‘coherent ecological network’, the above provisions do not necessarily lead to the creation of a real network. In fact, when looking at the Natura 2000 map,¹³ it is obvious that some member states have succeeded pretty well in using the instrument to create a network, whereas others have mainly designated isolated protected areas. For this latter situation, Articles 3(3) and 10 of the Habitats Directive are particularly relevant. Article 3(3) provides that Member States shall endeavour to improve the ecological coherence of Natura 2000 by maintaining, and where appropriate developing, features of the landscape which are of major importance for wild fauna and flora, as referred to in Article 10. The latter provision invites¹⁴ Member States, in their land-use planning and development policies, to maintain and develop features of the landscape which are of major importance for wild fauna and flora as a possible way to improve the ecological coherence of the Natura 2000 network. The European Commission issued a guidance document on Article 10 which, although not legally binding, aims to ‘help develop and implement integrated ecological connectivity related measures’ to maintain and restore connectivity and to respond to the impacts of climate change.¹⁵ The guidance document makes a big step forward by acknowledging that climate change requires flexibility in protected area management instead of only aiming for preservation within specific fixed locations.¹⁶ It only provides recommendations to the Member States for the implementation of Article 10, which is discretionary.

8 Despite the fact that many EU Member States use the Birds and Habitats Directives as a basis for far reaching connectivity policies and projects, there is some doubt as to the existence of a firm legal obligation that forces the authorities to implement the Natura 2000 connectivity practices in the EU described above. As stated above, the wording of Articles 3(3) and 10, which focus on connectivity, is not particularly strong. More and more authors, though, argue that from the combinative of this

¹¹ Samenwerkingsverband Markermeer-IJmeer (SMIJ), Investing in Markermeer and IJmeer, 2008, online publication at <http://www.markermeerijsmeer.nl/homedownloads/Engels/default.aspx>.

¹² Article 6(4) of the Habitats Directive, which also applies to Natura 2000 sites designated under the Birds Directive.

¹³ See the interactive map at <http://natura2000.eea.europa.eu>.

¹⁴ Article 10 literally states that the member states ‘shall endeavour, where they consider it necessary ...’. Hence, this provision is deemed to be not legally binding.

¹⁵ M. Kettunen, A. Terry, G. Tucker and A. Jones. 2007. Guidance on the maintenance of landscape connectivity features of major importance for wild flora and fauna: Guidance on the implementation of Article 3 of the Birds Directive (79/409/EEC) and Article 10 of the Habitats Directive (92/43/EEC). Brussels: SIEEP, 2007, p. 10.

¹⁶ Ibid., p. 47.

provision and the other provisions of both Directives, Member States in fact are *required* to take connectivity measures.¹⁷

- 9 Recent case law, albeit not based on Articles 3(3) and 10, seems to underpin this. In a 2011 case, the EU Court of Justice found that a mining project *within* a Natura 2000 site created a barrier between two breeding areas of the brown bear because of noise and vibrations.¹⁸ Between those two areas, there is a transit route, with a width of 10 kilometres, that is of great importance for the western population of the brown bear. The Court found that there was a risk of deterioration, and closure of the corridor might result in the western population being fragmented into two sub-populations and even in the species finally being divided into three populations. Hence, it concluded that the mining operations were contrary to Article 6(2) of the Habitats Directive. The Court found that there was also a breach in Article 6(2) regarding the cutting of a corridor between two subpopulations of Capercaille, one of which was located outside the site. This is even more interesting, as it seems to indicate that this provision also protects the subpopulations located outside the site to which the site's population is connected.
- 10 Although this case does not indicate that connectivity measures *between* protected areas are required, it does show that the authorities must have an eye on populations of species outside of the protected area. Additionally, it is fixed case law of the EU Court of Justice that activities outside of a Natura 2000 site that have a negative impact on the site, fall under the scope of the Directive.¹⁹ Taking this case law into account, the conclusion cannot be other than that destroying a corridor that leads to the deterioration of a site is not allowed either.
- 11 More broadly, the Habitats Directive sets a result obligation for member states to ensure a “favourable conservation status” for all species of Community interest and for typical species in natural habitats of Community interest (art. 2.2). Such status can't be reached without ensuring that a population “is maintaining itself on a long-term basis as a viable component of its natural habitats” (art. 1, i). No doubt, from a scientific point of view, connectivity is an important factor of population viability²⁰.
- 12 Policy documents, however, seem to be lagging behind these recent developments in case law. In its recent White Paper on adaptation, the European Commission does state that ‘in future it may be necessary to consider establishing a permeable landscape in order to enhance the interconnectivity of natural areas’,²¹ thereby seemingly acknowledging that the current Natura 2000 regime does not sufficiently require connectivity between natural areas to allow for species migration when climatic conditions change.
- 13 The goal of enhancing connectivity is also apparent from the recent discussions on introducing the concept of wilderness conservation. It is argued that relying on the wilderness concept would be beneficial for improving interconnectivity of protected areas to help species adapt to changing weather patterns and changing temperatures.²² However, the White Paper only lists one concrete action with regard to the Natura 2000 regime: ‘draft guidelines by 2010 on dealing with the impact of climate change on the management of Natura 2000 sites’.²³
- 14 Like the White Paper, the aforementioned ‘Biodiversity Strategy 2020’, which was published in a reaction to the conclusion that the 2010 target to halt the loss of biodiversity had not been met, almost completely relies on existing legal instruments. The strategy does state that spatial planning is

¹⁷ Particularly A. Trouwborst, *Conserving European Biodiversity in a Changing Climate: The Bern Convention, the European Union Birds and Habitats Directives, and the Adaptation of Nature to Climate Change*, (2011) *Review of European Community and International Environmental Law* 20(1), 62-77.

¹⁸ ECJ 24 November 2011, Case C-404/09 European Commission v Spain (Alto Sil).

¹⁹ ECJ 25 November 1999, Case C-96/98 European Commission v France (Poitevin marshes).

²⁰ See Ch.-H. Born, “La cohérence écologique du réseau Natura 2000” in *Natura 2000 et le droit*, Bruxelles, Bruylant, 2004, p. 163.

²¹ European Commission, *Adapting to climate change: Towards a European framework for action*. White paper, COM (2009) 147 final, p. 11.

²² C.J. Bastmeijer, An overview of wilderness and wildlife land. Documentary material 06, Conference on Wilderness and Large Natural Habitat Areas, Prague, Czech Republic, May 27-28 2009, www.wildeurope.org/attachments/030_06wilderness_law.pdf.

²³ Id. (supra note 21), p. 11.

essential to ensure better functional connectivity between ecosystems within and between Natura 2000 areas and in the wider countryside.²⁴ It does not, however, propose to set new rules to force Member States to apply spatial planning law as indicated. This would be difficult indeed, because spatial planning is not regarded as an issue on which the EU is competent (see further section 3.3 below). That is probably why the 2011 policy document suggests using the EU's financial instruments, such as the LIFE subsidy instrument, to stimulate stakeholders to create connectivity (see further section 3.6 below).²⁵

3.2 Sustainable Use Legislation

- 15 Two other EU Directives are important to mention because of their inherent need to take into account connectivity conservation if they are to be effective. The first is the EU Water Framework Directive which approaches water management from a river basin level. The second is the EU Marine Strategy Framework Directive dealing with marine and coastal waters.

3.2.1 EU Water Framework Directive

- 16 Since the EU has extensive policy and law in place in the field of water management, and since waters, by nature, often are important connectivity elements, it is relevant to briefly indicate the instruments that can be used to create wet connectivity. The EU's guidance document on Article 10 of the Habitats Directive,²⁶ notes that the EU Water Framework Directive of 2000 ('WFD')²⁷ 'provides a good opportunity to manage river basins at transnational scale'.²⁸ The goal of the WFD is to prevent European waters and their ecosystems from (further) deterioration and to promote sustainable water use. A further goal is to soften the effects of floods and droughts. To achieve this, Member States are obliged to designate river basin districts and draw up a River Basin Management Plan (RBMP) for each district.²⁹ Where necessary, basins must be designated internationally. EU Member States are to ensure coordination of the management of these international river basins together. In this respect, the WFD calls for transboundary cooperation.³⁰ Although the WFD does not explicitly mention obligations to implement the provisions of the Habitats Directive, it 'has been seen to provide important support to the management and monitoring of the Natura 2000 network in the future'.³¹ Since river basins often cross borders, Member States should explore ways to use 'the framework provided by the WFD to prevent fragmentation and enhance connectivity between Member States'.³² In fact, the WFD states that 'river continuity' is one of the elements that constitute a good ecological status, which is one of the basic goals that need to be achieved. Further integration between the WFD and Habitats Directive could be achieved by integrating connectivity issues into the RBMPs, as the Guidance advises. The WFD itself does not mention climate change. The EU Guidance, however, discusses climate change in relation to the WFD. Since the WFD is still in the process of being implemented, Member States are advised to 'actively support capacity building in relation to the importance and value of inland water ecosystem biodiversity, including issues related to the maintenance of ecosystems services and climate change'.³³
- 17 The WFD underlies many bilateral and or multilateral treaties among European riparian States to address necessary cooperation at river basin level. These treaties often contain connectivity

²⁴ Id. (supra note 21), p. 5.

²⁵ Ibid.

²⁶ Kettunen (supra note 15).

²⁷ Directive 2000/60/EC of the European Parliament and the Council of 23 October 2000 establishing a framework for community action in the field of water policy, (2000) OJ L 327 (Water Framework Directive).

²⁸ Kettunen (supra note 15), p. 83.

²⁹ Art. 4(1).

³⁰ Art. 3(4).

³¹ Kettunen (supra note 15), p. 82.

³² Ibid., p. 83.

³³ Id.

elements, for instance with the aim of removing barriers for migrating fish. For example, the Rhine Convention,³⁴ has among its main goals:³⁵

maintaining, improving and restoring the natural function of the waters; ensuring that flow management (...) promotes interactions between river, ground water and alluvial areas; conserving, protecting and reactivating alluvial areas as natural floodplains; conserving, improving and restoring the most natural habitats possible for wild fauna and flora in the water, on the river bed and banks and in adjacent areas, and improving living conditions for fish and restoring their free migration.

- 18 Specific programmes have been designed to achieve these goals, such as the 'Rhine 2020' programme adopted in 2001.³⁶ Connectivity is at the core of this programme. Along the entire river, valuable habitat types are maintained, upgraded and connected. Specific measures include:

- preserving free flowing river sections
- restoring river dynamics
- creating a more varied design of the structure of river banks and bottoms
- opening old alluvial areas to the river
- changing to more extensive agriculture in the floodplain
- removing obstacles to the migration of the river fauna³⁷
- reconnecting old river branches and torrents.

3.2.2 EU Marine Strategy Framework Directive

- 19 The EU Marine Strategy Framework Directive (MFSD) sets the framework for Member States to achieve 'good environmental status' for their respective marine areas by 2020.³⁸ Although the MFSD does not explicitly refer to connectivity, it is clear that in fact connectivity determines 'good environmental status':

"good environmental status" means the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations, i.e.: (a) the structure, functions and processes of the constituent marine ecosystems, together with the associated physiographic, geographic, geological and climatic factors, allow those ecosystems to function fully and to maintain their resilience to human-induced environmental change. Marine species and habitats are protected, human-induced decline of biodiversity is prevented and diverse biological components function in balance (...).³⁹

- 20 The MFSD and the WFD partly overlap, as the scope of both includes coastal waters. Biodiversity conservation is at the core of the MFSD, and it is expected that much of the implementation of the marine strategy will take place through marine spatial planning. The MFSD explicitly links to the Birds and Habitats Directives, as marine areas form part of the Natura 2000 network as well. The protection and management of marine Natura 2000 sites must be integrated in the marine strategy under the

³⁴ Convention on the protection of the Rhine, Bern, April 12th, 1999.

³⁵ Art. 3(1)(c) and (d).

³⁶ Rhine 2020, Programme on the sustainable development of the Rhine, available at the website of the International Commission for the Protection of the Rhine, at <http://www.iksr.org>.

³⁷ A detailed and comprehensive programme is in place to restore a viable population of wild Atlantic salmon in the Rhine, see the programme 'Salmon 2020', available at <http://www.iksr.org>.

³⁸ Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy, (2008) OJ L 164 (Marine Strategy Framework Directive).

³⁹ Article 3(5). In Annexes III and IV this has been elaborated in much more detail.

MFSD. As such, the connectivity requirements under the Birds and Habitats Directives will apply equally to marine policy and law under the MFSD.

3.3 Land Use/Spatial Planning Legislation

- 21 The EU has no competence in the field of land use/spatial planning. Art. 4 of the Treaty on the Functioning of the EU (TFEU) lists the fields on which the EU has a shared competence with its Member States. The environment and agriculture are part of this list, spatial planning is not. As will be shown below in section 5, and as is particularly obvious from the case study of the Netherlands, planning law does play a major role in connectivity conservation throughout the EU. This, however, is then always based on domestic law, and not on EU law. It should also be mentioned that at the domestic level, spatial planning law *can* be used to implement EU law. This, however, is the national legislature's choice. EU law cannot force its Member States to do so. This is also the reason why Art. 10 of the Habitats Directive only invites Member States to use land use and planning law to create connectivity (see section 3.1).

3.4 Development Control Legislation

3.4.1 Pollution control legislation

- 22 The permit system introduced by the EU's Industrial Emissions Directive (IED), and its predecessor the Integrated Pollution Prevention and Control (IPPC) Directive, is an example of a differentiated system of setting pollution controls, with a view to limiting the negative impact on nearby natural areas.⁴⁰ Under this Directive, installations of certain types of industry as well as large scale agricultural animal-keeping installations (bio-industry) have to obtain a permit in which emission limit values are to be laid down in order to attain a high level of protection for the environment as a whole.⁴¹ One of the provisions of the Directive stipulates that these emission limit values have to be set taking into account the geographical location of the installation and local environmental conditions.⁴² This provision requires the competent authority to take into account the presence of a connectivity area or connectivity landscape feature in the vicinity of the installation.

3.4.2 Environmental impact assessment legislation

- 23 In Europe, the impact of a project on connectivity has to be included in any EIA. A recent example that came before the EU Court of Justice is an EIA that was carried out to assess the impact of open-cast mining projects in Spain. The Court examined whether the EIA indeed had paid sufficient attention to the negative impact of these mining projects on connectivity, especially to the question whether the project created any barrier effect between the various pockets of habitat of the brown bear.⁴³
- 24 The EU also imposes a system of strategic assessments upon its member states.⁴⁴ The SEA-Directive, more specifically, imposes upon members states a duty to assess the impact of strategic plans and policy programmes in a strategic environmental assessment (SEA). Although these plans usually are not at this stage aimed at specific activities on a specific site, connectivity still can be a

⁴⁰ Industrial Emissions Directive 2010/75/EU, (2010) OJ L334/17. This Directive will take effect as of 2014. It integrates the provisions of the IPPC-Directive, Directive 2008/1/EC, (2008) OJ L24/8.

⁴¹ Art. 1. This remains unchanged in the Industrial Emissions Directive.

⁴² Art. 9(4). Unfortunately, this provision will be deleted from the Industrial Emissions Directive that will replace the IPPC Directive as of 2014.

⁴³ ECJ 24 November 2011, Case C-404/09 Commission v. Spain (Alto Sil).

⁴⁴ Following Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, (2001) OJ L 197/30.

relevant aspect to assess. If, for instance, a policy plan makes an inventory of the various locations present in a country that are suitable for waste facilities, energy installations or other activities, assessing the potential impact of all of these locations on connectivity should be included in the SEA, so that the impact of connectivity already plays a role in decision-making at this strategic level. Very often, once the choice has been made at the strategic level, it is very difficult if not impossible to make substantial changes at the project level. The same is even more true for regional or national infrastructure decisions, such as routing of highways and railroads. Obviously, such decisions can have a major impact on connectivity as highways and railroad may form massive barriers for wildlife. These decisions are usually made at the strategic spatial planning level. For such decisions, SEAs are extremely relevant. Again it is important that connectivity requirements are well presented and assessed in SEAs.

3.5 Voluntary Contractual Arrangements

- 25 In 1992, as a response to severe biodiversity loss and environmental degradation, the EU started the LIFE programme. LIFE is the EU's most important financial instrument supporting voluntary environmental and nature conservation projects throughout the EU, and some neighbouring countries. Recently, this programme is considered to make a significant contribution to strengthening *green infrastructure*. The concept of green infrastructure plays a vital role in the conservation of the EU's biodiversity and reconnecting already fragmented natural areas. The EU 2020 Biodiversity Strategy⁴⁵ emphasized the importance of using green infrastructure, by setting it as one of its six targets.
- 26 From 1992, LIFE has co-financed around 3104 projects across the EU, contributing approximately €2.2 billion to the protection of the environment.⁴⁶ The current phase of the programme, LIFE+, runs from 2007-2013 and has a budget of €2.143 billion, from which at least 78 percent must be used for project action grants (i.e. LIFE+ projects).⁴⁷ Each year the European Commission launches a call for LIFE+ project proposals. Any public or private body, actors or institutions registered in the European Union, can enter the programme, for example, individual farmers, farmers or other landowners joined together in an association of any kind, NGOs, local governments, etc. Project proposals can be either national or transnational, but the actions must exclusively take place within the territory of the 27 Member States of the European Union. Proposals can be submitted either by a single beneficiary or by a partnership.⁴⁸
- 27 In order for a proposal to be considered, it must be eligible under one of the programme's three components: LIFE+ Nature and Biodiversity, LIFE+ Environment Policy and Governance, and LIFE+ Information and Communication, and satisfy a number of other specified criteria. The applicants must submit their proposals through the Member States' competent national authority, who will forward project proposals to the European Commission. After the Commission has registered the project, the special body which is responsible for evaluation and revision of proposals, will verify admissibility, exclusion and eligibility of the project, and will propose to the LIFE+ Committee a list of projects suggested for co-financing. If the Committee gives a favourable opinion, and within the limits of the funds available, the Commission will decide upon a list of projects to be co-financed. Finally, if the European Parliament approves the project, individual grant agreements can be signed.⁴⁹
- 28 Generally, the maximum amount of co-financing for LIFE+ projects is 50 percent of the total eligible project costs. An exception may be made for LIFE+ Nature proposals that focus on concrete conservation actions for priority species or habitat types of the Birds and Habitats Directives, and then a co-financing rate can be raised to 75 percent of the total eligible costs.⁵⁰

⁴⁵ EC, 2011, Our life insurance, our natural capital: an EU biodiversity strategy to 2020, Communication from the Commission, COM(2011) 244.

⁴⁶ The LIFE programme, available at: <http://ec.europa.eu/environment/life/about/index.htm>.

⁴⁷ EC, 2007, the Financial Instrument for the Environment (LIFE+), Regulation of the European Parliament and of the Council, No 614/2007.

⁴⁸ <http://ec.europa.eu/environment/life/about/index.htm>.

⁴⁹ <http://ec.europa.eu/environment/life/about/index.htm>.

⁵⁰ Co-financing under LIFE+, available at: <http://ec.europa.eu/environment/life/about/index.htm>.

29 LIFE was a key instrument for funding green infrastructure initiatives, even before a coherent strategy on green infrastructure had been developed. In general, LIFE projects do not specifically focus on building green infrastructure. Nevertheless, from LIFE practices, it can be observed that even those projects that focus on habitat restoration, protection of species or integrated planning, have implemented key elements of the concept, and pointed the way for building future green infrastructure policy. LIFE+ Nature and Biodiversity projects and LIFE+ Environment projects have already shown how successfully they can assist the construction of green infrastructure. The more concrete examples of such initiatives which LIFE programmes have co-funded are:

- Conservation of Atlantic salmon in Scotland (CASS project, 2004-2008). The objective of the programme was to protect and contribute to the recovery of salmon, which were disappearing due to migration problems. The actions that have been taken include the removal of 25 obstacles to migration. This allowed salmon to access spawning grounds in the river system, which had been inaccessible before. The LIFE programme contributed € 2,347,908 in this 4 year project.⁵¹
- Demonstration project on land use and environmental management of the physical planning in Gallecs as a biological and stable connector in the fringe space of the Barcelona metropolitan area (GALLECS project, 2001-2004). The objective of the project was to protect Gallecs (the rural area in Barcelona which is serving the role of a metropolitan greenbelt) from urban and industrial pressures and subsequent environmental degradation. The LIFE programme by contributing € 700,691 has helped to contain the fragmentation of natural landscapes and habitats in Gallecs and to reduce the pressure of neighbouring settlements and industry.⁵²
- Corridors for Cantabrian Brown Bear Conservation (Corredores oso project, 2009-2011). The overall objective is to contribute to the recovery of the brown bear in the Cantabrian Mountains by promoting connectivity between isolated bear populations. This was done by supporting local councils and the public living in the inter-populated corridor area to undertake bear conservation and habitat enhancement measures, and by reducing threats such as illegal snares and poisoning in the inter-population corridor. The total LIFE contribution into this project programme is € 825,000.⁵³

30 Ultimately, the experiences of the LIFE projects can provide support for future policy and funding for green infrastructure initiatives. However, in order to achieve a sustainable improvement of EU green infrastructure, other funding sources, apart from LIFE, need to be identified.⁵⁴

3.6 Incentive-based Mechanisms

31 In Europe, incentives for connectivity conservation have been integrated into a more comprehensive subsidy scheme, aiming at supporting farmers' incomes without excessive impact on biodiversity. For decades, the EU Common Agricultural Policy (CAP) has been the source of subsidies for farmers to increase farm efficiency and food production in general (not specifically aimed at, for instance, biodiversity conservation or any other specific goal like individual contracts discussed above). Although this has been a success in the sense that both of these goals have been achieved, negative consequences were felt as well: distorted food markets, surplus products, and loss of biodiversity on agricultural lands. As a consequence, the CAP was reformed in 1999, 2003 and 2009 in order to cut price support and replace it by direct payments to farmers⁵⁵, progressively dissociated from production (first CAP pillar)⁵⁶. These direct payments, vital to most farmers, are contingent on landholder compliance with environmental legislation and good farming practices ("cross-compliance"). In parallel, an ambitious rural development policy has been put in place and co-funded by the EU and

⁵¹ LIFE04 NAT/GB/000250, CASS, Conservation of Atlantic salmon in Scotland , available from the projects database at: <http://ec.europa.eu/environment/life>.

⁵² LIFE02 ENV/E/000200, GALLECS, Demonstration project on land use and environmental management of the physical planning in Gallecs as a biological and stable connector in the fringe space of Barcelona metropolitan area, available from the projects database at: <http://ec.europa.eu/environment/life>.

⁵³ LIFE07 NAT/E/000735, Corredores oso, Corridors for Cantabrian Brown Bear Conservation, available from the projects database at: <http://ec.europa.eu/environment/life>.

⁵⁴ EC, 2010, LIFE building up Europe's green infrastructure: Addressing connectivity and enhancing ecosystem functions, available at: http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/green_infra.pdf.

⁵⁵ From 48% to 32% in 2013 of the EU's budget between 1992 and 2013. Total amount of money involved is currently around 55 billion euro per year (2011).

⁵⁶ Regulation 73/2009/EC, (2009) OJ L30/16.

Member States (second CAP pillar)⁵⁷. It aims at changing farm structures in order to achieve, among other things, environmental goals in the rural landscape. This policy has given birth to various types of conservation payment schemes in all Member States, including agro-environmental payments and financial support to preserve the “rural heritage”. Member States have to implement the rural development policy through “rural development programmes”, subject to environmental assessment and public participation.

- 32 The most ambitious type of payment in the CAP rural development policy is undoubtedly the agro-environment payment. Favouring voluntary action rather than coercion, agro-environmental measures consist of financial assistance provided to farmers who undertake voluntarily, for a fixed period, environmentally friendly commitments exceeding mandatory standards and good agricultural practices, in order to compensate both their loss of income and the resulting implementation costs. All Member States must set up an agro-environmental scheme on their territory, aiming at biodiversity conservation among other things, and fueled by a significant part of the total budget allocated to rural development. Payments may be made through individual contracts, unilateral subsidies or public procurement. Controls on the field and sanctions are to be organized by Member States through a complex “integrated management and control system”. Many types of commitments may be funded under this scheme, including conservation practices with high added value for biodiversity and connectivity. For instance, the Walloon Region (Belgium) provides 450 euros per hectare and per year for conservation and management of species-rich grasslands by farmers. In the Netherlands and in Flanders, payments are provided to farmers who can demonstrate that, through their commitments, selected grassland birds species successfully bred on their lands.
- 33 A new CAP reform is currently in full swing. It will introduce new instruments, especially in relation to the first pillar. In November 2010, the European Commission published a Communication on "the Common Agricultural Policy (CAP) towards 2020".⁵⁸ On 12 October 2011, the Commission presented a set of legal proposals⁵⁹ designed to make the future CAP more effective and to enhance its contribution to the Europe 2020⁶⁰ strategy, including its strategy on biodiversity. The aim is to strengthen the competitiveness and sustainability of agriculture and maintain its presence in all regions, in order to guarantee European citizens healthy and quality food production, to preserve the environment and to help develop rural areas. All suggested options require changes in present CAP instruments. In relation to market policy (the first pillar), all payments are still subject to cross-compliance (see above). However, the funding mechanism of the new CAP requires a review of the way direct payments are distributed. The Commission is proposing to spend 30% of direct payments (called “green payments”) specifically for agricultural practices beneficial to climate change and the environment – through crop diversification, maintenance of permanent pasture, the preservation of environmental reservoirs and landscapes, etc. This will presumably involve a move towards delivering incentives through individual voluntary agreements that focus on the particular attributes of specific areas of land.
- 34 As for the future of rural development policy (second pillar), the new CAP proposals suggest that investments should lift both economic and environmental performance. Furthermore, environmental measures should be more closely linked to the specific needs of regions and even local areas such as Natura 2000 and agricultural areas that have a High Natural Value (HNV areas).⁶¹ Agri-environment-climate payments and organic farming will receive increased support.
- 35 Approval of the different regulations and implementing acts is expected by the end of 2013, after a debate in the European Parliament and the Council. Ultimately, the CAP reform should be complete by January 2014.⁶²

⁵⁷ Regulation 1698/2005/EC, (2005) OJ L277/1.

⁵⁸ EC, 2010, *The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future, Communication from the Commission*, COM(2010) 672.

⁵⁹ http://ec.europa.eu/agriculture/cap-post-2013/legal-proposals/index_en.htm.

⁶⁰ http://ec.europa.eu/europe2020/index_en.htm.

⁶¹ EC, 2010, *The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future, Communication from the Commission*, COM(2010) 672.

⁶² http://ec.europa.eu/agriculture/cap-post-2013/index_en.htm.

- 36 Incentives for connectivity conservation have, thus far, *not* been integrated in the EU ETS, which is the world's largest multi-national greenhouse gas emissions trading scheme. It encompasses all 27 EU member states. Currently, about 40% of greenhouse gas emissions in the EU is governed by the EU ETS. Although the EU adopted far reaching deforestation targets,⁶³ greenhouse gas emitters in the EU are not allowed to purchase avoided deforestation credits created under REDD+ as an alternative to pollution permits. The European Commission decided that recognition of forest credits in the ETS at the present time is not realistic. This is explained by the fact that emissions from deforestation are almost three times higher than the amount of emissions regulated under the EU ETS. As the EU ETS is currently the only major operational trading system in the world, allowing companies to buy avoided deforestation credits would result in serious imbalances between supply and demand in the scheme.⁶⁴ As a result, the European Commission proposed to exclude forest credits from the EU ETS until at least 2020. After that, linking REDD+ to the EU ETS might still be a feasible alternative, but several issues, such as the conditions under which forest credits can be used in the ETS, and monitoring and compliance conditions have to be resolved.

4. A Critical Reflection

- 37 The question that arises is whether the relevant EU-law described above adequately promotes, enables and/or regulates connectivity conservation, and if not, what improvements could be made? It is obvious that the Natura 2000 network, as regulated under the Birds and Habitats Directives, forms an essential building block of connectivity law in Europe. Throughout the continent, large areas have been designated as protected areas, and the regulatory system that applies to these areas is sufficiently strict to offer long-term conservation. Thanks to an effective enforcement mechanism, exercised by the European Commission and the EU Court of Justice, the Birds and Habitats Directives are taken very seriously in the Member States, not just by the competent authorities, but by domestic courts as well.
- 38 An especially strong feature of EU connectivity law is the fact that the strict command-and-control type of rules present in the Birds and Habitats Directives, are accompanied by a range of instruments that offer positive incentives for land-owners and farmers. The LIFE+ programme, for instance, spends billions of Euros on connectivity projects each year.
- 39 This does not mean that improvements cannot be made. The texts of the Directives do not explicitly force Member States to create connectivity between or around individual Natura 2000 sites. Member States are only invited to do so. As will be shown in section 5 below, there are various Member States that, on a voluntary basis, actively promote connectivity under the European framework. In cases where connectivity measures are required to get or keep the species or habitat types for which a given area was designated in a favorable conservation status, it can be argued that connectivity is required. Recently, the EU Court of Justice took exactly this view. With connectivity becoming increasingly important, for instance due to the emerging impact of climate change on biodiversity, it is not unimaginable that case law will further develop along this line.
- 40 Further regulatory action by the European legislature could speed up the process of designing and implementing connectivity measures in the Member States. The legislature could, for instance, reformulate Art. 10 of the Habitats Directive so as to require Member States to take connectivity measures.⁶⁵

⁶³ The objective of halting global forest cover loss by 2030 at the latest, and to reduce gross tropical deforestation by at least 50 % by 2020 compared to current levels, EC, Addressing the challenges of deforestation and forest degradation to tackle climate change and biodiversity loss, Communication from the Commission, 17 October 2008, COM(2008) 645/3.

⁶⁴ Ibid.

⁶⁵ J. Verschuuren, Climate Change: Rethinking Restoration in the European Union's Birds and Habitats Directives, (2010) *Ecological Restoration* 28:4, p. 431-439.

5 National examples of connectivity instruments in European countries

- 41 Even though the potential for promoting connectivity instruments on the national level greatly varies between Western European and Central and Eastern European countries, European countries, generally speaking, are making a significant contribution to combating fragmentation. The differences between parts of Europe can be explained by the diverse natural characteristics, range in population density, traditions, and the capacity of the Member State to implement and promote policies.
- 42 There are several ways in which countries are trying to respond to fragmentation: through policies which do not have binding requirements, as well as through legal channels, or a combination of these. It can be done through integrating the protection of ecological networks in nature policy law, or through identification of biological links between areas in land-planning documents. Policies can also be implemented at different levels (national level, sub-national levels). In general, most of the countries start with spatial planning documents, and then adopt nature protection documents. However, the majority of Western European countries begin with integrating the concept into legislation on nature protection and then start to ensure that those policies are taken into account in spatial planning documents.⁶⁶
- 43 In this section, we target a number of countries to show how European countries are trying to combat fragmentation and promote connectivity: France, Germany, Spain, the United Kingdom, Finland and Slovakia.

5.1 France

- 44 France is one of the largest countries in the European Union with a territory of approximately 551 km². 83 % of the country's territory is covered by agricultural land with about 1.5 million people working on the land and deriving their livelihood from it. Forestry is also of a great importance in France, as 25 % of the country is wooded.⁶⁷
- 45 Geographically and climatically France has a vast diversity of landscapes and rich biodiversity. In 1990, 8.7 % of the total territory of France was designated as nature protection areas, under several protection regimes, such as National parks, Nature reserves, Regional Natural parks. Since then, this number has risen significantly, mainly thanks to the EU Birds and Habitats Directives. In 2011, 12.5 % of the territory was designated under the Natura 2000 framework. This, however, is still well beyond the EU average of 17.5 %. Furthermore, many areas designated under nature conservation laws have other land-use functions as well, such as agriculture, forestry, water management, hunting, tourism and leisure.⁶⁸

5.1.1 The development of national land use planning law

- 46 Current national land use planning law was enacted in France in 1999, the Voynet Act 1999 (Act 99-533 of 25 June 1999). New law has replaced the previous 1995 single planning scheme with nine planning schemes, one of which is dedicated to 'natural and rural areas'. Among other things, the Act called for the establishment of corridors and the extension of protected areas in order to protect biodiversity. Furthermore, it sets a goal to establish by 2020 a nationwide ecological network in accordance with the requirements and principles of the European ecological frameworks.⁶⁹

⁶⁶ PAN-European Ecological Network: Taking Stock, Economical and Social Council, UN, Working Paper No. WGSO-4/2007/22.

⁶⁷ <http://www.state.gov/r/pa/ei/bqn/3842.htm>.

⁶⁸ M.G.G. Neven, F.H. Kistenkas, Eurosites Insights. Image, implementation, interpretation and integration of Natura 2000 in European perspective. Wageningen, Alterra, Alterra-rapport 1222.1, p.70.

⁶⁹ Lausche, Barbara. (2011). Guidelines for Protected Areas Legislation. IUCN, Gland, Switzerland, Box III(1)-9: French land use planning and nature protection.

47 Implementation at the national level is taking place through individual regional plans for each of the country's 22 regions. There are also two levels of legally binding local plans: local municipal plans (Plan local d'Urbanisme) and master plans (Schéma de Cohérence Territoriale) prepared by groups of associated municipalities (intercommunalités). Master plans and local municipal plans are governed by the Land Use Planning Code, which gives municipal authorities the power to identify and protect sites, sectors and landscape elements for ecological purposes (Art. L. 123-1, para. 7). They may declare woods, forests or parks as classified wooded areas (*espace boisé classé*) (Art. L. 130-1), which results in the prohibition of any land use likely to affect their conservation.⁷⁰

5.1.2 Green Infrastructure in France

48 In 2007, during the national conference on the environment (Grenelle de l'environnement) through an intensive series of discussions, negotiations and dialogue between five key sectors: central government, local authorities, employers, employees and NGOs, the "green infrastructure concept" was launched. Among the recommendations for new actions in support of the concept, was the creation of national green (for land) and blue (for water) belts - Trame verte et bleue (TVB). A distinction between green and blue was made because not all the problems of continuity within water ecosystems can be managed using the same approach as is used for terrestrial habitats and species.⁷¹

49 Initially, implementation of TVB was hampered by the reluctance of farmers to implement TVB after their bad experiences with Natura 2000. They claimed that Natura 2000 boundaries were set disregarding farmers and others. Important stakeholder groups involved in managing the countryside, were completely unaware of the process and did not know what was going on.⁷² Therefore, the authorities tried to avoid referring to Natura 2000 when setting up the TVB initiative, and a clear distinction between the requirements of Article 10 of the Habitats Directive and the TVB process was laid down. However, this does not mean that Natura 2000 is ignored. All the activities which are currently taking place, including Natura 2000, are consistent with the new green infrastructure approach.⁷³

50 In January 2008, a steering committee was established to bring together government representatives, socio-economic partners and NGOs in order to negotiate the practical and operational aspects of the TVB. After six months of discussions, the committee managed to agree on the common vision and language of the policies, and to identify major goals for green infrastructure in France. The main goals are:

- 1) To diminish the fragmentation and vulnerability of natural habitats and species;
- 2) To identify and connect important natural units using corridors;
- 3) To aim at or preserve the good ecological status or the good potential of rivers and lakes;
- 4) To take into account the biology of migratory species;
- 5) To facilitate genetic exchanges for wild species;
- 6) To improve the quality and diversity of landscapes;
- 7) To enable shifts in range of wild species and natural habitats, in a climate change context.⁷⁴

5.1.3 Latest legislation on connectivity

51 In 2010, France enacted Act No 2010-788 of 12 July 2010, also known as Grenelle II Act.⁷⁵ This Act provides for the elaboration of "National Orientation Principles for the Preservation and Restoration of

⁷⁰ Ibid.

⁷¹ Kerstin Sundseth & Aleksandra Sylwester, Towards Green Infrastructure for Europe: Proceedings of EC workshop 25-26 March 2009, Brussels, Belgium, p.25

⁷² M.G.G. Neven, F.H. Kistenkas, Eurosites Insights. Image, implementation, interpretation and integration of Natura 2000 in European perspective. Wageningen, Alterra, Alterra-rapport 1222.1., p.71

⁷³ Kerstin Sundseth & Aleksandra Sylwester, Towards Green Infrastructure for Europe: Proceedings of EC workshop 25-26 March 2009, Brussels, Belgium, p.25

⁷⁴ Id.

Ecological Connectivity". These principles should be applied to national planning and projects. Regional ecological master plans also are required to respect these national principles when mapping green and blue belts, and the corresponding master plans and local plans have to include them among their ecological connectivity objectives.⁷⁶

5.1.4 National Biodiversity Strategy

- 52 Furthermore, the National Biodiversity Strategy, NBS (Stratégie nationale de la biodiversité, SNB) adopted in February 2004, was revised in 2010. The new strategy (2011-2020) sets as one of its targets the building of green infrastructure including a coherent network of protected areas. First, it calls for maintenance and reinforcement of resilience and functionality of ecosystems and sets a requirement that in the context of global change, species must be able to move to find better environmental conditions in which to live. Second, it stipulates that TVB, which includes both reservoirs of biodiversity and elements ensuring connectivity across the whole infrastructure, must be designed in a coherent manner at all territorial levels. Third, it states that there should be a sufficient number of protected areas, which represent different environments and are effectively managed. The network of protected areas must be evaluated and more widely constructed in order to contribute to development of French green infrastructure.⁷⁷

5.1.5 Example I: the municipality of Saint-Martin d'Uriage

- 53 The municipality of Saint-Martin d'Uriage, which is located near the city of Grenoble, provides an example of how existing nature protection measures in land use laws are being implemented. According to the master plan of the intercommunalité of which Saint-Martin d'Uriage is a part, connectivity must be re-established between habitats fragmented by urbanization and major infrastructure. This should be achieved through restoration of natural wooded corridors and the preservation of open spaces along watercourses.⁷⁸
- 54 Since 2004, Saint-Martin d'Uriage's local plan and maps have included ecological corridors vital for the connectivity of natural areas, classifying them as 'natural and wooded zones', which gives them special protection. The authorities have also established a subcategory within the natural and wooded zone for ecological corridors, and adopted special rules, for example, prohibiting roads in these areas where they may cause significant disturbance. Roads that are permitted must have border hedges with native and diversified plant species. Public and private fences must allow free movement of wildlife, and outdoor public and private lighting must direct beams towards the ground to minimize disturbance to wildlife.⁷⁹

5.1.6 Example II: Parc du Chemin de l'Ile

- 55 This project is located in the western part of Paris (Nanterre), and was initiated by local government. Among the project's assets which contribute to building green infrastructure are riparian corridors. Those corridors are a crucial component of stream ecology and provide an important transition between upland areas and aquatic environments. Comprised of flood-tolerant trees, shrubs and herbs, riparian vegetation helps stabilize streams by holding soils, containing and distributing sediment, and attenuating floods, and reduces water pollution by filtering runoff from upland areas. Riparian areas provide crucial habitat for a number of terrestrial wildlife species which depend on riparian areas for cover, food, and migration corridors.⁸⁰

⁷⁵ Act No. 2010-788 of 12 July 2010 regarding the national commitment to the environment (OJ of 14 July 2010), France.

⁷⁶ Lausche, Barbara. (2011). Guidelines for Protected Areas Legislation. IUCN, Gland, Switzerland, Box III(1)-9: French land use planning and nature protection.

⁷⁷ National Biodiversity Strategy 2011-2020, France.

⁷⁸ Lausche, Barbara. (2011). Guidelines for Protected Areas Legislation. IUCN, Gland, Switzerland, Box III(1)-9: French land use planning and nature protection

⁷⁹ Ibid.

⁸⁰ <http://www.greeninfrastructurewiki.com/page/Parc+du+Chemin+de+l%27Ile>.

5.2 Germany

- 56 In Germany, the creation of ecological networks and green infrastructure for the promotion of connectivity is shared between national and regional (Länder) levels. At the national level the legal framework was set out in Article 20-21 of the Federal Nature Conservation Act of 2009.⁸¹ Other relevant provisions are Article 10 of the Habitats Directive, and a national strategy (National Strategy on Biodiversity).
- 57 Under Article 20(1) of the Federal Nature Conservation Act, each Land (Federal State) is obliged to create an ecological network of interlinked biotopes, covering at least 10 per cent of its territory. The main purpose of such a network is to safeguard native fauna and flora species, to protect the habitats and biocoenoses (biological communities) of these species, and to preserve, restore and develop functioning ecological interrelationships within and between biotopes.⁸² Furthermore, each Land must guarantee that its coherence extends beyond its boundaries, and thus, must cooperate with other Federal States (Art.21(2)).
- 58 The network can include various components, such as national parks, nature reserves, Natura 2000 sites, parts of biosphere reserves, protected biotope types, and any other additional sites (including parts of nature parks or protected landscapes). The only condition is that they must all have an ecological role to play. Although Article 3 sets requirements for promoting connectivity and green infrastructure in Germany, there is no deadline for implementation.⁸³ In November 2007 Germany's federal cabinet accepted the "National Strategy on Biodiversity", which intended that by 2010 an ecological network oriented towards functional connectivity is to be established. However, the outcome was not available when writing this report as the first German federal government report on target attainment and implementation of measures under the Strategy had yet to be published.⁸⁴
- 59 Nevertheless, to a certain extent, all 16 Länder have created ecological networks. Altogether there are 300 ecological network projects in Germany, with a majority in mountain areas.⁸⁵ In terms of implementation, the German government is so far willing to transfer 125,000 ha of federal land to the Länder and the German Federal Environmental Foundation so that this land can be preserved as part of the national ecological network. In terms of funding, there have also been significant contributions, such as the project at Schaalsee which covered 300 km² across two Länder at a cost of 25 million euro.⁸⁶
- 60 It can be concluded that the German practice has proven very successful in mitigating fragmentation and promoting connectivity. The small projects and networks carried within one Land are helping to improve inter-Länder ecological networks. Furthermore, smaller-scale networks are also helping to address weakness in larger scale ecological networks.

5.2.1 Example I: Habitat Fallow Land (Lebensraum Brache) Project

- 61 Among the interesting examples of projects aimed at decreasing habitat fragmentation and improve connectivity within landscapes, is the project called 'Habitat Fallow Land' carried out in the Länder Hesse and Bavaria in 2003-2006.⁸⁷ The project was launched jointly by key stakeholder groups, including representatives from nature protection, hunting and agriculture sectors. The goal of the project was to improve the situation of wildlife in the agrarian landscape by encouraging farmers and others landowners to create and maintain set-aside areas with a specific goal to host wildlife.

⁸¹ Federal Nature Conservation Act (Bundesnaturschutzgesetz), 29 July 2009 (BGBl. I, 2009, p. 2542).

⁸² The Pan-European Ecological Network: taking stock (Nature and Environment N°146) (2007).

⁸³ Dr. Peter Finck, Planning and implementation of ecological networks in Germany, Federal Agency for Nature Conservation, Bonn, Germany.

⁸⁴ The Indicator Report 2010 to the National Strategy on Biological Diversity was adopted by the German Federal Cabinet on 17 November 2010, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Germany, 2010.

⁸⁵ Kettunen (supra note 15), Annex 2, p. 6.

⁸⁶ Kerstin Sundseth & Aleksandra Sylwester, Towards Green Infrastructure for Europe: Proceedings of EC workshop 25-26 March 2009, Brussels, Belgium, p. 29.

⁸⁷ <http://www.lebensraum-brache.de>.

Furthermore, the project aimed to integrate these wildlife friendly set-asides with basic agricultural practices.

- 62 During the project period, 2,200 hectares of arable farmland has been taken up for wildlife friendly set-asides. On these areas, for example, cultivation of low-cost seed mixtures as suitable cover-, breeding and feeding habitat for wildlife has been tested. In 2004, the project produced practical guidelines for the management of wildlife friendly set-aside. This included measures for the preparation of soils, optimal sowing times, seed assortments used and cultivation required.⁸⁸

5.2.2 Example II: German Green Belt (Grünes Band Deutschland)

- 63 Another fascinating connectivity project is the creation of a huge nationwide corridor extending from Travemünde on the Baltic sea in the north of the country to Hof in Bavaria on the Czech border in the south of Germany. The green belt coincides with the former iron curtain between East- and West-Germany, which was a no-go area for many years, and hence is relatively undisturbed. A survey found that 85.2 % of the area had not been adversely effected e.g. by agricultural intensification (11 %), forest intensification (1 %), or the construction of roads, sealed tracks or built-up areas (2.4 %). The Green Belt consists of focus areas, mostly Natura 2000 sites. Between these focus areas, large sections of the Green Belt serve as connecting areas and elements of national or international relevance.⁸⁹ The Green Belt initiative, obviously, is one of the prime examples of the ecological network that is being created under federal legal and policy framework mentioned above.

5.3 Spain

- 64 In 2007, Spain enacted the new national Nature Conservation Act. This emphasized the importance of ecological networks. Until then, nature conservation policies in Spain had been developed under the 1989 Nature Conservation Act, which had no reference to ecological connectivity.
- 65 The process of establishing ecological networks is taking place without any national coordination as there is no corresponding legal framework. In spite of that fact, by 2008, five regions had started to define their ecological network. However, by then only two regions, Catalonia and the Basque Country had a clear policy on ecological networks.⁹⁰
- 66 Integration of ecological networks and spatial planning are presenting another challenge. The Spanish Constitution of 1978 attributes full competencies in spatial planning to the regions. Therefore, administrations of all 17 regions have passed laws concerning the management of their territory. However, the lack of national legislation has resulted in a wide variety of methods and instruments, which has made it extremely difficult to achieve agreement between the regions. Except for the Catalonian region, other regions have not incorporated ecological networks into the land planning process.⁹¹ Nevertheless, the current planning practices are showing a positive tendency as they are not just aiming to preserve individual non-building areas and area networks, but rather are trying to manage open areas in Spain in a more uniform and comprehensive manner.⁹²

5.3.1 Cataluña region

- 67 The Catalonia regional Spatial Plan was adopted in 1995. According to its guidelines, planning should take into account the connection and the interaction of the areas considered within the regional Plan

⁸⁸ Kettunen (supra note 15), Annex 2, p. 7.

⁸⁹ U. Riecken, K. Ullrich, L. Geidezis, The Green Belt of Germany I. From death zone to lifeline, online poster available at http://www.bfn.de/fileadmin/MDB/documents/poster_grbd.pdf.

⁹⁰ SPEN - Spatial Planning and Ecological Networks, National Report for Spain, Environmental Policy Centre, 2008, p. 4.

⁹¹ Id.

⁹² Kettunen (supra note 15), Annex 2, p. 11.

of Sites of Natural Interest (PEIN). Later, in 1998, a resolution of the regional Parliament called the regional Government to adopt strategic guidelines for ecological and landscape connectivity and this produced a connectivity plan of the Sites of Natural Interest (DGPNMF 1999). In order to fulfill the provisions of the regional Spatial Plan, in 2006 the Department of the Environment published its guidelines for ecological connectivity. This document includes a total of 68 guidelines for the following areas: spatial planning, protected areas, threatened and protected species, linear infrastructures, rivers, agriculture, town planning, use of biological resources, environmental impact assessment, research, information and public participation. As a result of this policy, all the new Catalonian spatial plans include the principle of connectivity, and are structured in three systems: open spaces, settlements and mobility infrastructures.⁹³

- 68 The most urbanized area of the Cataluña's region is the province of Barcelona. It covers only 10% of the region, but at the same time is the center of economic development, and has 5 million inhabitants. There is also a lot of pressure coming from new development, road infrastructure and construction. Thus, the demand for natural open areas is very high. The local administration has protected the most important nature areas of the region as nature reserves, and restricted development in these areas.⁹⁴
- 69 Since 2003, the Technical Office for Territorial Planning and Analysis of the Barcelona provincial Council has been carrying out a geographical information system (GIS) project (called SITxell) aimed at analyzing the open areas of the Barcelona province. The project aims to plan the land-use of these areas, and to identify the role they play in the overall natural areas system.⁹⁵ It also seeks to give support to the policies of the local administration relating to open areas, so that the socioeconomic development of the territory can be balanced with the sustainability of natural systems. The project is based on classical conceptual approaches for landscape planning and takes into account a vast variety of geographical information regarding the attributes and values of the analyzed open areas. The fact that the project is carried at different land scales, from regional to local planning, has allowed the integration of the objectives of conservation and management of the open spaces into the land planning system.⁹⁶
- 70 Currently, SITxell's proposes a) to strictly protect up to 70 % of existing open areas; b) restore some important habitats (e.g. river systems); c) improve forestry, grazing and agricultural practices; and d) make transport infrastructure more permeable for species. In addition, SITxell also identifies a number of key areas to be protected in order to maintain ecological connectivity in the region.⁹⁷

5.3.2 Madrid region

- 71 The Madrid region is a good example of how the lack of regional planning affects nature protection in the high densely populated areas. The region is located in the middle of the country, with a territory of 8,021 km² and a population density of 758 inhabitants per square kilometer.
- 72 At the same time, the region has a wide range of preserved habitats and contains important populations of endangered species (39% of the region has been designated as Natura 2000). Such a rich biodiversity is constantly under (urban) pressure. One of the reasons is that Madrid City, which is a huge industrial and commercial centre, with the highest population density of the whole region, is geographically located in the centre, and thus is the main communication node in the country, whereas Natura 2000 sites are mostly located on an outer ring. Thus, the issue of connectivity in the Madrid region is very urgent.⁹⁸

⁹³ SPEN - Spatial Planning and Ecological Networks, National Report for Spain, Environmental Policy Centre, 2008, p. 16.

⁹⁴ Kerstin Sundseth & Aleksandra Sylwester, Towards Green Infrastructure for Europe: Proceedings of EC workshop 25-26 March 2009, Brussels, Belgium, p. 32.

⁹⁵ Kettunen (supra note 15), Annex 2, p. 11.

⁹⁶ http://ec.europa.eu/environment/nature/ecosystems/docs/green_infrastructure_integration.pdf.

⁹⁷ Kettunen (supra note 15), Annex 2, p. 11.

⁹⁸ SPEN - Spatial Planning and Ecological Networks, National Report for Spain, Environmental Policy Centre, 2008, p. 17.

- 73 This region was probably the first to begin to develop the idea of ecological networks. At the same time the regional Government started to prepare guidelines for the regional land planning strategy (Plan of Territorial Strategy: PRET) which included guidelines for ecological networks. Nevertheless, the PRET has never been approved and therefore, legally speaking, it does not exist.⁹⁹
- 74 Currently, all the land planning in Madrid relies on town planning, which only takes into account the interests of sectoral plans and legally protected areas. Even though the regional environmental authorities requested urban planners to consider ecological corridors during the process, this had no legal force. It can be concluded that at present land planning in the region of Madrid is the combination of town plans, designed to attend local interests only. Therefore, the Madrid region is an unsuccessful connectivity example, which shows how the lack of national legislation can affect the situation at a more local level.¹⁰⁰

5.3.3 Basque country

- 75 A good example of ecological connectivity is the Green Belt of Vitoria-Gasteiz, which is an outcome of comprehensive environmental restoration and recovery actions in the respective districts of the city. The basic aim of the plan is to recover the ecological and social value of this space through the creation of a natural continuum around the city built around a number of different environments of high ecological and landscape value. The Green Belt project around Vitoria-Gasteiz helps to protect a circular mountain route that runs through the main pastoral landscapes of the Basque Country and links up spaces between Natura 2000 sites and other landscapes of special beauty. More specifically, the Belt connects more than 100,000 ha of Natura 2000 areas around the town.¹⁰¹

5.4 United Kingdom

- 76 The process of nature protection in the United Kingdom (UK) has its own specificity, and is driven by a wide range of policies, legislation and agreements. Responsibility for nature conservation in the UK is a devolved one. England, Scotland, Wales and Northern Ireland each have their own strategies for biodiversity and the environment, which are complemented by a UK Strategic Framework and the [UK Biodiversity Action Plan](#).¹⁰²
- 77 The UK published the UK Biodiversity Action Plan (UK BAP) in 1994, and was the first country to produce such a document. The UK BAP contains a description of the UK's biological resources and provides detailed plans for conservation of their resources, at national and devolved levels.¹⁰³
- 78 After the devolution in 1998, England, Northern Ireland, Scotland and Wales created their own [biodiversity groups and strategies](#). This improved the conservation approach, as countries could create their strategies taking into account specific conditions and typical characteristics typical. Therefore, there are four Country Biodiversity Groups and each of these has published country strategies to guide their BAP work.¹⁰⁴ However, there is also a shared vision for UK biodiversity conservation, which was adopted by the devolved administrations and the UK governments in 2007. This common position is described in "Conserving Biodiversity – the UK Approach". This publication lays down the future shared priorities for UK Conservation, and the responsibilities at UK and country levels.¹⁰⁵
- 79 The document illustrates the urgent need to reduce habitat fragmentation. It acknowledges that priority habitats and species cannot be managed in isolation and emphasises the importance of an

⁹⁹ Id.

¹⁰⁰ Id.

¹⁰¹ PAN-European Ecological Network: Taking Stock, Economical and Social Council, UN, Working Paper No. WGSO-4/2007/22, p. 60.

¹⁰² <http://jncc.defra.gov.uk/page-5356#drives>.

¹⁰³ <http://jncc.defra.gov.uk/default.aspx?page=5155>.

¹⁰⁴ <http://jncc.defra.gov.uk/page-5701>.

¹⁰⁵ <http://jncc.defra.gov.uk/default.aspx?page=5155>.

Ecosystem Approach. This approach requires ecosystems to be considered as a whole and explains how the different components function and depend on one another, especially as these relationships respond to climatic and other environmental changes.¹⁰⁶ The UK framework for conserving biodiversity lays down the guiding principles, which should be taken into account by devolved administrations while issuing their strategies.

- 80 We will now focus on two of the four devolved countries, England and Wales.

5.4.1 England

- 81 In 2011, the Department for Environment, Food and Rural Affairs (Defra) published the new English biodiversity strategy "Biodiversity 2020: A strategy for England's wildlife and ecosystem services". It sets out the strategic direction for biodiversity policy for the next decade. The development and delivery of the English Biodiversity Strategy is under the supervision of the England Biodiversity Group, and is supported by specific Strategic Information Groups (SIGs), which report to the group frequently via the Biodiversity Action Reporting System (BARS).¹⁰⁷
- 82 The English policy calls for restoration of ecological networks across the country. The suggested landscape scale approach includes five components to be implemented in the area of land use and economic activities which are influencing the landscape: a) core areas of high nature conservation value which contain rare or important habitats or ecosystem services. They include protected wildlife sites and other semi-natural areas of high ecological quality; b) corridors and 'stepping stones' enabling species to move between core areas. These can be made up of a number of small sites acting as 'stepping stones' or a mosaic of habitats that allows species to move and supporting ecosystem functions; c) restoration areas, where strategies are put in place to create high-value areas (the 'core areas' of the future) so that ecological functions and wildlife can be restored; d) buffer zones that protect core areas, restoration areas and 'stepping stones' from adverse impacts in the wider environment; and e) sustainable use areas, focused on the sustainable use of natural resources and appropriate economic activities. Together with the maintenance of ecosystem services, they 'soften' the wider countryside, making it more permeable and less hostile to wildlife.¹⁰⁸

5.4.2 Example I (England): the West Cambridgeshire Hundreds Project

- 83 The project was launched in 2005 by private local landowners, who were aiming to connect areas of Ancient Woodland. As a starting point the initiators have asked a land agent to identify all of the relevant landowners and land managers within the local area. They approached conservation organizations and received support from the Woodland Trust and the Wildlife Trust. Currently, the West Cambridgeshire Hundreds project covers more than 10,000 hectares. The project focuses on expansion and linkage of habitats, concentrating on reconnecting the ancient woodlands and enhancing the hedgerow network across the project area. These goals are primarily achieved through creation of wildlife corridors.¹⁰⁹

5.4.3 Example II (England): Agri-environment schemes to protect biodiversity

- 84 Within England two agri-environment schemes have significantly helped to maintain and improve habitat connectivity: the Environmentally Sensitive Areas (ESA) scheme and the Countryside Stewardship Scheme (CSS).

¹⁰⁶ Conserving Biodiversity – the UK Approach, published by the Department for Environment, Food and Rural Affairs, UK, 2007, p. 9.

¹⁰⁷ <http://jncc.defra.gov.uk/page-5701>.

¹⁰⁸ The Natural Choice: securing the value of nature, Presented to Parliament by the Secretary of State for Environment, Food and Rural Affairs by Command of Her Majesty, 2011, p. 18.

¹⁰⁹ Think BIG: Why landscape-scale conservation benefits wildlife, people and the wider economy, England Biodiversity Group report, 2011, available at:
<http://naturalengland.etraderstores.com/NaturalEnglandShop/NE309>.

- 85 The Environmentally Sensitive Areas Scheme was introduced in 1987 to offer incentives to encourage farmers to adopt agricultural practices which would safeguard and enhance parts of the country of particularly high landscape, wildlife or historic value.¹¹⁰ The ESA scheme was voluntary. Farmers with eligible land in ESAs were offered a ten-year agreement that provided an annual payment in return for following a certain prescribed set of farming practices designed to conserve and enhance the landscape, historic and wildlife value of the land under agreement.¹¹¹
- 86 Among the resulting environmental benefits are: improved numbers of wading birds in lowland wet grassland, protection and improvement of species-rich grassland on the chalk downs and in hay meadows, landscape improvements from better management of features such as hedges and dry stone walls and from conversion of arable to grassland, and protection of historic features, such as ancient field systems.¹¹²
- 87 The Countryside Stewardship Scheme (CSS) was introduced as a pilot scheme in England in 1991 and operates outside areas identified as Environmentally Sensitive. Payments are made to farmers and other land managers to enhance and conserve or re-create important English landscapes and to provide for public enjoyment of them.
- 88 Ultimately ESA and CSS have played a significant role in promoting connectivity and maintaining biodiversity, landscape and historic interest values within agreement land. Even though both schemes (ESA and CSS) are closed to new applicants because they have been superseded by the Environmental Stewardship scheme, which has the same objectives, some existing agreements will continue until 2014.¹¹³

5.4.4 Wales

- 89 The most recent Welsh program for tackling existing environmental challenges was published in 2006. This document, 'Environment Strategy for Wales', is a guideline for actions up to 2026.¹¹⁴ The Strategy identifies the main problems Wales is currently facing, such as climate change, degradation of ecosystems, unsustainable resource use, loss of biodiversity, loss of landscape and heritage quality and distinctiveness, poor quality living environments and environmental hazards. Among other things, the Strategy particularly warns about such indirect impacts of climate change as migration and loss of species and habitats. Therefore, the program calls for wider environment, which will be able to support biodiversity through reducing habitat fragmentation and increasing extent and interconnectivity of habitats.¹¹⁵
- 90 Under Welsh spatial planning law, sustainability must be taken into account in all development activities.¹¹⁶ An ecosystems approach guides the Countryside Council for Wales's (CCW) actions and policies. Therefore, CCW constantly tries to integrate environmental considerations into socio-economic drivers and processes. The CCW, together with the Forestry Commission of Wales and other committees, carried out a lot of research and data gathering and produced a series of maps, for instance on connectivity, landscape character, recreational planning, and ecosystem services, with the goal of ensuring reference being made to connectivity in spatial planning decisions.¹¹⁷ One of the initiatives that help to achieve these goals is the mapping of Wales-wide habitat networks project. Such network maps allow the prediction of species movements, thus enabling decision-makers to take these movements into account.¹¹⁸

¹¹⁰ <http://www.naturalengland.gov.uk/ourwork/farming/funding/closedschemes/esa/default.aspx>.

¹¹¹ Kettunen (supra note 15), Annex 2, p. 13.

¹¹² <http://www.naturalengland.gov.uk/ourwork/farming/funding/closedschemes/esa/default.aspx>.

¹¹³ Ibid.

¹¹⁴ <http://jncc.defra.gov.uk/page-5701>.

¹¹⁵ Environment Strategy for Wales, Welsh Assembly Government, 2006.

¹¹⁶ The Wales Spatial Plan Update 2008, People, Places, Futures, Approved by the National Assembly for Wales 8th July 2008.

¹¹⁷ Kerstin Sundseth & Aleksandra Sylwester, Towards Green Infrastructure for Europe: Proceedings of EC workshop 25-26 March 2009, Brussels, Belgium, p. 33.

¹¹⁸ Applying connectivity mapping to spatial planning in Wales, Countryside Council for Wales, Maes-y-Ffynnon, Bangor, Gwynedd and Baker Shepherd Gillespie, Wyastone Business Park, Monmouth.

5.4.5 Example: Framework for the South East Wales Networked Environmental Region

- 91 In 2009, the Welsh Assembly Government and the Countryside Council for Wales conducted a report on the ‘Framework for the South East Wales Networked Environmental Region’ (NER). The project’s aim is to support the region by proposing a number of interconnected and integrated natural connections. The report emphasizes the vital role of ‘ecosystem services’ and explains the benefits of environmental networks. The successful establishment of NER will provide high quality natural connections, protect the environment, restore biodiversity and foster prudent use of natural resources.¹¹⁹
- 92 The main goal of the project is to develop a multifunctional network of green infrastructure that makes the landscape more permeable to wildlife, provides ecosystem services (including wildlife habitat, clean air and water and other natural resources), supports economic growth, stores carbon, provides renewable energy, builds resilience to climate change, promotes healthy living, provides access for walkers and cyclists, recreation and learning and strengthens culture. In the future, the project is expected to provide a strategic framework for integrating action for ecological connectivity into a wider green infrastructure.¹²⁰

5.5 Finland

- 93 Finland is among the most forested countries in Europe, with around two third of its land covered by production forests.¹²¹ As the forest ensures a significant income for the state, and hosts most of the country’s biodiversity, the government is putting a lot of effort into promoting and improving integrated management of ecosystems and landscapes and reducing habitat fragmentation. For those reasons, a landscape ecological planning (LEP) approach, has been implemented. The LEP approach mainly concerns the planning of the land which is owned by the state, but it is planned to extend the programme to privately owned lands. The main idea of this approach is to ensure joint management of different forest areas, instead of regulating them separately. The establishment of ecological networks and the improvement of connectivity is central to the LEP approach. All state owned forests (6.5 million hectares) are covered by landscape ecological plans. In 2006, LEPs covered 150,000 hectares of ecologically valuable set aside productive forests areas, and 81,000 of productive forest land that had been designated as ecological corridors. LEP has made an important contribution to reducing habitat fragmentation.¹²²

5.5.1 Example: Ruuhka-Suomi project

- 94 There are some interesting examples of more local initiatives for the promotion of ecological networks. The Ruuhka-Suomi Project is a shared project of the Finnish Association for Nature Conservation (FANC) and UYSP (Uusimaa regional office of FANC), aimed at the most densely populated part of Finland. The Uusimaa area is a modern urban area in Helsinki, with a high population density and intensive building, traffic and infrastructure. At the same time, the area is located in southernmost Finland which has the richest biodiversity. Thus, Uusimaa is under threat because of fragmentation of remaining natural habitats.¹²³ The project aims to support regional and local branches of government, NGOs and citizens in land use planning and environmental and strategic impact assessment processes, by producing information on connectivity. The project also actively supports national and regional developments by providing comments on land-use plans with potential impacts on nature conservation and biodiversity.

¹¹⁹ Framework for South East Wales Networked Environmental Region, Welsh Assembly Government Spatial Plan Unit, Countryside Council for Wales, Wales Environment Link, Environment Agency Wales, 2009, p.2

¹²⁰ Ibid., p. 17.

¹²¹ <http://www.state.gov/r/pa/ei/bgn/3238.htm>.

¹²² Kettunen (supra note 15), Annex 2, p. 3.

¹²³ <http://www.sli.fi/luontojaymparisto/maankaytto/ruuhkasuomihanke/ruuhkasuomienglish>.

5.6 Slovakia

- 95 Agricultural land covers around 50 % of the total area of Slovakia, while 40 % is covered by forests.¹²⁴ As a consequence of recent rapid economic development, the fragmentation of landscapes appears to be a growing issue. Even though the total area designated under Natura 2000 is almost 30 %,¹²⁵ not all the relevant habitats enjoy sufficient protection. With regard to that, a number of national environmental policies have been integrated into Slovakian legislation, including the Constitution.¹²⁶
- 96 The Act on Nature and Landscape Protection (initially Act 287/1994, replaced by Act 543/2002 in 2003) confirms the requirements of Natura 2000 and sets specific criteria for a national system of protected areas in Slovakia. It divides the Slovak territory into five levels of protection, according to the intensity of the measures required. Currently, there are 23 large protected areas designated in Slovakia, including 9 National Parks and 14 Protected Landscape Areas.¹²⁷
- 97 The Act also provides the basis for the establishment of the Territorial System of Ecological Stability (TSES), defined as 'an integrated structure interconnected to other ecosystems, their components and elements, which ensure a diversity of life conditions and forms in the landscape'.¹²⁸ The TSES is implemented at national, regional and local levels. The system consists of bio-centres, bio-corridors, and interactive elements of national, regional or local importance. A bio-centre is an ecosystem or group of ecosystems that create permanent conditions of reproduction, refuge and feeding of wildlife and for conservation and natural development of their communities. A bio-corridor is a set of ecosystems which connect bio-centers and allows the migration and exchange of genetic information between wildlife. Bio-corridors are aiming to link habitats that are currently isolated or threatened with fragmentation due to planned land-use (e.g. roads and real estate plans). An interactive element is a specific ecosystem or group of ecosystems (e.g., grasslands, swamps, vegetations, lakes) connected to bio-centers and bio-corridors, which ensures their positive influence on the surrounding parts of the landscape changed or disturbed by human activities.¹²⁹ It has been estimated that bio-centers occupy 2,595 sq. km (5.3 % of the SR territory) and bio-corridors 2,660 km.¹³⁰
- 98 When it comes to land-use planning in Slovakia, the main tool is the Landscape Ecological Planning approach (LANDEP). LANDEP is a systematically structured specific complex of applied landscape-ecological methods. The main goal is to design ecologically optimal landscape organization, landscape use and protection, which results in the suitable location of human activities in the landscape and subsequent measures to provide for the functioning of these activities.¹³¹ The LANDEP approach is incorporated into the Territorial Planning and Building Code.¹³² Landscape Ecological Plans form an integral part of the approach and they are an obligatory part of spatial planning documentation at the regional level. The elaboration of the Landscape Ecological Plan is a complex process of mutual harmonization of the spatial requirements of economic and other human activities with landscape and ecological conditions.¹³³ The LANDEP approach includes five stages: analysis, synthesis, interpretation, evaluation and proposals and measures. The finalized plan shows what the main land-use related threats to the environment are, including aspects related to ecological connectivity. This approach makes a positive contribution to rational and considerate utilization of natural resources and conservation of overall landscape quality and stability, including ecological connectivity.¹³⁴

¹²⁴ official web-site of the Ministry of Agriculture and Rural Development of the Slovak Republic
<http://www.mpsr.sk/en/index.php?start&language=en&navID=24>.

¹²⁵ <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/07/482&format=HTML&aged=0&language=EN&guiLanguage=en>.

¹²⁶ Kettunen (supra note 15), Annex 2, p. 10.

¹²⁷ Doç. Hüseyin Gökçeüş, Turker Umut, James W. LaMoreaux, Survival and Sustainability: Environmental Concerns in the 21st Century, Springer, ISBN 978-3-540-95990-8, 2011, p. 1430.

¹²⁸ http://www.sazp.sk/slovak/periodika/sprava/psreng/nature/nature_b_3.html.

¹²⁹ R. H. Jongman, Dana Kamphorst, Council of Europe, Ecological Corridors in Land use Planning and Development Policies, Nature and Environment, No 125, 2002, p. 26.

¹³⁰ http://www.sazp.sk/slovak/periodika/sprava/psreng/nature/nature_b_3.html.

¹³¹ Kettunen (supra note XX), Annex 2, p. 11.

¹³² Act 50/1976 Zb. on Territorial Planning and Building Code (Building Act and its amendments).

¹³³ Ibid. Art. 139 c), (4).

¹³⁴ Kettunen (supra note 15), Annex 2, p. 11.

The Netherlands Ecological Network

Arie Trouwborst

1 Introduction

- 1 Since the late 1980s, the Netherlands government has pursued the creation and conservation of a coherent national network of natural areas. The official Dutch term for this network is *Ecologische Hoofdstructuur* (literally: ‘ecological main structure’), the commonly used acronym being EHS. This case study will primarily employ the (unofficial) English term ‘Netherlands Ecological Network’. This Network is central to connectivity conservation in the Netherlands. Over the years, the Netherlands Ecological Network has been shaped and protected through a mix of instruments, including land purchase, spatial planning, and nature conservation legislation. This case study introduces and discusses the Netherlands’ EHS policy and the various domestic instruments involved. The structure and headings of the case study have been adjusted accordingly, reflecting the central role of the EHS to connectivity conservation in the Netherlands.

2 International and Regional Context

- 2 Pertinent international treaties to which the Netherlands is a party include the Ramsar Wetlands Convention, the World Heritage Convention, the Convention on Migratory Species, and the Biodiversity Convention (see section IV of Volume 1). An important regional treaty to which the Netherlands is a party is the pan-European Bern Convention on European Wildlife and Natural Habitats (see section V Volume 1). Furthermore, as an EU member state, the Netherlands is bound by relevant EU legislation, including the Birds Directive and Habitats Directive (see section V of Volume 1 and the EU case study in the present volume). The national policies and legislation introduced below serve to implement the Netherlands’ obligations with respect to connectivity conservation under the various aforementioned international, regional and EU legal instruments. In particular, the Netherlands Ecological Network comprises all of the Dutch Ramsar Wetlands of International Importance and Natura 2000 sites, and contributes to the Pan-European Ecological Network (PEEN).

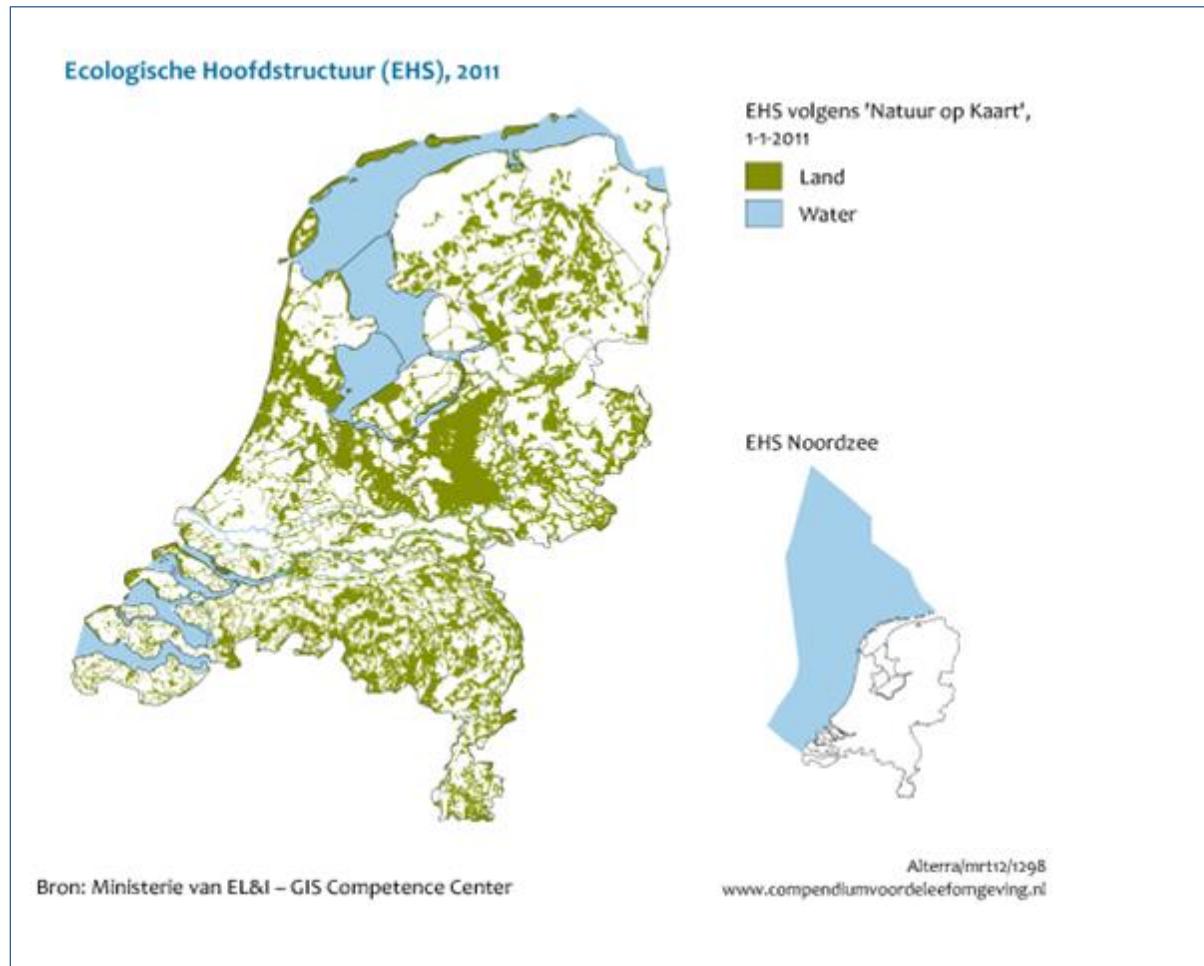
3 Domestic Context

3.1. The Netherlands Ecological Network

- 3 The EHS can properly be considered the backbone of nature in the Netherlands. It consists of, and connects, large and small existing natural areas, (agri)cultural landscapes with notable ecological values, and areas still to be converted into nature, the so-called ‘nature development areas’ (*natuurontwikkelingsgebieden*). Specifically, the Network comprises ‘core areas’ (*kerngebieden*), ‘nature development areas’ and ‘connectivity zones’ (*verbindingszones*). Core areas are existing areas with ecological values of national and/or international significance, with a minimum size of 250 hectares. They comprise protected natural areas, including the twenty National Parks and all Natura 2000 sites in the Netherlands, estates (*landgoederen*), forests, agricultural landscapes with notable natural values, and large water bodies including the IJsselmeer, Wadden Sea, and the entire portion of the North Sea within the Netherlands Exclusive Economic Zone. Nature development areas are areas with good possibilities for restoring ecological values of national and/or international significance. Connectivity zones are areas interconnecting the areas of the former two categories. The

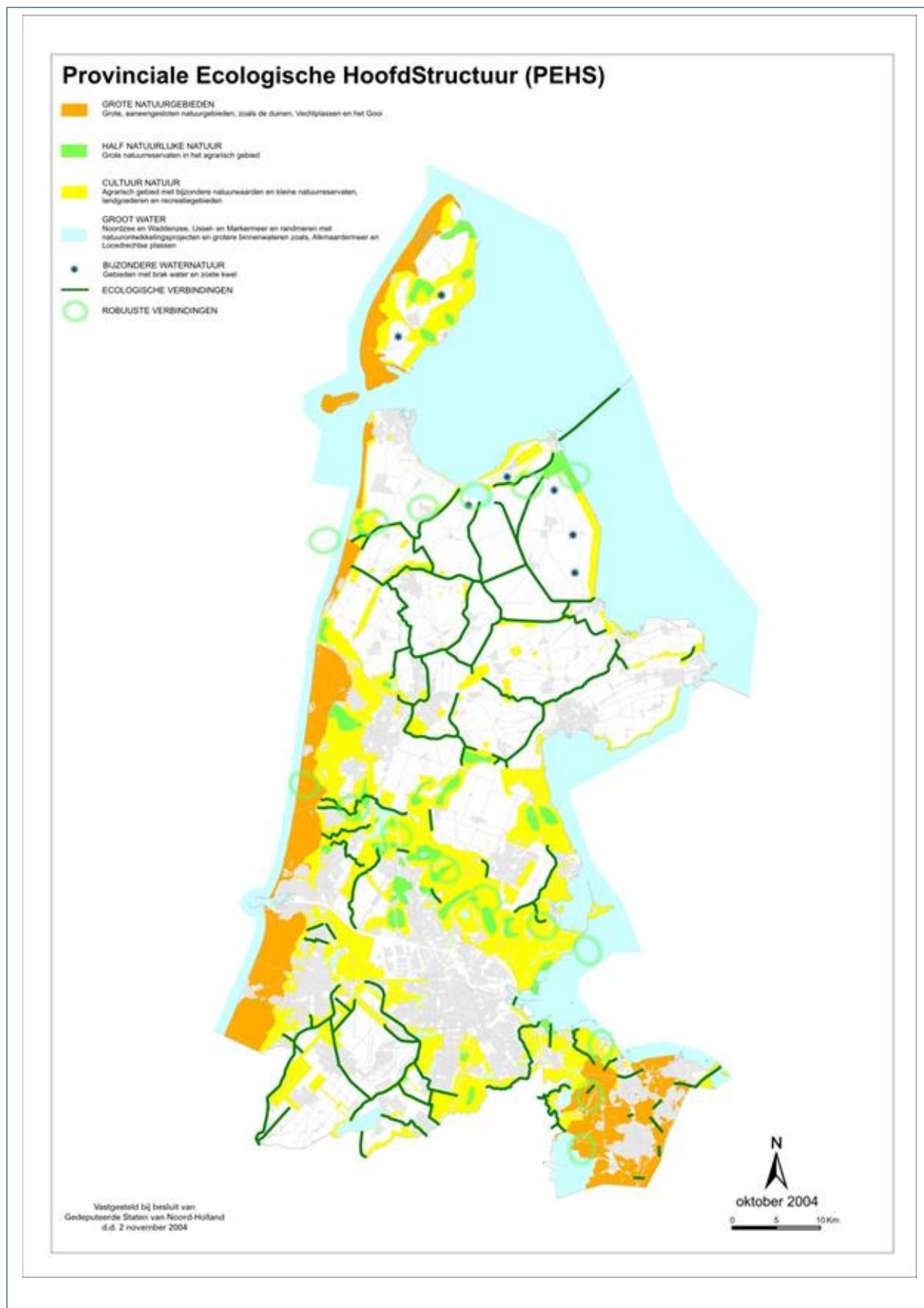
Netherlands Ecological Network also aims to connect Dutch areas with natural areas across the border in neighbouring states. Figure 1 shows the contours of the EHS in 2011.

Figure 1: Overview of the Netherlands Ecological Network in 2011



- 4 The objective of the EHS scheme is to contribute to the conservation and restoration of nature and biological diversity in the Netherlands. A number of national policy instruments have been key to the development of the Network. Whereas the idea of an ecological infrastructure had surfaced in national policy in 1986, it was the Nature Policy Plan (*Natuurbeleidsplan*) of 1990 which introduced the term *Ecologische Hoofdstructuur* (Ministerie van Landbouw, Natuurbeheer en Visserij 1990). In 1995, the *Structuurschema Groene Ruimte I* (SGR-I), a national spatial policy instrument for rural areas, provided a rough map for the EHS at the national scale. It also set out guidelines, criteria and targets for the Network. The plan envisaged the inclusion in the terrestrial part of the Network of around 440,000 hectares of existing nature, 200,000 hectares of agricultural lands, and 50,000 hectares of 'nature development areas' – altogether accounting for one-sixth of Dutch territory. On the basis of this national roadmap, the twelve Dutch provincial governments delineated the Network components within their respective jurisdictions and incorporated more specific guidelines and criteria in regional planning instruments. By way of an example, Figure 2 portrays the Network at the level of the province of Noord-Holland. Legally binding land use restrictions, in turn, were laid down by municipal governments in local zoning plans.

Figure 2: The EHS in the province of Noord-Holland in 2004. Dark green lines indicate ‘connectivity zones’. Chains of light blue circles indicate (scheduled) ‘robust connectivity zones’



- 5 The designation, management and protection of the areas composing the EHS has been pursued by the national government through a mix of instruments. These include spatial planning, protected areas legislation, the allocation of budgets for land purchase and management subsidies, and measures aimed at the improvement of the environmental quality within the Network, in particular by addressing the problems posed by low water tables, surface water contamination, acidification, and nitrogen deposition. In this connection, certain environmental standards set through pollution control legislation – either in national regulations or in individual permits – impose maximum emission levels aimed at limiting the deposition of contaminants within the Netherlands Ecological Network. The regulations of most direct relevance for the Network, however, are contained in spatial planning and nature conservation legislation, which are dealt with in separate sections below.
- 6 The annual area to be purchased and/or put under subsidized nature management has been laid out by the national government in a scheme, so as to finalize the entire EHS by the end date – which used to be 2018 until the recent re-adjustment of the EHS scheme (see below). The acquisition of new areas to complete the pre-designed jigsaw puzzle of the Netherlands Ecological Network has relied on substantial funds provided by the national government. Once purchased, ownership and management of the areas concerned have typically been transferred to private and semi-public nature conservation organizations. The areas presently included in the Network are managed by an array of different actors, including individual farmers, private forest and estate owners, local authorities and recreation boards, water supply companies, water boards, non-governmental nature conservation organizations, the National Forest Service, the Ministry of Infrastructure and the Environment, and the Ministry of Defence.
- 7 To supplement quantitative targets such as acquired hectares, ecological quality targets for the EHS were formulated between 1995 and 2000. These include target species as well as sets of national and regional ‘nature objective types’ (*natuurdoeltypen* or targeted types of nature) and ‘nature objective maps’ (*natuurdoelkaarten*). Based on international significance and national threat levels, 1042 target species from 22 taxonomic groups were selected. Nature objective types are targeted combinations of abiotic and biotic features. 92 of these have been described, ranging from near-natural to multi-functional objective types (Bal et al. 2001).
- 8 By the end of the first decade after the initiation of the EHS it became apparent that the Network as envisaged would fall short of meeting its ecological objectives: newly restored natural areas were too fragmented, connectivity zones were undersized and non-ecological infrastructure such as roads and railways posed too many obstacles to connectivity. To counter these shortcomings, a major new component was added to the EHS scheme in 2000, in the form of plans to form several large-scale, strategic connectivity zones at a regional rather than a local level, denominated ‘robust connectivity zones’ (*robuuste verbindingszones*) (Ministerie van Landbouw, Natuur en Voedselkwaliteit 2000; see also Broekmeyer and Steingrüber 2001). These zones, which involve additional areas which were not formerly protected, are depicted in Figure 3.
- 9 Furthermore, a specific programme was agreed in 2004 to address physical barriers to connectivity posed by human infrastructure such as highways, railways and man-made waterways (*Meerjarenprogramma Ontsnippering*, MJPO). Over 215 major obstacles to connectivity were identified, and plans made and funds allocated to overcome these between 2005 and 2018. By 2011, 59 obstacles had been comprehensively addressed, and a further 44 partly resolved. Typical measures involved are the construction of underpasses for animals like badgers, martens and foxes, and of large overpasses ('ecoducts') suitable for large mammal species (red deer, wild boar, roe deer), reptiles, butterflies and a host of other organisms in their wake (see Figures 4-6).
- 10 As part of a bigger plan to decentralize government policies and cut national budgets following the financial and economic crises since 2008, many aspects of the EHS scheme were drastically re-adjusted by the center-right coalition of VVD and CDA led by Prime Minister Rutte, which took office in 2010 (referred to hereinafter as the Rutte-I administration). In particular, the goal for the terrestrial part of the Network was reduced from the formerly envisaged 728,500 hectares to 600,000 hectares, and the national plans and funding for the ‘robust connectivity zones’ were cancelled altogether. Responsibility for the Netherlands Ecological Network will be relegated to the provinces in 2014, and defragmentation measures and subsidy programs are also executed at the provincial level with a lower budget. Finally, the envisaged completion of the EHS was delayed until 2021

(*Onderhandelingsakkoord Decentralisatie Natuur*, 2011). Some of these rather controversial and heavily debated revisions of the Netherlands Ecological Network have been reversed, however, following a premature exit of the Rutte-I cabinet. In 2012, following elections, a new government took office, composed of Rutte's VVD and the center-left PvdA, a party which has been in opposition of the EHS revisions. Specifically, this new coalition agreed to complete the Network as formerly designed, including the robust connectivity zones, but to take more time for its completion, with the final deadline yet to be determined (*Bruggen Slaan: Regeerakkoord VVD - PvdA*, 29 October 2012).

Figure 3: EHS (green areas plus water), robust connectivity zones (red), and locations of Natura 2000 sites (blue circles).

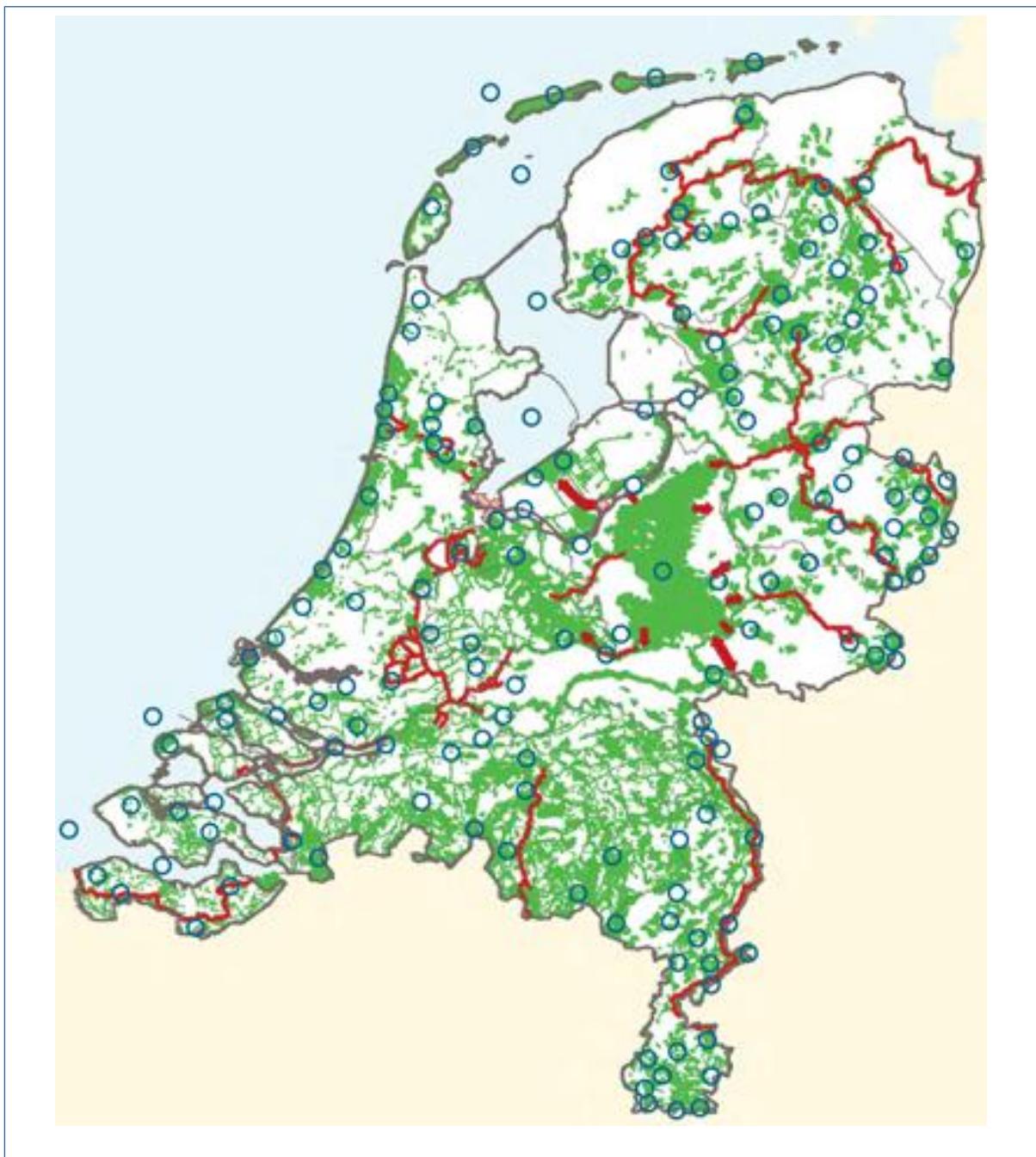
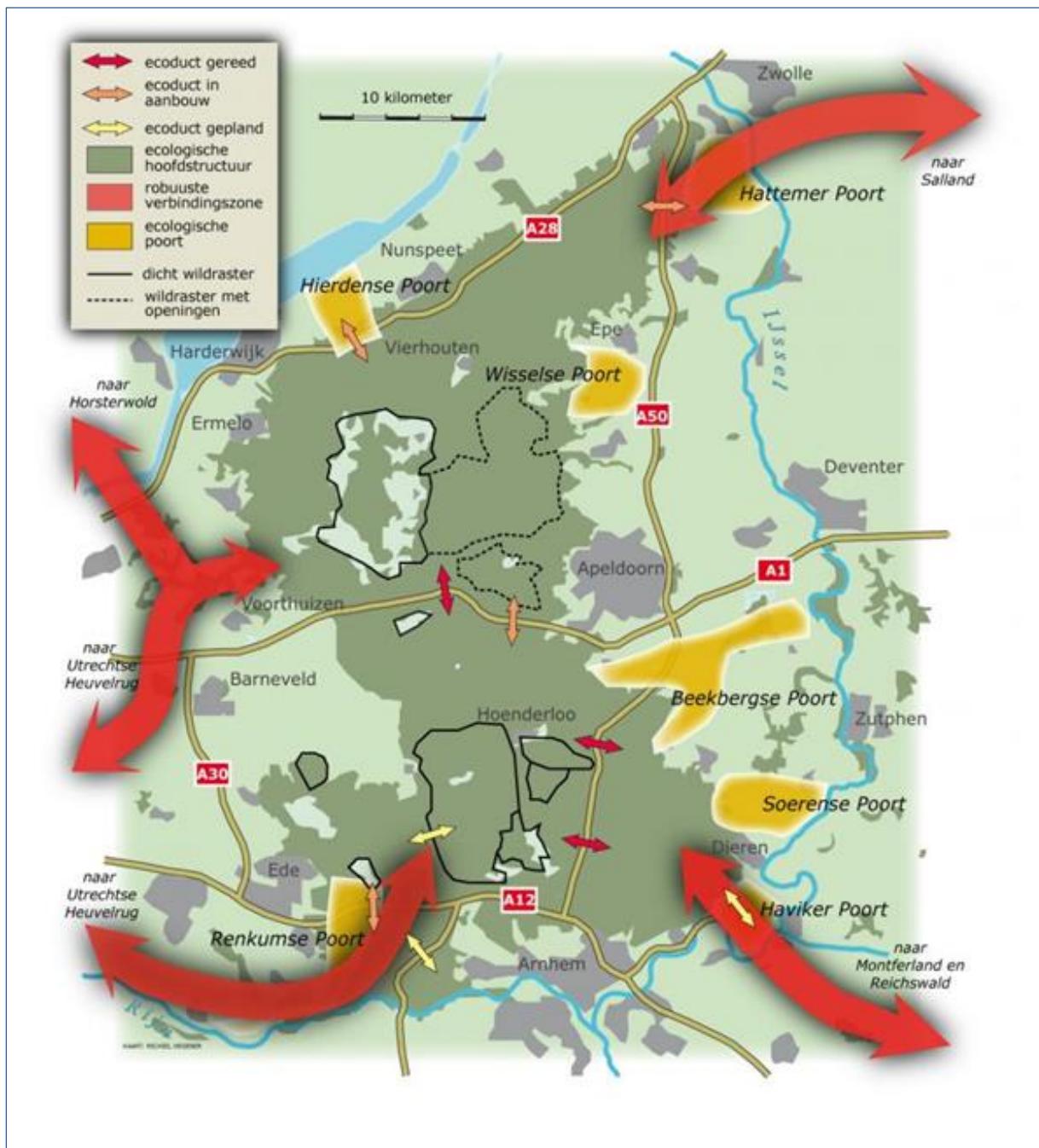


Figure 4. Connectivity measures at a regional scale showing the Veluwe area, with big arrows indicating ‘robust connectivity zones’ and small arrows indicating ‘ecoducts’ (red: completed; pink: under construction; white: planned).



Source: <http://ruimtelijkeordeninggeldersevallei.jouwweb.nl/overheidsbeleid-en-regionaal-beleid>, accessed 5 April 2012

Figure 5. Illustration showing how ecoducts are designed for red deer, with many smaller species in its wake (Provincie Gelderland Begeleidingscommissie Ecoducten Veluwe 2006)

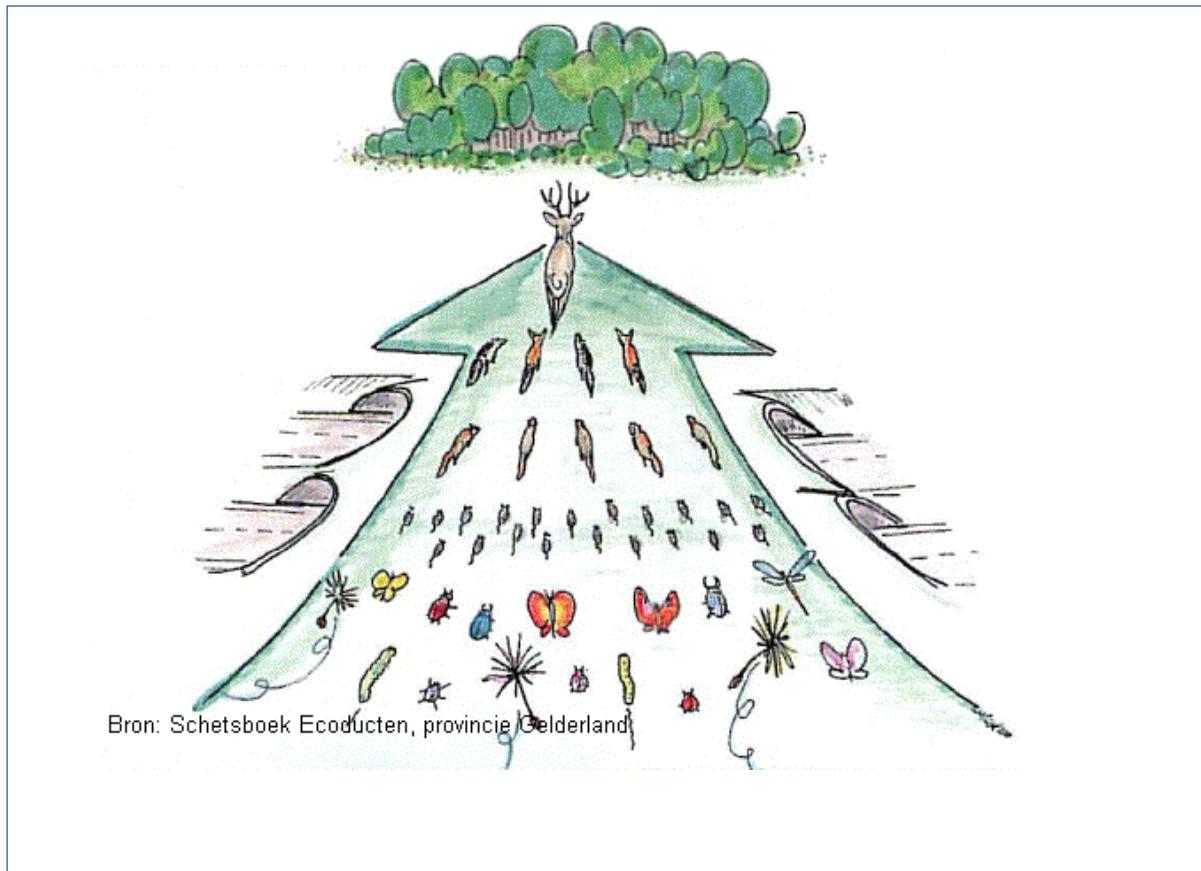
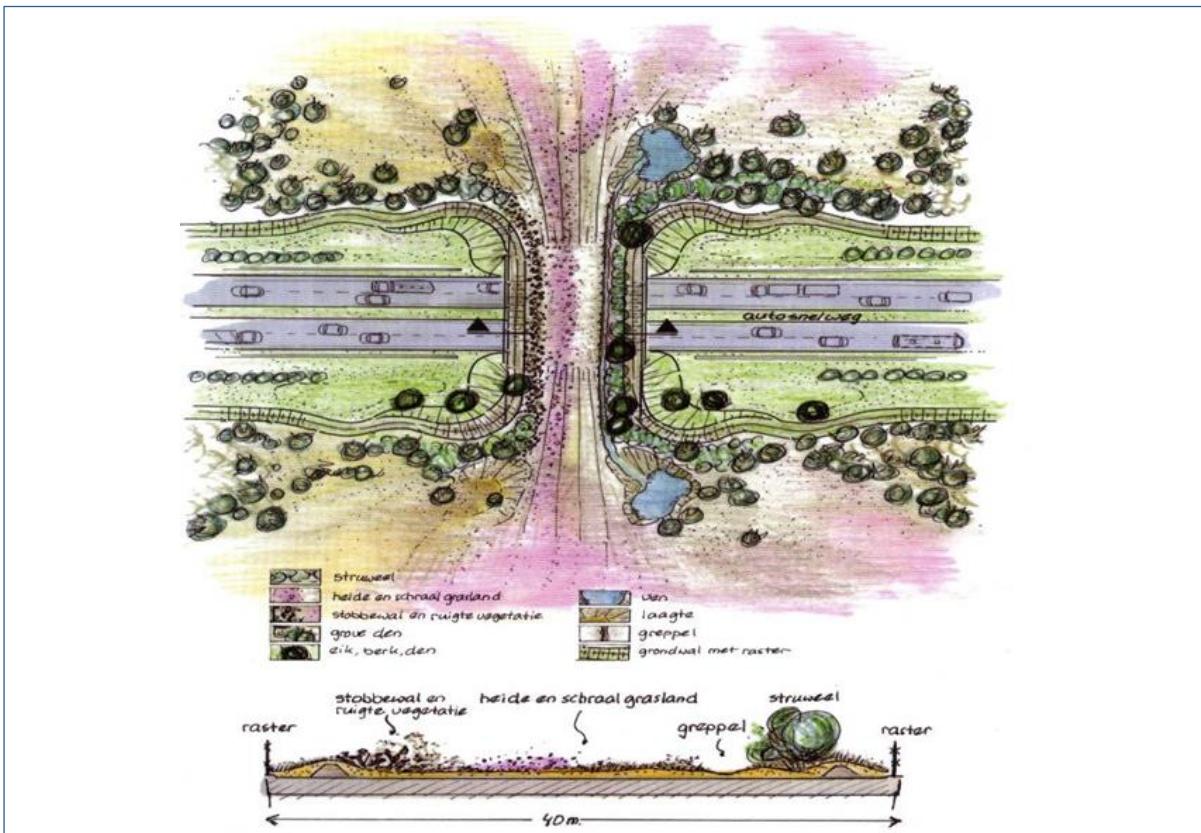


Figure 6: Sketch showing ecoduct, with different vegetation types and structures in order to suit an array of species (Provincie Gelderland Begeleidingscommissie Ecoducten Veluwe 2006)



3.2. Conservation Legislation

- 11 Protected natural areas are the ‘core areas’ of the Netherlands Ecological Network. Of these, the twenty National Parks currently existing in the Netherlands are considered the ‘pearls’ of the EHS. These National Parks are continuous areas of at least 1000 hectares each. Together they cover 120,000 hectares, which is nearly 3% of Dutch territory. Two National Parks are part of transboundary parks, with Belgium (Border Park ‘De Zoom/Kalmthoutse Heide’) and with Germany (Border Park ‘Maas-Swalm-Nette’). The decentralization operation affecting nature conservation in the Netherlands which was initiated in 2011 also covers the National Parks, resulting in a situation whereby provinces become responsible for National Parks. The National Parks are part of the EHS and the Natura 2000 network in virtually their entirety.
- 12 Over 160 natural areas in the Netherlands have currently been (or are destined to be) designated as Special Area of Conservation (SAC) under the EU Habitats Directive and/or Special Protection Area (SPA) under the Birds Directive. All of these Natura 2000 areas belong to the Netherlands Ecological Network. Natura 2000 sites are the predominant protected area in the Netherlands. Other protected area types include ‘protected natural monuments’ (*beschermde natuurmonumenten*) and ‘protected landscapes’ (*beschermde landschappen*). The designation and protection of these areas is regulated in the Nature Protection Act (*Natuurbeschermingswet* 1998, 1998). To a considerable extent, the Act’s provisions reflect, and build on, relevant provisions from the EU nature conservation directives. To avoid duplication, therefore, reference is made here to the EU case study in this volume.
- 13 Generic species protection – applying both within and outside protected areas – in the Netherlands is pursued through other legislation, namely the Flora and Fauna Act (*Flora en Faunawet*, 1998). The Act implements the requirements imposed by the Birds and Habitats Directives concerning the strict protection of species, in particular prohibiting killing, capturing, disturbing, etc., and the corresponding possibilities for granting exemptions from these prohibitions. The scope of the Act furthermore extends to many additional species, and also includes the regulation of hunting in the Netherlands. As the Act’s provisions are of limited relevance from a connectivity conservation point of view, they are not discussed here in detail. A significant part of the EHS is not protected through nature conservation law, but through spatial planning law.

3.3. Spatial Planning Legislation

- 14 The parts of the Netherlands Ecological Network which are situated outside the ‘core areas’ just discussed, are designated as part of the EHS under the Spatial Planning Act (*Wet Ruimtelijke Ordening*, 2008) and associated instruments at national, provincial and municipal levels. In the aforementioned national spatial policy instrument SGR-I of 1995, a rough map of the EHS was provided at the national level. One level down, each of the twelve Dutch provinces determines the precise boundaries of the Network, including the ‘nature development areas’, within the province. The final stage is the designation of the areas involved in municipal zoning plans, whereby their land use destination is laid down as nature conservation or a combination of nature conservation and compatible agricultural use.
- 15 This incorporation in municipal zoning plans entails direct legal consequences for citizens. A set of requirements is laid down in these plans to prevent inappropriate development within the EHS, or even outside of it if the activity is thought to have a negative impact on the ecological values within the Network. These requirements can, for instance, prohibit the erection of buildings within the Network or set minimum distances for certain activities in the Network’s proximity. The latter applies, for instance, to large-scale cattle farming or other bio-industry activities emitting nitrates which can adversely affect the quality of the natural habitats within the EHS. Infringements on the National Ecological Network can only be permitted when certain conditions are fulfilled. One of these is that infringements must be offset in accordance with detailed standards requiring that there be no net loss of area, of quality, or of connectivity within the Network. In practice this tends to lead to the recreation or restoration of new areas to be included within the Network, mostly through land swaps or land purchases by the initiator of the proposed project. These and other standards are laid down in a joint policy instrument concluded between the national government and the provinces, in consultation with municipalities and other stakeholders (Ministerie van Landbouw, Natuur en Voedselkwaliteit et al. 2007).

3.4. Voluntary and Incentive-based Mechanisms

- 16 Private nature conservation measures are stimulated in the Netherlands in various ways. One long-standing instrument is the Estates Act Natuurschoonwet 1928. The Act aims at the conservation of estates (*landgoederen*), particularly their natural values, by providing the owners, usufructuaries and leaseholders of estates with tax benefits if certain conditions regarding the conservation of the areas involved are met. To be eligible for the tax benefits involved, an estate must measure at least five hectares and at least 30% of its area must consist of woods or other natural landscapes. Tax benefits include exemptions from Real Estate Tax (*Onroerende Zaak Belasting*, OZB) and Income Tax (*Inkomstenbelasting*).
- 17 Nature conservation measures on private land within the Netherlands Ecological Network are also promoted through the 2011 subsidy programme *Subsidie Natuur- en Landschapsbeheer* (SNL), which is an integrated version of previous programmes that have existed since 1975. Under the SNL scheme, farmers and (other) private landowners can apply for subsidies to finance projects within the EHS over a six year period. The projects are grouped together in so-called packages. Individual applicants subscribe to one or more of these packages, and then get funding for the execution of such a package. There are two basic groups of packages, focused on farmland and natural habitats, respectively. Farmland packages, for instance, include measures aimed at protecting nests of meadow birds or at creating foraging areas for wintering geese. Some of these packages are especially relevant because they include connectivity measures, such as those aimed at botanical meadows (no use of pesticides, extensive grazing, etc.) and at meadows with a flora of high ecological value. For other private landowners, subsidies under the SNL are aimed at preserving the specific habitat type or cultural landscape existing on their lands, e.g., various types of marshes, dunes or grasslands, or cultural landscape elements like hedgerows and lanes of old trees. A specific subsidy programme, the *Subsidieregeling Kwaliteitsimpuls Natuur en Landschap* (SKNL), exists for the conversion of land into nature, particularly in areas zoned for nature development.. It applies *inter alia* to farmers willing to convert their agricultural land into nature, with the subsidy intended to cover the loss of economic value of these lands as a result of the function change, and also the costs of the measures that physically convert the agricultural land into nature. The subsidy programme also applies to landowners wishing to enhance the ecological quality of properties that already host nature. The programme provides financial incentives to convert lands into nature that form an essential corridor between protected areas, and is thus of specific interest from a connectivity viewpoint. Both subsidy programmes are currently run by the provinces. Until 2011, similar programmes were executed at the national level, using national nature conservation budgets

4 A Critical Reflection

- 18 Several recent assessments carried out under the auspices of the Netherlands Environmental Assessment Agency make clear that biodiversity loss in the Netherlands has still not been halted (Van Veen and Bouwma 2007; Van Veen et al. 2010). Populations of vulnerable species and the quality of vulnerable ecosystems continue to deteriorate (Van Veen et al. 2010). Within the Netherlands, the large majority of species and habitat types listed under the EU Birds and Habitats Directives has a (very) unfavourable conservation status, and Dutch figures compare unfavourably with those in other member states (Van Veen et al. 2010). This raises the question as to the role of the EHS in this regard
- 19 At the time the Netherlands Ecological Network was launched, no monitoring system was established, performance indicators were not developed, and no baseline was determined against which to measure the Network's effect. The (connectivity) conservation benefits of the EHS are thus difficult to determine with any degree of accuracy (Bennett 2012). Importantly, it should also be borne in mind in the present context that the Network has not been completed yet – with completion now foreseen in 2021. Nevertheless, there is good reason to believe that the state, and particularly the prospects, of biological diversity in the Netherlands would have been worse without the EHS scheme (Bennett 2012).

- 20 An important performance indicator developed when the Network was already evolving concerns the extent of suitable spatial conditions for the target flora and fauna species which are associated with the various applicable nature objective types. The indicator employs a 'key patch' approach, with a key patch defined as an area with a carrying capacity sufficiently large to sustain a key population and sufficiently close to other patches to receive an average of one immigrant per generation (Verboom et al. 2001). Despite a steady increase of such areas from 1990 to 2008, the number of species for which adequate spatial conditions exist has increased in that period by only two percent. At the same time, a decline has taken place of animal species requiring large areas of habitat. As regards the future, it has been estimated that in the longer term the EHS would provide sufficient spatial conditions for about two-thirds of the target species (Reijnen et al. 2005; Van Veen et al. 2010; Bennett 2012). It should be noted that the latter assessment is based on the EHS policy as it stood before the downgrading operation initiated by the Rutte-I administration. The same is true of the conclusions from a 2009 analysis regarding the significance, for species from the annexes to the EU Birds and Habitats Directives, of those parts of the Netherlands Ecological Network which are not designated as Natura 2000 areas (Bouma et al. 2009). According to this study, over half of the species for which Special Areas of Conservation or Special Protection Areas must be (and have been) designated, also require measures in the 'non-Natura 2000' share of the EHS if national targets are to be achieved. Furthermore, for a quarter of the strictly protected species from Annex IV of the Habitats Directive the Netherlands Ecological Network is deemed crucial to the achievement of the corresponding national conservation targets (Bouma et al. 2009). In the words of a recent review, the EHS does apparently "play an important role in achieving the national species conservation objectives, including those for Natura 2000 species" (Bennett 2012).
- 21 Apparently, however, current efforts are not sufficient. A 2010 review conducted for the Netherlands Environmental Assessment Agency (Van Veen et al. 2010) identified a series of bottlenecks. These include the following:
- As stated above, even upon completion of the EHS plans as they stood before their modification in 2011, adequate spatial conditions would still not exist for a third of all target species.
 - Whereas the amount of acquired hectares intended for 'nature development' (mostly agricultural lands) has steadily increased, their actual conversion to nature is lagging far behind schedule. This is due to a mix of factors, including the amount of land owners involved in many nature development areas, the voluntary character of purchase, bureaucratic complexities and budgetary constraints.
 - Targets for the conversion of agricultural lands into nature under the SKNL subsidy programme are not being met. Most land owners (farmers) are unwilling to adjust the way they manage their lands, and/or have insufficient faith in the government to commit themselves to the conversion procedure.
 - The other subsidy programme for nature conservation on private land, the SNL, is similarly ineffective. This especially concerns the packages for conservation measures on farmland, with low continuity being a major problem. In most cases, after the six years of a subsidy are through, farmers do not apply for a new subsidy for the same lands, for a variety of reasons including bureaucratic hurdles and practical difficulties associated with the actual application of the conservation measures involved.
 - The resolution of the over 200 connectivity obstacles posed by highways, railways and waterways identified in the MJPO programme is running behind schedule.
 - Although nitrogen deposition has decreased since 1990, this decrease has come to a stop in recent years and deposition remains too high in many vulnerable parts of the Network, e.g., fens and peat-moors.
 - Artificially lowered water tables are a persistent problem in many parts of the Network, as Provinces have only recently begun to implement measures to counter this problem.
- 22 In sum, halting and reversing biodiversity loss in the Netherlands, and attaining a favourable conservation status for target species – all the more so in light of climate change – does not appear feasible without consolidating, expanding and enhancing the EHS. As pointed out above, however, recent government policy has been aiming for less EHS, instead of more. Of special interest in the present context is the policy change regarding the 'robust connectivity zones'. A 2006 study aimed at identifying the best options for national conservation policy to respond to climate change, calls for a good spatial coherence between Natura 2000 sites and other natural areas in general, and for the accelerated implementation of the envisaged robust connectivity zones in particular (Vos et al. 2006). The crucial role of these zones for the adaptation of flora and fauna to climate change was confirmed

in a study specifically focussing on this issue, commissioned by the national government (Geertsema et al. 2009). The study concludes that the planned robust connectivity zones would make an important contribution to removing major obstacles to the adaptation of species to climate change resulting from habitat fragmentation.

- 23 In light of the above, the previous administration's plan to downscale the Netherlands Ecological Network, further delay its completion, and abandon the scheduled robust connectivity zones, would clearly have constituted a serious setback for connectivity conservation in the Netherlands. Besides, it is open to serious doubt whether these plans were compatible with the Netherlands' obligations under international and EU law, particularly those under the Birds and Habitats Directives (Backes et al. 2010; Fleurke and Trouwborst 2011; Trouwborst 2011b and the EU case study in this volume).

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Connectivity Conservation Law through the Eyes of the Greater Cedarberg Biodiversity Corridor*

Dr Alexander Ross Paterson

1 Introduction

- 1 While South Africa ranks as the third most biologically diverse country in the world, it is currently hemorrhaging this diverse biological wealth. The most recent assessment of the nation's biological resources highlights that 40% of terrestrial ecosystems, 57% of river ecosystems, 65% of wetland ecosystems, 43% of estuary ecosystems and 58% of coastal and inshore ecosystem types are threatened.¹³⁵ Furthermore, increasing numbers of terrestrial, marine and aquatic species are regarded as threatened.¹³⁶ These challenges are compounded by the trappings which accompanied South Africa's transition to a constitutional democracy such as the political and budgetary priorities accorded to socio-economic development imperatives, the need to promote rural development amongst impoverished communities, large scale rural land tenure reform and land redistribution, and the creation of a highly fragmented governance regime particularly evident in the environmental sector.
- 2 Notwithstanding these challenges, South Africa's conservation authorities have sought to transform the country's regulatory framework during the past two decades to thwart the demise of its rich and diverse biological wealth. While this contemporary legal regime does not include dedicated legislation governing connectivity conservation, it does contain a range of legal tools for promoting the realisation of this concept – legal tools which are scattered across the country's conservation, sustainable use, land-use planning, development control, coastal management and fiscal legislation. These legal tools are complemented by a range of voluntary contractual arrangements and incentive measures. This case study seeks to explore the opportunities provided by, and constraints associated, with the use of these legal tools for promoting connectivity conservation through the lens of the Greater Cedarberg Biodiversity Corridor.

2 Overview of the Greater Cedarberg Biodiversity Corridor

2.1 Origins and Setting

- 3 The origins of the Greater Cedarberg Biodiversity Corridor (GCBC) are rooted in the Cape Action for People and the Environment (CAPE), a partnership of government and civil society formed in 2001. CAPE aims to conserve and restore the biodiversity of the Cape Floristic Region and adjacent marine environment, while delivering significant benefits to the people of the region. Comprising 23 signatory partners united around the above common vision, a central aspect of CAPE's strategy is adopting a landscape-level approach to biodiversity conservation, through 'landscape initiatives'. These initiatives

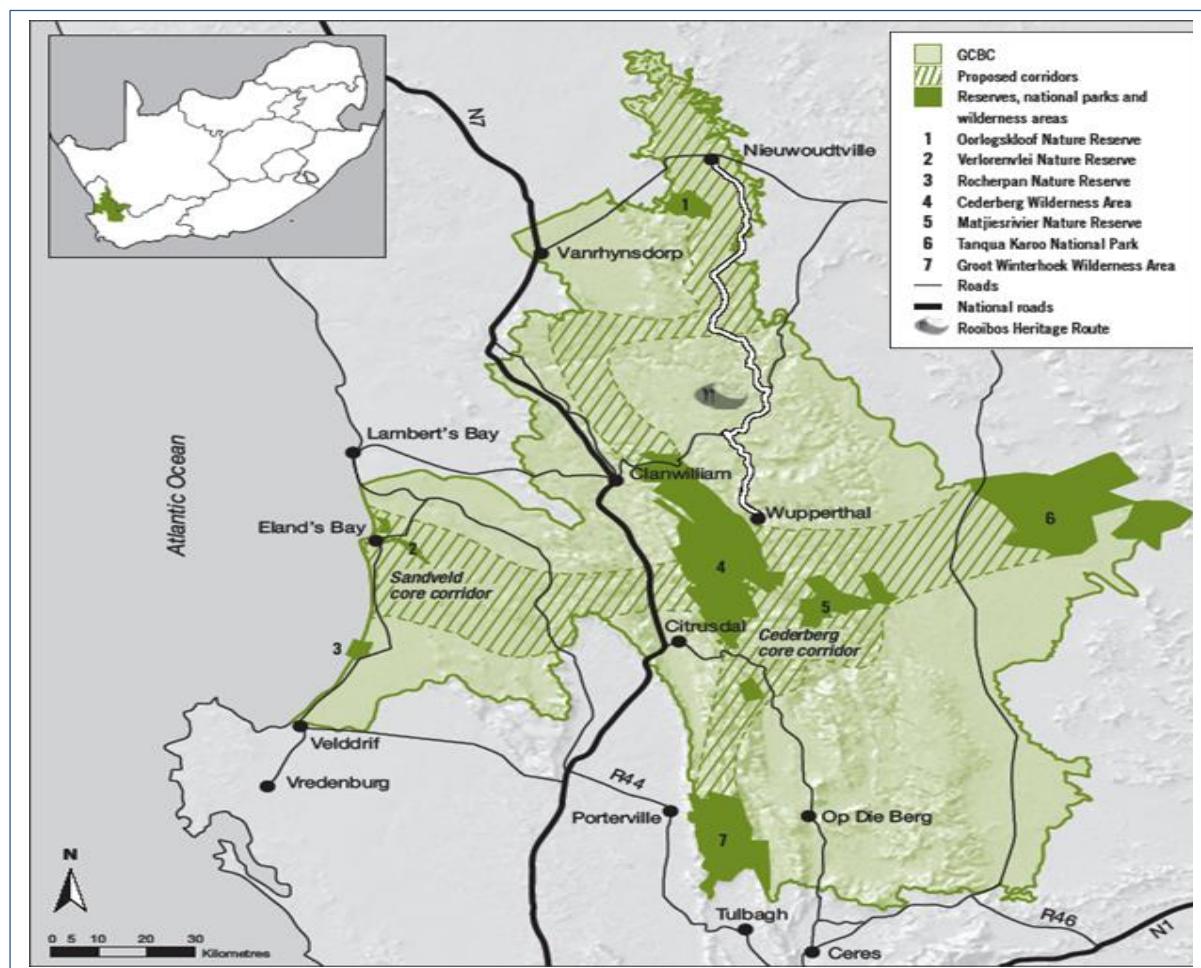
* This Case Study reflects the South African position as at 1 August 2012.

¹³⁵ Driver A, Sink K, Nel, J, Holness S, Van Niekerk L, Daniels F, Jonas Z, Majiedt P, Harris L & Maze K *National Biodiversity Assessment 2011: An Assessment of South Africa's Biodiversity and Ecosystems. Synthesis Report* (2012) South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria.

¹³⁶ See generally on the state of South Africa's biological resources: Department of Environmental Affairs and Tourism *South African Environmental Outlook: A Report on the State of the Environment* (2006) 108-137; Department of Environmental Affairs and Tourism *National Biodiversity Strategy and Action Plan* (2005) 13-17; and *White Paper on the Conservation and Sustainable Use of South Africa's Biodiversity* (1997) (published in GN 1095 GG No.18163 dated 28 July 1997) 13-14.

take various forms including corridor initiatives, mega-reserves and biosphere reserves. They seek to overcome the constraints associated with traditional conservation and protected area initiatives, and focus on promoting the sustainable management of a mosaic of land uses, where people live and work in harmony with nature and within the natural resource limits of the landscape - inherent in the notion of 'living landscapes'.¹³⁷ Central to this approach is the creation of corridors of continuous natural habitat across the living landscape. These corridors seek to conserve species, critical habitats, biological patterns and ecological processes; and are viewed as important tools in the context of climate change adaptation. The GCBC is one such corridor initiative.

Figure 1: Greater Cedarberg Biodiversity Corridor



- 4 The GCBC is situated on the south western coast of South Africa and covers an area of 1.8 million hectares stretching approximately 160 km from Nieuwoudtville in the north to the Groot Winterhoek Wilderness Area in the south; and some 200 km from Elandsbaai in the west to the Tankwa Karoo National Park in the east. Incorporating diverse geology, climatic conditions, flora and fauna, it is an area of high biological importance containing two global biodiversity hotspots (the Cape Floral Kingdom and the Succulent Karoo biome).¹³⁸ It is characterized by 42 vegetation types and contains three important bird areas, 175 wetlands and several important riverine corridors. The area is also permeated with valuable archeological sites providing evidence of settlement dating back to the Early Stone Age.
- 5 Approximately 10% of the area falls within several forms of statutorily prescribed protected areas that are legally and institutionally secure. A further 32% of the land is regulated under less secure forms of

¹³⁷ Greater Cedarberg Biodiversity Corridor Planning Phase Report (2005), 6

¹³⁸ For a comprehensive overview of the importance of the area, see: Low A, Mustart A, Van der Merwe H
Greater

Cederberg Biodiversity Corridor: Provision of Biodiversity Profiles for Management (2004) COASTEC.

protected areas and/or by way of voluntary conservation agreements. Outside of these areas, the predominant land use is stock farming and agriculture (citrus, wine, deciduous fruit, tea and potatoes). These sectors provide employment to about 50% of the area's population. At last available count this population stood at 28 560 inhabitants and the area's population density at 2.5 persons per km. Approximately 30% of these inhabitants are unemployed and of those who are employed, 78% earn less than R1500/month (less than USD200/month). Outside of the agricultural sector, employment opportunities are limited. According to the last available statistics, approximately 16% of the land within the GCBC has been transformed from its natural state - with the rate of transformation increasing as agriculture expands in the area. As a result, 18 of the 42 vegetation types occurring in the GCBC have been identified as critically endangered, endangered or vulnerable.

2.2 Institutional Arrangements Underpinning the Corridor

- 6 The area falling within the GCBC spans land owned by many different entities (government departments, communities and private landowners); and traverses the administrative boundaries of several municipalities (local government authorities) and two provincial governments (namely the Western Cape and the Northern Cape). The natural resources situated within the GCBC and the activities impacting on these resources are regulated by a diverse array of laws administered by several national, provincial and local authorities.¹³⁹ This diversity of institutions clearly posed significant challenges for creating a workable institutional structure to administer the GCBC. CapeNature, the provincial conservation authority in the Western Cape, acts as the implementing agent for, and service provider to, the GCBC. Together with a Project Management Unit (housed within CapeNature), it seeks to ensure that lasting partnerships are built throughout the corridor between all the above relevant stakeholders. A steering committee with representation from 22 organisations (including those mentioned above) meets quarterly to review the progress of CapeNature and the PMU and make decisions to guide their future action.

2.3 Objectives and Strategy of the Corridor

- 7 The vision of the GCBC is to conserve the biodiversity within the area through the sustainable utilization of the area's unique living landscape. The key objectives of the initiative include:

- to provide a framework which will underpin community participation in the management of the GCBC and the natural resources and heritage values that it contains;
- to maintain the diversity of landscapes and habitats within the GCBC and its associated species and ecosystems;
- to support lifestyles and bring benefits to, and contribute to the welfare of local communities, which are in harmony with nature and the preservation of the social and cultural fabric of the communities concerned;
- to help ensure that the associative and non-material values of the GCBC and traditional land-use practices are recognised and respected;
- to contribute at a bio-regional scale to conservation and sustainable development;
- to prevent and eliminate, where necessary, land uses and activities which are inappropriate in scale and/or character;
- to buffer and link provincial and national protected areas;

¹³⁹ These include: Department of Environmental Affairs; Department of Water Affairs; Department of Agriculture, Forestry and Fisheries; South African National Parks; South African National Biodiversity Institute; South African National Heritage Resources Agency; CapeNature; Western Cape Heritage Resources Authority; Department of Environmental Affairs and Development Planning (Western Cape); Department of Environmental and Nature Conservation (Northern Cape); West Coast District Municipality; Namakwa District Municipality; Bergriver Local Municipality; Witzenberg Local Municipality; Cederberg Local Municipality; Matzikama Local Municipality; and Hantam Local Municipality.

- to encourage scientific and educational activities which will contribute to the long term well-being of fauna and flora populations of the GCBC and to the development of public support for the environmental protection of the GCBC;
- to provide opportunities for public recreation and tourism of a type and scale that will ensure preservation of the essential qualities of the GCBC; and
- to act as a model of sustainability, both for the benefit of the people and the area, so that lessons can be learnt for wider application.

- 8 Five key strategies have been developed to aid in the attainment of these objectives, namely those relating to: expansion; industrial involvement; local economic development and human-well being; awareness; and coordination.¹⁴⁰ It is the first of these, the Expansion Strategy, which is most central to the realm of connectivity conservation. The principle goal of corridor planning, as envisaged by the GCBC, is to maintain and restore connectivity across the landscape, linking land parcels together or enabling them to serve as stepping stones to facilitate the movement of species through the landscape. This is a distinct challenge in South Africa given the country's increasingly sporadic and disjointed land-use patterns which are compounded by the reality that 80% of scarce and threatened ecosystems and habitats are situated on private land. The Expansion Strategy accordingly recognises that the attainment of this goal is dependant on a range of measures, such as: introducing area-wide and landscape planning; identifying priority biodiversity sites on privately-owned land parcels; stimulating the creation of additional protected areas through voluntary stewardship agreements; introducing conservation measures governing important sites falling outside these protected areas; creating land-use planning strategies to promote appropriate forms of land use on these sites; and restoring degraded land and resources on key sites.
- 9 Following extensive, participatory broad and multi-scale planning, five main corridors have been identified in the GCBC with a view to linking critical biodiversity areas within it. These are founded on two core corridors, namely the Sandveld Core Corridor and Cederberg Core Corridor. The Sandveld Core Corridor runs from Elandsbaai on the West Coast through to the central Cederberg Wilderness Area. This corridor provides an important ecological gradient from the coast to the inner higher lying areas and contains some of the most threatened biodiversity in the GCBC because of unplanned agricultural expansion. The Cederberg Core Corridor is situated to the south east of the Cederberg Wilderness Area and overlaps with one of South Africa's eight world heritage sites, namely the Cape Floral Region Protected Areas. This corridor contains several rare and endangered species as it lies at the interface between the Fynbos and Succulent Karoo biomes. Much of the work over the past few years has focussed on establishing these two core corridors, and has included area-wide planning processes and negotiations with private landowners with a view to incorporating their land into protected areas or under some form of stewardship arrangement. These two core corridors will in the future be complemented by the addition of the: Bokkeveld Corridor (extending northwards from the Cederberg Wilderness Area towards the Oorlogskloof Nature Reserve); Groot Winterhoek Freshwater Corridor (extending southwards from the Cederberg Wilderness Area towards the Grootwinterhoek Wilderness Area) and the Olifantsberg Corridor (extending westwards from the Cederberg Wilderness Area to towards the Sandveld Core Corridor). All three of these latter corridors provide important upland-lowland gradients, traverse important biomes, are home to rich species diversity and provide important potential migration paths for plant and animal species in light of climate change.
- 10 The remainder of this case study highlights the broad array of tools inherent in South Africa's contemporary legal framework which have been used, or could be used, to promote the connectivity goals of the GCBC.

3 Domestic Laws Facilitating Connectivity Conservation

- 11 While South Africa does not have dedicated legislation promoting connectivity conservation, several domestic laws contain legal tools for realising the concept. These legal tools are found inherent in laws permeating many distinct legal sectors, namely: conservation legislation (establishing protected areas; promoting biodiversity planning; and regulating listed ecosystems and species); sustainable

¹⁴⁰ For further details on these strategies and the projects that have been implemented to give effect to them, see <http://www.cederbergcorridor.org.za>.

use legislation (regulating specific natural resources such as fresh water, natural forests, soil, heritage and marine living resources); land-use planning legislation (governing future spatial planning, zoning and subdivision); development control legislation (providing for environmental impact assessment, strategic environmental assessment and environmental management frameworks); integrated coastal management legislation (regulating planning and development in the coastal zone) and fiscal legislation (governing an array of conservation incentives). The administration of these laws is scattered across the national, provincial and local spheres of government. This legislative scheme is further complemented by several non-statutory schemes that seek to promote connectivity conservation through the use of voluntary contractual arrangements. This scheme is exceptionally broad in its ambit and detailed in its formulation. The delimited scope of this case study only provides an opportunity to briefly reflect on its general operation and utility in promoting connectivity conservation in the context of the GCBC.

3.1 Conservation Legislation

3.1.1 Establishing Protected Areas

12 South Africa currently has eleven main national laws¹⁴¹ and eighteen main provincial laws¹⁴² providing for the designation of over twenty-five different forms of statutory prescribed protected areas. As depicted in Figure 2 below, approximately 10% of the land falling within the GCBC is incorporated within several forms of strictly regulated protected areas including national parks, provincial nature reserves, local authority reserves and marine protected areas. This percentage includes both state and privately owned land. The statutory objectives for establishing these areas are diverse and while not specifically referring to connectivity, are sufficiently broadly phrased to promote the conservation of core areas of high conservation value and adjacent areas to act as buffer zones to, or corridors between, these areas. These areas are generally subject to strict regulation with provision being made in the founding laws for the appointment of management authorities, the preparation of management plans and the strict regulation of activities within them. The majority of these protected areas are managed by government conservation authorities, with their protection being perpetual in nature.

13 A further 32% of the land in the GCBC is incorporated in what may be termed less secure forms of protected areas such as: private nature reserves, national heritage sites and mountain catchment areas; or in conservancies (see Figure 3 below). The former are similarly regulated by statute and as their name suggests, the rationale for their creation is diverse and includes biodiversity conservation, heritage protection and fresh water management. They are less formal in the sense that management often falls to private landowners and regulation is less strict, with greater provision being made for regulated access and use. The latter, the conservancies, do not have statutory standing and comprise areas subject to voluntary stewardship agreements concluded between private landowners and provincial conservation authorities (see further part 3.7 below).

¹⁴¹ Relevant national laws include: the National Environmental Management: Protected Areas Act 57 of 2003; National Environmental Management: Biodiversity Act 10 of 2004; World Heritage Convention Act 49 of 1999; National Heritage Resources Act 25 of 1999; National Environmental Management Act 107 of 1998; National Forests Act 84 of 1998; Marine Living Resources Act 18 of 1998; Environment Conservation Act 73 of 1989; Forest Act 122 of 1984; Mountain Catchment Areas Act 63 of 1970, and Sea Birds and Seals Protection Act 46 of 1973. For a comprehensive overview of South Africa's protected areas regime, see further: Paterson AR 'Protected Areas: South Africa' in Lausche B *Guidelines for Protected Areas Legislation* (2011) IUCN Environmental Policy and Law Paper No.81 IUCN Environmental Law Centre Bonn.

¹⁴² Relevant provincial laws include: Nature Conservation Ordinance (Transvaal) 12 of 1983; Nature Conservation Ordinance (Cape) 19 of 1974; Nature Conservation Ordinance (Natal) 15 of 1974; Nature Conservation Ordinance (OFS) 8 of 1969; Transkei Environmental Conservation Decree 9 of 1992; Nature Conservation Act (Ciskei) 10 of 1987; Protected Areas Act (Bophuthatswana) 24 of 1987; Bophuthatswana Nature Conservation Act 3 of 1973; Provincial Parks Board Act (Eastern Cape) 12 of 2003; Limpopo Environmental Management Act 7 of 2003; Limpopo Tourism and Parks Board Act 8 of 2001; Mpumalanga Nature Conservation Act 10 of 1998; Mpumalanga Tourism and Parks Agency Act 5 of 2005; Kwazulu-Natal Nature Conservation Act 29 of 1992; Kwazulu-Natal Nature Conservation Management Act 9 of 1997; Northern Cape Nature Conservation Act 9 of 2009; Eastern Cape Parks and Tourism Act 2 of 2010; and Western Cape Biosphere Reserves Act 16 of 2011.

Figure 2: Formal Protected Areas

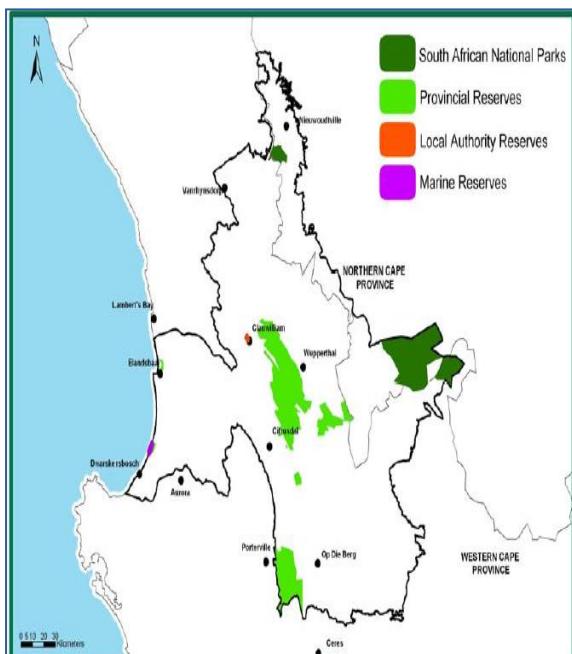
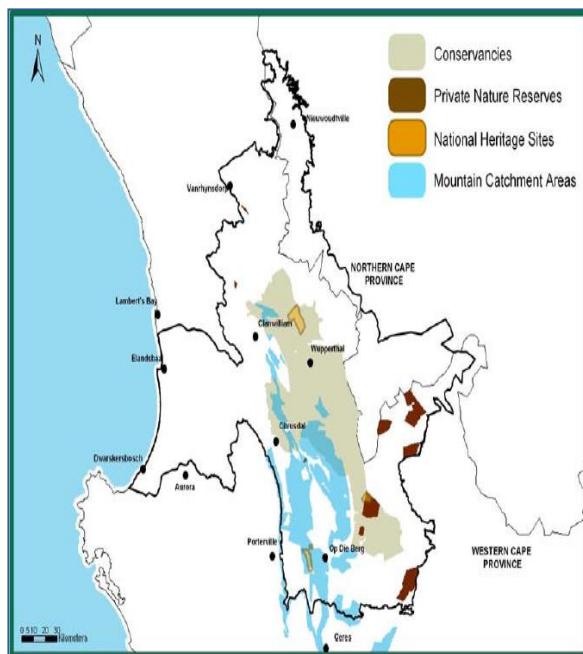


Figure 3: Less Formal Protected Areas



- 14 The diverse array of protected areas and stewardship options has afforded conservation authorities and landowners broad flexibility to tailor diverse conservation solutions to specific contexts or objectives – including promoting connectivity conservation. This is notwithstanding the fact that South Africa’s underpinning statutory framework governing protected areas makes no express provision for connectivity conservation. Recent national protected area strategies, such as the *National Protected Areas Expansion Strategy*¹⁴³ (2009) and the *Strategy on Buffer Zones for National Parks*¹⁴⁴ (2012) do expressly recognise the value of protected areas in promoting connectivity, maintaining ecological processes and fostering resilience to climate change. They are indicative of the Government’s realisation of the need to better integrate protected areas into their surrounding landscapes in an effort to meet biodiversity thresholds for terrestrial and freshwater ecosystems.

3.1.2 Biodiversity Planning

- 15 This comprehensive protected areas regime at play in the GCBC is complemented by several national and provincial laws which provide the underpinning planning framework for informing priority conservation action (including the designation of formal and less formal protected areas) and an array of tools for promoting the realisation of this planning regime.¹⁴⁵ In both senses, these laws provide valuable tools for promoting connectivity conservation, with the most important law being the National Environmental Management: Biodiversity Act (NEMBA).¹⁴⁶ It provides for the adoption of a national biodiversity framework¹⁴⁷ and the declaration of bioregions and associated bioregional plans.¹⁴⁸ These

¹⁴³ Government of South Africa *National Protected Areas Expansion Strategy for South Africa* (2009). The Strategy

prescribes an array of targets for ensuring that a representative sample of South Africa’s crucial ecosystems are conserved and identifies forty-two large, intact and un-fragmented areas of high conservation value deemed suitable for inclusion in large protected areas.

¹⁴⁴ GN 106 GG No. 35020 dated 8 February 2012. The Strategy sets out the Government’s plan for establishing and managing buffer zones around the country’s national parks to ensure that they are able to meet their objectives.

¹⁴⁵ See notes 7 and 8 above for a list of these laws.

¹⁴⁶ 10 of 2004.

¹⁴⁷ The national environmental Minister must prescribe a national biodiversity framework which provides for an integrated, coordinated and uniform approach to biodiversity management; and identifies priority areas for conservation action and the establishment of protected areas (s 38 and s 39).

mechanisms, which are applicable in the context of the GCBC, may promote connectivity conservation and therefore require brief elaboration.

- 16 NEMBA prescribes that the national environmental Minister must prepare a national biodiversity framework that provides for an integrated, co-ordinated and uniform approach to biodiversity management by organs of state in all spheres of government, non-governmental organisations, the private sector, local communities, other stakeholders and the public.¹⁴⁹ It must also identify priority areas for conservation action and the establishment of protected areas, provide for regional co-operation and may determine norms and standards for provincial and municipal environmental conservation plans. This *National Biodiversity Framework*,¹⁵⁰ complemented by a *National Biodiversity Assessment*¹⁵¹ and the *National Biodiversity Strategy and Action Plan*¹⁵² (NBSAP), was published in 2009. It identifies thirty-three priority actions to be undertaken in the next five years in order to give effect to the strategic objectives highlighted in the NBSAP. It therefore provides an important planning framework to promote, inform and co-ordinate the short-term efforts of the many organisations and individuals involved in conserving and managing South Africa's biodiversity. While not expressly referring to connectivity conservation, several of the priority actions focus on promoting objectives and activities associated with this ideal such as creating ecological corridors and buffers between areas of high conservation value. This statutory planning framework is complemented by several relevant programmes that in the context of the GCBC include the *Cape Action Plan for People and the Environment*¹⁵³ and the *Succulent Karoo Ecosystems Programme*¹⁵⁴ that further guide and coordinate priority conservation action.
- 17 This national planning framework is mimicked at the regional level. The national and provincial environmental Ministers may determine a geographic region as a bioregion and publish a bioregional plan to manage the biodiversity situated within it.¹⁵⁵ The content to be included in such a plan is set out in the Act and must essentially contain measures for the effective management of biodiversity in the region.¹⁵⁶ The national Minister has promulgated *Guidelines Regarding the Determination of Bioregions and the Preparation of and Publication of Bioregional Plans*.¹⁵⁷ These Guidelines contain detailed information on how to determine the boundaries of bioregions, the content to be included in a bioregional plan, the process to be followed in determining a bioregion and publishing a bioregional plan, and who shall use the plan. Interestingly, the Guidelines specifically recognise the principle of representation and persistence as key characteristics of a systematic biodiversity plan. Furthermore,

¹⁴⁸ The national environmental Minister or relevant provincial environmental Minister may determine a geographical region as a bioregion and publish a plan for managing the biodiversity within the region (s 40 and s 41).

¹⁴⁹ S 39(1) and (2).

¹⁵⁰ GN 813 GG No. 32474 dated 3 August 2009.

¹⁵¹ *National Biodiversity Assessment* (2012) (note 2). Commissioned by the Department of Environmental Affairs, it contains an assessment of South Africa's biodiversity, socio-economic and political context and provides an overview of key issues, constraints and opportunities relating to it.

¹⁵² Department of Environmental Affairs and Tourism *South Africa's National Biodiversity Strategy and Action Plan* (2005). Commissioned by the erstwhile Department of Environmental Affairs and Tourism, it sets out a comprehensive long-term strategy for the conservation and sustainable use of South Africa's biodiversity and the equitable sharing of benefits derived from this use.

¹⁵³ CAPE is a partnership of government and civil society, aimed at conserving and restoring the biodiversity of the Cape Floristic Region and the adjacent marine environment, while delivering significant benefits for communities living in the region. It has 23 signatory partners (including government departments, municipalities, non-governmental and community-based organizations and conservation agencies). In addition to coordinating and providing strategic direction to conservation functions, it enables donor funding to be channeled into new areas of work and approaches to conservation. The following specific areas of work are targeted: landscape initiatives; conservation stewardship; business and biodiversity; fine-scale planning; catchment management; conservation education; and strengthening institutions. A number of task teams coordinate work in these areas. For further information on CAPE's projects see <http://www.caapeaction.org.za/>.

¹⁵⁴ SKEP is also a partnership of government and civil society, aimed at implementing a 20-year strategy to conserve the sensitive Succulent Karoo Ecosystem. It focuses on the following four strategic areas: increasing local, national and international awareness of the unique inherent biodiversity of the Succulent Karoo; expanding protected areas and improving conservation management; supporting the creation of a matrix of harmonious land uses; and improving institutional coordination. For further information on SKEP see <http://www.skep.org/>.

¹⁵⁵ S 40(1) and (2).

¹⁵⁶ S 41.

¹⁵⁷ GN 291 GG No. 32006 dated 16 March 2009.

they state that any such plan must identify a portfolio of critical biodiversity areas required to meet biodiversity pattern and ecological process targets and that these areas should include spatially explicit ecological corridors that need to be managed to ensure connectivity of natural habitat in the landscape. No such bioregions or bioregional plans have been published to date but given their broadly framed nature, they could be used to promote, inform and coordinate connectivity conservation initiatives within the GCBC and beyond. Were any such plans to be developed in relation to the area included in the GCBC, their content would need to be reflected in the strategies underpinning the operation, management and expansion of the GCBC.

- 18 The final type of plans provided for in NEMBA are biodiversity management plans. Their preparation may be initiated by a range bodies and must be approved by the national Minister.¹⁵⁸ These plans can be prepared for both listed and non-listed ecosystems and indigenous species warranting special conservation attention. They must be aimed at the long-term survival in nature of the species or ecosystem to which the plan relates; provide for a responsible person, organisation or organ of state to implement the plan; and be consistent with a number of broader planning instruments including the *National Biodiversity Framework*, applicable bioregional plans and relevant integrated development plans (IDPs) prepared by municipalities.¹⁵⁹
- 19 A biodiversity management plan may be fortified by a ‘biodiversity management agreement’, in that the Minister may enter into such an agreement with stipulated bodies ‘regarding the implementation of a biodiversity management plan, or any aspect of it’.¹⁶⁰ These bodies feasibly include government authorities, organisations and private landowners. In order to encourage persons to enter into such agreements, various income tax benefits have recently been introduced in respect of expenditure incurred in implementing them.¹⁶¹
- 20 The national Minister has promulgated *National Norms and Standards for Biodiversity Management Plans for Species*¹⁶² and *Norms and Standards for Biodiversity Management Plans for Ecosystems*.¹⁶³ These Norms and Standards set out the scope, format, approval and implementation process for these plans. Interestingly, the latter set of norms and standards recognise the following forms of ecosystems as warranting inclusion in any such management plan: ecosystems in buffers or corridors linked to protected areas; ecosystems that play an important role in the provision of ecosystem services; and ecosystems likely to be important for ecosystem-based adaptation to climate change. The management objective to be included in these biodiversity management plans could, for example, be to maintain or restore connectivity, or to address under-representation of a particular ecosystem or species in the protected areas system.
- 21 Only one final and two draft biodiversity management plan for species¹⁶⁴ have been approved to date. No biodiversity management plans for ecosystems currently exist. No biodiversity management agreements have been concluded to date in respect of these plans and given their novelty, the precise nature of these agreements is yet to be clarified. However, they feasibly provide a further useful legal tool for promoting connectivity conservation objectives and actions in respect of both species and ecosystems by a diverse array of stakeholders both within and outside the borders of protected areas.
- 22 What is also important to note is that before adopting or approving any of these three types of plans, the authorities are obliged to follow the intergovernmental and public consultative process laid down in NEMBA.¹⁶⁵ Furthermore, the Act also provides for the co-ordination and alignment of these biodiversity planning instruments with each other and with those prescribed in other environmental

¹⁵⁸ S 43(1).

¹⁵⁹ S 45. See part 3.3.1 below for a discussion of these IDPs.

¹⁶⁰ S 44.

¹⁶¹ See part 3.6.2 below for a discussion of these incentives.

¹⁶² GN 214 GG No. 31968 dated 2 March 2009.

¹⁶³ GN 532 GG No. 35486 dated 2 July 2012.

¹⁶⁴ Specifically for cycads (final), Kalerbossie (draft) and black rhino (draft).

¹⁶⁵ S 47 read with s 99 and s 100.

and land-use planning laws.¹⁶⁶ This should potentially ensure that issues of connectivity conservation permeate different planning contexts and the decisions informed by them.

3.1.3 Listed Ecosystems and Species

- 23 Several national¹⁶⁷ and provincial conservation laws¹⁶⁸ provide for the protection of threatened and protected ecosystems and species.¹⁶⁹ This ordinarily involves a two stage process: first, the listing of the relevant ecosystem or species; and secondly, the imposition of a range of restrictions relating to activities which may impact on such species. The most contemporary of these schemes is contained in NEMBA, which specifically provides for the identification of threatened and protected ecosystems and species¹⁷⁰ and the preparation of biodiversity management plans¹⁷¹ for those so listed. These two mechanisms may similarly promote connectivity conservation and are both at play in the context of the GCBC.
- 24 NEMBA enables the national or relevant provincial environmental Minister to publish a national or provincial list of ecosystems that are threatened and in need of protection.¹⁷² A number of different categories of ecosystems, and their location, may be listed, namely: critically endangered ecosystems; endangered ecosystems; vulnerable ecosystems; and protected ecosystems.¹⁷³ Once listed, the authorities may publish a list of processes or activities that pose threats to such ecosystems (called threatening processes).¹⁷⁴ Once so identified, the threatening process is regarded as an activity requiring an environmental authorisation, preceded by an environmental impact assessment.¹⁷⁵ Furthermore, the situation of listed ecosystems must be taken into account by several organs of state in preparing various environmental and land-use plans, including IDPs adopted by municipalities.¹⁷⁶
- 25 A *National List of Threatened Ecosystems* has been published.¹⁷⁷ It contains 225 terrestrial ecosystems situated across South Africa that are critically endangered (53), endangered (64) or vulnerable (108). This list is the first stage of a phased process that will culminate in the national Minister publishing additional lists of threatened ecosystems in the freshwater, estuarine and marine environments. It sets out the rationale and criteria¹⁷⁸ for identifying threatened ecosystems and the implications of listing them. While the primary rationale for listing ecosystems is to reduce the rate of ecosystem and species extinction through proactive management and not apparently to ensure the persistence of landscape-scale ecological processes, it is acknowledged that the latter may be a

¹⁶⁶ The three ‘biodiversity’ plans may not be in conflict with each other and with: environmental implementation plans (EIPs) or environmental management plans (EMPs) prescribed in terms of the NEMA; IDPs and spatial development frameworks (SDFs) prescribed in terms of the Local Government: Municipal Systems Act 32 of 2000; and other relevant national or provincial plans (s 48).

¹⁶⁷ These include NEMBA and National Forests Act.

¹⁶⁸ These include the provincial laws listed in note 8 above.

¹⁶⁹ A full discussion of these laws falls outside the purview of this case study. The following discussion is accordingly limited to those ecosystems and species regulated under NEMBA.

¹⁷⁰ The Minister or relevant provincial Minister may respectively publish lists of national and provincial ecosystems that are threatened and in need of protection (s 52). The Minister may, in addition, publish lists of species that are threatened and in need of protection (s 56).

¹⁷¹ Any person, organization or organ of state wishing to assist with the conservation of listed ecosystems and species can prepare a biodiversity management plan aimed at ensuring the long-term survival of the listed ecosystem and species (s 43 and s 45). No such plan has yet been submitted for approval.

¹⁷² S 52(1).

¹⁷³ S 52(2) and (3). These lists must be reviewed every five years (s 52(4)).

¹⁷⁴ S 53(1). These ‘threatening process’ are yet to be listed.

¹⁷⁵ S 53(2). The EIA process is regulated under the National Environmental Management Act (107 of 1998) (s 24) read together with the *Environmental Impact Assessment Regulations* (GNR 543-546 GG No. 33306 dated 18 June 2010). These threatening processes are expressly listed as identified activities requiring basic assessment under these regulations (identified activity No. 25 in GNR 544).

¹⁷⁶ S 54.

¹⁷⁷ GN 1002 GG No. 34809 dated 8 December 2011.

¹⁷⁸ These criteria are: irreversible loss of natural habitat; ecosystem degradation and loss of integrity; rate of loss of natural habitat; limited extent and imminent threat; threatened plant species associations; threatened animal species associations; fragmentation; priority areas for meeting explicit biodiversity targets as defined in a systematic biodiversity plan.

natural consequence of the former. Several of the listed ecosystems are located within the GCBC,¹⁷⁹ thereby providing a further legal mechanism for further promoting connectivity conservation within and between these listed ecosystems through factoring their existence into relevant planning frameworks and regulating activities which may negatively impact on them.

- 26 NEMBA also empowers the national Minister to publish a list of critically endangered species, endangered species, vulnerable species and protected species.¹⁸⁰ Once so listed, no person may carry out a restricted activity¹⁸¹ involving a specimen of such a species without a permit.¹⁸² In addition, the Minister may prohibit the carrying out of any activity that may negatively impact on the survival of a listed threatened or protected species by notice in the *Government Gazette*.¹⁸³ The Minister published a *List of Critically Endangered, Endangered, Vulnerable and Protected Species*¹⁸⁴ and the *Threatened and Protected Species Regulations*¹⁸⁵ (*TOPS Regulations*) regulating the permitting process. Several of the listed species are similarly situated in the GCBC and in so far as this scheme provides for the uniform regulation of activities impacting on species across an entire landscape, it may indirectly promote connectivity conservation.

3.2 Sustainable Use Legislation

- 27 While South Africa's contemporary conservation legislation provides the overarching legal dispensation of most relevance to promoting connectivity conservation in the GCBC, several of the country's sectoral resource use laws may also indirectly aid connectivity conservation. These laws, which are administered by several different government agencies, seek to regulate the use of agricultural resources,¹⁸⁶ fresh water resources,¹⁸⁷ forests¹⁸⁸ and marine living resources.¹⁸⁹ The regulatory tools inherent in these laws are exceedingly diverse and a full discussion of them unfortunately falls outside the purview of this case study. In summary, these laws generally provide for the following types of legal tools: the generation of planning frameworks (at national and regional levels); the prescription of principles and objectives (to guide decision-making); the introduction of permitting schemes (for activities such as using water, clearing land, catching marine living resources and harvesting natural forests); the imposition of directives and control measures (to control alien invasive species, prevent soil erosion, protect wetlands, regulate grazing capacity and prevent wild fires); the provision of subsidy schemes (to facilitate irrigated agricultural development by resource poor farmers); and the establishment of voluntary resource management associations and committees (such as water user associations, soil conservation committees and fire protection associations). While none of these laws directly refer to connectivity, many of the regulatory tools inherent in them may indirectly promote the concept. Several provide for integrated and multi-level planning to inform national and regional priority action. The prescription of overarching principles and objectives promotes consistent decision-making within and between the natural resource sectors. Many of the laws directly regulate several activities that may undermine connectivity. Finally, the laws appear to increasingly recognise the value of coordinated landowner action/participation facilitated through the creation of voluntary associations and committees. This potential could be greatly improved through

¹⁷⁹ These include: Swartland Shale Renosterveld; Cape Vernal Pools; Kouebokkeveld Alluvium Fynbos; Kouebokkeveld Shale Fynbos; Bokkeveld Sandstone Fynbos; Ceres Shale Renosterveld; Hopefield Sand Fynbos; Leipoldville Sand Fynbos; Piketberg Quartz Succulent Shrubland; and Piketberg Sandstone Fynbos.

¹⁸⁰ S 56(1).

¹⁸¹ The term 'restricted activity' is defined very widely in the Act to include almost all activities relating to living specimens or derivatives of listed species, including development activities impacting on these species (s 1).

¹⁸² S 57(1).

¹⁸³ S 57(2). In this regard, the Minister has imposed a national moratorium on the trade of individual rhinoceros horns and products and derivatives thereof (GN 148 GG No. 31899 dated 13 February 2009).

¹⁸⁴ GNR 151 GG No. 29657 dated 23 February 2007, as amended.

¹⁸⁵ GNR 152 GG No. 29657 dated 23 February 2007, as amended.

¹⁸⁶ Conservation of Agricultural Resources Act 43 of 1993 (administered by the Department of Agriculture, Forestry and Fisheries).

¹⁸⁷ National Water Act 36 of 1998 (administered by the Department of Water Affairs).

¹⁸⁸ National Forest Act 84 of 1998 and National Veld and Forest Fire Act 101 of 1998 (administered by the Department of Agriculture, Forestry and Fisheries).

¹⁸⁹ Marine Living Resources Act 18 of 1998 (administered by the Department of Agriculture, Forestry and Fisheries).

engraining connectivity as: an essential component of the planning frameworks; one of the key objectives of each of the natural resource laws; an important criterion informing the grant of any permit, directive or control measure; and a fundamental function of any voluntary association/committee.

3.3 Land-Use Planning Legislation

28 Complementing this comprehensive sustainable use regime applicable in the GCBC, is a multi-tiered land-use planning regime administered predominantly by municipalities. This regime is relevant to promoting connectivity conservation in two main respects. The first is the manner in which municipalities are compelled to align their relevant future spatial planning with relevant biodiversity planning frameworks. The second is the manner in which specific land-use management tools administered by these authorities can be used to promote conservation connectivity.

3.3.1 Future Spatial Planning

29 Future spatial planning is a key component of South Africa's land-use planning regime and is entrenched in several national¹⁹⁰ and provincial laws.¹⁹¹ These laws compel municipalities to prepare several overlapping plans to guide future land-use in their municipal area. These plans include integrated development plans (IDPs), spatial development frameworks (SDFs) and structure plans.

30 All 284 municipalities in South Africa are obliged to prepare IDPs to promote integrated development and management of their municipal area.¹⁹² While their content does not confer and take away land-use rights, they must be taken into account by municipalities in their land-use and development decision-making.¹⁹³ These decisions would include township, rezoning and subdivision approvals. When developing these IDPs, the municipalities have to ensure that they are aligned with and incorporate relevant aspects of a broad array of biodiversity plans prepared by conservation authorities, such as the *National Biodiversity Framework*, bioregional plans and biodiversity management plans. Furthermore, municipalities must also take into account the situation of listed ecosystems within their jurisdiction and align their IDPs accordingly. These IDPs must contain a spatial development framework (SDF), which provides guidelines for current and future land-use management in the municipality's jurisdiction. The content of these SDFs must similarly be aligned with the abovementioned biodiversity planning tools and inform relevant land-use and development decisions. The final component of the land-use planning regime that provides for future spatial planning are structure plans, a remnant from South Africa's 'old' planning regime,¹⁹⁴ which generally have the same statutory status as IDPs and SDFs.

31 Cumulatively, these future spatial planning tools provide significant avenues for connectivity conservation issues to permeate land-use and spatial planning frameworks and decision-making. This potential is however dependant on connectivity conservation imperatives being entrenched in the relevant biodiversity plans, and municipalities having the capacity to then integrate this relevant content into their IDPs, SDFs and structure plans when they are developed or updated. This is where this potential is somewhat limited in the context of South Africa generally and the GCBC in particular, where none of the relevant IDPs, SDFs and structure plans currently make specific reference to connectivity conservation. This can be attributed to two main reasons. First, many of the relevant biodiversity plans are still in their infancy given the contemporary nature of the overarching legislative regime. Secondly, many rural municipalities, including several of those whose jurisdictions traverse

¹⁹⁰ Local Government Municipal Systems Act 32 of 2000 and Physical Planning Act 125 of 1991.

¹⁹¹ Kwazulu-Natal Planning and Development Act 5 of 1998; Northern Cape Planning and Development Act 7 of 1998; Land Use Planning Ordinance (Cape) 15 of 1985; Town Planning Ordinance (Natal) 27 of 1949; Town Planning and Townships Ordinance (Transvaal) 25 of 1965; and Townships Ordinance (Free State) 9 of 1969.

¹⁹² Local Government: Municipal Systems Act (s 25 and s 26).

¹⁹³ Local Government: Municipal Systems Act (s 35).

¹⁹⁴ The preparation, status and amendment of structure plans is predominantly regulated under the Physical Planning Act 125 of 1991 and the provincial planning legislation (see note 57 above).

the GCBC, do not currently have the capacity or resources to attend to such alignment. Both these challenges will hopefully be overcome in the future.

3.3.2 Zoning, Environmental Overlays and Subdivision

- 32 Land-use planning legislation also contains several legal tools that directly confer or take away land-use rights, most importantly zoning and subdivision. All land falls within the jurisdiction of a particular municipality which is required to accord such land a particular zoning. These zones include open space, agriculture, rural, residential or industrial and are reflected in zoning scheme maps prepared by municipalities. Certain land-use/development rights and restrictions are attached to the different zones. These strictly regulate the types and scale of development that can be undertaken and are contained in zoning scheme regulations prepared by municipalities under provincial planning legislation.¹⁹⁵ Should a landowner wish to undertake a different land-use or alter the rights and restrictions attached to their current zoning, he/she has to apply to the relevant municipality to either rezone the land, or obtain a formal departure from the current restrictions. As discussed above, the development of the zoning scheme and the taking of any rezoning/departure decision must be informed by any relevant future spatial planning framework. Therefore, in so far as the latter entrench connectivity conservation principles, these principles should infiltrate these key zoning tools and decisions. This potential is however currently similarly frustrated in the GCBC by the factors discussed above in the context of future spatial planning.
- 33 A second planning tool which is being anticipated by several municipalities for introduction in future revised zoning schemes is the use of environmental overlay zones.¹⁹⁶ An overlay zone enables a municipality to give effect to specific guidelines or goals contained in a SDF or other relevant plan. This is achieved through the imposition of an overlay zone on a particular area – containing a set of land-use restrictions/incentives/requirements which apply in addition to those attached to the area's base zoning. Several forms of overlays are anticipated including those providing for development objectives, strategic incentives and specific management measures. While still being developed, this tool could be used in the future to promote connectivity conservation, in the form of conservation connectivity overlays, providing municipalities with flexible discretion to impose additional nuanced layers of temporary or permanent land-use restrictions and incentives where the circumstances so dictate.
- 34 A third planning tool embedded in land-use planning legislation is subdivision. Any person seeking to subdivide land must obtain approval from the relevant municipality¹⁹⁷ and/or from the national agricultural authorities (where rural land is concerned).¹⁹⁸ Subdivision decisions should be informed by the future spatial planning framework entrenched in particularly the IDPs and SDFs and this scheme therefore provides another valuable tool for potentially precluding the fragmentation of consolidated compartments of land of high conservation value or of importance to promoting connectivity conservation. As in the context of zoning, its utility in the GCBC is currently rather limited, as it is the national agricultural authorities (the promoters of agricultural expansion) and not municipalities, which seem to hold greater power in the context of rural land subdivision.

3.4 Development Control Legislation

- 35 Activities that may negatively impact on the environment are strictly regulated by development control legislation. Inherent in this dispensation are several legal tools of potential relevance to promoting connectivity conservation in the GCBC. These include provision for environmental impact assessment (EIA); strategic environmental assessment (SEA); environmental management frameworks and the designation of critical biodiversity area.

¹⁹⁵ Zoning is regulated under the laws listed in note 57 above.

¹⁹⁶ See for instance the City of Cape Town, *Revised Integrated Zoning Scheme* (Draft 4), dated November 2007.

¹⁹⁷ Subdivision in the urban context is regulated under the laws listed in note 57 above.

¹⁹⁸ Subdivision in the agricultural context is regulated under the Subdivision of Agricultural Land Act 70 of 1970.

The old law requires landowners seeking to subdivide agricultural land to obtain approval from the Minister of Agriculture, Forestry and Fisheries to do so.

3.4.1 Environmental Impact Assessment

- 36 South Africa has developed a comprehensive EIA framework¹⁹⁹ in the past fifteen years to regulate certain types of potentially environmentally harmful activities. This framework is founded on a listing approach whereby national and provincial environmental Ministers may identify certain activities which trigger the need for an environmental authorisation, preceded by some form of EIA. These activities can be listed nationally or in respect of certain areas or provinces only, and certain activities require the development applicant to undertake a full EIA and others a form of basic EIA - a distinction which is determined by the following factors: the size of the activity; the degree of risk; and the certainty of the risk arising. The mandate to consider the EIA and grant the environmental authorisation usually rests with the provincial environmental authority. While once again making no express reference to connectivity, this EIA scheme may promote it as many of the listed activities have potential to undermine connectivity such as: housing developments; industrial activities; agricultural activities; forestry activities; activities that transform undeveloped land; road construction; activities which may impact on threatened/protected species/ecosystems; and developments near watercourses, estuaries or the coast. Furthermore, several of the listed activities specifically refer to a broad range of developments undertaken in areas actively seeking to promote/or of key importance to promoting connectivity conservation such as: protected areas; critical biodiversity areas; ecosystems service areas identified within relevant spatial planning frameworks; areas targeted for protected areas expansion; world heritage sites; biosphere reserves; and buffers around these areas. This EIA scheme therefore provides a tangible legal mechanism to regulate activities that may undermine connectivity initiatives.

3.4.2 Strategic Environmental Assessment

- 37 For the bulk of the past two decades, SEA had no statutory basis in South Africa and was purely voluntary in nature. However, South Africa's contemporary EIA regime²⁰⁰ expressly enables national and provincial environmental Ministers to promulgate SEA regulations.²⁰¹ These regulations are yet to be promulgated, but once they are they may become of relevance if they recognise and promote connectivity as a mandatory element to be considered in SEAs undertaken for a particular area, project or activity.

3.4.3 Environmental Management Frameworks

- 38 One specific legal tool inherent in the country's contemporary EIA regime aimed at promoting SEA are environmental management frameworks (EMFs).²⁰² The nature and purpose of these EMF's vary significantly and can take the form of information documents and/or a map: specifying an area's environmental attributes (sensitivity, extent, significance, interrelationship); detailing the conservation status of the area; stating environmental management priorities for the area; identifying potentially harmful activities; identifying potentially undesirable activities; and indicating areas of socio-cultural value. The legal framework enables both the national and provincial environmental Ministers to prepare and approve an EMF, and once so approved, all authorities must take the content of the EMF into account in their administrative decisions impacting on the area in question. These decisions could include the grant of land development approvals, rezoning approvals, subdivision approvals, permits to use and extract natural resources, land clearing permits and decisions about where to establish protected areas. The nature and purpose of these EMFs are framed sufficiently broadly to enable them to be tailored towards promoting connectivity. One such EMF has been adopted in respect of land incorporated within the GCBC.²⁰³ It currently contains no reference to connectivity but as mentioned above it does provide a potential tool for promoting this concept in the future.

¹⁹⁹ National Environmental Management Act 107 of 1998 (section 24) read together with the *Environmental Impact Assessment Regulations* (GNR 543-546 GG No. 33306 dated 18 June 2010).

²⁰⁰ Ibid.

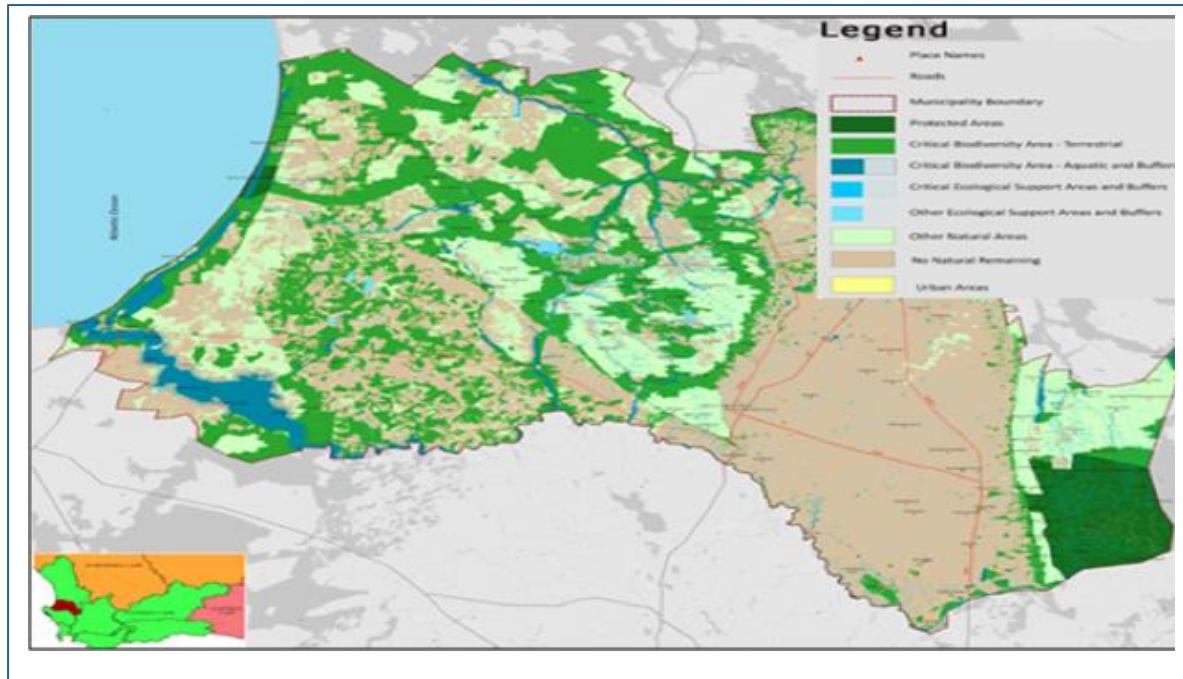
²⁰¹ S 24(5)(bA)(ii).

²⁰² GNR 547 GG No. 33306 dated 18 June 2010 (Reg 69-72).

²⁰³ *Namaqua Environmental Management Framework* (PN118 PG No. 1476 dated 4 November 2012).

3.4.4 Critical Biodiversity Areas

Figure 4: Critical Biodiversity Area: Berg River Mouth



- 39 One of the most contemporary moves in the context of development control legislation has been the identification of critical biodiversity areas (CBAs) – effectively fine-scale biodiversity planning undertaken by provincial conservation authorities. These plans map the critical biodiversity areas (terrestrial and aquatic) and associated critical ecological support areas and buffers (see Figure 4 below for one example drawn up for the south-western section of the GCBC). As such they are highly relevant in the context of connectivity. These plans have developed in a rather sporadic manner and their status is still rather unclear with some arguing they have no legislative home or binding status; and others that they constitute either a form of bioregional plan or an environmental management framework. Notwithstanding this lack of clarity, they are currently being used as an essential decision-making tool by most spheres of government when considering applications for environmental authorizations, rezoning approvals, subdivision approvals and land clearing permits. As such they provide an important tool for informed decision-making with a view to promoting connectivity conservation.

3.5 Integrated Coastal Management Legislation

- 40 Given that the western boundary of the GCBC abuts the Indian Ocean, it provides an interesting example for reflecting on the manner in which domestic lawmakers have sought to introduce a regime that promotes connectivity across the terrestrial and marine divide. One of South Africa's most contemporary environmental laws is the National Environmental Management: Integrated Coastal Management Act²⁰⁴ (NEMICMA). Its express purpose is to: establish a system of integrated coastal and estuarine management, including norms, standards and policies; promote the conservation of the coastal environment; maintain the natural attributes of coastal landscapes and seascapes; ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable; and to control the adverse effects of inappropriate development on the coastal environment. The law defines the coastal zone exceptionally broadly and in its simplest sense it spans from the boundary of South Africa's exclusive economic zone (200

²⁰⁴ 24 of 2008.

nautical miles off the country's coastline) to one kilometer inland of the high water mark in rural areas and 100 metres inland of the high water mark in urban areas.²⁰⁵

- 41 Owing to the novelty of the law, many of its legal provisions are not yet fully in effect, but they do hold great potential for promoting connectivity in the regulation of the GCBC's terrestrial and marine interface and therefore do warrant brief consideration in this case study. These provisions relate to coastal management planning; coastal management committees; estuarine management; and regulatory and enforcement mechanisms to govern activities in the coastal zone.

3.5.1 Coastal Management Planning

- 42 Prior to the advent of NEMICMA, no dedicated planning scheme existed to inform the integrated management of the coastal zone. The Act remedies this by providing for three tiers of plans, namely: a national coastal management programme; provincial coastal management programmes; and municipal coastal management programmes.²⁰⁶ These programmes must be prepared by the relevant national, provincial and municipal authorities and their respective programmes must contain their coastal management policies, vision and objectives. Each of these programmes must be consistent with the tier above and be reviewed every five years. Furthermore, express provision is made for the content of these programmes to be aligned with other relevant plans such as IDPs, SDFs, the National Biodiversity Framework and the National Estuary Management Protocol (see 3.5.3 below). These programmes are in the process of being developed and given their broad prescribed scope and status as statutory policy, they provide a key opportunity for promoting connectivity in the coastal environment, as they should inform the actions and decisions of all three spheres of Government. It remains to be seen whether this potential will be realised as they will no doubt require extensive capacity and resources to develop.

3.5.2 Coastal Management Committees

- 43 As the Act provides for series of tiered coastal management programmes, it also provides for a series of tiered coastal management committees, namely national, provincial and local coastal management committees.²⁰⁷ The composition of these committees includes government representatives (from a diverse array of environmental sectors); community representatives and members of the scientific community. Their functions are very similar and include: promoting integrated coastal management in the relevant sphere of government and between this sphere and others spheres; providing advice on coastal management issues to relevant decision-makers; facilitating the development of coastal management programmes; promoting coordination; and facilitating the integration of coastal management concerns and objectives into relevant plans such as IDPs, SDFs, policies and plans of organs of state whose activities may adversely impact on the coastal environment. As in the above planning context, these committees are still being established, but once they are, they should promote the attainment of the coastal management objectives identified in the different spheres' coastal management programmes.

3.5.3 Estuarine Management

- 44 GCBC is home to several important estuaries and wetlands, one of which, Verlorenvlei, is a Ramsar site. Prior to the introduction of NEMICMA, there was no dedicated domestic regime to govern wetlands. NEMICMA has resolved this by mandating the national environmental Minister to prepare a *National Estuarine Management Protocol*.²⁰⁸ The prescribed content for this *Protocol* includes: a strategic vision and objectives; management standards; procedures or guidelines as to how to manage estuaries and which authorities should undertake such management; and details regarding estuarine management plans which it is anticipated provincial and local government authorities will be required to prepare for estuaries situated in their jurisdiction. NEMICMA prescribes that all estuaries

²⁰⁵ Chapter 2.

²⁰⁶ Chapter 6.

²⁰⁷ Chapter 5.

²⁰⁸ Chapter 4.

must be managed in a coordinated and efficient manner and in accordance with the *Protocol*. A draft *Protocol*²⁰⁹ was published in 2012 with one of the central guiding principles being to maintain and/or restore the ecological integrity of South African estuaries by ensuring that the ecological interactions between adjacent estuaries, between estuaries and their catchments, and between estuaries and other ecosystems, are maintained. Once finalised, the *Protocol* and the estuary management plans should go some way towards promoting hydrologic connectivity in the coastal environment.

3.5.4 Regulatory and Enforcement Mechanisms

- 45 NEMICMA also contains a broad array of tangible legal mechanisms for regulating activities which may negatively impact on the coastal zone. The regulatory mechanisms include: the designation of special management areas (within which activities will be strictly regulated);²¹⁰ the prescription of coastal set-back lines (on the seaward boundary of which development will be prohibited or strictly regulated);²¹¹ the prescription of coastal zoning schemes (which will trump existing municipal zoning schemes);²¹² and the grant of coastal leases and concessions (to enable people to develop and extract resources in certain parts of the coastal zone).²¹³ None of these regulatory mechanisms are in operation yet but they provide additional valuable tools for regulating activities in the coastal zone which may negatively impact on connectivity within this sensitive area. One mechanism that is in existence relates back to activities requiring an environmental authorisation under South Africa's main EIA regime (see 3.4.1 above). Where an authority is considering an application of this nature for a listed activity to be undertaken in the coastal zone, it is prohibited from granting it if the activity is likely to damage 'dynamic coastal processes' or is 'contrary to the interests of the whole community'.²¹⁴ The latter term is defined to include the interest of human and 'other living organisms that are dependent on the coastal environment'.²¹⁵
- 46 The above are complemented by several enforcement mechanisms that seek to deal with persons whose actions do negatively impact on the coastal environment. These include repair and removal notices (issued to persons who have constructed illegal structures within the coastal zone)²¹⁶ and coastal protection notices (issued to persons whose activities are having/are likely to have an adverse effect on the coastal environment).²¹⁷ The power to issue these notices spans national, provincial and municipal authorities. Failing to comply with the notice can lead to both a directive being issued and criminal prosecution. Once again, given their novelty, there is little evidence of these enforcement mechanisms being frequently used within the GCBC but this will no doubt change over time.
- 47 The above are complemented by several enforcement mechanisms that seek to deal with persons whose actions do negatively impact on the coastal environment. These include repair and removal notices (issued to persons who have constructed illegal structures within the coastal zone)²¹⁸ and coastal protection notices (issued to persons whose activities are having/are likely to have an adverse effect on the coastal environment).²¹⁹ The power to issue these notices spans national, provincial and municipal authorities. Failing to comply with the notice can lead to both a directive being issued and criminal prosecution. Once again, given their novelty, there is little evidence of these enforcement mechanisms being frequently used within the GCBC but this will no doubt change over time.

²⁰⁹ GN 336 GG No. 35296 dated 4 May 2012.

²¹⁰ S 23-24.

²¹¹ S 25.

²¹² S 56-57.

²¹³ S 65-67.

²¹⁴ S 63-64.

²¹⁵ S 1.

²¹⁶ S 60.

²¹⁷ S 59.

²¹⁸ S 60.

²¹⁹ S 59.

3.6 Voluntary Contractual Arrangements

- 48 Voluntary contractual arrangements have also grown in prominence in South Africa in the course of the past decade particularly in the context of biodiversity conservation. Their use has been integral to expanding the proportion of land of high conservation value within the protected areas estate. Promoting the intersection between the formal and less formal forms of protected areas has been greatly facilitated through several government programmes and projects. One of specific relevance in the context of the GCBC is the CAPE Stewardship Programme, administered by the provincial conservation agency, CapeNature. The Programmes objectives are: to ensure that private and communally-owned areas with high biodiversity value receive secure conservation status and are linked to a network of other conservation areas in the landscape; to ensure that landowners and communities who commit their property to a stewardship option enjoy tangible benefits for their conservation actions; and to expand biodiversity conservation by encouraging commitment to, and the implementation of, good biodiversity management practices on private and communally owned land in such a way that the landowners become empowered decision makers.
- 49 The Stewardship Programme generally promotes three main stewardship options which vary with respect to the degree of formal protection, the length of protection and the level of potential benefits accruing to landowners who enter it. These are: contract nature reserves (constituted by legally recognised contracts in respect of private land to protect biodiversity in the long term with the land being generally incorporated into private, local or provincial nature reserves); biodiversity agreements (negotiated legal agreements between the conservation agency and a landowner for conserving biodiversity in the medium term); and conservation areas (flexible options with no defined period of commitment, including conservancies). Several tracts of land within the GCBC have been secured under this Programme (generally that land depicted in Figure 3 as incorporated within private nature reserves and conservancies).

3.7 Incentive-based Mechanisms

- 50 Prescribing a comprehensive regime to promote connectivity conservation is potentially worthless unless adequate resources are set aside to implement it. This is perhaps one of the greatest challenges facing South Africa's conservation regime with other socio-economic priorities receiving increasing budgetary priority. South Africa is yet to develop a payment for ecosystem services scheme or a greenhouse gas emission-trading scheme that allows those who conserve nature to sell offsets to greenhouse gas emitters. One mechanism that is however gaining domestic prominence to overcome the resource hurdle is conservation incentives, in terms of which various property tax and income tax benefits are offered to persons who voluntarily contribute their land for incorporation within several forms of protected areas, share the cost of managing such areas or who take conservation action outside of these areas. Several of these incentives are at play in the GCBC.

3.7.1 Property Rates Incentives

- 51 Under the Local Government: Municipal Property Rates Act,²²⁰ no property tax can be levied on parts of a special nature reserve, national park or nature reserve which are not developed or used for commercial, business, agricultural or residential purposes.²²¹ This property tax prohibition feasibly encourages private and communal landowners to contract land of high conservation value into these forms of protected areas in order to avoid escalating property tax liabilities. Interestingly, provision is made for retrospectively recouping all property tax that would have been due should the landowner withdraw from any contractual arrangement.²²² The Act furthermore identifies a specific range of categories of property that may be subjected to differential rating, exemptions, rebates and reductions. These categories include protected areas and farms/small-holdings held for non-commercial

²²⁰ 6 of 2004.

²²¹ S 17(1)(e).

²²² S 17(2).

purposes.²²³ Many of South Africa's 284 municipalities (including those whose boundaries span the GCBC) are still in the process of formulating their municipal property tax policies, which will inform the implementation of these property tax benefits. However, the property tax benefits should cumulatively facilitate the inclusion of key private land within the protected area's estate thereby promoting connectivity conservation.²²⁴

3.7.2 Income Tax Incentives

- 52 Income tax incentives are similarly granted to landowners who forgo development opportunities on their land in the interests of biodiversity conservation.²²⁵ These incentives, prescribed under the Income Tax Act²²⁶ were only formally implemented in 2009. They generally differentiate according to the degree to which a landowner is willing to voluntarily assume restrictions on his/her land-use rights, the duration of such limitations, and any costs incurred in managing his/her land in the interests of biodiversity conservation.
- 53 Three broad distinctions exist. Landowners who agree to contract their land into a national park or nature reserve for a minimum period of 99 years can for the purpose of determining their taxable income, annually deduct 10% of the market value of their land (less the value of any land-use rights retained), and any costs incurred in implementing the management plan for the protected area.²²⁷ Landowners who agree to contract their land into a national park, nature reserve or protected environment for a minimum period of 30 years can, for the purpose of calculating their taxable income, annually deduct any costs incurred in implementing the management plan for the protected area.²²⁸ Finally, landowners who incur conservation and maintenance expenses in implementing the terms of a biodiversity management agreement with a minimum duration of 5 years can deduct these expenses for income tax purposes.²²⁹ Although the latter agreements do not formally constitute protected areas, biodiversity management agreements concluded under the NEMBA provide a very useful tool for creating buffers around, and connectivity corridors between, formally proclaimed protected areas – thereby promoting connectivity conservation

4 A Critical Reflection

- 54 What should be evident from the above, is that while South Africa does not have a dedicated law expressly seeking to regulate connectivity conservation, there exists a complex web of laws containing a diverse array of legal tools for promoting the realisation of the concept. Several key lessons can potentially be learned through reflecting on the application of these laws in the context of the GCBC. These relate to: the importance of planning; the value of drawing from a diversity of legal tools; the need to facilitate cooperative governance; and the necessary prerequisite of providing resources, capacity and support.

²²³ S 8 (differential rating) and s 15 (exemptions, reductions and rebates).

²²⁴ For a full discussion of these property tax incentives, see: Paterson A, 'Property Tax: A Friend or Foe to Landscape Protection in South Africa' (2005) 12(2) *South African Journal of Environmental Law and Policy* 97-121, and Paterson A, 'Tax Incentives - Valuable Tools for Biodiversity Conservation in South Africa' (2005) (1) *South African Law Journal* 182-216.

²²⁵ For a comprehensive discussion of these income tax incentives, see: Paterson A, 'Considering Recent Developments in Environmental Fiscal Reform in South Africa' (2009) 16(1) *South African Journal of Environmental Law and Policy* 29-34.

²²⁶ 58 of 1962.

²²⁷ S 37C(5)-(7).

²²⁸ S 37C(4).

²²⁹ S 37C(1)-(3).

4.1 Planning Imperatives

- 55 One of the successes of the GCBC appears to lie in the comprehensive planning exercise that preceded and informed the area's establishment. This broad and participatory planning process crucially scoped the ecological, climatic, geographic, social, cultural and economic landscape of the area, thereby ensuring that the strategies guiding the management and expansion of the GCBC have a solid scientific footing. This project specific planning is complemented by a broad array of statutory planning instruments spanning conservation, sustainable use, land-use planning, development control and integrated coastal management legislation. While the majority of the laws governing these statutory planning instruments do not specifically refer to connectivity, their scope is fortunately sufficiently broadly framed to potentially advocate the concept. They accordingly hold great potential for providing a comprehensive planning framework to promote connectivity conservation. Owing to the contemporary nature of these laws, many of these planning frameworks are still in the process of being developed and it is therefore too early to comment on whether this potential will be realised. Two further important aspects inherent in this contemporary statutory planning framework are provision for the alignment of the content of these statutory plans with one another and the fact that authorities are compelled to take them into account in their decision-making.

4.2 Drawing from a Diversity of Legal Tools

- 56 In addition to planning instruments, the overarching legal framework contains a diverse array of legal tools of relevance to facilitating connectivity conservation in the GCBC. These legal tools feasibly provide for the promotion of connectivity: within and outside of protected areas; in a range of natural resource sectors; between the terrestrial and marine environment; and by a broad range of stakeholders. These statutory tools are complemented by several voluntary contractual arrangements. While the majority of the laws governing the legal tools do not again specifically refer to connectivity, this case study would appear to provide support for the idea that even in the absence of dedicated or express connectivity legislation one can often creatively construct legal solutions to practically promote the concept out of those legal tools that already exist. It provides further support for the idea that drawing from, or providing for, a diverse array of legal tools, complemented by voluntary measures, affords authorities and landowners alike necessary and desirable flexibility to tailor legal solutions best suited to their context. This diversity of legal tools does however have several associated challenges.

4.3 Facilitating Cooperative Governance

- 57 One of the most central challenges is how to overcome the potential institutional and legislative fragmentation and duplication this diversity creates. In recognition of these challenges, South Africa has entrenched cooperative governance as a constitutional dictate²³⁰ and introduced several statutory²³¹ and non-statutory mechanisms²³² specifically aimed at promoting its realisation. These go some way towards alleviating the problem but need to be complemented by site- or project-specific initiatives. The GCBC provides two examples of such initiatives. Firstly, ensuring that the steering committee for the GCBC includes representation from all relevant stakeholders. Secondly, developing a clear set of objectives and strategies to guide priority action in the GCBC.

²³⁰ Constitution of the Republic of South Africa, 1996 (Chapter 3).

²³¹ These include: the prescription of a series of national environmental management principles with which all organs of state whose actions may significantly affect the environment must comply; provision for environmental management and implementation plans to promote cooperation between government authorities whose mandates impact on or affect the environment; procedures for fair decision-making and conflict resolution; procedures for integrated environmental management and integrated permitting procedures; provision for mandatory cross-consultation between sectoral authorities and cross-representation key institutions and decision-making bodies; and the creation of cross-sectoral environmental compliance and enforcement institutions.

²³² These include: establishing several intergovernmental environmental advisory committees; and entering into standard operating procedures and service delivery agreements to promote improved environmental governance.

4.4 Providing Resources, Capacity & Support

- 58 A second challenge associated with diversity is ensuring that all relevant stakeholders have the necessary skills, capacity and resources to understand and use the available legal tools for promoting connectivity. Given the novelty and diversity of the relevant legal framework governing these tools, there is still much domestic uncertainty as to the precise nature and status of the legal tools and who has the mandate to administer them. This uncertainty is compounded by the limited capacity and resources of several key stakeholders (crucially provincial and local government authorities) to implement them. As highlighted by several aspects of this case study, these resource and capacity constraints may undermine the potential of many of the available legal tools for promoting connectivity conservation and accordingly need to be addressed. They impact not only on the proactive use of potential tools, but also on the ability of authorities to ensure compliance with existing laws which seek to regulate activities (particularly mining, agriculture and township development) that directly undermine connectivity conservation. One positive trend in this regard is the recent introduction of several tax incentives to encourage landowners to contribute voluntarily to conservation, thereby potentially relieving some of the resource pressures experienced by key government authorities.