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*Published in:*  
Ekologia

*Publication date:*  
1996

*Document Version*  
Early version, also known as pre-print

*Citation for published version (APA):*  
Brandt, J. (1996). Disperal corridors in Danish regional planning. *Ekologia*, 15(1), 79-87.

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## DISPERSAL CORRIDORS IN DANISH REGIONAL PLANNING

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### Abstract

Brandt J.: Dispersal corridors in Danish regional planning. *Ekológia*, (Bratislava), Vol. 15, No. 1, 77–85, 1996.

The paper presents the relatively long tradition in Denmark for planning of dispersal corridors. This tradition is only linked to the regional level of the Danish counties, whereas a national as well as a local planning of dispersal corridors is missing. Some reasons related to the development of conservation planning in Denmark are discussed, and a tendency of contradiction between traditional conservationist way of thinking and the planning needs related to ecological corridors is pointed out.

### Introduction

A hierarchical approach to ecological network planning has been well known and discussed in Danish conservation planning since the beginning of the 80ties (Agger, Brandt, 1984). It has however not been systematically implemented in Denmark: The systematic planning of ecological corridors has neither been proposed as a part of a conservation strategy at the national level, nor at the local, municipal level.

At the regional level, however, ecological corridors have been strongly recommended by the Ministry of Environment and developed as a more or less important parts of the conservation planning during the last 10–15 years in the majority of Danish counties. This has been done in a very decentralized manner, giving room for a variety of planning concepts and practical applications in different counties.

At the local level, there has been a growing practical activity on dispersal ecological problems initiated by the county authorities, but generally without plans for local networks and without any connection to the planned dispersal corridors at the regional level.

In the following some examples of different regional planning strategies that have been developed in the counties will be presented.

Reasons for the missing national network will be given, and some positive arguments for the missing network-planning at the local level, related to the general conservation strategy that has been followed in Denmark during the last 20 years, will be stated.

## Former concepts of connection in regional planning

Conceptually ecological connections are very often related to the development of modern Island-biogeography, based on MacArthur, Wilson (1967) and the succeeding endeavour to transfer their theory to agricultural landscapes.

From a planning point of view this is however not correct: Especially among landscape architects the principle of planning landscape connections, greenways, has been known and used for years. In the comments to the Danish conservation act from 1978 it was stated that regional planning according to the law among other things should designate „important landscape bands, e.g. river valleys and forest reaches, that connect a nature area with another or connect a town to a nature areas“ (Fredningsstyrelsen, 1979). Looking at the first regional plans in Denmark it is also possible to see remnants of this tradition, that obviously has been renewed and stimulated by the development of the Island-biogeography.

Already in the regional plan of the greater Copenhagen area from 1973 the most important landscape connections are described, and their collisions with barriers in form of main transport corridors are clearly expressed as one of the main conflicts that has to be solved within the physical planning at the regional level. In the county of Fyn a plan for „lines of connection“ between the most important natural habitats was made in 1976 and implemented unanimously in the regional plan from 1980. Also in other regional or conservation plans from around 1980 indications of such type of connections can be seen, but generally it has not been explicitly said in the text following the plans.

## The beginning of ecological corridor planning in Denmark

However, the Island bio-geography became very rapidly popular from the beginning of the 80ties. Especially in the Greater Copenhagen Area the concept of ecological corridors was put into the planning procedure very quickly. A proposal for future ecological corridors in greater Copenhagen was presented in 1983, based on rather detailed biological surveys (Asbirk, 1984). This proposal was implemented into the regional plan from 1985 and has been confirmed with very small changes in all later plans. The corridors were 1 km in width, and although originally intended to be concretely adapted to the local circumstances in a future planning process, the zone has in fact been rather strictly managed to prevent a tug of war by each conflict with the owners, e.g. concerning dispensation for the general conservation rules. The corridors had a big influence on other aspects of the integrated planning, e.g. agricultural planning and the water protection planning, where another 500 m were added to each side of the corridor, thus putting restrictions on land use in a considerable part of the rural zone.

For the leading urban planners of that time, putting emphasis to the importance of transport corridors as the backbone of regional planning, the idea of corridors for plants and animals was not only understandable and logical, it was also a very welcome mean for the conquest of the rural zone for drinking water, conservation and recreational purposes. The renewed interest in the rural zone was not only a matter of growing needs following the urbanization of the 60ties and 70ties, but was also influenced by the rapid changes in the agricultural structure during these years, where especially the field rationalization caused the removal of a considerable part of the so-called small biotopes of the agricultural areas (see page 83). Also in The County of Western Zealand the planning of ecological corridors started very early (Ovesen, 1984).

In the regional plan for 1983 the corridors were indicated with a 500 m broad zone, spreading out from the protected areas into the so-called landscape- and agricultural areas. The indication is however, when it comes to administrative practice, only to be understood as a line, not an area with related restrictions on land use. And that is probably the reason, why there have been very few conflicts on this planning. The indication of the corridors has been repeated up to the last regional plan in 1993, where there has been only one formal protest, namely from the 989 ha Basnæs manor, owing a big forest in the southernmost part of the county. They wanted the corridors to be deleted from their property, and postulated, that it would disperse the game from the estate. The protest was rejected by the county with reference to the positive influence of the corridors on the renewal of the game stock, also within the property of the Basnæs manor.

These activities of the counties near Copenhagen at the beginning of the 80ties influenced the conservation authorities in the Ministry of Environment substantially, and in 1983 an instruction in conservation planning was distributed to the counties, putting emphasis on the corridor planning.

The probably most important point in the guidance was a map of a hypothetical structure for a hypothetical county, showing special protected areas within contiguous nature areas, further connected by ecological, landscape- and cultural-geographical connections. This was an optional guideline for the conservation planning in the counties, which would only have a binding political status, if an incorporation in the integrated regional plans could be obtained.

### **Dispersal corridors in the Danish counties after 10 years of planning**

The guidelines from the Ministry of Environment were received in a very different way in the counties, not yet having been involved in corridor planning.

In Northern Jutland the conservation authorities started by planning a rather rough network in 1985 and refined it during the next years, both in the number and the quality of corridors. Six types of ecological connection were defined:

1. a wet fresh type (lakes, bogs, meadows, water courses)
2. a type for beach meadows
3. a type for dunes and sandbeaches
4. a type for raised bogs, heath, and raised beach plains with ridges and swales (a special landscape type related to the ongoing post-glacial transgression of Northern Jutland)
5. a type for slopes and commons, and
6. a type for bush-and tree-vegetation (forest, thickets, and hedgerows).

In the main structure of the conservation plan these types were however pooled into one line signature, and the conservation plan was never integrated as a politically binding part of the regional plan, where certainly different types of nature areas were shown, but not, how they could be connected.

This is however not the case south-west of this region, in the County of Viborg. In the regional plan from 1985 areal corridors with a high density of natural areas within the agricultural regions are shown, as well as line signatures for a rather dense network of ecological corridors.

In the most recent plan from 1993, these structures have been even more pronounced through a simplified areal structure, that defines almost all of the former linear corridors as areal features, and more important, devote them the same planning status as the core areas, namely as special protected areas. In connection with the designation of especially sensitive agricultural areas that are established as a part of the new EU agricultural policy for 1995, almost all of the corridors within these areas have got this preference status, thus giving farmers within the areas an opportunity for extra EU-financed support if they implement extensification and other types of environmental improvements such as a 12 m buffer zone along watercourses or other linear biotopes.

A similar development can be seen in Southern Jutland.

Only few counties have no signs of corridor planning in their regional or conservation plans. Two of them have directly delegated the problem of dispersal ecology to the

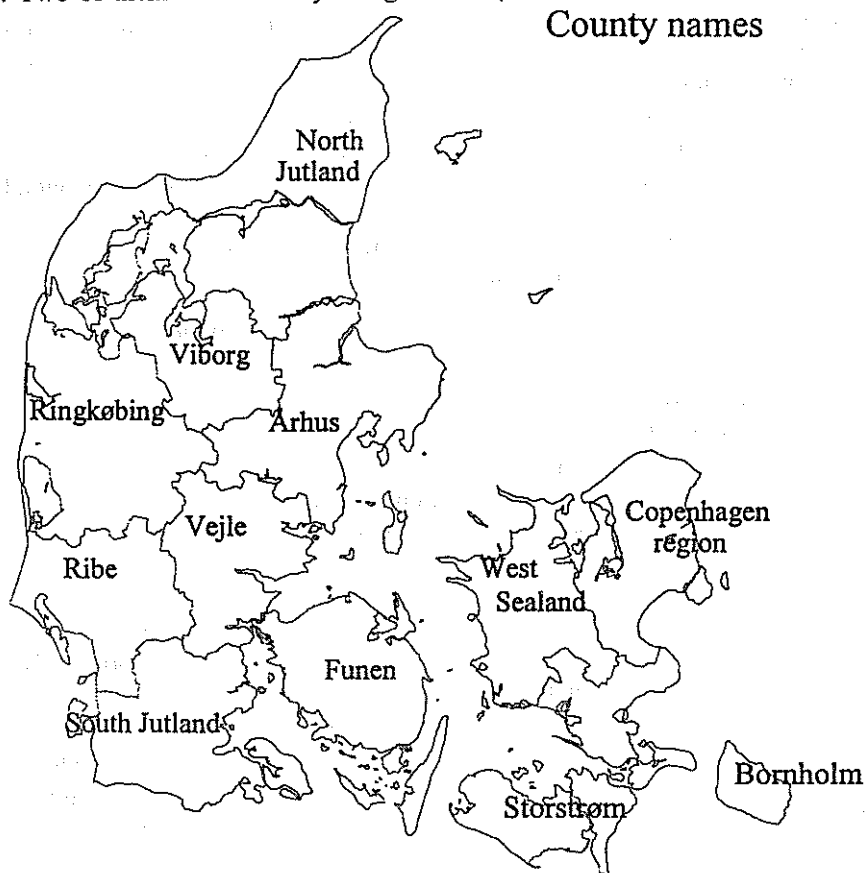


Fig. 1. Map of the Danish Counties. Until 1989 regional planning for the 3 counties in the Greater Copenhagen Area: Frederiksborg Amt, Roskilde Amt and Copenhagen Amt, was taken care of by a special Capital-council, dissolved in 1990.

municipalities, which however seldom have the capacity and interest to take care of it. In one county – Fyns county – there have been delineated „areas of biological connection“ back to 1980 – but in the last regional plan, these areas have been deleted, with the comment, that they in planning practice were without importance.

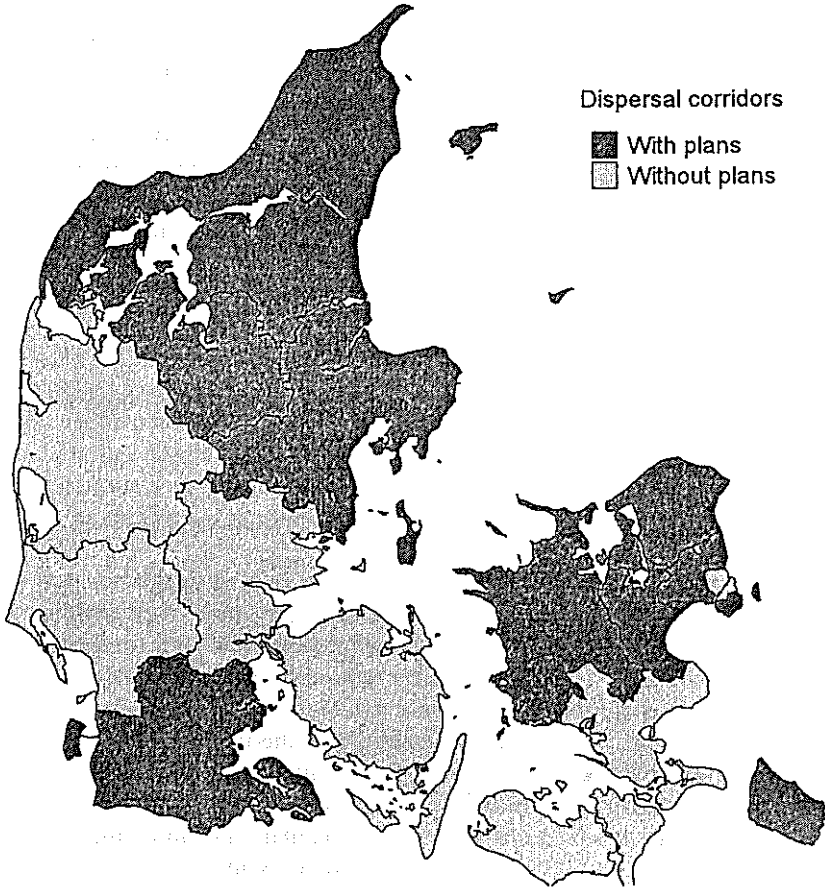


Fig. 2. Danish counties that according to the latest regional or conservation plans are engaged in planning of dispersal corridors at the regional level.

Fig. 2 shows counties that according to the latest plans are engaged in planning of dispersal corridors at the regional level – directly in their regional plans or indirectly by recommendations in the conservation plans.

As seen from the map, the majority of the Danish Counties has been engaged in this type of planning. But it has been done in very different ways, with very different planning principles. Also the endeavour to realize the plans differs considerably.

Concerning the realization of the plans up to now only few of the planned corridors have changed their land use as a result of the planning. This should not be a surprise: The plans have only been in work for 10 years, and since the most important measures are general constraints or stimulation on the private land use within the planned corridors, it certainly takes its time before substantial changes can be expected.

But without doubt internal administrative factors add to the slow implementation of the dispersal corridors. One has to realize, that it might be a problem, that the planning and implementation of ecological corridors are an administrative matter of the regional conservation authorities. Even in the cases where these authorities have been positively concerned with the planning of dispersal corridors, it mostly turns up to be an insurmountable obstacle, that these authorities tend to see the planning of dispersal corridors as an unreasonable economic and time-competition with their main endeavour to protect areas of special biological interests.

### **The missing networks at the national level**

Much experience concerning planning of dispersal corridors has been collected at the regional level, strongly supported by the state authorities within conservation planning.

Facing all this experience at the county level, it might turn up as a surprise, that no plans for a national ecological network have been set up – not even from an academic point of view.

I can see two explanations for this: The first being related to the position of the agricultural sector in Denmark, traditionally the strongest, most well-organized and efficient economic lobby within the Danish society. In 1970 a very fundamental law divided Denmark into 3 zones, a rural zone, an urban zone and a weekend dwelling zone, leaving not only all types of urban development within the urban zone, but also keeping the rural zone basically for agricultural purposes. Up to the last years, this law and the philosophy behind it have been observed very strictly by the authorities at all levels. Of course conservation interests in the rural zone have been taken into account, but defining national corridors connecting main types of habitats and landscapes that would set up specific restrictions in the free agricultural land use within such corridors would have been too much in contradiction to the zoning law and the idea of free enterprise for farmers within the rural zone. It has been politically easier to leave such initiatives to the regional planning.

Another explanation has to be found within the development of conservation planning itself: During the 70ties there was a tense conflict in Denmark concerning conservation strategy: the rapid economic growth increased the pressure on the land use at all levels. Should the answer be to give priority to national parks that include the most important nature interests, or should it be to press for improvements at a general level, trying to keep as much nature as possible, also in the more intensively used agricultural areas? Indeed, the latter strategy won. We have no national parks in Denmark, but we have – besides the normal nature protections – a still more refined system of mild

**Table 1.** The history of general protection – without compensation – of biotopes in the Danish agricultural landscape according to the Nature Conservation Act (1937, 1972, 1978, 1984 § 43) and the Nature Protection Act (1992 § 3, 4 and 12) (Min. size in m<sup>2</sup>) (Brandt, 1994)

	•1937	1972	1978	1984	1992
Barrows	all	all	all	all	all + 2 m buffer zones
Other archaeological sites					most types + 2 m buffer zones
Water courses		> 1.5 m	> 1.5 m + specially selected	> 1.5 m + specially selected	high priority + 2 m buffer zones
Lakes and ponds		all natural lakes	> 1 000	> 500	> 100
Bogs			> 5 000	> 5 000	> 2 500
Heaths				> 50 000	> 2 500
Salt meadows				> 30 000	> 2 500
Fresh meadows					> 2 500
Commons					> 2 500
Stone and earth dikes					all on topographical maps (provisionally) + 2 m buffer zones

general protections, that is restrictions on the free land use – without economic compensation – that makes it illegal to alter certain types of nature without permission from the county authorities (see Table 1).

The table shows how this general protection has developed. From being originally a culturally based protection of barrows from the Bronze and Iron Ages, the list has been enlarged to more and more nature types. In addition, the minimum size of landscape elements regulated by the law has also been lowered considerably. Especially the new Nature Protection Act from 1992 has been focusing on the importance of the so-called small biotopes, the more tiny nature elements within and between the fields in the countryside, like stone- and earth dikes, small bogs, heath, meadows and commons down to a quarter of a hectare, and small ponds down to 100 m<sup>2</sup>. In the regional planning this tendency was already seen at the beginning of the 80ties, where the Ministry of Environment in connection with the approvment of the regional plans asked the counties to give recommendations expressing the wish to secure the remaining small biotopes in the open land, like hedgerows, small bogs and ponds.

The widespread interest in the small biotopes among the general public, supported by the general protection and by campaigns among farmers focusing on their importance for wildlife, scenery and game, has obviously influenced the strategy of many farmers. The general tendency of reduction in the amount of small biotopes that has been observed especially since the 60ties has generally been stopped during the 80ties, where



Table 2. Table showing the development of small biotopes in Denmark in 1981–1989 (Brandt, Holmes, Larsen, 1994)

Development of small biotopes in Denmark 1981–1991*		1981–1986 [% per year]	1986–1991 [% per year]	Wet linear biotopes	Dry linear biotopes
13 Test sites in eastern Denmark (52 km <sup>2</sup> )	wet linear	– 0.1	– 1.1	drainage ditch canal brook river	road verge field divide hedgerow slope railway dike treerow stone wall footpath
	dry linear	– 0.1	+ 0.2		
	all linear	– 0.1	0.0		
	wet areal	– 1.8	– 0.8		
	dry areal	+ 0.9	+ 2.0		
10 Test sites in eastern Jutland (40 km <sup>2</sup> )	all areal	– 0.6	+ 0.6	Wet areal biotopes	Dry areal biotopes
	wet linear		+ 3.2		
	dry linear		0.0		
	all linear		+ 0.4		
	wet areal		+ 2.4		
25 Test sites in Denmark** (100 km <sup>2</sup> )	dry areal		+ 4.7	wet Marl pit other wet pit artificial pond bog natural lake village pond alder swamp rain water basin	dry Marl pit other dry pit barrow game plantation other plantation natural thicket solitary tree ruderal area highpower mast
	all areal		+ 3.7		
	wet linear		+ 0.3		
	dry linear		0.0		
	all linear		+ 0.1		
	wet areal		+ 0.3		
	dry areal		+ 2.6		
	all areal		+ 1.5		

\*indicated as % annual change in average for all test sites; the linear in % of length; the areal in % of number

\*\*including 2 test-sites on Bornholm in the Baltic Sea

a net increase in the density of hedgerows, game plantations, open ditches and small ponds can be observed especially in eastern Jutland (see Table 2).

Certainly this tendency has also been strongly supported by internal agricultural factors, such as reintroduction of a proper field rotation, changes in the EU price system etc., supporting a general extensivation of agricultural land use. But the growing focus on small biotopes has added to a growing recognition among farmers of the benefits they can have of a balanced and multiple use of the land, not only to be managed as a mere medium for intensive agricultural production.

## Conclusion and outlook

The integration policy of general protection might have a profound influence on the development of strategies for ecological networks in Denmark. In 1993–95 substantial resources are being used for the biotope registration according to the new nature protection law. This registration can form a powerful tool not only for refined plans for

ecological networks at the regional level, but also for a concrete planning of networks for a detailed integrated land use at the local level.

But strange enough, this perspective is not at all to be found within the activities of contemporary conservation planning in the Danish counties or in the Ministry of Environment. Obviously the main obstacle for such a development seems to be organizational: Setting up ecological networks in already intensively used agricultural landscapes is seldom just a question of conservation, but much more a matter of nature restoration at a modest level: Design of hedgerow networks, creation of tiny buffer zones, spatially planned stimulation of (re)establishment of small ponds in moist hollows, game- and other plantations around former marl pits, spots with bad soil conditions or a more or less marked slope topography, etc. All in all a variety of small measures that over time can stimulate the formation of functional ecological networks at the local level, especially if they are closely connected to extensification measures within the agricultural planning. This will seldom be of much relevance for the carrier perspective of a traditional nature conservationist that has been used to see his/her main mission primarily taking care of the most threatened species and landscape types. One might argue, that the long term landscape ecological work for a balanced, multiple sustainable land use of the countryside would be better off by leaving the responsibility to broader local oriented authorities, than to traditional conservationist planners.

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*Received 6. 2. 1995*

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