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Scientific review paper

Close-to-nature forestry – Participatory planning and educational outreach: using Forest Development Types (FDT) in communication and learning

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Abstract

Conversion from age-class forestry to close-to-nature forest management calls for new ways to describe and communicate long-term goals for stand development with forest owners, workers and managers, as well as stakeholders. Further, it is crucial to integrate goals and methods of close-to-nature forestry into education and training. In Denmark, Forest Development Types (FDT), illustrated by use of profile diagrams, has proved a useful concept for communicating such “novel” long-term goals thus being instrumental in facilitating and supporting dialogue and participation in planning processes. The concept has already been applied to 120,000 ha of state owned forests and used by the municipality of Aarhus – Denmark’s second largest city – as part of a participatory planning process in agreeing upon long-term goals for 1,800 ha of forest in and adjacent to the city. Further, the concept of forest development types is used as a planning and design tool for forest landscape restoration in teaching at the international master course “Urban Woodland Design and Management” at the University of Copenhagen. Drawing upon experiences gained from these actions, the paper describes and discusses the concept of Forest Development Types as a tool easing social learning between research and practice, promoting public involvement, and facilitating professional learning around close-to-nature forest management at the university level.

Key words: silviculture, close-to-nature management, forest development type, participatory planning, educational outreach, public relations

Sonaravno gozdarstvo – povezovanje participativnega načrtovanja in izobraževanja: uporaba razvojnih tipov gozda za komuniciranje in poučevanje

Izvleček

Prevzgoja enomernih sestojev umetnega nastanka v sonaravne gospodarske gozdove zahteva nove načine opisovanja in komuniciranja dolgoročnih gozdnogojitvenih ciljev tako za načrtovalce, gozdne delavce, lastnike gozdov kot tudi za druge deležnike. Prav tako je pomembno vpeljati cilje in metode sonaravnega gospodarjenja v izobraževanje in usposabljanje. Na Danskem so v ta namen uporabili razvojne tipe gozda (Forest Developmental Types - FDT), ki so nazorno prikazani z opisi in ilustracijami vertikalnih profilov. Izkazali so se kot zelo koristni za komuniciranje »novih« dolgoročnih ciljev gojenja gozdov kot tudi za podporo dialogu in participaciji deležnikov v procesu načrtovanja. Omenjeni način dela so že uporabili na površini 120.000 ha državnih gozdov v mestni občini Aarhus (drugo največje mesto na Danskem) kot del participativnega načrtovanja. Prispeval je k dogovoru o dolgoročnih gozdnogojitvenih ciljih za 1.800 ha mestnih in primestnih gozdov. Prav tako so razvojne tipe gozda uporabili kot orodje za načrtovanje gozdne krajine v sklopu mednarodnega magistrskega študija “Urban Woodland Design and Management” na Univerzi v Kopenhagnu. Članek predstavlja uporabo razvojnih tipov gozda v participativnem načrtovanju, praksi in vseživljenjskem učenju deležnikov upravljanja z gozdovi ter za povezovanje znanosti in prakse. Poudarja prednosti in slabosti razvojnih tipov gozda, ki so jih nakazale dosedanje praktične izkušnje.

Ključne besede: gojenje gozdov, sonaravno gospodarjenje z gozdovi, razvojni tipi gozda, participativno načrtovanje, vseživljenjsko učenje, delo z javnostjo

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1 Introduction

1 Uvod

Close-to-nature forest management is a leading current issue in Europe. It has been practiced in various forms in central and eastern European countries like Switzerland and Slovenia for more than a century (SCHÜTZ 1999a, 1999b) and has recently been officially adapted in NW European countries and regions, e.g. Wales (National Assembly for Wales 1999), Niedersachsen (Niedersächsisches Forstplanungsamt 1995) and Denmark (Forest and Nature Agency 2002)).

In 1989, foresters from 10 European countries met in Slovenia and founded the PRO SILVA Europe federation, advocating forest management building on natural processes (www.prosilva.org). In the twenty years that have passed since the establishment of PRO SILVA, we have witnessed a marked rise in studies of natural forests reserves as important references for close-to-nature forest management and in evaluations of experiences gained from the many practices of close-to-nature management that have been established in Europe (LARSEN *et al.* 2010). While this has contributed to advancing and refining the theoretical and practical knowledge-base for close-to-nature forest management, the tools used to describe and communicate about it have received much less attention. This has been pointed out as a crucial factor for why close-to-nature forest management is difficult to communicate to foresters, forestry students as well as stakeholders and the public (Scientific Panel on Ecosystem based Forest Management 2000).

2 Forest Development Types as developed in Denmark

2 Razvojni tipi gozda na Danskem

Close-to-nature forestry is a complex management paradigm, which is difficult to communicate. A common challenge in adapting close-to-nature forest management is to transform overall targets and policies of sustainable forest management into long-term goals at stand level and to implement these in practice. What stand structures are we aiming at as a means to fulfil the demands from society, and how can the long-term goals for these stand structures be described? These questions are significant challenges in many NW European countries, where close-to-nature forest management has recently been adapted and where the landscape is deprived of virgin forests as important references for education and dissemination efforts. Most forests here are of plantation origin and professionals are trained and educated within the plantation forestry tradition.

In Denmark, close-to-nature forest management was initiated in 2005 (Forest and Nature Agency 2005, HAHN *et al.* 2005), replacing a two century long tradition of age-class plantation forestry. During the last two centuries, an inherent understanding of management goals and how to communicate these in the plantation forestry paradigm has emerged, enabling the forest ranks to translate directly between standard parameters and reality. In short, standard parameters such as species, age, height, basal area, growing stock, and site conditions are enough for an experienced forester to display an intuitive understanding of the stand and to envision it in reality. More irregular and diverse structures as those associated with forests managed along close-to-nature principles can, however, hardly be described in terms of such standard parameters (OTTO 1995, TAHVANAINEN *et al.* 2001, JENSEN *et al.* 2005). And if they could, there would be a mismatch for foresters trained and educated within age-class forestry as they have neither mental nor real models to relate to. Correspondingly, the conversion from plantation forestry to close-to-nature forest management demands a common understanding of close-to-nature forest management principles and long-term goals for stand development, implying development of tools for organising and communicating these new management principles and anticipated stand structures.

In this context, Forest Development Type (FDT) scenarios in combination with their illustration by means of profile diagrams were developed as a concept for organizing and alleviating communication of long-term goals for close-to-nature stand development (Fig. 1). A FDT describes the long term goal for stand development in a given locality (climate and soil conditions) in order to accomplish specific long-term aims of functionality (ecological-protective, economical-productive, and social-/cultural functions). The goal is described with respect to stand structure, species composition and regeneration dynamics and this is also illustrated in a profile diagram depicting the stand structure and composition at "maturity". Profile diagrams have gained interest during the last century, especially where mixed-forest management has been practiced, indicating that the more irregular and diverse (i.e. complex) the structures are, the greater the needs for integrative visual tools (NIELSEN 2006). Researchers and teachers in forestry (e.g. MAYER 1980, OLDEMAN and SCHMIDT 1986, OLDEMAN 1990, OLIVER and LARSON 1990, OTTO 1994, RÖHRIG *et al.* 2006), forest ecology (e.g. LEIBUNDGUT 1959, Koop 1989) and landscape architecture (e.g. GUSTAVSSON 1986, GUSTAVSSON and INGELÖV 1994) have used profile diagrams as aids where other methods set limits on the ability to understand forest structures and when words and numbers set limits on the ability to communicate design and management ideas.

Forest Development Type 12: Beech with ash and sycamore



- Structure:** Species rich, well structured forest with beech as dominating element mixed with ash and cherry and in south-eastern Denmark additionally with hornbeam and lime. The in-mixed species occur mainly in groups. The horizontal structures arise between groups of varying size and age. Where the light demanding species such as ash, sycamore and cherry dominate, vertical structures occur periodically with shade trees (beech, hornbeam, elm, and others) in sub-canopy strata.
- Species:** Beech. 40 – 60 %, ash and sycamore: 30 – 50 %, cherry, hornbeam, oak, lime, and others up to 20 %
- Dynamics:** Beech regenerates mainly in groups and smaller stands. Ash and sycamore as gap specialists regenerate in openings later followed by beech. Hornbeam belongs to the sub-canopy stratum and regenerates under shade, whereas the pioneer species (cherry and oak) only regenerate after larger openings and/or in relation to forest edges.
- Functions:** Productive: The forest development type has a high potential for production of hardwood in larger dimensions and of good quality.
Protective: In most parts of the country the beech dominated forest represents the potential natural vegetation; consequently, many indigenous species are connected to this forest development type. It has a great potential for conserving biodiversity connected to the NATURA 2000 habitat type 9139 and 9150.
Recreational: Through its mixture of (indigenous) species in combination with pronounced variation in size the forest development type gives a multitude of recreational experiences and intimacy.
- Occurrence:** The forest development type belongs on protected sites in the eastern and northern parts of Denmark on rich, well drained soils with good water supply as illustrated below.

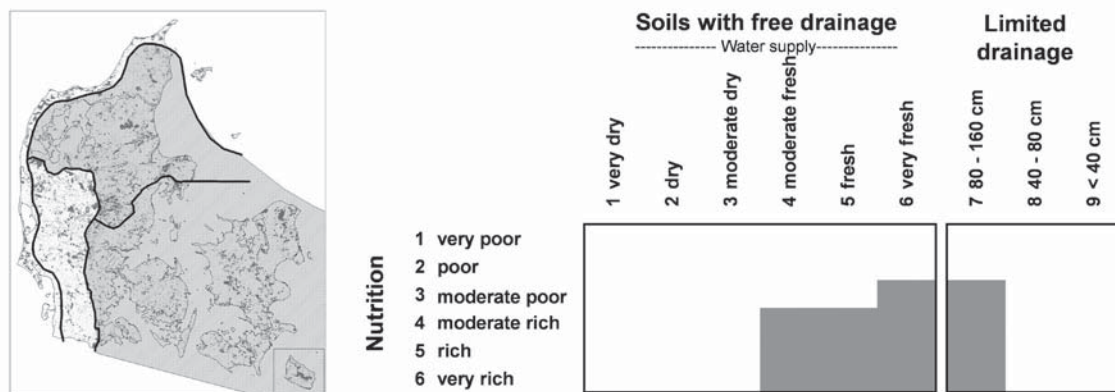


Figure 1: Description and illustration of Forest Development Type 12: Beech with ash and sycamore. The map over Denmark in the lower left corner shows the four eco-regions and which eco-zones the FDT will occur in (grey raster).

Slika 1: Opis in slika razvojnega tipa gozda št. 12: bukev z jesenom in platano. V spodnjem levem kotu zemljevida Danske so prikazane štiri eko-regije s pripadajočimi razvojnimi tipi gozda (siva podlaga).

3 Elaborating Forest Development Types in and with practice – social learning

3 Izdelava razvojnih tipov gozda – socialno učenje

In Denmark, 19 Forest Development Types have been developed (Fig. 2) in close collaboration between researchers and professionals from all levels of the Danish Forest and Nature Agency (DNFA). The idea was to facilitate the encounter between the professionals' experience-based, contextual knowledge and skills and the scientific contextual-free knowledge in order to synthesise and advance the knowledge and simultaneously facilitate understanding of the goals as described in the FDT scenarios (LARSEN and NIELSEN 2007).

Researchers (i.e. the authors) and professionals were united in a demand-led learning process, where professionals defined the problem, which in turn helped to keep focus throughout the process and to secure commitment and an adequate output. In retrospective, this process constitutes a successful example of social learning (i.e. the process of framing issues through analysing and debating alternatives in the context of inclusive social deliberation (REICH 1988)). In the process, FDTs and their illustration by means of profile diagrams were continuously sketched and reworked to provide scenarios that could spur imagination and encourage interaction and exchange of knowledge (LARSEN and NIELSEN 2007).

Informal observations during the process indicate that the collaborative process of developing the FDT scenarios and their illustrations served as an integrative and flexible concept for communicating long-term goals for close-to-nature stand development. Secondly, observations suggest advantage to illustrated FDT scenarios as a concept for organising and ease communication about such management goals, making them easy comprehensible for forest workers (field staff with vocational level education and staff implementing semi-skilled labour) and managers (forest supervisors, forest officers and forest rangers with forestry education at master and bachelor levels), especially among the staff who have been actively engaged in the process as opposed to those not involved (LARSEN and NIELSEN 2007).

The catalogue with the 19 FDTs was finalized and published in May 2005 (Forest and Nature Agency 2005). Three months later, when the DNFA staff became acquainted with the FDT, a questionnaire survey was performed. The survey confirmed the informal observations obtained during the process of the FDT-development and showed that FDTs had taken hold amongst DFNA employees. Across all levels of the classical forestry hierarchy, respondents assessed the tool favourably as a way to describe long-term goals and as an aid for their work in order to realize these goals. Both managers and workers had already used and had clear ideas of a wide range of future uses for the FDTs,

ranging from management planning and silvicultural decisions to communication with various stakeholder groups (NIELSEN and LARSEN 2006).

DFNA employees, however, emphasised discussions with colleagues as being of utmost importance for their understanding of the FDTs. The collaborative process provided room for several discussions of the meaning, accuracy and implications. This 'social dimension' of understanding pinpoint that the communicative effectiveness of FDTs in combination with their illustration partly depends on the way it is used; i.e. whether it is used as a concept for communication of long-term goals to professionals (one-way communication) or as a platform for initiating dialogue about such goals – the latter being the case in DNFA. Further, the fast implementation of FDTs in the daily work was no doubt boosted by the fact that the conversion to nature-based forest management had already been decided politically beforehand (Forest and Nature Agency 2002). Hence, the professionals' direct acceptance of the FDTs may also reflect the political-administrative arrangements. It is therefore important to stress that the engagement of the professionals themselves in its development and the political preparation have contributed actively to the DFNA staff's positive assessment and general acceptance of the FDTs and enabled the tool to become a powerful agent in the future development of a shared understanding of the principles and long-term goals for close-to-nature stand development in Denmark.

4 Use of illustrated Forest Development Types in public participation

4 Uporaba slik razvojnih tipov gozda pri sodelovanju javnosti

The debate about close-to-nature forest management is also linked to an ongoing discussion within urbanized societies, implying that forest management must be developed in a transparent process. Increasing numbers of people are interested in being part of the decision-making process and in influencing forestry practices (BUCHY and HOVERMANN 2000). This is especially the case in urban and peri-urban forests, which are intensively used for recreation. One of the main aspects of the successful public involvement is that information should be understandable for all participants. Traditional Danish forest plans describing goals through thematic maps and numeric data on stand level provide little support for this purpose, and thus they have been restricted to communication between foresters, while another set of tools has been needed for communication with people without special knowledge of forestry.

Visualization is a common language to which both foresters and people without special forestry knowledge

FOREST DEVELOPMENT TYPES IN DENMARK

The Danish Forest and Nature Agency has decided to convert the Danish State owned forests from age-class to more nature-based forest management. The aim is to support and harness natural processes. In the temperate, nemoral zone, where Denmark is situated, forests subjected to nature-based management will be a mixture of different species of varying age and height growing in a fine-grained structure, where regeneration develops in gaps in a shifting steady state mosaic. This is in contrast to today's uniform, even-aged monoculture stands where management is needed at regular intervals and regeneration is artificial.

The conversion demands a shared understanding of how the near-natural forests should appear when fully developed. In relation to this, the Forest Development Type (FDT) concept has been adopted. The forest development type describes the long-term goal for the development of a particular part of a forest, with respect to stand structure, species composition, stand dynamics, timber production, nature conservation, and recreation.

The Forest and Nature Agency has, in collaboration with Professor J. Bo Larsen, Forest & Landscape Denmark, developed a catalogue of 19 different forest development types that cover the span of growth conditions and forest functionalities in the Danish state owned forests. In the coming years the forest development types will be established in all wooded areas managed by the agency.

This poster illustrates how the 19 forest development types could appear when fully developed. The Forest and Nature Agency have started the development of the existing stands in direction of the forest development types, and changes will be experienced gradually. However, the time span needed before some stands are fully converted into the forest development types will cover up to several tree-generations.

The current forests



The future forests

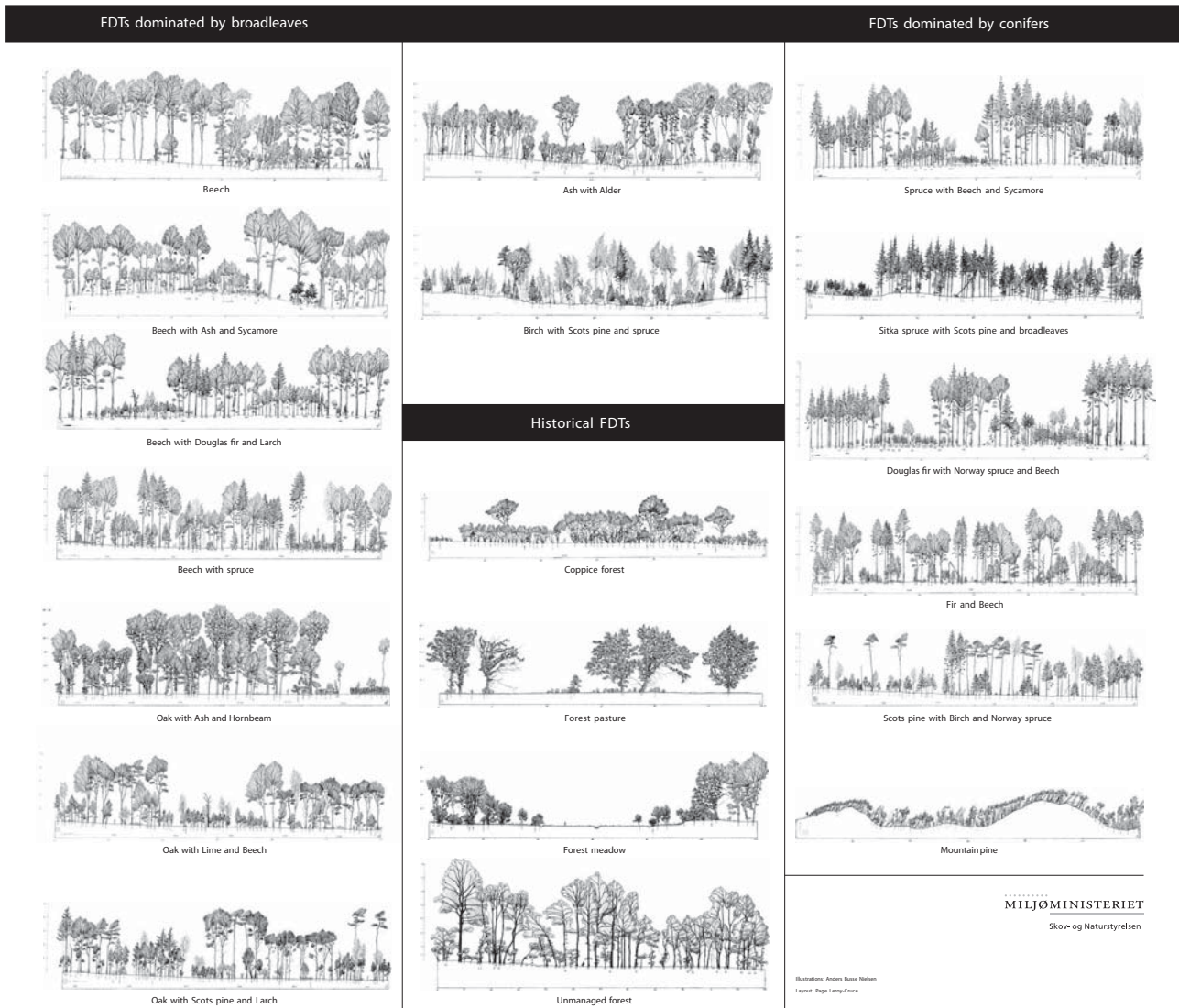


Figure 2: Poster depicting the present forest types in Denmark and the future 19 FDTs. The two upper profile diagrams show typical forest stands at present in Denmark (even-aged monocultures of beech, respectively Norway spruce). Below the 19 FDTs they are grouped in broadleaved dominated (9), conifer dominated (6) and historical forest types, including untouched forest (4).

Slika 2: Prikaz današnjih tipov gozdov in 19 prihodnjih gozdnih tipov. Zgornja vertikalna prereza kažeta sedanjo zgradbo gozdov na Danskem (nasadi bukve in smreke). Spodaj je prikaz razdelitve 19 gozdnih tipov na 3 skupine: prevladujoči listavci – 9, prevladujoči iglavci – 6, negospodarjen gozd – 4.

can relate, and different types of computer-aided visualisations and manually produced images such as drawings and sketches have been developed for supporting public participation in forest planning and management (TYRVÄINEN *et al.* 2006). The profile diagrams developed to support the communication of long-term goals for close-to-nature forest management at the stand level have been used in a study of public preferences for forest stand characteristics (NIELSEN and JENSEN 2007). Results from the study show that the profile diagrams enable lay persons to imagine the forest stand in reality and to judge the recreational merits of stands subjected to close-to-nature forest management. This indicates that the illustrated FDTs are easily comprehended by both professionals and lay persons and thus might serve as a communication tool, which can be shared between foresters and people without special forestry background.

The illustrated FDTs have recently been used by the municipality of Aarhus to support the active participation by the local communities in defining and agreeing upon long-term goals for close-to-nature forest management in 1,800 ha urban and peri-urban forests administrated by the municipality. With a population of 300,000, Aarhus is the second largest city in Denmark. The richness and diversity of forests within the city and at the urban fringe is essential to the city's identity and the forests are intensively used for recreation and have a central place in the mind of the local community (Aarhus Municipality 2009).

By 2006, the city of Aarhus was the first municipality in Denmark to officially adapt the Close-to-nature forest management principles in their urban woodlands. This decision initiated a three year participatory process. During the process of defining and agreeing upon long term goals for the urban forest stands and landscape development, the FDTs were used as a framework for advancing and describing the strategic, long-term goals. The FDTs were further used to allocate different site adapted forest types (adapted to soil conditions, climate and functionality) and their composition into coherent forest landscapes, thereby creating links between planning, design and management. Further posters describing the FDTs and illustrating their distribution at the forest level were successfully used to support the communication between the public, politicians and professionals in hearings and public arrangements (Fig. 3, Aarhus Municipality 2009).

5 Educational outreach

5 Izobraževalni prispevek

The concept of Forest Development Types and their use as a planning tool has been introduced by the two authors as a learning platform in the international master course in Urban Woodland Design and Management at the



University of Copenhagen. As for the staff in the Danish Forest and Nature Agency, the FDT help to stimulate and organise the students' ways of thinking about long-term forest development (LARSEN and NIELSEN 2007). In a corresponding manner, the illustrations of the FDTs by means of profile diagrams force the students to consider the principles of close-to-nature management and its impact on stand structures and dynamics and augment the discussions among the students in developing a coherent design of forest landscapes.

In the course, FDTs are used to establish close links between structures and functions at the stand, forest and landscape levels. Danish forests often lack structural complexity and are deprived of visual variation and habitat diversity. This is partly because age-class silviculture has for centuries endeavoured to improve and homogenise site conditions for tree growth by soil amelioration and draining or ditching. On the landscape level, this has caused a pronounced loss of habitats and complexity and the disappearance of natural landscape characters and variations. A thorough analysis of the landscape in its topographical variation, soil conditions, natural and cultural values, and hydrological features including the potential to re-establish natural hydrology and wetlands give an excellent basis for a close-to-nature re-design where different FDTs combined with varied open and semi-open nature types and edge types can be used as planning tools.

In the course, students have worked with a close-to-nature re-design of 150 ha of Vestskoven at the urban fringe of greater Copenhagen. Vestskoven was established on agricultural land some 30 years ago with the goal to create a large recreational forest that could separate and structure the intense and rapid urban sprawl of the 1960s and 1970s and provide important recreational possibilities for the 300,000 new citizens in the western part of Copenhagen.

The forest has obvious problems in relation to urban use, including uniform stand structures (even aged monocultures), lack of habitats within the forest, including smaller openings and glades, fragmented blocks of geometrically formed stands and open areas, and lack of connectivity between open areas (Fig. 4). However, it has also possibilities including young stands with a good potential to develop into other structures as well as different species and stands with site adapted and native broadleaved species.

As an example how the FDT-concept has been adopted in the learning process, Fig. 5 presents the restoration plan elaborated by a group of students where four Forest Development Types (FDTs) have been laid out in respect of existing values in the young plantations and adjacent plains. The 4 selected FDT's (FDT 11, Beech pillar hall; FDT 71, Silver fir with beech and spruce; FDT 21, Oak with ash and hornbeam; FDT 92, Grazing forest), each have distinct experiential and ecological characteristics, unify the many small stands in larger units. The variety of sizes of open areas is increased by adding small intimate

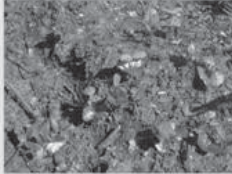
Natur og Miljø
 Teknik og Miljø
 Århus Kommune

Udlægning af skovudviklingstyper

Hvad er en skovudviklingstype ?


Betegnelsen "skovudviklingstype" beskriver den ønskede skovbevoksning på meget langt sigt på et bestemt sted. Det er en beskrivelse af hvilke træarter, der skal findes på arealet og en beskrivelse af, hvordan træerne vokser i samspil. Tidshorizonten er meget lang. Den kan være flere hundrede år, afhængigt af, hvad der vokser på stedet i dag. Ideelt set vil valget af en bestemt skovudviklingstype ikke afhænge af, hvad der vokser i dag. For eksempel kan ønsket være at ændre træarten fra rødgran til en blanding af bøg, ask og ær.


Grundlag for udpegning



Jordbund


- Overordnet kortlægning af jordarter og jordtyper
- Lokal opbygget viden og erfaring om jordbunden
- Jordbunds kortlægning i nyere skove
- Kortlagte lavbundsarealer
- Eksisterende træarters trivsel






Naturværdier

- Kortlægning af særlige biotoper - nøglebiotoper
- Kortlægning af Natura 2000-områderne
- Viden om sjældne og truede arter



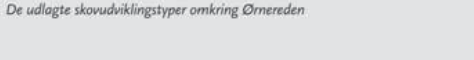
Skade Bakker
Ørnereden


De udlagte skovudviklingstyper omkring Ørnereden



Klima og topografi


- Generelt kendskab til områdets klimatiske og topografiske forhold
- Viden om vindudsatte, randpåvirkede arealer






Rekreative hensyn


- Viden og erfaring om hvor folk færdes
- Variation i skovbilledet
- Opretholde steder med udsigter gennem skoven
- Opretholde skovtyper typisk for Århuskovene




ask og rødell




bøg




eg med ask og avnbøg




bøg med ask og ær




eg med lind og bøg




bøg, douglasgran og lærk



eg, skovfyr og lærk



bøg og gran



urnet skov

Figure 3. Poster describing the FDTs and illustrating their distribution at the forest landscape level by use of forest maps and profile diagrams. The poster was developed by the Aarhus Municipality to support communication between the public, politicians, and professionals (in Danish).

Slika 3: Prikaz razvojnih tipov gozda in njihove porazdelitve na nivoju krajine z uporabo gozdarskih zemljevidov in vertikalnih prerezov. Poster so pripravili na občini Aarhus kot pripomoček v komunikaciji med laiki, politiki in gozdarji (v danščini).

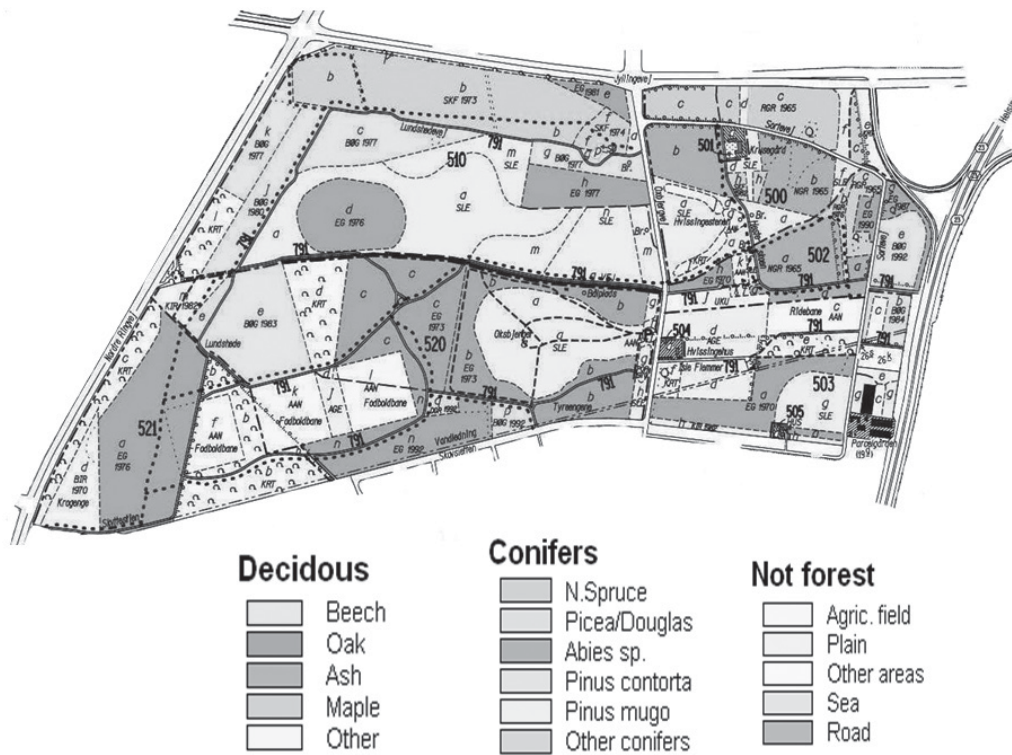


Figure 4: Land-use map for the eastern part of Vestskoven, showing typical classical even-aged monocultures of forest stands in a fragmented composition of uniform blocks of geometrical shaped stands and open spaces.

Slika 4: Zemljevid rabe tal za vzhodni del kraja Vestskoven kaže tipične enodobne nasade pravilnih geometrijskih oblik, ki so razdrobljeni v prostoru.

glades in the forested parts. Some of the open areas have been linked to add even further spatial variety and increase the coherence. The larger central plain has been subdivided by additional planting of groups of trees and by breaking up a stand to form tree groups of varying size. Parts of the forested and open areas have been converted into grazing forest through heavy thinning and additional planting of trees. The borders between forested parts and open areas have been re-shaped more organically, cutting out in the existing stands and additional planting of edge species, creating better interlock between the forested and open areas and more diverse and complex edge structures. Ponds have been restored at emerging wetlands and integrated as attractions for people and biodiversity in relation to small glades, at forest edges, and in larger plains.

6 Conclusions and outlook

6 Zaključki in predvidevanja

The paper describes an approach to close-to-nature forest management as a strategy to restore stands, forests and forested landscapes in urbanized societies like Denmark, where the importance of recreational and ecological values equals or even surpasses the classical production goals. In relation to this, the concept of forest development types has been established as a planning and design tool for forest landscape restoration, both in terms of describing the development of specific forest stand but also to illustrate the anticipated landscape development as an integration of different ecosystems, including different forest types, semi-open forests, glades, edges, open areas and water bodies. Applying this tool box in designing the forest landscape utilizing the existing and potential variation in topography, geology and hydrology it is possible to develop robust and functional forest landscape for urban societies with high recreational, aesthetic, biological and productive values.

Studies indicate that communication of long-term goals for stand and landscape development through FDT scenarios and their illustration are easy to comprehend by both professionals and lay persons. Correspondingly,

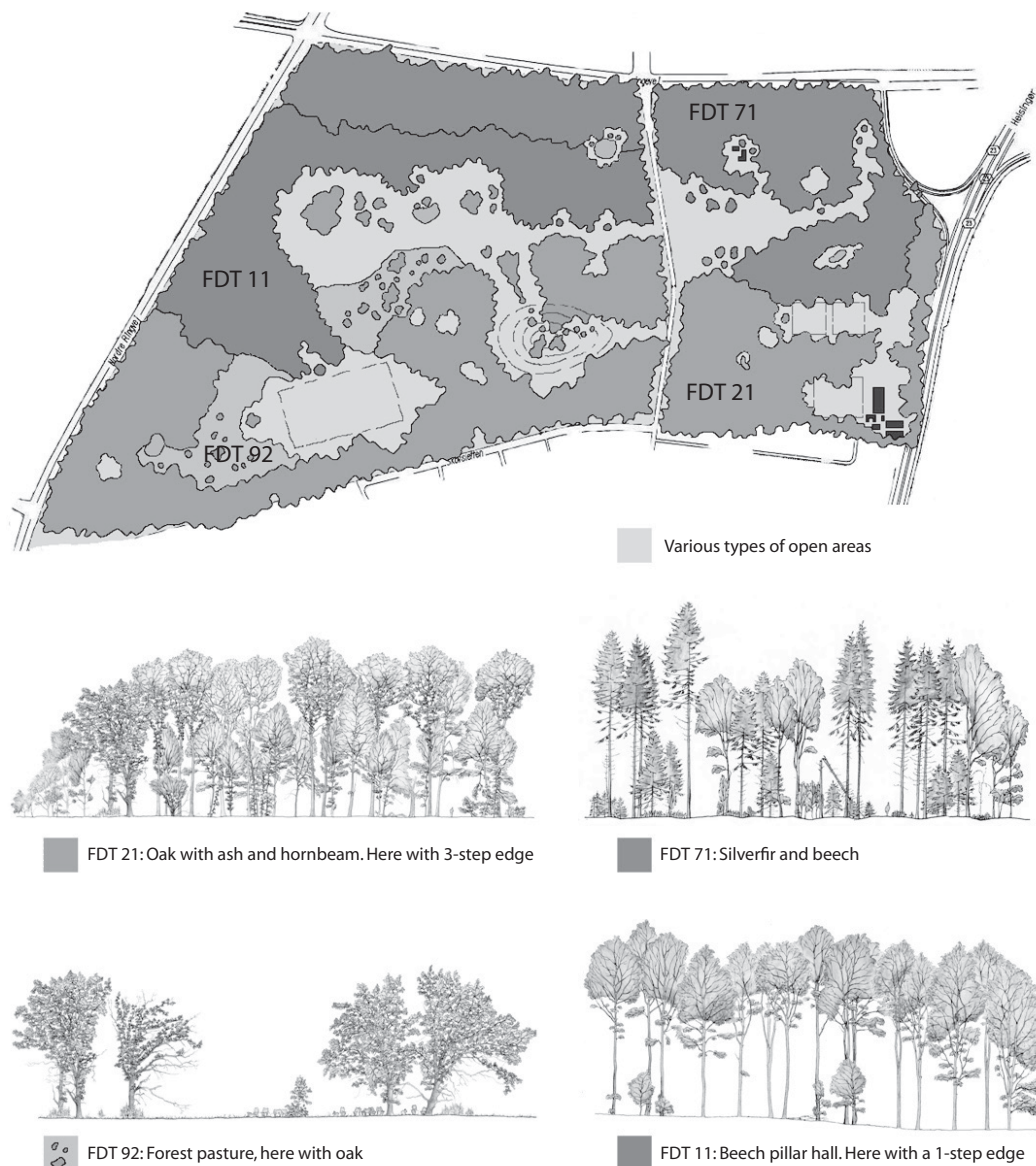


Figure 5: Restoration plan for the eastern part of Vestskoven as proposed by a group of students attending the international master course in Urban Woodland Design and Management. The plan in combination with the profile diagrams of the four FDT's including examples of different edge-types gives an instant impression of the anticipated goals for the urban forest landscape as well as for the development at the different forested parts, which can be used as an off-set for participatory planning approaches.

Slika 5: Načrt prevzgoje za vzhodni del kraja Vestskoven, kot so ga predlagali študentje na mednarodnem seminarju o načrtovanju in upravljanju urbanih gozdov. Načrt je kombinacija vertikalnih prerezov za štiri gozdne tipe s predvidevanimi cilji za urbano krajino, kar je lahko dober pripomoček pri participativnem načrtovanju.

they might serve to support active participation of the locals in defining and agreeing upon long-term goals for urban forest landscape development, in processes where managers should be flexible to adapt goals and principles to the specific social-cultural context of a given forested landscape. In this respect, the use of FDT as a planning and communication tool democratizes the decision making process. Further, the tool box has proven to be an excellent platform for learning at different educational levels

– from teaching at universities in forestry and landscape architecture to courses provided to practitioners.

It must be stressed that the concept of Forest Development Types in combination with profile diagrams as planning and communication tool can be used independently of applying close-to-nature management principles. FDT's describing other silvicultural concepts can be developed, described, and applied accordingly.

7 Summary

7 Povzetek

Ključnega pomena za uspešnost postopne prevzgoje enodobnih gozdov umetnega nastanka v bolj naravne gozdove je vključevanje ciljev in metod sonaravnega gozdarstva v izobraževanje in praktično usposabljanje upravljavcev, lastnikov in vseh deležnikov v gozdnem prostoru. V deželah, kjer ni tradicije sonaravnega gospodarjenja in primanjkuje primerov dobrih praks, je treba uporabiti izboljšane načine prikazovanja in sporočanja »novih« dolgoročnih gozdnogojitvenih ciljev. Na Danskem so v ta namen uporabili razvojne tipe gozda (Forest Development Types - FDT), ki so predstavljeni opisno in slikovno z značilnimi vertikalnimi prerezi gozdnih sestojev. Tako si vsi udeleženci procesa participativnega načrtovanja lažje predstavljajo nadaljnji razvoj gozdov. V urbanizirani družbi, kakršna je Danska, ekološke in socialne vloge gozdov značilno presegajo ekonomske vidike gospodarjenja, zato je velik poudarek na načrtovanju in prikazovanju vseh krajinskih elementov od posameznih dreves in skupin dreves zunaj gozda, koridorjev, parkovnih gozdov, jas, vodnih teles, do nasadov tujerodnih vrst v prevzgoji in naravnih sestojev.

Praktična uporaba razvojnih tipov gozda je pokazala, da vizualizacija olajša sporočanje in razumevanje dolgoročnih gozdnogojitvenih ciljev za strokovnjake in laike. Skladno s tem je lahko spodbuda za aktivno sodelovanje lastnikov in deležnikov pri načrtovanju razvoja gozdnega prostora. V tem smislu uporaba FDT kot načrtovalnega in komunikacijskega orodja demokratizira postopek sprejemanja odločitev. Zbirka orodij se je izkazala tudi kot odlična platforma za učenje na različnih stopnjah izobraževanja, od poučevanja na univerzitetnih programih gozdarstva in krajinske arhitekture do programov za praktične aplikacije. Treba je poudariti, da je zasnova FDT v kombinaciji s profilnimi diagrami kot načrtovalno in komunikacijsko orodje mogoče uporabiti neodvisno od uveljavljanja načel sonaravnega gospodarjenja z gozdovi. FDT-je, ki opisujejo druge gozdnogojitvene koncepte, je mogoče ustrezno razviti, opisati in uporabiti.

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