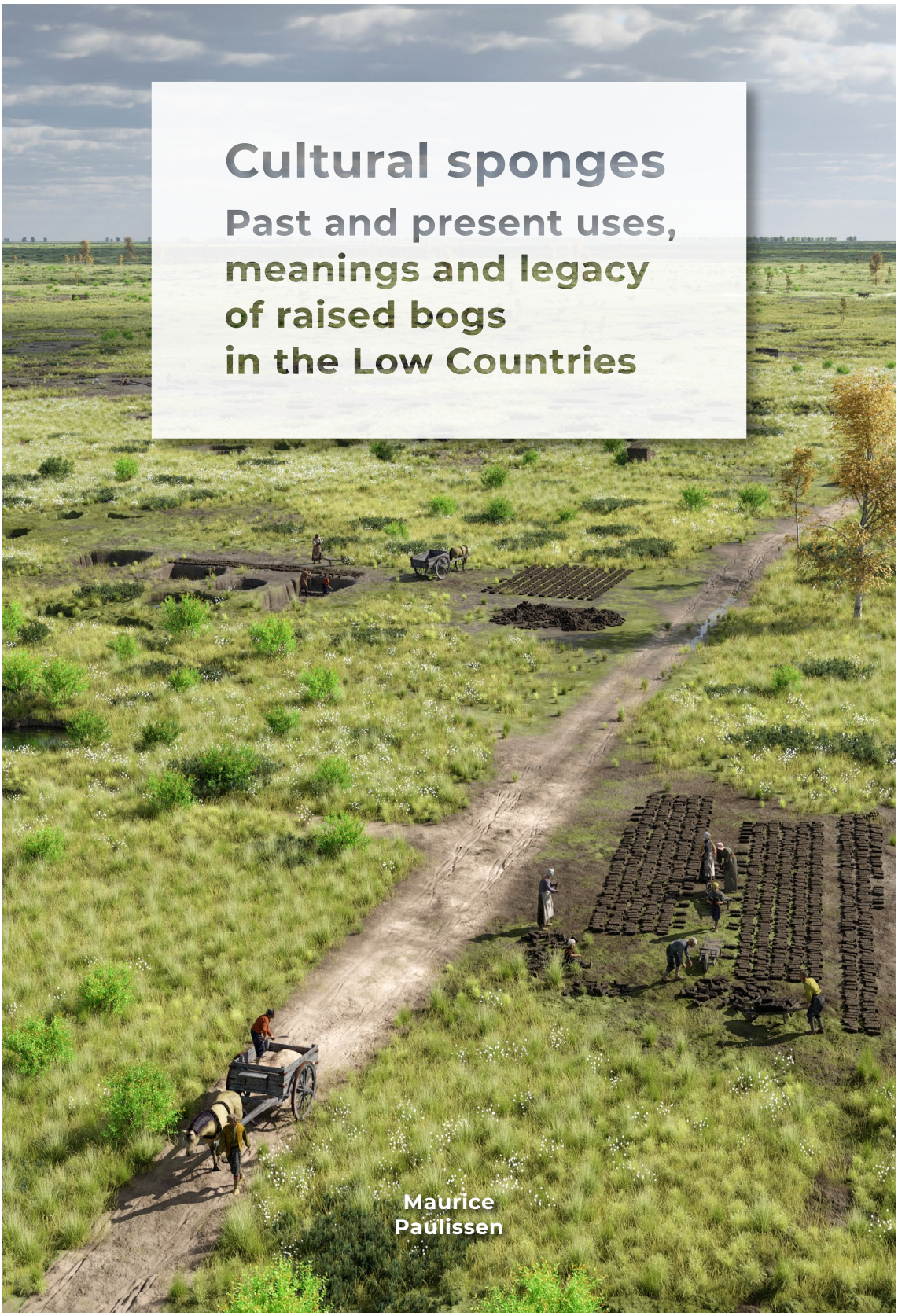
Cultural sponges
Past and present uses, meanings and legacy of raised bogs in the Low Countries
Maurice Paulissen

PROPOSITIONS

1. Bog recovery starts in the relics of human bog destruction. (this thesis)
2. Bog-related cultural heritage will be better preserved if local communities are in charge. (this thesis)
3. In qualitative research, theorising carries the inherent risk of overstatement.
4. Emphasising the Low Countries' uplands raises understanding of our lowland history.
5. Spatial design informed by road history knowledge prevents the emergence of elephant paths.
6. For a small and populous country, the Netherlands includes a large periphery.

Propositions belonging to the thesis, entitled

Cultural sponges: Past and present uses, meanings and legacy

of raised bogs in the Low Countries

Maurice Paulissen

Wageningen, 30 June 2023

Cultural sponges

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Thesis committee

Promotors
Prof. Dr E.H. Huijbens
Professor of Cultural Geography
Wageningen University & Research

Prof. Dr T. Spek
Professor of Landscape History
University of Groningen

Co-promotor
Dr R. van Beek
Associate professor, Soil Geography and Landscape and Cultural Geography
Wageningen University & Research

Other members
Prof. Dr J. Wallinga, Wageningen University & Research
Prof. Dr T. Soens, University of Antwerp, Belgium
Dr L. Egberts, Vrije Universiteit Amsterdam
Dr P. Pungas-Kohv, Estonian Fund for Nature, Tartu, Estonia

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Cultural sponges

Past and present uses, meanings and legacy of raised bogs in the Low Countries

Maurice Paulissen

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This thesis is dedicated to my parents,
who saw the beginning of this project,
but not its completion

SUMMARY

In this thesis I examine the history of human relations with raised bogs in the Low Countries. Raised bogs (or simply 'bogs') are peat moss-dominated wetlands that develop organic soils (peat). Bogs once covered large parts of north-western Europe and the Low Countries in particular. Over the last millennium, many bogs have profoundly altered or disappeared altogether due to reclamation for agriculture or peat extraction for fuel. The remaining bogs are highly protected and subject to ecological restoration.

Because of their distinct materiality, bogs have been likened to natural sponges and have provided specific opportunities and constraints for human uses. This has resulted in a special cultural history and layeredness from prehistoric times onwards. This history and its material manifestation in the landscape has been explored rather one-sidedly in the context of the historical Low Countries. Previous studies have focused in particular on the prehistorical-archaeological context and on large-scale bog transformations from the Middle Ages onward. Underexposed aspects relate to other bog *uses* (notably as commons), to bog *meanings* more in general and to the bog-related *legacy* resulting from both. This thesis takes a new perspective by looking at bogs as *cultural* sponges, that is, as places where significant human entanglements with the material properties of bogs have been enacted and engraved into the landscape.

Four themes are central to this study: the appropriation of resources from bogs in the area of tension between private and common interests (Chapter 2); bogs as perceived natural barriers and borderlands (Chapter 3); the different place meanings that bogs have, and have had, to people (Chapter 4); and the visible cultural remains of human-bog entanglements in the present-day landscape (Chapter 5). These themes have particular salience in the context of the Low Countries and relate to the academically underexposed aspects of bog *uses*, *meanings* and *legacy*, which function as cross-cutting perspectives in this thesis.

The overall approach is interdisciplinary and this thesis has thematic, theoretical and methodological connections with landscape history, environmental history and cultural geography. The central chapters are primarily empirical and each is largely based on case studies. These are mostly derived from three main (former) bog regions in the Low Countries: the Bourtanger Moor, the Peel, and the Hautes-Fagnes.

Chapter 2 addresses the hitherto underexposed question to what degree and how peat commercialisation from bog commons was significant, contested and impactful on the commons. I examine two early modern cases, which show that the significance

of peat selling was in its permanence, recurrence, or regional outreach, rather than its volume share in total peat extraction. In one of the cases, peat commerce could partly be explained by the local community's financial distress in the war-ridden early seventeenth century. However, in both cases an additional motive appeared to be the opportunity to earn money in a 'commercial survival economy'. Long-term subsistence use of common-pool resources could go together with a moderate degree of commercialisation, and state influence occurred notably during local conflict among commoners over commercialisation. Taken together, the results show a complex commons context which differs from the image of autonomous commons purely focused on local needs as held by common-pool resource theory.

Chapter 3 extends the reach of the meanings and uses of bog commons by examining how bog landscapes afforded their development into borderlands. I use Gibson's theory of affordances (about how people perceive their environment and what it has to offer) as a theoretical lens. On the one hand, the outcomes endorse existing explanatory models that the increasing economic importance of peat fuel (affordance of resources) drove border demarcation from the late Middle Ages onward. Conflicts between neighbouring communities over peat fuel extraction were strong drivers for border demarcation. On the other hand, the chapter also underlines how bog landscapes became borderlands through their affordance to work as visual and *de facto* obstacles to human mobility. But, paradoxically, bogs also afforded options for access and passage. This was determined by the spatio-material structure of bog landscapes and by variation in weather conditions at different timescales, where periods of drought or frost increased access options.

In Chapter 4, I add further nuance to the preceding more institutional perspectives by studying what spatiotemporal patterns in place meanings of bog landscapes occurred from prehistory to present. Place meanings describe how people (individually or as a group) ascribe and preserve meaning to a place. Virtually all predefined place meanings (attachment, beauty, biodiversity, functionality, risk, admiration, historicity, and mystery) are found in late modern and present-day material. In older periods, functionality, risk, and mystery stand out. I explain the co-existence of paradoxical place meanings by daytime/night-time differences in people's experiences in bogs. I conclude that physical bog landscape characteristics have been important place meaning determinants, as underlined by similar meaning patterns across different bog areas. The long coexistence of the meanings of mystery (and risk) alongside functionality may explain the persistent popularity of negative clichéd images about bogs.

Chapter 5 moves from uses and place meanings of bogs to the material legacy of these cultural entanglements. It addresses the question what range of cultural remains can be expected in (former) bog landscapes, how these are currently integrated into the management of (former) bog areas, and how conservation and display of these remains can be aligned with nature management. I centre on tangible cultural remains at the surface of (former) Dutch bog areas. Three case studies reveal a large diversity of cultural remains, particularly in bog areas that have been subject to large-scale commercial peat exploitation. Subsequently, a literature survey shows that coherent and structural visions on the incorporation of bog-related cultural remains in future landscape management – within and outside bog reserves – are currently lacking. By contrasting nature management measures in a simple matrix table with options for dealing with cultural remains in bogs, I conclude that preserving bog-related cultural remains and making or keeping them visible can generally go well with achieving ecological goals.

In Chapter 6, I summarise the answers to the research questions of the central chapters and conclude that the natural s*pongescapes* that bogs represented have, through their spatiotemporally varying accessibility, resource distribution and value, informed and co-produced cultural *spongescapes*. These, in turn, have acted as landscape-scale archives storing a broad cultural legacy. Even where these *spongescapes* have been completely 'squeezed out' (modified or destroyed) by human uses in the course of history, the rich bog legacy has largely remained present both in the landscape and in collective memory. I discuss additional insights emerging from the three cross-cutting perspectives and relate these to ongoing academic debates. After a reflection on theory, method, and the wider academic contribution of this thesis, I discuss its societal implications. Therein I propose a new way of bog governance where local communities and nature conservancy institutions jointly manage bog landscapes. This may ultimately offer the best prospects for achieving ambitious nature, climate and heritage goals.

SAMENVATTING

In dit proefschrift onderzoek ik de geschiedenis van de menselijke relaties met hoogvenen in de Lage Landen. Hoogvenen zijn door veenmossen gedomineerde moerassen die organische bodems (veen) ontwikkelen. Ooit bedekten hoogvenen grote delen van Noordwest-Europa en de Lage Landen in het bijzonder. In het afgelopen millennium zijn veel hoogvenen ingrijpend veranderd of helemaal verdwenen door ontginning voor de landbouw of winning van turf als energiedrager. De resterende hoogvenen zijn in hoge mate beschermd en vaak vinden er ecologische herstelprojecten plaats.

Vanwege hun bijzondere materialiteit zijn hoogvenen wel vergeleken met natuurlijke sponzen en hebben zij specifieke mogelijkheden en beperkingen geboden voor menselijk gebruik. Dit heeft geleid tot een bijzondere culturele geschiedenis en gelaagdheid vanaf de prehistorie. Deze geschiedenis en de materiële uiting ervan in het landschap zijn relatief eenzijdig onderzocht in de context van de historische Lage Landen. Eerdere studies hebben zich vooral gericht op de prehistorisch-archeologische context en op grootschalige transformaties van hoogveenlandschappen vanaf de Middeleeuwen. Onderbelichte aspecten hebben betrekking op andere *functies en gebruiksvormen* van hoogvenen (vooral als *gemene gronden*, met andere woorden, gemeenschappelijk gebruikt en beheerd land), op *betekenissen* van hoogvenen meer in het algemeen en op de hoogveen-gerelateerde culturele *erfenis* die uit beide voortvloeit. Dit proefschrift kiest een nieuw perspectief door te kijken naar hoogvenen als *culturele* sponzen, dat wil zeggen, als plaatsen waar belangrijke menselijke verwikkelingen met de materiële eigenschappen van hoogvenen hebben plaatsgevonden. Verwikkelingen waarvan talrijke sporen in het landschap zijn gegrift.

Vier thema's staan centraal in deze studie: de toe-eigening van hulpbronnen uit hoogvenen (als gemene gronden) in het spanningsveld tussen particuliere en gemeenschappelijke belangen (Hoofdstuk 2); hoogvenen als 'natuurlijke barrières' en grensgebieden (Hoofdstuk 3); verschillende plaatsbetekenissen die hoogvenen hebben en hebben gehad voor mensen (Hoofdstuk 4); en de zichtbare culturele overblijfselen van historische verstrengelingen tussen mens en hoogveen in het huidige landschap (Hoofdstuk 5). Deze thema's zijn van bijzonder belang in de context van de Lage Landen en houden verband met de academisch relatief eenzijdig belichte aspecten van de *gebruiksvormen*, *betekenissen* en culturele *erfenis* van hoogvenen, die in dit proefschrift als overkoepelende perspectieven fungeren.

De algemene aanpak is interdisciplinair en dit proefschrift heeft thematische, theoretische en methodologische raakvlakken met landschapsgeschiedenis, milieu-

geschiedenis en culturele geografie. De centrale hoofdstukken zijn voornamelijk empirisch van aard en elk hoofdstuk is grotendeels gebaseerd op casestudies. Deze zijn meestal afkomstig uit drie belangrijke (voormalige) hoogveengebieden in de Lage Landen: het Bourtangerveen, de Peel en de Hoge Venen.

Hoofdstuk 2 gaat in op de vraag in welke mate en op welke wijze het verhandelen van turf uit hoogvenen die beheerd werden als gemene gronden belangrijk, omstreden en van invloed was op de deze gebieden. Commercialisering van hulpbronnen was volgens de regels voor het beheer van gemene gronden doorgaans strikt verboden. Ik onderzoek twee voorbeelden uit de vroegmoderne tijd, waaruit blijkt dat het belang van de turfcommercialisering lag in het permanente karakter, het terugkerende karakter of het regionale bereik, en niet zozeer in het volume-aandeel in de totale turfwinning. In een van de voorbeelden kon de turfhandel gedeeltelijk worden verklaard door de financiële nood van de plaatselijke gemeenschap in de door oorlog geteisterde vroege zeventiende eeuw. In beide voorbeelden leek een bijkomend motief echter de mogelijkheid om geld te verdienen in een 'commerciële overlevingseconomie'. Langdurig gebruik van gemeenschappelijke hulpbronnen voor de eigen behoefte (waarvoor gemene gronden bedoeld waren) kon samengaan met een beperkte mate van commercialisering, en overheidsinvloed deed zich met name voor tijdens lokale conflicten tussen gebruiksgerechtigden over commercialisering. Alles bij elkaar tonen de resultaten een complexe context in de gemene gronden die verschilt van het beeld dat dergelijke gronden beheerd werden door autonome organisaties die louter waren gericht op lokale behoeften, zoals de *common-pool resource*-theorie stelt.

Hoofdstuk 3 breidt de reikwijdte van de betekenissen en het gebruik van hoogvenen als gemene gronden uit door te onderzoeken hoe hoogveenlandschappen zich hebben kunnen ontwikkelen tot grensgebieden. Ik gebruik Gibsons theorie van *affordances* (over hoe mensen hun omgeving, en wat die te bieden heeft, waarnemen) als theoretische lens. Enerzijds bevestigen de resultaten bestaande verklaringsmodellen dat het toenemende economische belang van turf als brandstof (*affordance* van hulpbronnen) de grensafbakening vanaf de late Middeleeuwen aanstuurde. Conflicten tussen naburige gemeenschappen over de winning van turfbrandstof waren sterke drijfveren voor grensafbakening. Anderzijds wordt in het hoofdstuk ook benadrukt hoe hoogveenlandschappen grensgebieden werden doordat ze als visuele en feitelijke obstakels voor de menselijke mobiliteit fungeerden. Maar paradoxaal genoeg bood het hoogveen ook mogelijkheden voor toegang en doorgang. Dit werd bepaald door hoe de materiële structuur van hoogveenlandschappen ruimtelijk varieerde en door variatie in weersomstandigheden op verschillende tijdschalen, waarbij perioden van droogte of vorst de toegangsmogelijkheden vergrootten.

In Hoofdstuk 4 voeg ik verdere nuances toe aan de voorgaande, deels meer institutionele, perspectieven door te bestuderen welke ruimtelijk-temporele patronen in plaatsbetekenissen (*place meanings*) van hoogveenlandschappen zich voordeden van de prehistorie tot heden. Het concept *place meaning* beschrijft welke betekenis(sen) mensen individueel of als groep aan een plaats toekennen. Vrijwel alle in dit hoofdstuk vooraf gedefinieerde plaatsbetekenissen (gehechtheid, schoonheid, biodiversiteit, functionaliteit, risico, bewondering, historiciteit en mysterie) worden aangetroffen in laatmoderne bronnen en in de hedendaagse data. In oudere perioden springen functionaliteit, risico en mysterie eruit. Ik verklaar het naast elkaar bestaan van paradoxale plaatsbetekenissen door dag/nacht-verschillen in de ervaringen van mensen in hoogvenen. Fysieke kenmerken van het hoogveenlandschap zijn belangrijke determinanten van plaatsbetekenissen geweest, zoals wordt onderstreept door vergelijkbare betekenispatronen in verschillende hoogveengebieden. De bevinding dat de betekenissen mysterie (en risico) enerzijds en functionaliteit anderzijds lang naast elkaar hebben bestaan kan de aanhoudende populariteit van negatieve clichébeelden over hoogvenen helpen verklaren.

Hoofdstuk 5 verlegt de aandacht van het gebruik en de plaatsbetekenissen van hoogvenen naar de materiële erfenis van dergelijke culturele verstrengelingen. Het behandelt de vraag welk scala aan culturele resten – zoals bouwwerken of andere sporen in het landschap - in (voormalige) hoogveenlandschappen te verwachten is, hoe deze culturele resten geïntegreerd zijn in het huidige beheer van (voormalige) hoogveengebieden, en hoe het behoud en het zichtbaar maken van deze resten afgestemd kan worden op het natuurbeheer. Ik concentreer me op tastbare culturele resten aan de oppervlakte van (voormalige) Nederlandse hoogveengebieden. Drie casestudies laten een grote diversiteit aan culturele resten zien, met name in hoogveengebieden waar grootschalige commerciële turfwinning heeft plaatsgevonden. Uit documentanalyse blijkt dat coherente en structurele visies op de inpassing van hoogveen-gerelateerde culturele resten in het landschapsbeheer - binnen en buiten hoogveengebieden - vooralsnog ontbreken. Door natuurbeheersmaatregelen in een eenvoudige matrixtabel af te zetten tegen opties voor het omgaan met culturele resten in hoogvenen, concludeer ik dat het behouden en zichtbaar maken van hoogveen-gerelateerde culturele resten over het algemeen goed samen kan gaan met het bereiken van ecologische doelen.

In Hoofdstuk 6 vat ik de antwoorden op de onderzoeksvragen van de centrale hoofdstukken samen en concludeer ik dat hoogveenlandschappen als *natuurlijke spongescapes* - door hun in ruimte en tijd variërende toegankelijkheid en (waarde van) hulpbronnen – hebben bijgedragen aan het ontstaan van *culturele spongescapes*.

Deze hebben op hun beurt gefungeerd als landschapsarchieven die een rijk cultureel erfgoed bewaren. Zelfs waar de *natuurlijke spongescapes* in de loop van de geschiedenis door menselijk gebruik volledig zijn 'uitgeknepen' (veranderd of vernietigd), is het rijke aan hoogveen-gebruik gerelateerde erfgoed grotendeels aanwezig gebleven, zowel in het landschap als in het collectieve geheugen. Ik bespreek aanvullende inzichten die voortkomen uit de drie overkoepelende perspectieven en relateer deze aan academische debatten. Na een reflectie over theorie, methode en de bredere academische bijdrage van dit proefschrift, bespreek ik de maatschappelijke implicaties ervan. Daarbij stel ik een nieuwe manier van hoogveenbeheer voor waarbij lokale gemeenschappen en natuurbeheersorganisaties gezamenlijk hoogveenlandschappen beheren. Dit biedt uiteindelijk misschien wel de beste vooruitzichten voor het bereiken van ambitieuze natuur-, klimaat- en erfgoeddoelstellingen.

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CHAPTER 1

Introduction

1.1 HISTORY'S ACTUALITY: CONTESTED RAISED BOGS

As the 2022 Russian invasion of Ukraine triggered the largest military conflict and refugee crisis in Europe since the Second World War, as well as soaring energy costs across the continent (Deutschlandfunk 2022; El Bakkali 2022), two remarkable newspaper articles on Irish raised bogs demonstrated how markedly peatlands are related to these current events. The articles reported how measures to ban the selling of peat and other smoky fuels in Ireland – a curb meant to reduce carbon emissions and air pollution and conserve the remaining bogs - 'have gone up in smoke amid soaring costs' and 'fuelled a tense narrative of urban elites versus rural poor' (Carroll 2022; Carroll and Connolly 2022). Box 1.1 further illustrates the case.

Box 1.1. 'We're being left with nothing': Ireland's turf wars expose rural grievances

In policy terms curbing the commercial cutting and burning of turf was supposed to be 'low hanging fruit', an overdue crackdown on a practice harmful to health and the environment. Instead, it turned into a cautionary tale about populism, energy prices, Vladimir Putin and just transition to a green economy, a combustible nexus that is playing out across much of Europe.

Soggy peatlands formed by the accumulation of decayed vegetation cover much of Ireland's midlands. Lacking coal and woods, not to mention electricity, Irish people survived for centuries by draining bogs and using peat as fuel. Storytelling by a blazing hearth embodied the national identity. From the 1930s a semi-state company, Bord na Móna, extracted peat on an industrial scale, a source of patriotic pride. Families, thought to number several thousand, that live near the remaining bogs are still allowed to cut turf for domestic use in accordance with traditional 'turbary rights'. Commercial contractors with mechanical equipment do the cutting for many such families and sell the surplus with little or no regulation or taxation. About 100,000 households, many in old, draughty dwellings, use turf for heating, according to some estimates.

Ned Phillips, 49, [said] 'I'll not stop cutting turf here no matter what law they pass. It's our tradition. We're doing no harm here.' It was his mother's dying wish that he continue a tradition dating back centuries, a wish he intends to honour, even though the family's patch of bog is now part of a conservation area. 'I'll fight till my death.'

In this thesis I examine the history of human relations with raised bogs (*hoogvenen* in Dutch) in the Low Countries - that is, the historical territories that roughly constitute the present-day Netherlands, Belgium, and Luxembourg. In this relatively densely populated 'high-pressure cooker', bogs were - on a large scale and early on - intensively and commercially used and thereafter often fully reclaimed to agricultural land (Borger 1992; Jongepier et al. 2011). This makes the Low Countries such an illustrative case for exploring the range of human-bog relationships and its legacy. I do so from the perspective of four central themes, partly reflected in the preceding example from European actuality. These themes concern (1) the appropriation of resources from bogs in the area of tension between private and common interests; (2) bogs as perceived natural barriers and borderlands; (3) the different place meanings that bogs have,

Fiona Conlon, a fellow turf cutter, appealed for understanding. 'People think we're being thugs or radicals. We're not heathens. It's pride. We believe in what we do. My home feels like home because of the turf fire. The warmth and the glow – that's a real sense of comfort.'

There is consensus in Ireland that the climate crisis is real – deniers get no traction. Nor do populists, as a rule. However, the battle over turf has exposed rural grievances that echo supporters of anti-establishment politicians in Britain, the continent and the US.

Successive governments have tried and failed to rein in commercial turf operators. 'It's a real political failure to tackle a very stinging nettle,' said Séamus Boland, head of Irish Rural Link, an advocacy group for disadvantaged areas.

One reason is cultural. 'There is a lot of emotional attachment to turf burning,' said John Sweeney, a climate expert and geography professor at Maynooth University. 'The idea that you can't have a home without a blazing hearth is something we have to get over in Ireland. We have to recognise the damage far exceeds the emotional benefits.'

The other reason is financial. Contractors risk losing livelihoods. Families that heat homes with peat fear retrofitting, with costs of thousands of euros, and a switch to much pricier alternative energy sources. 'I don't want to destroy the whole world but I don't want to be poor either,' said John Dore, 62, [a turf cutter] who lives by the country's largest raised bog, the Bog of Allen in County Kildare. (Headline and text taken from Carroll (2022); Courtesy of Guardian News & Media Ltd.)

and have had, to different people (for instance, local residents in bog areas versus environmentalists and policy makers, as in the Irish example); and (4) the visible cultural remains of human-bog entanglements in the present-day landscape. I expand on these central themes in Section 1.4 below. But before further exploring and problematising the cultural relations of bogs, I will first elaborate on what bogs are and how their specific properties set them apart from many other landscape types.

1.2 RAISED BOGS AS NATURAL SPONGES

Raised bogs (in this thesis often abbreviated to 'bogs') globally constitute a major category of peat-accumulating wetlands. They are mainly found in the temperate and subarctic regions of the northern hemisphere, where in the course of the Holocene (the geological epoch that started some 11,700 years ago) they gradually came to cover vast expanses of land (Succow and Edom 2001; Quik 2023). Bogs develop in areas with a precipitation surplus and a relatively even annual spread of precipitation. Thus, in Europe they have formed in particular in the Atlantic and boreal regions and in inland mountainous zones. In the Low Countries, extensive bogs developed on the coastal plain in the west as well as in eastern inland areas, in particular after 7000 BCE (Jongepier et al. 2011; Vos 2015; Quik 2023). Peat mosses (i.e., various *Sphagnum* species) constitute the most characteristic components of living bog vegetations and of the underlying peat deposits (Figure 1.1). Although precipitation is naturally poor in nutrients, efficient nutrient uptake enables peat mosses to exclusively live off what precipitation provides them with. This distinguishes bog vegetation from plant life of another major category of peat-accumulating wetlands, namely fens (*laagvenen* in Dutch), which are also fed by groundwater and/or surface water (Verhoeven 1992; Succow and Edom 2001).

The peat mosses characteristic of raised bog vegetation actively acidify their environment in the process of nutrient uptake. Due to their special anatomy, peat mosses are able to absorb and retain water in amounts of roughly twenty times their dry weight. Partly because of the permanently wet and acidic habitats that peat mosses thus create, the decomposition rates of dead peat moss and other organic material are much lower than their production rates. As a result, dead organic matter (peat) accumulates in raised bogs. The wet, acidic, and nutrient-poor conditions in peat moss vegetations make it difficult for other plant species to establish themselves. Peat mosses can thus be considered ecosystem engineers: species that build their own preferred habitat (Jones, Lawton, and Shachak 1994; Van Breemen 1995; Figure 1.2). Consequently, in the course of the Holocene, peat deposits of locally more than ten

metres thick have developed in western European bogs (e.g., Casparie and Streefkerk 1992, 96; Succow and Edom 2001).

As bogs and other peatlands still cover vast areas worldwide, they are of global importance to carbon and water cycles. For instance in terms of the former, healthy bogs may function as net carbon sinks (Gallego-Sala et al. 2018), which can potentially help mitigate climate change by absorbing and sequestering carbon dioxide (e.g., Tanneberger and Wichtmann 2011). This ecosystem service of bogs, next to their importance for biodiversity conservation, is also at the core of their contestation in the opening example of present-day Irish bogs.

Through their strong ability to retain and then slowly release incoming water from precipitation, bogs dampen discharge peaks in water courses originating from them. Therefore, bogs are oftentimes likened to sponges (Gerding 1995, 16; cf. Van Breemen 1995, 274). From a human perspective, the *spongescapes* that raised bogs represent have a number of specific natural properties that set them apart from many other landscape types.[1] Their wet and soft surface has posed challenges to humans in traversing bogs. The dependence of bog vegetation on atmospheric nutrient inputs implies a low natural fertility of bog landscapes. Together with their wet and acidic character, this has caused western European bogs to be virtually treeless by nature. Special properties of peat, the organic deposits underlying and produced by the living bog vegetation, include their characteristics to shrink and gradually disappear through oxidation when drained. Moreover, the material is combustible, and if it catches fire it can continue to smoulder under the bog surface even in damp conditions (Lin et al. 2020).

1 The term *spongescape*, coined by Prof. Dr Ir Tom Buijse of Wageningen University, is the working title of a Horizon Europe-funded project of which grant agreement is being finalised as this is written.

<< Figure 1.1. Raised bogs and peat mosses at different scales. Upper photo: aerial overview of Teiču purvs, a bog landscape (brown area) of c. 20,000 ha in Latvia (courtesy of F64 Photo Agency/Mārtiņš Zilgalvis). Middle photo: natural depression containing a small raised bog (diameter c. 50 m) in the Brackvenn area of the Hautes-Fagnes bog region, eastern Belgium. A yellowish mat of peat mosses (*Sphagnum* species) is well visible on the middle foreground (photo by author). Lower photos: close-ups of four different bog species of *Sphagnum*. The diameter of the *capitula* ('heads' of the individual moss shoots) is in the order of 1-2 cm (taken from Bengtsson, Granath, and Rydin 2016, https://doi.org/10.1002/ece3.2119, CC BY 4.0).

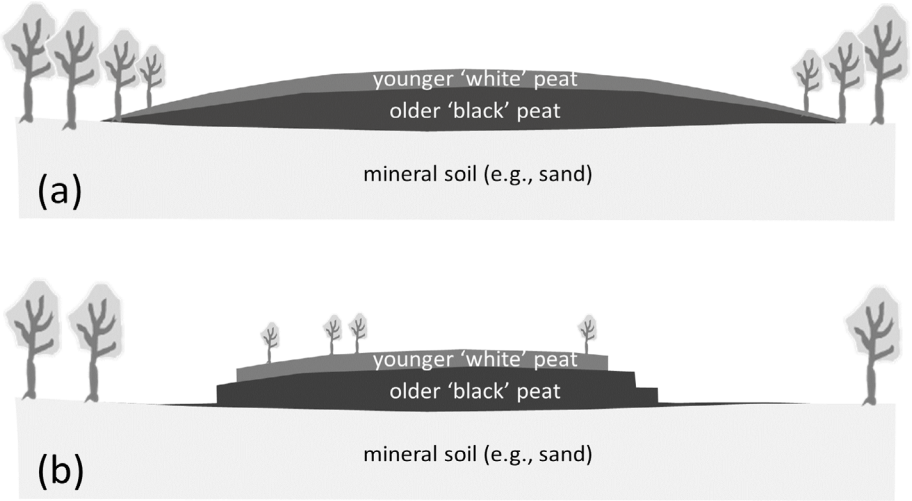

Figure 1.2. Schematic cross-section of a raised bog. (a) Near-intact non-forested raised bog. The peat deposits have developed on top of mineral soil (light grey). Forest naturally occurs on the mineral soil and on the edges of the bog. Peat layers progressively become younger from bottom to top. Generally, a distinction is often made between a lower black peat and an upper white peat layer with different physico-chemical properties. (b) Raised bog impacted by peat cutting at the edges. This causes the natural transition from raised bog to surrounding mineral soil to be disturbed. It contributes to bog water loss, which leads to drier conditions especially at the bog surface, where peat mosses decline while heather, grasses, shrubs and small trees can settle on the disturbed bog. Next to other use forms, all extant bog remnants in the Netherlands, Belgium, and north-western Germany have been impacted by peat cutting since at least late medieval times.

1.3 RAISED BOGS AS CULTURAL SPONGES

Beyond the metaphor of bogs as *natural* sponges, the present thesis takes a new perspective by looking at bogs as *cultural* sponges, that is, as places where significant human entanglements with the material properties of bogs have been enacted and engraved into the landscape. Here I give a brief overview of bog research in the humanities and social sciences over recent decades, to serve as a starting point for my argument. Looking over these wide-ranging disciplines, I broadly distinguish three main strands of academic publications with their own disciplinary, thematic and temporal emphases.

The first concerns studies from an archaeological perspective, focusing mainly on prehistoric and early historic periods. Raised bogs have drawn particular attention in archaeology because of their role as unparalleled cultural archives. Bog peat deposits have exceptional capacities to conserve organic and other cultural remains. These deposits, as well as the underlying mineral soils, have revealed a wealth of unique and often well-preserved finds dating from stone age to modernity (e.g. Van der Sanden 1990; Gearey and Chapman 2022; Van Beek et al. 2023). These range from pottery and tools, wooden trackways and wheels to human bodies and indicate that, rather than being shunned, bogs were frequently visited and used in various ways by prehistoric and early historic people - for instance, for ritual use, resource extraction, or as part of supralocal traffic networks (Casparie 1987; Fontijn 2003; Nekrassoff and Renson 2015). The peat deposits of present-day bog remnants are also valued for their quality to function as palaeo-environmental archives storing biological proxies that can be studied to contextualise the archaeological record and reconstruct past natural environments in general (e.g., Behre 2003; Gearey et al. 2010; Gearey and Chapman 2022). However, archaeologists have pointed at the continuing environmental and climatic pressures on bogs that put the long-term preservation of their peat archives – including their cultural heritage – at risk (Van Beek 2015). Besides more 'scientific' approaches to reconstruct past environments, archaeologists have also engaged with intriguing topics such as ritual use of bogs and the context and background of bog body deposition (Van der Sanden 1990; Kama 2017; Van Beek et al. 2023). Such topics generate questions concerning the precise nature of human-bog entanglements and past place meanings of bogs. Despite interesting endeavours to combine, for instance, folklore sources with archaeological evidence (Kama 2017), it is obviously challenging to generate detailed and nuanced pictures of human-bog entanglements in the more distant past.

The second strand of bog-related studies works from an historical or historical-geographical perspective and focuses on different aspects of bog use, with a temporal emphasis on the medieval and (early) modern periods. The general focus is on (transitions to) relatively intensive use forms, mainly agricultural reclamations or systematic peat extraction, and/or on the socioeconomic contexts thereof (e.g., De Zeeuw 1978; Unger 1984; Gipp 1986; Derex 2001; Ruuskanen 2016; 2018a; 2018b; Strohwasser 2018; Bruisch 2020). Both use categories typically meant a drastic transformation of the appearance and ecosystem functioning of bogs up to complete destruction (Rotherham 2009; 2020, 14). Within Europe, the Low Countries and surrounding areas were early centres of both intensive bog use categories. Consequently, much of the bog literature relating to this region has focused on large-scale bog transformations (Wassermann 1985; Stol 1990; Borger 1992; Gerding 1995; Van Dam 2001; Raven 2011; Zomer 2016), and partly on reconstructing former bog areas that had disappeared through intensive use (e.g., Renes 1984; De Bont 2008; Jongepier et al. 2011; Leenders 2013; Koopmanschap 2015; Van Beek, Maas, and Van den Berg 2015). Studies in this group represent historical-geographical, landscape historical and economic historical approaches, often as regional monographs. While this implies different perspectives, study objects and methods, together these studies have yielded a fairly complete picture of the large-scale bog transformations particularly in the western and northern Low Countries and their societal context of population growth, urbanisation, reclamation and forest clearance, and growing dependence on peat fuel. Next to this main thematic focus, several studies (indirectly) address the use and management of bogs from a legal and social historical perspective (Vera 2011; Hoppenbrouwers 2018; Van Zalinge-Spooren 2018). Finally, some historians and geographers have published on the social and politico-military significance of large raised bogs in the Low Countries as border zones (De Vos 1989; Baas 1995; Karel 2000; Raven 2011; Jedwab 2020).

The third main strand in the literature centres on the cultural entanglements of bogs from a human geography, anthropology and literary studies perspective. Topics and approaches range from ethnographic descriptions of (former or 'traditional') small-scale bog use forms (e.g., Pungas-Kohv et al. 2015; cf. Johnson 2000) and folklore stories (e.g., Meredith 2002) to studies of perceptions and place meanings (Pungas and Võsu 2012; Pungas-Kohv et al. 2015) and analyses of artistic expressions relating to bogs (Meredith 1999; Jarząb 2014; Pungas-Kohv and Soovik 2019). The temporal focus of this third strand is generally on (late) modernity and the present. Geographically, particular focal areas include the British Isles and the Baltic region (e.g., Meredith 1999; 2002; Jarząb 2014; Pungas and Võsu 2012; Pungas-Kohv and Soovik 2019). The Low Countries seem somewhat underexposed in this thematic domain, although they are not unexplored (e.g., Schouten, Van Ool, and Kempenaar 2003; Sintobin and Corporaal 2021).

Summarising the preceding with respect to the Low Countries as a study area, I conclude that – taken together - previous studies have yielded much knowledge on spatiotemporal developments and cultural remains at the area level, as well as on the larger socio-economic contexts of the (post-)medieval raised bog transformations. However, a number of less exposed aspects stand out. First, little attention has been paid to the medieval and (early) modern use of raised bogs in situations where these were not (yet) subject to large-scale peat extraction and reclamation. In these situations, bogs were typically managed as common lands by surrounding village communities (Box 1.2). To what extent and how was the use of bog commons contested, given the growing dependence on peat fuel of the local and supra-local economy in early modern times?

Box 1.2. A brief introduction to the commons

Human appropriation of natural resources is among the most fundamental and impactful ways in which people have left an imprint on their environment. Indeed, raw materials and energy sources have played an increasing role as the basis of the economy throughout history (Radkau 2008). At present, we are familiar with two main ways in which natural resources are owned and managed: either by the public sector (for instance, 'the state') or by the private sector ('the market'), as underpinned by legislation drawn from Roman times. In the past however, there was a third way of organising property rights. It was omnipresent and of great importance to many European rural economies, and succinctly referred to as 'the commons' (Ostrom 1990; De Moor 2015; Grüne, Hübner, and Siegl 2015, 277). Common-pool resources are not the same as open-access goods (Ostrom 1990; Bonan 2018, 622; De Keyzer 2018, 109). Thus, not everyone had the right to appropriate resources from common lands. Rather, this right was reserved to a well-defined group of people, the commoners, and clearly articulated through rules and sanctioned practices.

Second, few academic studies have looked in more detail into what specific meanings bogs had to people in the Low Countries (a recent exception being Jedwab's (2020) study on medieval Noord-Brabant). How did people perceive and value these peculiar bog landscapes and how did this relate to (changing) bog use practices or broader contemporary views on land use? Third, while as a by-product of historical geographical studies knowledge has been generated about regular physical remains of bog-transforming processes in the (present-day) landscape (e.g., Leenders 2013; Zomer 2016), detailed systematic overviews of bog-related cultural remains from a heritage perspective are lacking. Moreover, what possible meaning these cultural remains may have to local communities, and how these remains play or could play a role in the present-day (nature) management of bog remnants have been underexposed topics (Box 1.3).

According to Grüne, Hübner, and Siegl (2015, 277), the historical appearance of rural commons can be traced back to an objectively existing, subjectively perceived, or expected scarcity. This led to institutional regulation and restriction of access to resources that were previously free (open access). From the late Middle Ages onwards abundant source material shows that in the Low Countries vast stretches of forest, heathland and bogland were managed as commons (Van Zanden 1999; Hoppenbrouwers 2002; Vera 2011, 417; De Moor 2015; De Keyzer 2018; Beeckaert 2020). In public perception, common lands are often considered marginal, from an economic, soil fertility, but also socio-cultural perspective (Roymans 1995, 17-19; Svensson and Gardiner 2009). The commonly used term 'wasteland' illustrates this. Indeed, common lands often included the less fertile lands within a village area. But because of the mostly large areas they covered in comparison to intensively used agricultural land, they were still of great economic importance to local communities in terms of the volume of resources they provided for subsistence (Svensson and Gardiner 2009).

Box 1.3. Cultural remains and cultural heritage

The historical interaction between people and their environment, between culture and nature, has left numerous tangible traces in the landscape. Many bog remnants in western and central Europe may look natural at first glance, but harbour numerous (former) drainage ditches, old boundary markers, relics of small-scale peat extraction, old paths leading to these extraction sites, and so on. Even stronger is the human imprint in former raised bog areas, where the traces of large-scale peat extraction and/or agricultural reclamation are literally engraved into the landscape, often down to the mineral subsoil (Wassermann 1985; De Bont 2008; Jongepier et al. 2011; Leenders 2013; Van Beek 2015; Zomer 2016; Strohwasser 2018). In this thesis, I refer to all these traces by the generic term *cultural remains*, and the focus is mainly on the relatively young and visible traces at the surface of (former) bogs.

Cultural *remains* are not inherently cultural *heritage*. The designation of sites, objects or other cultural remains as heritage is preceded by a process of value attribution (Braaksma 2017, 16-17). Moreover, heritage is not only about material structures and objects. Over time, the concept of heritage has broadened to include oral traditions, skills or community practices. These new categories are referred to as *intangible* heritage (Kelly 2009; Egberts 2017, 30). Why people (should) value cultural heritage has been substantiated by several studies (Braaksma, Jacobs, and Van der Zande 2016, 64). It may be, for instance, because heritage symbolises the history and identity of a group of people (e.g., Cosgrove 1984; Lowenthal 1985; Bender 1993). It may also be because of the aesthetic or educational values of heritage (Torkildsen 2005) or because heritage strengthens the tourism economy (Bessière 1998; Palmer 1999). In any case, it is clear that heritage is intrinsic to landscapes. Heritage is therefore increasingly involved in landscape design, planning, management and research (Scazzosi 2004; Gražulevičiūtė-Vileniškė 2008; Braaksma 2017).

Heritage, including that which is present in the landscape, has over the past century been conceptualised in different ways in the academic

debate, as briefly summarised by, for instance, Braaksma, Jacobs, and Van der Zande (2016, 64-65) and Egberts (2017, 30-31). During much of the previous century, heritage values were generally thought to be intrinsic to certain old objects or sites, and value assignment and management of heritage were primarily the domain of experts (Antrop 2005; Macdonald 2013). From the 1990s onward, the broader public has increasingly been involved in attributing value to cultural remains (Braaksma 2017, 16-17; Edensor 2022, 16), and the meanings assigned to cultural remains in the landscape increasingly became the focus of heritage studies. These meanings were acknowledged to vary across people and time (Harvey 2001; Abu-Khafajah 2010). A structuralist view of heritage also emerged, in which the experience of heritage rather than 'the thing itself' was central. The objects conceived as heritage were no longer seen as self-evident or inherently valuable. Rather, heritage was considered a process of engagement, communication and meaning-making in which all heritage is essentially intangible (Smith 2006, 1-7).

Recent theorising has focused more on human practices. Indeed, cultural remains may have meaning to people in the context of regular routines they practice outside, even if they don't value these remains explicitly or consciously as heritage themselves (Smith 2006; Braaksma 2017). In this view, heritage is seen as part of the lifeworld in which a rich collection of cultural remains from previous generations of people dwelling in that world have sedimented. Scholars involved have become more interested in the role of corporeal experiences and materiality in remembering and heritage production. The biographical approach to objects, places and landscapes over the longer term has been an important exponent of this current (e.g., Kolen 2005; Edensor 2022). These partly parallel academic tendencies have co-shaped changes in governmental policies and societal practices with respect to landscape heritage production and management (OCW 1999; Edensor 2022).

1.4 NEW PERSPECTIVES ON HUMAN-BOG ENTANGLEMENTS IN THE LOW COUNTRIES

The preceding two sections have shown, first, that bogs - as natural and cultural sponges - are landscapes with unique and special material properties. Second, the distinct materiality of bogs, and the opportunities and constraints this has provided to humans, have led to a special cultural history and layeredness from prehistoric times onwards. Third, this cultural history and its material manifestation in the landscape has been explored rather one-sidedly in the context of the historical Low Countries, as much previous work has focused on the prehistorical-archaeological context and on large-scale bog landscape transformations from the Middle Ages onward. I identified three underexposed aspects relating to bog *uses*, bog *meanings* and to the bog-related *legacy* that results from these. Here I address these underexposed aspects in more detail.

1.4.1 Bog uses: autonomous commons solely serving local needs?

The first aspect relates to bog *uses* and specifically to bog resource appropriation in situations where these peatlands were not (yet) privatised for commercial peat exploitation, or were not (yet) reclaimed into agricultural land. In these situations, bogs functioned as common lands (e.g., Collard and Bronowski 1993; Hoppenbrouwers 2018; Van Zalinge-Spooren 2018). Bog commons have mainly been treated in regional-historical, non-academic publications in which theoretical frameworks or references to academic debates are mostly lacking. Some older academic and archival publications include collections of bylaws and charters relating to bog commons (e.g., Krom and Sassen 1884; Hansotte 1973). These publications are aimed at making old texts accessible rather than providing contextualised discussions of their content. The few academic studies that focus on commons in raised bog regions do so primarily from a regional-monographic perspective. They centre on the analysis and evolution of bylaws and conflicts in relation to social changes in local communities, and so their research interest in raised bogs is at most indirect (Droesen 1927; Hoppenbrouwers 2018; Van Zalinge-Spooren 2018). This also has a practical cause, as most of the extant source material lends itself best to this end.

What these studies and non-academic regional-historical publications on bog commons do show, however, is how peat was a continuing source of conflict due to the scarcity of domestic fuel and people's unequal access to this resource. In places adjacent to bogs, many had the right to cut peat for subsistence. But in towns or villages without access to bog commons, this was not the case. The occurrence of peat commercialisation would

then be obvious, and evidence of it can be found especially in the regional-historical literature (Van Oudenhoven 1670, 15; Thomassin 1879, 430; Krebsbach 1926, 136–137; Wisimus 1936, 72; Moureaux 1974, 1221; Renes 1999, 193; Boeije and Philipsen 2001; 2002; De Ladoucette [1818] 2009, 92). Indeed, within Europe, the Low Countries are characterised by relatively early commercialisation of the rural economy (De Moor 2015, 54). While theoretically interesting because commoners usually explicitly forbade the selling of goods taken from commons, the topic of commercialisation of common-pool resources – also beyond the context of raised bogs - has received limited attention from an historical perspective. I will take a detailed look at two cases of peat commercialisation from early modern bog commons (Chapter 2). How significant was turf commercialisation? To what degree was it contested among commoners and other relevant actors such as government bodies? What was the impact of commercialisation on the common lands and the commons institutions in the long run?

1.4.2 Bog meanings: nature's material effects on human sense-of-place and agency

The second underexposed aspect relates to bog *meanings* to people in the past. The pending question here is how bog landscapes - through their spatial layout and material composition and how these are perceived by humans – have influenced human agency and place meanings. In this particular context, 'perceived' is meant in an environmental psychological rather than a cultural historical ('way of seeing') sense (cf. Wylie 2007; Ward Thompson 2018).

While previous research has paid much attention to the large-scale material changes in the bog landscape and their socio-economic contexts, little attention has so far been paid to how the distinctive materiality of the raised bog landscape itself has been culturally transmitted. The value of such research lies in its potential to provide insight into how consistent, underexposed and seemingly taken-for-granted meanings of raised bogs, such as that of boundary area between polities, have originated in relation to the perceived barrier effect of raised bogs. Furthermore, research into the long-term variation of place meanings can provide background and insight into contemporary meanings that bogs have for different groups of people.

This thesis operationalises this by addressing two themes related to bog landscapes in the historical Low Countries. The first concerns the observation that the majority of bogs in western and central Europe have a long history as territorial and/or cultural borderlands. This has often been noted in the popular and academic literature, but the background to this phenomenon seems mostly taken-for-granted or uncritically

attributed to the fact that bogs constitute 'natural barriers' (Gipp 1986, 308; Joosten 1991, 91; Collard and Bronowski 1993; Gerding 1995; Rotherham 2009; Strohwasser 2018; Jansen and Grootjans 2019). This theme will be central to Chapter 3.

The second theme concerns long-term variation in place meanings of bogs. The notion of place meaning denotes a broad concept that describes how people (individually or as a group) ascribe and preserve meaning to a place (Jacobs and Buijs 2011). Place meanings can have many dimensions, e.g. use of a place, its aesthetic value, emotional attachment to, and memories or knowledge of a place. The question of what spatiotemporal patterns in place meanings of bog landscapes occurred from prehistory to present will be central to Chapter 4.

1.4.3 Legacy of bog entanglements

The third underexposed aspect relates to the *legacy* resulting from past uses, place meanings, and representations of bogs. This legacy largely consists of tangible and intangible cultural remains. A number of issues and tensions relating to cultural remains in bog landscapes are of particular interest. The first issue is the disciplinary gap between nature and culture which exists both in academia and in other societal sectors. As Schepers et al. (2021) have argued, this divide causes problems in particular for the management of landscapes that are hard to categorise as either 'natural' or 'cultural' but represent an obvious blend of both. Raised bogs are a fitting example of such 'blended landscapes'.[2] Of importance here is Edensor's (2022, 19-20) observation that different actors and social groups experience and value landscapes in different ways in connection to their daily practices, professional work, but also their personal backgrounds as shaped by gender, class, age, and so on. This may lead to conflicts over landscape and heritage in heavily protected sites such as most north-west European bog remnants. These sites are primarily managed according to ecological and hydrological goals and guidelines harkening to the dominance of natural science-oriented understandings of what a living bog should be. At the same time local residents may feel particularly connected also to the stories, memories and tangible cultural remains connected to 'their' bog landscapes. Contestation looms in particular in the many cases of large-scale bog rewetting projects that have been started up over past decades. Large-scale bog restoration and rewetting projects may cause significant changes in the landscape and cause nuisance or generate a sense of loss among local residents. A relevant question,

2 Virtually no landscape in Europe or elsewhere in the world can be considered as purely natural or purely cultural; there is always a blend of the two. However, in this thesis I regularly refer to raised bogs as 'natural landscapes' to point out that bogs can develop and maintain themselves without human interference. At the same time, this thesis obviously stresses the long history of intricate human entanglements with bogs.

then, is what room and what role there may be for cultural remains in landscapes subject to transformation challenges, such as many bog areas. Cultural remains have an ongoing, unfolding relation with the landscape they are part of. This encompasses both the impacts of the landscape's materiality and agency on the cultural remains, but also on the way people experience these objects and places (Edensor 2022, 122, 128). Given this, how can cultural remains be integrated into the nature management of (former) raised bog landscapes in synergetic ways? This theme will be central to Chapter 5.

1.5 OBJECTIVE, RESEARCH QUESTIONS, AND RELEVANCE

The main purpose of my research is:

> to reach a detailed understanding of past human-bog relations and entanglements, and offer suggestions for the future management of raised bog areas and their cultural heritage as visible in the landscape.

These human-bog relations and entanglements encompass a large range of bog use forms, place meanings, representations, and cultural remains. In this thesis, I focus on a selection of prominent and underexposed examples elaborated in four central thematic chapters. The following specific research questions have been formulated for these chapters:

- Chapter 2: To what degree and how was peat commercialisation significant, contested and impactful on raised bog commons?
- Chapter 3: How did raised bog landscapes afford their development into borderlands?
- Chapter 4: What spatiotemporal patterns in place meanings of bog landscapes occur from prehistory to present?
- Chapter 5: How can bog-related cultural remains be integrated into the integral management of (former) raised bogs?

In order to explicitly address various relevant aspects for each of these questions and guide the structure of the narratives, these research questions are broken down into sub-questions as the chapters will show.

With the answers to the questions addressed in the four central chapters, considered together, I will answer the overall research question of this study:

> How have raised bog landscapes historically and through their materiality structured human use and place meanings and how can the resulting cultural remains best be integrated into the management of these (former) landscapes?

In order to answer these questions and reach the overall goal, I will adopt an interdisciplinary general approach rooted at the intersection of three disciplines: landscape history, environmental history, and cultural geography. The essence, adequacy and added value of this interdisciplinary approach will be elaborated upon in Section 1.7.

The originality of this study resides in two main aspects. First, it combines a (long-term) historical outlook with the use of concepts and theory drawn from the social sciences. While not unusual in the humanities at large, it is a new approach with respect to research on the cultural relations of bogs in the Low Countries. This approach will allow for new insights and explanations of the way humans, individual and in different social groups, have been entangled with bog landscapes and their materiality. Second, thematically this thesis goes off the beaten track of previous research into human-bog relations in the Low Countries by studying significant yet underexplored aspects relating to the history and actuality of human-bog relations in the Low Countries.

The knowledge that this research will yield is useful in addressing a number of current societal issues around bogs and beyond. First, looking at bogs from the perspective of historical commons subject to resource commercialisation will be relevant to present-day questions of responsible and durable use of depletable resources - also beyond the context of raised bogs. Second, climate adaptation and water management in general, and peatland regeneration in particular are increasingly complex social challenges. They often involve divergent and conflicting stances of local stakeholders (Bal 2019, 339; Jacobs and Buijs 2011, 1). A better understanding of the various place meanings that bogs (historically) have to different people, then, can be helpful in addressing these challenges. Third, much effort is going into bog restoration, but the cultural record is often overlooked as a key component of the importance and 'valuing' of these landscapes at present and for the future (Flood, Mahon, and McDonagh 2021; Gearey and Everett 2021). Consequently, there may be a lack of awareness in bog restoration projects of the fact that climate change and other environmental pressures may have negative effects not only on the long-term survival of bogs and their peat deposits, but also on the cultural remains present within and at the surface of these deposits. Fourth, and more in general, Huijbens (2021, 5, 9) has argued that in order to escape from the current economic race to the bottom that puts humanity in danger through its enormous environmental impact, we need 'a re-storying of our relations with planet Earth, calling for attentiveness to things we take for granted or even ignore'. That is, we need to (re)'develop earthly attachments in the Anthropocene'.

This requires new understandings of materiality. Taking a historical perspective is helpful here as it can contribute to better understanding our present and where we are heading. Bogs, then, are apt as model landscapes to gain new understandings of materiality, marginality and how to develop earthly attachments in times of dire need.

1.6 CONCEPTUAL FRAMEWORK

By looking in detail at human-bog entanglements, this thesis aims to bridge the gap between nature and culture. The distinction and the opposition between these concepts have a long history in Western thought (Wylie 2007, 144-147). In conjunction with this, the questions of the degree to which nature has impacted human societies and whether natural or cultural forces prevail in shaping landscapes have been longstanding issues in geography and in the environmental humanities and social sciences at large (Radkau 2008, 1-6; Ruuskanen and Väyrynen 2017, 464-465).

Various attempts have been made to bridge the gap between nature and culture. Some scholars have taken nature or landscape as an entirely cultural construct (e.g., Cosgrove and Daniels 1988, 1). Others have underlined the inextricable interwovenness of the two. An example of the latter is Merleau-Ponty's existential phenomenology (Merleau-Ponty [1945] 2013; Wylie 2007, 140), which has served as an inspiration for the conceptual framework presented here.

In these phenomenological approaches landscape (and thereby nature) is conceptualised as the active, embodied and dynamic relation between people and land, more generally between culture and nature. Landscape encompasses all relations between people and land, and these relations are ongoing and evolving rather than static. As summarised by cultural geographer John Wylie (2007, 143-144), these relations 'constitute an embedded and engaged being-in-the-world that comes before any thought of the world or of landscape as merely an external object. Body and environment fold into and co-construct each other through a series of practices and relations'. As such, landscape is no longer a cultural frame or a 'way of seeing'. Neither is it a physical surface or inert terrain. Rather, landscape becomes the ongoing practice and process of dwelling (Wylie 2007, 149, 162). The dwelling perspective has been central to much of the work of the anthropologist Tim Ingold (2000). It holds that the mind should be considered as embedded in the whole system of relations between organism and environment in which we as humans are necessarily engaged. The mind is thus not locked up in our individual body as opposed to an 'outside' natural world (Ingold 2000, 16).

Figure 1.3 visualises the conceptual idea central to this thesis. The starting point is that nature (in this case represented by raised bogs), is strongly intertwined with culture (including perceptions, practices, and place meanings). Here, I take 'perception' broadly, to include both the 'technical', environmental psychological sense (cf. Gibson 1979) and the cultural historical 'way of seeing' sense (cf. Wylie 2007; Ward Thompson 2018). The term 'entanglements' encompasses the various ways in which humans and bogs, i.e. culture and nature, are interwoven. These entanglements produce a legacy, which itself can be considered as yet another form of entanglement. This legacy partly consists of tangible cultural remains in or on the peat deposits or in former bog areas that have disappeared due to excavation or reclamation. But the legacy can also include stories, placenames, customs and traditions, and even regional identities linked to bog landscapes. The strong intertwining of nature and culture is also reflected in the recognition of the influences of raised bogs' materiality on human perceptions, place meanings and uses of the bog landscape. This aligns my research with the broader material turn of recent decades, where social science and humanities scholars have regained interest in nature's material influences on human society and culture (e.g., Whatmore 2002; Haraway 2003; Thrift 2007; Wylie 2007; Bennett 2010; LeCain 2017; Edensor 2022).

The entanglements between culture and nature are potentially subject to contestation. One example is contested bog use, as illustrated by early modern conflicts around commercialisation of peat taken from bog commons (Chapter 2). Another example is conflicting place meanings, which of course may be linked to contested use forms. For instance, to one group of people bogs may represent places of beauty, mystery, and/or biodiversity that deserve to be protected and preserved. To others, however, bogs may primarily symbolise places of hard labour, of traditional ways of resource extraction - places that should continue to be exploited (cf. Carroll 2022). Contestation may also apply to the legacy resulting from human-bog entanglements. For example, local residents may be concerned that cultural remains left by their forefathers who worked hard to extract resources from the bog will be damaged or erased by bog rewetting projects harkening to biodiversity or climate goals (Chapter 5).

Figure 1.3 is static, but can also be imagined as a film, a moving picture. Uses, meanings, perceptions, and the legacy these entanglements produce vary in time, as influenced by the changing materiality of nature as well as the changing socioeconomic and larger cultural contexts. Thus, from the distant past into the future, human-bog entanglements have been and are in a continuous state of becoming. To quote Wylie and Ingold: 'the landscape, both the milieu and the activity of dwelling, thus becomes ontologically saturated with temporality; the two are fused and indissoluble as a

phenomenological 'whole' – 'the process of becoming of the world as a whole" (Ingold 2000, 201; Wylie 2007, 161).

In this thesis, I consider bogs as cultural sponges. Like sponges, bogs are porous by nature. Figuratively speaking, through the pores of bogs many specific human-bog relations have been woven over time, and these have produced an entangled mesh of *naturecultures*, to use Haraway's (2003) term. As such, bogs throughout history have been charged with cultural remains left by these human-bog relations. These remains have over time become buried within the bogs' peat deposits, or have remained visible at the bog surface. Similarly, bogs have also soaked up place meanings, placenames and stories. In this thesis, I will squeeze out some of these cultural *spongescapes* to examine various aspects of man's past and present cultural entanglements with bogs. Complementing these overarching ideas, some of the four following chapters have their own specific theoretical framework, relating to the chapters' themes and research questions. These specific frameworks will be introduced in the respective chapters.

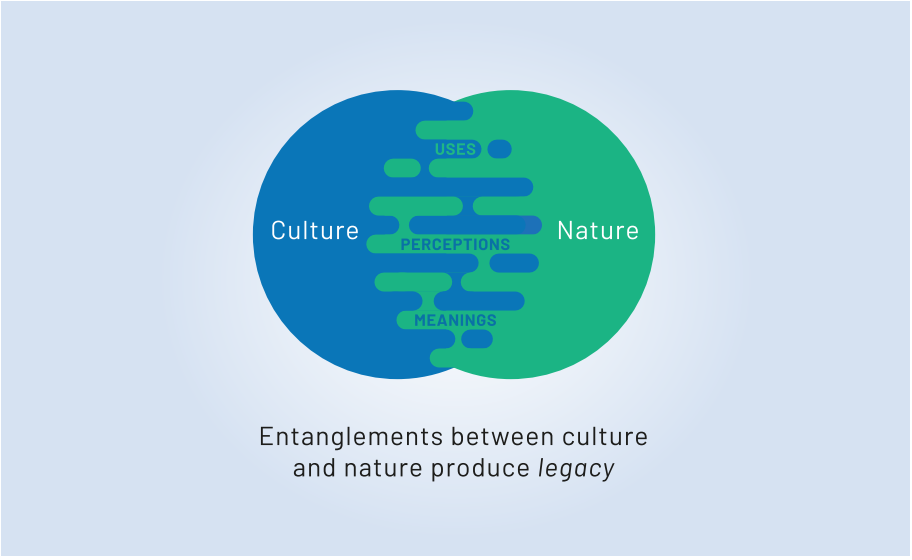

Figure 1.3. The conceptual idea central to this thesis assumes a strong interwovenness of culture and nature, as expressed by multiple entanglements informed by nature's materiality and producing cultural remains. The entanglements and resulting cultural remains are often contested among different human actor groups. Graphic design courtesy of Robert Jan van Oosten.

1.7 RESEARCH APPROACH

Based on the objective and the thematic research questions of this thesis, I have chosen an approach that partly uses a broad, long-term perspective (from prehistory to present), while elsewhere zooming in on shorter periods of early or late modernity. Because of the temporal and thematic ranges covered by the particular set of research questions, an interdisciplinary approach bridging landscape history, environmental history, and cultural geography has been applied. This approach allows to tap into the specific strengths of the individual disciplines it relates to. These can be characterised as follows:

- *Landscape history* concerns the history of the rural landscape, as determined from earth scientific, ecological and cultural evidence both material and immaterial (Stevenson 2015, 991). The specific potential of this discipline for the present research project lies in its familiarity with long-term perspectives and interdisciplinary methods.

- *Environmental history* is the study of the interactions between the physical environment and human societies in the past. This may include inquiry of the structure, distribution and characteristics of past natural environments (material dimension), the study of how humans have tried to regulate the relationship between society and nature as well as between social groups in matters concerning nature (political dimension), and/or the study of perceptions, thoughts, and representations of past environments (cultural dimension) (McNeill 2010, 347; Whyte 2013, 1). Potential strengths of environmental history that inform this study are a close attention to change, causation, contingency, and historical context (Isenberg 2014, 5).

- *Cultural geography* studies the relationship between culture, spaces and place (or landscape). It examines, for instance, cultural values, practices, discursive and material expressions and artefacts of people, and how places, place meanings and identities are produced (Castree, Kitchin, and Rogers 2013). A strong concern with or embedding in social theories is characteristic of much cultural geographical work. It is also an important way in which this discipline relates to the present thesis.

All three disciplines share affinity with the three cross-cutting perspectives (bog uses, bog meanings, and the resulting legacy) and main conceptual notions of this thesis (Sections 1.4 and 1.6). However, the four thematic chapters of this thesis have varying degrees of interdisciplinarity and use different sources and methodologies, depending

on the chapters' specific aims and research questions. All four central chapters are of a primarily empirical nature and based largely on case studies to allow for sufficient depth while ensuring the overall research remains practically manageable. The empirical evidence is mainly drawn from three large (former) bog regions across the Low Countries (Figure 1.4). These are from north to south: (1) the Bourtanger Moor region in the north-eastern Netherlands and bordering north-western Germany (former extent c. 160,000 ha), of which the Bargerveen (2,083 ha) is the main surviving bog remnant; (2) the Peel region in the south-eastern Netherlands (former extent c. 55,000 ha, present-day nature reserves 4,146 ha); (3) the Hautes-Fagnes bog region in eastern Belgium and extending into Germany (former peat extent c. 15,000 ha, present-day nature reserves c. 5,400 ha).

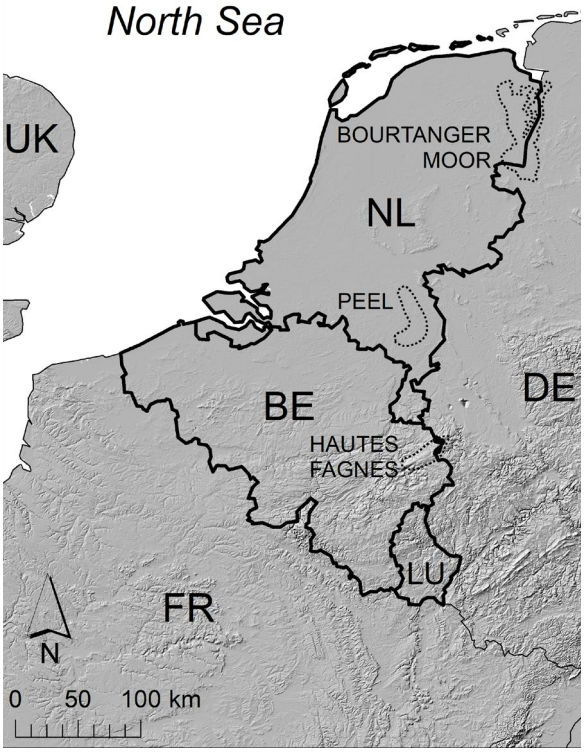

Figure 1.4. The Low Countries as the study area of this thesis. The location of the three (former) raised bog regions from which most case study materials for this thesis were drawn are indicated.

1.8 STRUCTURE OF THE THESIS

The structure of this thesis follows a thematic logic. Chapters 2 through 4 address the first part of the general research question of this thesis, namely how bogs have structured - historically and through their materiality – human uses and place meanings.

Chapter 2 discusses two early modern cases that illustrate bogs as contested common lands through the previously underexposed topic of peat commercialisation. The background and outcomes are discussed in relation to common-pool resource theory.

Chapter 3 then examines the supposed natural barrier working of large bogs in relation to these peatlands' historical function as borderlands. Empirical material drawn from three case study areas is analysed using Gibson's (1979) affordance theory as a lens to elucidate how nature's materiality and agency made large bogs into persistent borderlands. As such, Chapters 2 and 3 focus on two important historical functions ('use forms') of bogs to human society, being the provision of peat as a vital resource and the role of bogs as borderlands.

Next, Chapter 4 examines how different place meanings of bogs to people have developed from prehistory to the present. It starts from the tension between persistent popular negative stereotypes of raised bogs and these peatlands' obvious use value to humans. Archaeological and historical evidence are combined with current online survey data from Dutch bog areas, adding historical depth in an interdisciplinary way novel to place meaning research.

Chapter 5 then addresses the second part of the general research question, being how human uses and place meanings have been culturally engraved in bog landscapes and how the resulting cultural remains can be integrated into the management of (former) raised bog areas. The chapter starts from an analysis of tangible cultural remains at the surface of (former) bog areas in three Dutch case studies and works towards recommendations to better align the management of bog remnants with preservation and display of the potential heritage values they harbour.

The central empirical chapters of this thesis are co-authored. This is down to the generally interdisciplinary nature of this research project and a division of labour based on complementary (disciplinary) research expertise. In the Conclusion and discussion (Chapter 6), the research questions of this thesis will be answered and the outcomes and perspectives of this study discussed, bringing the results of the four central chapters together in the light of relevant academic and societal debates.

CHAPTER 2

Dire necessity or mere opportunity? Recurrent peat commercialisation from raised bog commons in the early modern Low Countries

Based on:
Paulissen, M., Van Beek, R., Nekrassoff, S., Huijbens, E.H., Spek, T. 2021. Dire necessity or mere opportunity? Recurrent peat commercialisation from raised bog commons in the early modern Low Countries, *International Journal of the Commons* 15(1), 100-118. https://doi.org/10.5334/ijc.1054.

ABSTRACT

Commercialisation of resources taken from commons is considered problematic in several ways in traditional commons scholarship. In particular common-pool resource (CPR) theory argues that institutions for collective action such as commons are largely autonomous, experiencing little influence from either the market or the state, and focusing only on the needs of entitled (local) communities. Consequently, commercialisation and sustainable collective use of common-pool resources are largely considered incompatible. Moreover, the dominant focus of CPR theory is on renewable resources rather than non-renewable resources such as peat. Although commons scholarship has broadened over the last decades and come to more nuanced views on the state-market-common trichotomy, our study adds historical depth and does pay attention to peat as a valuable non-renewable resource. We analyse historical sources on two cases of peat commercialisation from raised bog commons in the early modern Low Countries: the *Bakelse gemeint* in the Dutch Peel region, and the *commune de Xhoffraix* in the Belgian Hautes-Fagnes. In terms of volume, the share of commercialised peat in the total peat exploitation was limited; the significance of peat commercialisation lay in its permanence, recurrence, and/or regional outreach. Taxes and high debts placed communities in dire financial straits, which was one of the motives for peat commercialisation. In addition, state institutions could intervene in commons management if there was an (internal) conflict. Sources indicate that these institutions had a pragmatic attitude towards peat commercialisation, probably to foster social harmony and local prosperity in times of resource contestation and economic hardship. This study adds a novel intermediate category of peat exploitation to the traditional binary subdivision in domestic peat extraction from commons versus large-scale commercial exploitation of privatised bogs. We demonstrate that long-term use of common-pool resources could go together with a moderate degree of commercialisation. Rather than being fully autonomous, commons in the early modern Low Countries were – permanently or at times of internal conflict – clearly impacted by markets, notions of private user rights, and state institutions.

Keywords: commercialisation; commons; early modern period; institutions; marketisation; peatlands; the Netherlands; Belgium; common-pool resources

2.1 INTRODUCTION

Peat soils in general and raised bogs in particular covered a significant part of the common land area in north-western Europe until well into the nineteenth and twentieth centuries.[3] These wetlands contained a resource of potential economic value beyond the subsistence economy of local rural communities, namely peat fuel (Gerding 1995, 366; Rotherham 2009, 9). The harvesting and appropriation of this fuel through history is generally seen as a binary phenomenon, placing small-scale domestic sustenance extraction from commons opposite large-scale commercial peat exploitation from privatised bogs (Rotherham 2009, 22; Joosten 2019, 104-106). This chapter discusses a hitherto overlooked third way of peat exploitation: small-scale market-oriented peat extraction from common lands alongside domestic use of these grounds.

This topic adds a new perspective as commercialisation of resources taken from commons is generally considered problematic in traditional commons scholarship. In particular common-pool resource (CPR) theory argues that institutions for collective action such as commons are largely autonomous, experiencing little influence from either the market or the state, and generally focusing only on the needs of entitled (local) communities. Consequently, commercialisation and sustainable collective use of common-pool resources are largely considered incompatible. Moreover, CPR theory focuses on renewable resources rather than non-renewable goods such as peat (e.g. Ostrom 1990; Poteete, Janssen, and Ostrom 2010; Rodgers et al. 2011, 9; De Moor 2015).

Partly building on this traditional work, commons scholarship has over the last decades developed into a large and diversified research field (Quintana and Campbell 2019; Van Laerhoven, Schoon, and Villamayor-Tomas 2020). The trichotomy state-market-common (or community) is now seen by many as artificial, and various authors have discussed contemporary hybrid forms of natural resource management (Lemos and Agrawal 2006; Driessen et al. 2012; Villamayor-Tomas et al. 2019). A more nuanced view of the commons' autonomy and relations with the state and markets has thus emerged.

This chapter addresses two specific lacunae in understanding commercialisation of common-pool resources. First, the currently emerging nuanced picture is lacking historical resonance since most commons scholars study present-day cases using a socio-economic lens (Van Laerhoven, Schoon, and Villamayor-Tomas 2020).

3 For English-language overviews on raised bogs in north-western Europe and the Low Countries in particular, their past uses and transformations, present states and future challenges, we refer to Frankard et al. (1998); Van Beek, Maas, and Van den Berg (2015); and Joosten, Tanneberger, and Moen (2017).

This chapter will delve into the specific history of practices of commercialisation, examining how different actors and institutions responded to it in the past and what can be learned from this for present-day situations of common-pool resource commercialisation. Second, commons scholarship to date mainly focuses on 'the big five', a select group of preferred topics: fisheries, forests, irrigation, pastureland, and water (Van Laerhoven, Schoon, and Villamayor-Tomas 2020). In comparison, raised bog commons and their peat (fuel) resources have been markedly understudied. This contrasts starkly with the historical predominance and economic importance of these wetlands in north-western Europe.

Against the background of renewed societal interest in commons in the wake of the global financial crisis (De Moor 2015, xiii; Bregman 2020, 309-15), this chapter will analyse historical sources concerning two local cases of peat commercialisation from different raised bog regions in the Low Countries. The available peat commercialisation data caused us to put the emphasis on the first half of the seventeenth century in one case and on the second half of the eighteenth century in the other. However, in both cases we also zoom out to the wider (early) modern period. The spatiotemporal setting of our study is particularly apt for two reasons. Firstly, a commercial economy strongly developed in this part of Europe since the late Middle Ages (Hoyle 2010, 362–6; De Moor 2015, 54). Secondly, bog commons were relatively abundant in the early modern Low Countries.[4]

To operationalise our research, we formulate the following research questions:

1. What was the property and use rights situation of the studied bogs?
2. To what degree and in which ways was commercialisation of peat taken from the commons significant?
3. Which were the motives for and attitudes towards peat commercialisation of the main actors involved?
4. What was the long-term impact of commercialisation on the studied peat resources and common-pool institutions?

4 Although many bogs covered vast areas they functioned as commons rather than open access resources at least since late medieval times (Gerding 1995; Leenders 2013; Van Zalinge-Spooren 2018). This was because the use of large bogs was invariably shared by several surrounding communities. Even if there was enough peat for everyone initially, bogs also supplied other resources. Where possible, they were used as pastureland (e.g. Schumacker and Streel 1994, 12; Gerding 1995, 16). As the latter use form was per definition of a very extensive nature, this easily led to conflict over boundaries of individual communities' shares of the bog. Such conflicts were numerous in late medieval and early modern times and have undoubtedly promoted early regulation of bog use (cf. Van Zalinge-Spooren 2018).

2.2 BACKGROUND: HISTORICAL RESEARCH ON THE COMMONS-STATE-MARKET INTERSECTION

Traditional commons scholarship, and notably common-pool resource (CPR) theory, provides arguments for why local communities developed self-governance of collective resources, why commons were meant to exclusively serve the needs of entitled users, and why commercialisation of goods from commons was forbidden. In late medieval and early modern Europe, resource management solutions offered by markets or governments were either not available or emergent, and therefore not sufficiently reliable. Consequently, and according to CPR theory, appropriators formed autonomous self-help groups for resource governance (De Moor 2015, 3, 12, 38). Rural commons in CPR theory are considered to exclusively serve the needs of entitled - mostly local - people, because commons are understood as of vital importance to their farming systems and functioning as an insurance for the poor (Svensson and Gardiner 2009, 22; De Moor 2015, 59; Grüne, Hübner, and Siegl 2015, 277). Commercialisation of goods taken from commons was therefore strictly banned to protect valuable and depletable resources, and ensure sustainable management (Van Zanden 1999, 131; De Moor 2015, 54, 59, 93; De Keyzer 2018, 1, 4). Accordingly, CPR theory sustains the view that commons were very autonomous, without much interference of the state or the market; that commercialisation and sustainable collective use of common-pool resources were largely incompatible; and that common lands were primarily of local economic importance.

Historians and non-historians alike have convincingly argued that by focusing strongly on common-pool institutions, CPR theory neglects the role of historical, political, economic, ecological, and other contexts in the development of successful common resource management systems (McCay 2002, 361; Rodgers et al. 2011, 199; Grüne, Hübner, and Siegl 2015, 291-292; De Keyzer 2018, 45; Quintana and Campbell 2019, 1114-1115). Consequently, more attention needs to be paid to how rural commons in the past were used in everyday practice, and how they linked with markets and governments on a supralocal scale.

As to the political-economical context of common-pool institutions and concerning the degree of (approving) lordly or state influence on commons regulations, there was considerable regional variation across Europe. Often, such influence went beyond the merely supportive attitude of external governmental authorities towards commons underlined by, e.g., Ostrom (1990, 90) and De Moor (2015, 38). In many regions, territorial lords had a decisive and sometimes coercive impact on the institutional organisation of commons and the way resources could be used (Grüne, Hübner, and

Siegl 2015, 277), because they claimed the property right of non-reclaimed land. Also, extreme taxation during war periods could force commons to sell their resources (Van Zanden 1999, 133-4, 136).

By contrast, commercial relations of commons have received less attention in historical studies (Hoyle 2010; Brakensiek 2015, 62). While stressing the prohibition to commercialise goods taken from commons, De Moor (2015, 93) also warns that 'common land may not be regarded as functioning outside the market system'. Examples of the latter are provided by Hoppenbrouwers (2002, 90-1) and De Keyzer (2018, 21, 74-7). The latter author found that modest commercial sheep breeding did not jeopardise the success of common resources and institutions in a sandy region of the Low Countries. But other resources in the common lands she studied apparently 'offered fewer commercial opportunities than grazing' (De Keyzer 2018, 40). These outcomes raise the question to what degree, under which conditions, and in which form commons and markets could become interlinked. The literature presents a range of potential interactions. While Van Zanden's example indicates motives of financial need, De Keyzer's work suggests that commercialisation of goods from commons could be a lasting and everyday phenomenon. In that case, it may fit in with the notion of a 'commercial survival economy' as coined by Thoen (2001). Others even stated that commoners took any opportunity to produce goods for the market (Grüne, Hübner, and Siegl 2015, 276). In brief, current understanding of conditions and drivers for the commercial exploitation of goods from historical commons is deficient, as it lacks comprehension of motives and attitudes of individuals and common-pool institutions involved in relation to the wider economic and institutional settings.

2.3 CASE STUDY AREAS

The methodology for selecting the two case studies and the associated sources is described in detail in Appendix 2.1. The selected local cases (Figure 2.1) are the *Bakelse gemeint* (located in the Peel in the present-day Netherlands) and the *commune de Xhoffraix* (in the Hautes-Fagnes, in present-day Belgium).[5] Their geographical and historical contexts are described in this section.

5 The terms '*gemeint*' and '*commune*' both designate common lands.

2.3.1 Bakelse gemeint

The *Bakelse gemeint* comprised a lowland bog and heathland common in the Peel region (south-eastern Netherlands; Figure 2.1a, b). The Peel commons supplied various resources to the agricultural subsistence economy of neighbouring communities. On these lands sheep and cattle were grazed, beehives were placed, sods for manure production and building materials were gathered, and fuel was collected (Renes 1999, 182, 184; Van Zalinge-Spooren 2018, 133). Peat cutting in the Peel region is documented from the fifteenth century onwards (Renes 1999, 193). Its growing importance was related to strongly declining local wood supplies due to demographic pressure since the high Middle Ages (Joosten 1989, 331; Vera 2011, 429).

Historically, the *Bakelse gemeint* was at the north-eastern limit of the duchy of Brabant. In the early seventeenth century, the temporal focus of our case study, three communities were using the common at equal rights. These were the village communities of Bakel and of Aarle-Rixtel (including Beek and Donk), and the town of Helmond (Van Zalinge-Spooren 2018). In 1648, the States-General succeeded the duke of Brabant as the sovereign, and the case study area became part of a Generality Land of the Dutch Republic.

The main study period (1608-1620) saw economic and demographic recovery amidst a longer period of war and turbulence in the Peel region (Adriaenssen 2008, 276). The 1651 house count, the closest available to our main study period, numbered 238 houses for the community of Bakel (Dussart 1947, 72-73). Around 1700, the wider Peelland region had a population density of 34 inhabitants per km^2 (Van Xanten and Van der Woude 1965, 25, 42).

2.3.2 Commune de Xhoffraix

The *commune de Xhoffraix* is in the Belgian Hautes-Fagnes, an upland area on the north-eastern fringe of the Ardennes massif (Figure 2.1a, c). There were prominent stretches of naturally wooded dryland separating the non-wooded bogs in the Hautes-Fagnes. The late medieval and early modern period witnessed strong deforestation, driven by charcoal production for the regional iron industry, by other developing industries, and by extensive land use forms (like those in the Peel region). As a result, both drylands and wooded wetlands became more open. By the 1770s, non-wooded common lands were dominant in terms of surface area (Robert 1963; Schumacker and Streel 1994, 12, 16-19). Although these are generically named *fagne* (literally 'peatland'), not all were peatlands. Peat cutting in the Hautes-Fagnes is documented from the late sixteenth

century onwards (Abbaye de Stavelot-Malmedy 1583a, b), but may have started locally over 200 years earlier (Hindryckx and Streel 2000). As in the Peel, its importance grew as wood became scarcer. Although coal mining had existed around Liège and Aachen (some 30-40 km away) since the Middle Ages, coal was only introduced in the Hautes-Fagnes as a fuel on a larger scale around 1880 (Hoyois 1953, 558).

Historically, the south-western Hautes-Fagnes (including the *commune de Xhoffraix*) were part of the ecclesiastical princedom of Stavelot-Malmedy. The *commune de Xhoffraix* was used collectively by nearby communities (Figure 2.1c). In 1780, the villages of Xhoffraix, Mont, and Longfaye were listed as such (Polain 1864, 354), while the common was also used by the village of Bévercé. Although a 1583 princely ordinance even allowed Malmedy townsmen to cut peat on this common (Abbaye de Stavelot-Malmedy 1583b), it seems unlikely that they routinely did so during our study period.[6] Around 1777, the four villages using the common counted 156 houses (cf. Ferraris and Bracke 2009), with an average population density in the study area of around 25 inhabitants per km^2.[7] Between 1750 and 1800, the region's population increased by c. 25 per cent (Hansotte 1987, 360, 374). Although the study period (1754-1793) was a time of relative peace, passing armies and billeted troops intermittently placed a heavy burden on the local population (Nekrassoff 2017, 21-22) and the economic situation gradually worsened due to demographic growth and periods of bad harvests (Butil et al. 1992, 52).

6 A 1780 ordinance (Polain 1864, 354-5) suggests that peat was mainly cut by the villagers mentioned, while Lacaille (1772-1802) indicates regular peat sales to Malmedy citizens from surrounding villages around 1788.

7 Estimated by multiplying the number of houses on the Ferraris map by 5 (average number of residents per house as assumed by Hansotte 1973, 27). The number of houses per village around 1750 presented by Hansotte (1973) are significantly lower and considered less reliable than those based on the Ferraris map.

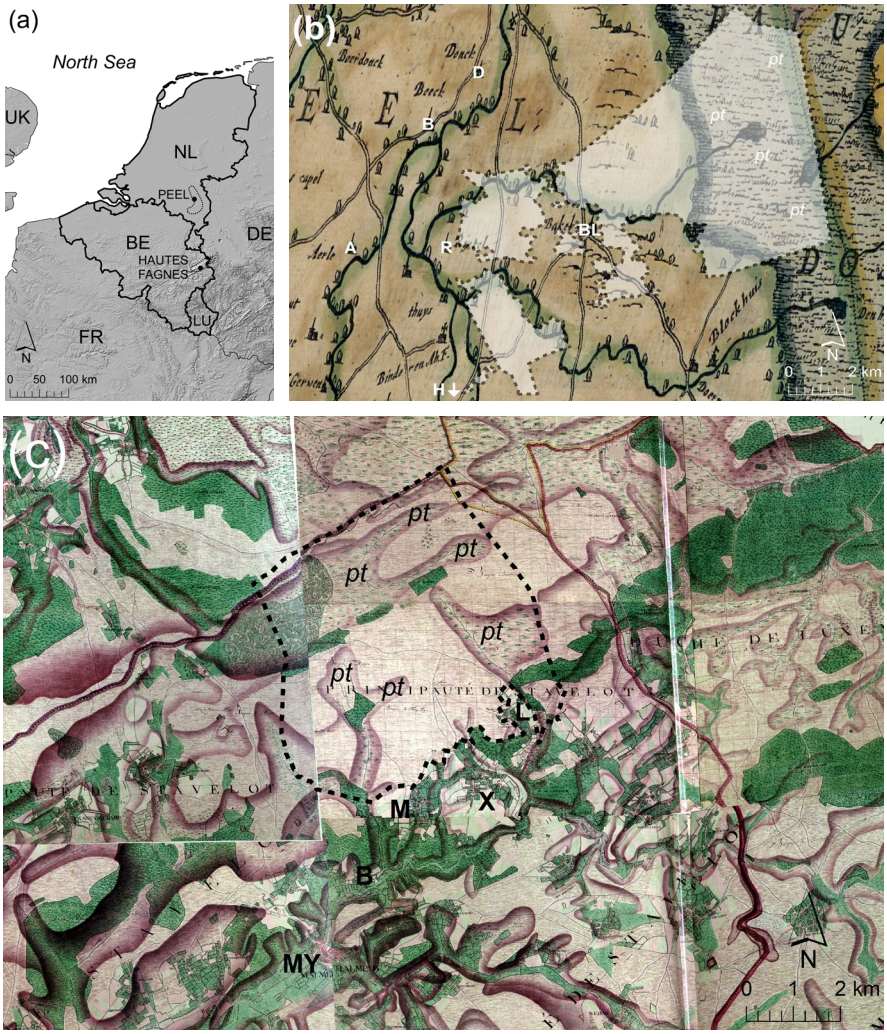

Figure 2.1. (a) Location of the Peel and Hautes-Fagnes bog regions (dashed lines) within the Low Countries, and of the two local case study areas within the bog regions; (b) *Bakelse gemeint* (transparent white area) projected on a map by Hondius (1639). Entitled communities: BL = Bakel; A = Aarle; R = Rixtel; B = Beek; D = Donk; H = Helmond; (c) The *commune de Xhoffraix* on the Ferraris map (1777). Entitled village communities: X = Xhoffraix; M = Mont; L = Longfaye; B = Bévercé. MY indicates the town of Malmedy. In (b) and (c), dashed lines indicate the limits of the studied commons; *pt* indicates peatlands. The image of the Ferraris map is not based on the official digital version of the Royal Library of Belgium (KBR), but has been reproduced from Ferraris and Bracke (2009). As the copyright holder of the atlas and the maps therein, KBR has kindly permitted use of this image.

2.4 RESULTS

2.4.1 Property and use rights of the bog commons

Both study areas and periods exhibited similar property and use rights situations. In both cases formal property was claimed by the respective territorial lords (Hansotte 1987, 361-2; Van Zalinge-Spooren 2018, 44, 48). In 1326, the duke of Brabant formally granted the right to collectively use the *Bakelse gemeint* common to several nearby communities. These were Bakel on the one hand, and a collective of the communities of Aarle, Rixtel and Beek on the other. That same year, the community of Helmond bought in without the duke's involvement (Van Zalinge-Spooren 2018, 228, 255). Similarly, the prince-abbot of Stavelot-Malmedy had granted common land-use rights to local communities in his territory as well. In both cases, the entitled user communities had to pay a yearly remuneration and/or rend services to the lord (Abbaye de Stavelot-Malmedy 1736-1766; Hansotte 1987, 361-2; Krom and Sassen 1884, 15-17).

Of particular interest to both studied commons were the parcellations that existed to allot the common lands to user communities or even individual users. These reflect user rather than property rights and can be grouped into parcels at community level and at personal or family level. An example of the former was found in the *Bakelse gemeint*, where the entitled communities each had their own part of common land including peat deposits (Van Zalinge-Spooren 2018, 136-7). There were many examples of parcels on personal or family level in the wider regions studied as well, such as the heathlands in the Principality of Stavelot-Malmedy (Hansotte 1987, 362, 365). The early modern Peel bogs, and probably also the pre-1800 *commune de Xhoffraix*, had parcels for sustenance peat cutting on family level (Van Zalinge-Spooren 2018, 120).[8] These examples illustrate that notions of private user rights influenced common-pool resource management.

Another similarity was that the communities of both cases were largely autonomous in the management of their commons (Hansotte 1987, 375; Van Zalinge-Spooren 2018, 48). For example, the territorial lords could not freely sell common land or commercialise its use and had to respect the commoners' rights (Hansotte 1987, 362; Vera 2011, 185). Moreover, in the *Bakelse gemeint* the entitled communities jointly appointed representatives (named *peelmeesters*) who regulated and supervised the use of the common. Each community could appropriate a certain amount of goods,

8 Cadastral maps of c. 1830 show that the bogs in the *commune de Xhoffraix* were divided into small parcels (Cadastre prussien 1828-1830).

including peat. The separate communities decided themselves how these products were distributed amongst their members. But there was more: the 1326 charter gave the communities using the *Bakelse gemeint* the right to, among others, exclude foreigners and sell common land (Van Zalinge-Spooren 2018, 28-9, 248).

2.4.2 Significance of peat commercialisation

Such rights to sell common land were usual for communities in the Peel region. But as it meant killing the goose that laid the golden eggs, communities were very reluctant to do so and only did it out of dire financial need (Van Zalinge-Spooren 2018, 254-255). Another way to generate income was preferred, namely to sell marketable goods from their common, such as peat. Yet, peat commercialisation was formally prohibited by consecutive versions of the *Bakelse gemeint* bylaws (Gemeentebestuur Deurne 1499; Gemeentebestuur Helmond 1571-1627, 1649; Appendix 2.2). Other commons in the Peel region had similar restrictive regulations to limit peat commerce (Van Zalinge-Spooren 2018, 113-4). Nonetheless, peat commercialisation by villagers of Bakel occurred regularly from around 1600. In 1608, the community of Bakel was taken to the Council of Brabant (the duchy's highest court) by the other entitled communities over commercialisation of turves from the *Bakelse gemeint*. In its 1611 interim and 1620 final judgments, the Council allowed Bakel to sell peat to outsiders, but ordered them to provide the other entitled communities with overviews of peat sold (Boeije and Philipsen 2002). Figure 2.2 shows the volumes of commercialised peat as recorded in the accounts for the period 1613-1619.

The quantities of sold peat were expressed in different units. We assume that 'carts', 'loads' and 'waggons' – the terms encountered in the sources – indicated similar dimensions. Thus, the total number of recorded peat loads sold annually ranged from one in 1616 to just over 200 loads in 1618 (Figure 2.2). According to these records, just under 400 loads of peat were sold from Bakel over these seven years, with a median annual amount of 40 loads.

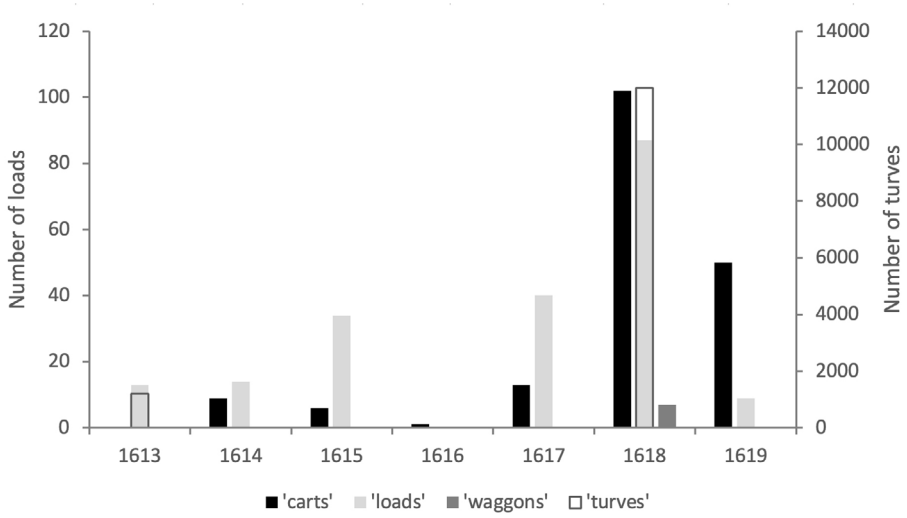

Figure 2.2. Quantities of peat sold from Bakel as recorded by subsequent village clerks (1613-1619). The right-hand y-axis displays quantities expressed in turves, while the quantities expressed in the remaining units are depicted on the left-hand y-axis. This explains why bars representing different units overlap for 1613 and 1618. Source: Gemeentebestuur Helmond (1613-1619).

The significance of this peat commercialisation can be assessed in different ways. One is to estimate the volume ratio of commercialised to privately used peat within the same entitled user community. Data on historical domestic peat consumption in the study areas and the Low Countries in general are very scarce (cf. Gerding 1995, 312-3). Two sources (Fontaine 2006; Rotherham 2009), partly outside the spatiotemporal scope of the case studies, held data on household peat consumption and vehicle load capacity (Figure 2.3).[9] Based on these, a median annual peat consumption of 7.1 vehicle loads per household could be established.[10] Multiplying the number of houses in the study areas in the time periods under study by 7.1, the total number of vehicle loads of peat privately consumed annually by all households of the entitled community can be obtained. In the case of Bakel, a median volume ratio of commercialised to privately used peat of 1:42 was thus found (Figure 2.3).

9 Both sources refer to the period before houses were well insulated. Rotherham (2009) provides data for East Anglia. Since this region is climatically comparable to the Peel region, we assume similar annual peat consumption rates. For the colder Hautes-Fagnes region we rely on Fontaine (2006).

10 This fits in with the range of 1-16 vehicle loads of turves that local households took away from bogs in the southern Belgian Ardennes in 1819 (Watelet 1982, 212).

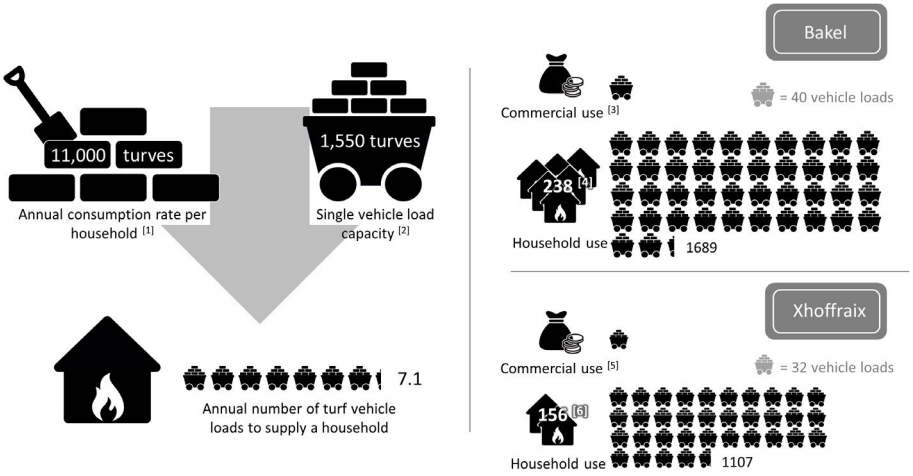

Figure 2.3. Calculation steps to estimate the volume ratios of commercialised to privately used peat from the studied bog commons. All numbers are medians, except the number of houses per community. Sources: [1] Fontaine (2006, 12); Rotherham (2009, 22); [2] Fontaine (2006, 24); Rotherham (2009, 32); [3] this study; [4] Dussart (1947, 72-73); [5] this study; [6] Ferraris and Bracke (2009) (number of houses only of the villages entitled to use the *commune de Xhoffraix*).

A second determinant of the significance of peat commercialisation from commons is its geographical outreach. In the wider regions of the case studies, distances between neighbouring villages and towns were typically 5-7 km. Most places had their own common serving the local community's needs. Many of these commons also provided peat fuel, but the largest quantities of peat were found in the commons situated within the Peel and Hautes-Fagnes bog landscapes (Schumacker and Streel 1994; Van Zalinge-Spooren 2018). Between 1613 and 1619, turves sold from Bakel were carried overland to towns and villages up to 35 km away. Sources from 1649 and 1705 also refer to turf shipping to (breweries in) the city of 's-Hertogenbosch – some 40 km from Bakel – over the small river Aa (Figure 2.4). These turves were carried overland to a place 10 km from Bakel and then transferred to boats (Resoluties Raad van State 1649; Schepenbank Bakel en Milheeze 1705). These distances and transport means are indicative of a multi-party commercialised trading scheme for peat. This further underlines the active market that existed at the time, making the peat a relevant resource far beyond local economic significance.

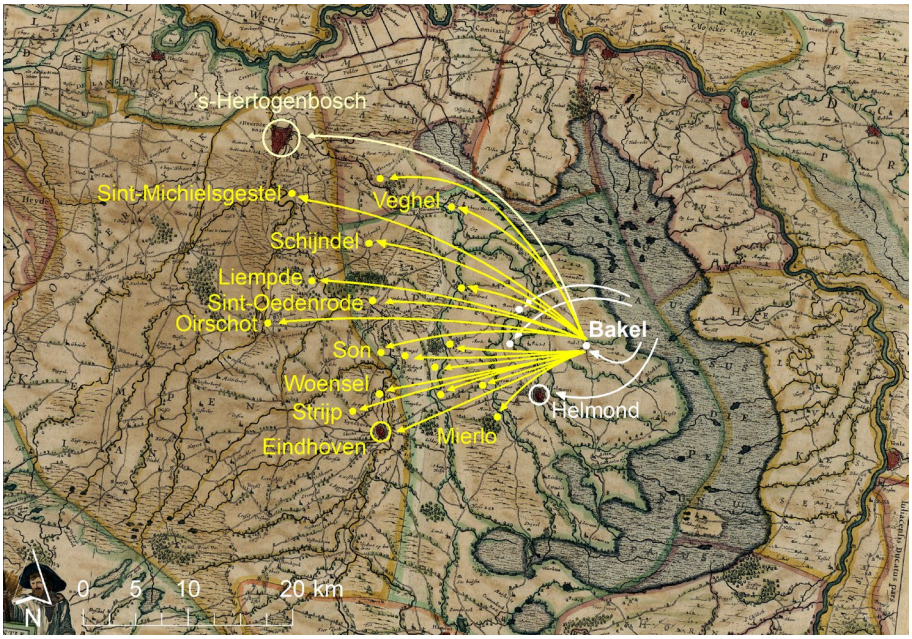

Figure 2.4. Destinations of peat taken from the *Bakelse gemeint*, plotted on a map by Hondius (1639) which clearly depicts the Peel bog region (in blue). White arrows indicate peat flows to communities entitled to use the common. Yellow arrows indicate the 1613-1619 regional exports, while the light-yellow arrow indicates exports to the city of 's-Hertogenbosch as attested in 1649 and 1705.

A third determinant of the significance of peat commerce from commons is its permanence or recurrence over time. Peat commercialisation from Bakel was certainly not limited to the period 1613-1619 covered by Figure 2.2. Sources from the period 1649-1841 also refer to regional overland hawking and trading of turves by inhabitants of Bakel as a substantial activity (Resoluties Raad van State 1649; Schepenbank Bakel en Milheeze 1705; Resoluties Raad van State 1727; De la Court 1841). The *commune de Xhoffraix* showed 40 years of uninterrupted peat commercialisation. Turves were sold to the abbatial paper mill in Malmedy and brought there using carts. Figure 2.5 gives an overview of peat bought by the mill. The annual number of cart loads of turves ranged from 9 to 53 with a median of 32.[11] Although the source did not explicitly state

11 We attribute the low peat supply in the 1754-56 period to the difficult start-up of the paper mill after it was founded in 1750 (Kaefer 1971, 16).

the peat provenance, it is highly likely that it was extracted in the nearby *commune de Xhoffraix*.[12] Based on the same key figures and assumptions as for the *Bakelse gemeint*, the median volume ratio of commercialised to privately used peat is 1:35 for the *commune de Xhoffraix* (Figure 2.3). This ratio may have been greater considering that turves were also (allowed to be) sold to inhabitants of Malmedy (Lacaille 1772-1802; Polain 1864, 354).

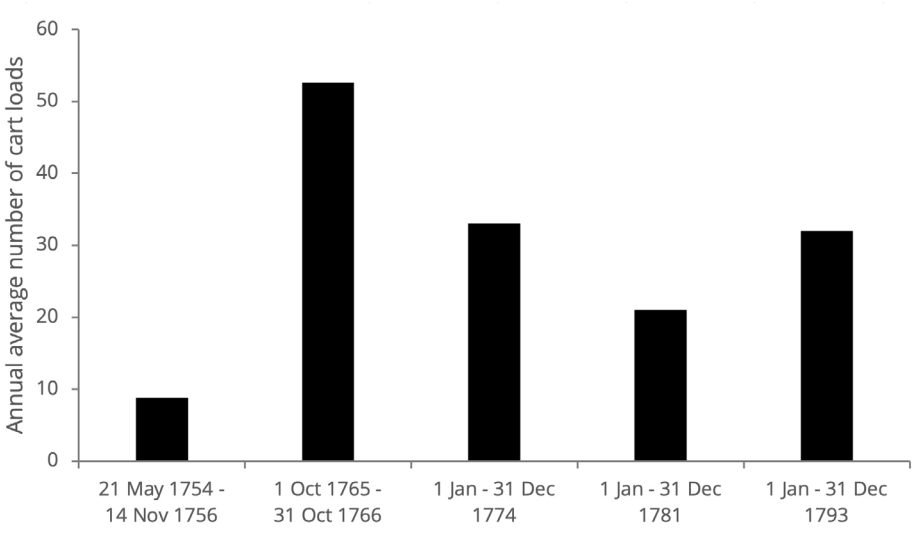

Figure 2.5. Overview of peat bought by the Malmedy abbatial paper factory during five sample periods (Abbaye de Stavelot-Malmedy 1754-1793).

Although our study focuses on two local cases, a fourth determinant of the significance of peat commercialisation from commons is its regional incidence. Turf commerce from bog commons also occurred in other localities in the Peel and Hautes-Fagnes. A

12 Almost everyone involved in transporting the peat to the factory came from the villages entitled to use these bog commons (Figure 2.1c). Froment (1968, 32) states that the bog Fraineu, which is in the *commune de Xhoffraix*, had been 'intensively exploited' to provide fuel for the Malmedy paper mill (he refers to the successor of the abbatial mill, early nineteenth century). We assume that in our period of study, peat for the abbatial paper mill could have been extracted in any bog of the *commune de Xhoffraix* (personal observations of the first and third author during a field visit of the Fraineu bog remnants and personal communication with Philippe Frankard MSc and Pascal Ghiette MSc of the Service Public de Wallonie, 3 December 2019).

seventeenth-century description of the Bailiwick of 's-Hertogenbosch states that the inhabitants of (non-specified) villages bordering the Peel bogs had peat in abundance for private use and sold turves to other communities where fuel was scarce. The peat was transported by carts and it was claimed that the traders made good profits (Van Oudenhoven 1670, 15). Other sources indicate that besides Bakel, the nearby Bailiwick villages of Asten, Deurne, and Someren were also involved in peat commerce (Leen- en Tolkamer 1726; Resoluties Raad van State 1727). These communities directly bordered extensive bog commons and were entitled to their use. On the eastern side of the Peel, the administration of the Austrian Netherlands conducted a survey of industrial and commercial activities in its territories in 1764. For the district of Meijel, the inventory mentions that the only produce consisted of rye, buckwheat and peat. The report stated that the grain yields of that village were insufficient to feed its population. The inhabitants sold peat in the nearby cities of Roermond and Venlo and in bordering (foreign) territories. The profits were used to buy additional grain for their own consumption. The inventory was concluded by stating that peat represented the whole commerce of the inhabitants of Meijel, and that they did not pay any import duties to foreign territories for their turves (Moureaux 1974, 1221).

Most references for the Hautes-Fagnes relate to late modern peat commercialisation. Thomassin (1879, 430) and De Ladoucette ([1818] 2009, 92) referred to peat use by the region's early industries. According to Froment (1968, 32), two peat bogs were 'intensively' exploited for industrial needs of the nearby towns of Malmedy and Monschau.[13] It is difficult to quantify peat commercialisation based on these sources. In the later nineteenth century, people from the wider region annually came to the Hautes-Fagnes with hundreds of carts to buy turves. Around 1926, villagers of Weywertz cut peat primarily for private household use (Krebsbach 1926, 136-7). Villagers of Solwaster sold peat to farriers in the neighbouring town of Spa, who used this fuel to mount iron tyres to cartwheels (Wisimus 1936, 72). It can be deduced from Krebsbach (1926) that villagers in the region used to sell at least four carts of the amount of peat they cut annually.

2.4.3 Peat commercialisation: actor motives and attitudes

In the 1608-1620 lawsuit the people of Bakel claimed that peat was sold out of dire financial need and that selling turves at a high price was the only way to pay their taxes and war-related debts. Villagers sold peat to outsiders because they paid more for the

13 Besides the aforementioned Fraineu bog, Froment (1968, 32) refers to the Brackvenn bog that supposedly supplied peat to Monschau factories. The latter is confirmed by Barkhausen (1925, 14) who specifically refers to the Monschau cloth industry.

turves than people from the entitled communities in the *Bakelse gemeint*. Bakel also pointed out that each entitled community had its own delimited part of the common, which meant that the village did not divest the others by commercialising its peat (Boeije and Philipsen 2002). The stance of the other entitled communities, opposed to Bakel's peat trade, was supported by the bylaws which prohibited selling turves to outsiders (Gemeentebestuur Helmond 1571-1627). Bakel did not deny these bylaw rules, but contested their validity as long as the Council of Brabant had not declared these regulations as binding. This was a clever move, since the Council had already allowed Bakel to sell peat to outsiders in an interim judgment (1611), if they provided the other entitled communities with accounts of the sold turves as illustrated in Figure 2.2. The final judgment (1620) confirmed this, thus actually overruling the bylaws (Boeije and Philipsen 2002). Bakel used the motive of dire need again in 1649. During that year's dry summer, they claimed to have cut additional peat, expecting to sell this to 's-Hertogenbosch breweries (Resoluties Raad van State 1649). Later sources present peat commercialisation from Bakel primarily as a long-standing tradition (Schepenbank Bakel en Milheeze 1705; Leen- en Tolkamer 1726; Resoluties Raad van State 1727).

In the Hautes-Fagnes case, a 1583 princely ordinance on the *commune de Xhoffraix* allowed the entitled villagers to sell peat to Malmedy, but not to foreigners or other outsiders. As part of a judgment following a dispute between the villagers entitled to use the common on one side and the townsmen of Malmedy on the other, the document makes explicit that the state strived for social harmony among both parties:

> Que [Son Altesse] pour entretenir paix et bonne voisinnance entre ses subiectz par son haultain officier chastierat arbitrairement ceulx quy contre la teneur de ceste sentence et ordonnance […]. ('That [His Highness], in order to maintain peace and good neighbourliness between his subjects, will - through his high officer – as an arbitrator persecute those that [act] against the content of this judgment and ordinance […].'; Abbaye de Stavelot-Malmedy 1583b)

Two centuries later, a princely ordinance from 1780 concerning the same common again allowed the entitled villagers to sell peat to Malmedy, while forbidding peat extraction by and peat sales to non-entitled outsiders (Polain 1864, 354). We found no direct evidence regarding these villagers' thoughts about peat sales to the abbatial paper mill. The factory's regular peat procurement spanned four decades (Figure 2.5). If there was any opposition against peat commercialisation among entitled bog users, the preceding proves it was not decisively effective nor enforced in any way. The long persistence of this peat commercialisation makes it unlikely that dire need was the sole motive.

2.4.4 Long-term impacts of peat commercialisation on the commons

Figure 2.6 summarises and extends the preceding account through a timeline of key events and developments in the long-term history of the two case studies until present. Although the main temporal focus has been on the early modern period, this section specifically analyses what happened in the late modern period (i.e. after 1800) to assess the long-term impact of turf commercialisation on both the peat reserves and the common-pool institutions of our case studies.

The long-term effect of peat commercialisation on the non-renewable resource itself obviously was adverse in both studied cases but limited compared to the impact of peat extraction for private household needs (Figure 2.3). In the French period, c. 1794-1815, the ownership of the common lands was assigned to the newly established local governments (municipalities). In cases where several communities had jointly used common lands, as in the *Bakelse gemeint*, their respective municipalities became joint owners. This situation complicated decision-making concerning the *Bakelse gemeint* and – apart from municipal pine afforestation starting around 1840 – not much changed until the second half of the nineteenth century. The common lands continued to be seen as indispensable for local agriculture, and the technical means, knowledge and capital to reclaim the harsh bogs and heathlands was insufficient. Peat was cut and sold on a significant scale from the *Bakelse gemeint* until the 1860s (Thissen 1993, 32-3, 40, 47). Ultimately, the remaining common-pool resources of peat in the *Bakelse gemeint* were destroyed by large-scale reclamations for forestry and agriculture in the decades after 1880 (Thissen 1993, 47). These reclamations were driven by several factors. First, the advent of artificial fertilisers further decreased the importance of the common lands for local agriculture, while technically improving the potential for reclamation (Thissen 1993, 87). Second, after decades of preparation, the four municipalities jointly owning the *Bakelse gemeint* had finally divided their common property in 1864 and mostly sold the land to private owners shortly afterwards (Thissen 1993, 50-1). A similar pattern was observed in the Hautes-Fagnes. Here, reclamations mainly served spruce afforestation, causing tensions between municipalities (representing local commoners) and forest administration officials throughout the nineteenth century (Dries 2017, 156-157). In contrast to the bogs of the *Bakelse gemeint*, the cutover bogs of the *commune de Xhoffraix* have largely survived into the present as non-forested nature reserves, with patches of living bog vegetation showing peatland regeneration potential (Collard and Bronowksi 1993).[14]

14 Norway spruce (*Picea abies*) does not grow well on thick bog peat deposits and the main bog remnants were eventually largely spared from afforestation.

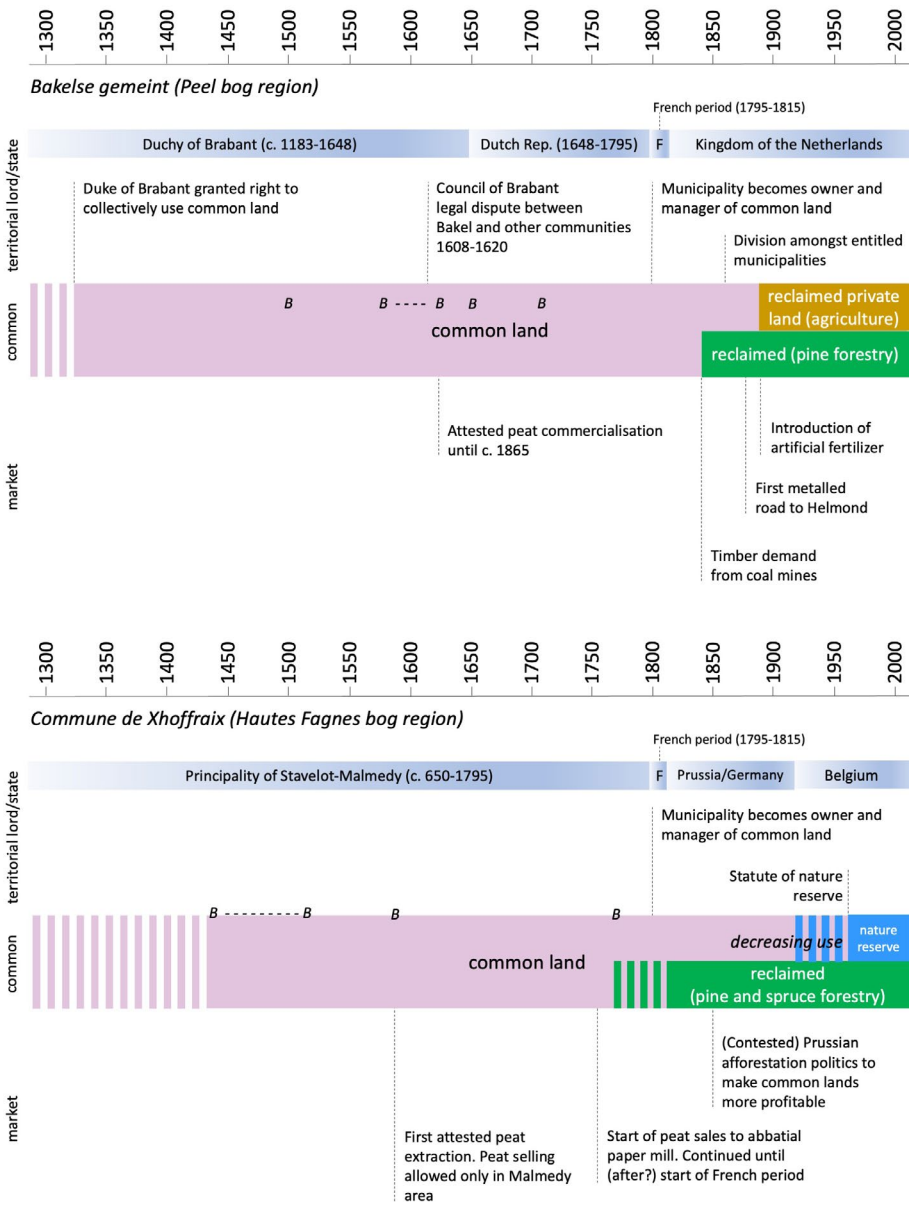

Figure 2.6. Timeline of key events and developments in the long-term history of the two case studies. *B* indicates newly issued bylaws or ordinances that have been handed down. In the case of the *Bakelse gemeint*, bylaws were made by the common-pool institution. In the case of the *commune de Xhoffraix*, the issuing of ordinances was more top-down from the lord/state towards the commoners. This explains the different positions of the *B*s in the graphs. Main sources for the post-1800 period: Collard and Bronowski (1993); Thissen (1993).

Looking at the effects of peat commercialisation on the long-term survival of the studied common-pool institutions, it can be sustained that the peat trade had no decisive negative impact. Nevertheless, peat selling from the *Bakelse gemeint* was initially heavily contested among the entitled user communities, and the eighteenth century saw tensions between Bakel and the other communities about varying issues (Van Zalinge-Spooren 2018, 82). But the common-pool institution survived, and common-pool resource use including peat commercialisation continued for decades after the civic municipality had succeeded this institution around 1800 (Thissen 1993, 32, 40). A similar evolution was observed in the Hautes-Fagnes, where peat cutting on municipality-owned bog commons continued into the twentieth century (Fontaine 2006, 6-8). This primarily concerned domestic extraction, but included peat selling to outsiders (Krebsbach 1926, 136-7; Wisimus 1936, 72).

2.5 DISCUSSION

This study has highlighted a largely overlooked category of historical peat exploitation, namely market-oriented extraction from common lands by commoners. Active peat commercialisation from commons was a recurrent or permanent phenomenon in the early modern cases studied and went together with regular domestic peat cutting on the commons.

The property and use rights patterns found in the study fit well with the general pattern for continental north-western Europe (Grüne, Hübner, and Siegl 2015, 276-277). The two cases analysed can therefore be considered representative for a larger geographical region, provided that regional patterns of fuel supplies and demands from local inhabitants and industries are roughly similar.

Early modern peat commercialisation occurred in different forms. In the case of the Peel bogs, turves were sold to places in the wider region where access to peat was limited and people were willing to pay relatively well for it. Even though there was some (intended) supply to industries, such as breweries in the city of 's-Hertogenbosch, turves were generally sold to individuals. In the early modern Hautes-Fagnes, peat was supplied to local paper and cloth manufactories. The studied ordinances indicate that individuals also bought turves there, but their share in total commercialisation is hard to establish. The significance of peat commerce from commons was in the frequency of its regional occurrence, and in its permanence, recurrence, and/or regional outreach, rather than in its volume compared to total peat extraction. However, especially in the Bakel case

there possibly was an underestimation of commercialisation given the background and state of the peat sales records. Our findings underline that bog commons were not economically marginal but at times heavily contested and of supralocal importance.

Villagers using the *commune de Xhoffraix* were formally allowed by their territorial lord to sell peat within the Malmedy area, but not to outsiders (Abbaye de Stavelot-Malmedy 1583b; Polain 1864, 354-5). For the *Bakelse gemeint* it may be asked whether peat commercialisation was in fact clandestine. Although the local bylaws forbade it, the way village authorities repeatedly referred to their (tradition of) peat commerce before higher authorities suggests it was an open rather than clandestine business. According to Bakel inhabitants, their motive to sell peat was the village's financial hardship due to war or other crises. This motive is mirrored by Van Zanden's (1999, 133-4) findings for commons elsewhere in the early modern Low Countries, and by Venter and Witkowski (2013) and Weyer, Shackleton, and Adam (2018) for present-day African cases. But looking at the longer term, this did not seem to be the only explanation. In both our cases, peat commercialisation stretched out over turbulent as well as more peaceful and prosperous times. Thus, it seems plausible that commercial turf-selling was also just to earn some extra money. If we broaden Thoen's (2001) notion of a 'commercial survival economy'[15], it may aptly frame peat commercialisation from commons. Bakel's eighteenth-century's requests to central authorities to facilitate their peat commerce even seem to invoke the tradition of peat commercialisation in a self-legitimising way. Most likely our cases of commercialisation were driven by the emergence of a commercial economy and rural proletariat (Hélin and Quenon 1994, 62, 66; Bieleman 2008, 139-140) looking for an income. In a similar way, several villages in the early modern Hautes-Fagnes specialised in wheeled transport services (Yante 1986; De Ladoucette [1818] 2009, 96).

The 1583 and 1780 princely ordinances on the *commune de Xhoffraix* suggest the state aimed to mediate disputes (in line with Hansotte 1987, 357) and protect the commoners' interest against non-entitled outsiders, while allowing a limited degree of commercialisation. Similarly, the Council of Brabant allowed Bakel inhabitants to sell peat under certain conditions, thereby overruling the local bylaws. Hence, state institutions in both cases reflected a pragmatic attitude, probably with the intention to foster social harmony and local prosperity in times of resource contestation and economic hardship.

15 Thoen (2001) specifically coined this term to describe early modern agriculture in the urbanised county of Flanders.

From a theoretical perspective, two aspects of peat commercialisation from bog commons merit particular attention. The first deals with the distinction between renewable and non-renewable resources. CPR theory develops its assumptions primarily from renewable resources such as pastureland (see e.g. Ostrom 1990, 26). The bylaws and ordinances studied in general did not explicitly distinguish between renewable and non-renewable resources.[16] This corresponds with similar (implicit) findings for other historical commons of the Low Countries (e.g. Van Zanden 1999; De Moor 2015; De Keyzer 2018). Other studies have shown that restrictive bylaws were also issued with respect to commercialisation of renewable common-pool resources (e.g. De Keyzer 2018, 71; Van Zalinge-Spooren 2018, 130).[17] In general, what counted for early modern commoners was the practical (commercial) use value of common-pool resources. Both renewable and non-renewable resources could potentially have commercial value, and both types of resources were susceptible to overuse with deleterious and lasting effects. Moreover, whether commoners perceived peat as a renewable or a non-renewable resource may also have depended on the historical and geographical context, in particular the remaining volume of peat present in the common.[18] The second aspect relates to the question whether peat was the only resource taken from bog commons. If it was, then the common may have been more prone to deleterious free riding (through commercialisation) than if it offered other important (renewable) resources as well. In neither case studied was peat fuel the only resource taken from the commons. The bogs also supplied renewable goods of vital importance to the agrarian sustenance economy, such as extensive pastureland and litter for use in the stables. Importantly, the studied bogs were part of larger common lands that included heathland and patches of forest as well. These ecosystems provided timber and firewood as well as fodder and sods which after mixing with manure were used to improve arable land. These various renewable and non-renewable resources were mentioned in different bylaw rules. Mostly, the bylaws did not specify whether the goods came from the bogs or other parts of the common. No evidence could be identified that commoners saw imminent peat depletion as the inevitable end of their common. Instead, the common continued to be valuable as extensive pastureland, and local farmers considered it as vital land to guarantee sufficient manure until well into the nineteenth century (e.g. Thissen 1993, 33; De Keyzer 2018, 74). Hence, the fact that the studied commons offered various sustenance resources next to peat fuel may have motivated the commoners to preserve their common despite tensions over peat commercialisation.

16 Only the most recent one, the 1780 ordinance for the *commune de Xhoffraix*, points at the danger of the peat deposits becoming fully depleted due to overuse.

17 Especially rules to avoid overgrazing by sheep flocks, as these flocks could contribute to soil deterioration and drift-sand development.

18 Cf. the consecutive ordinances for the *commune de Xhoffraix* (Appendix 2.2).

These findings contribute to the debate on the structure and functioning of historical and present-day commons in two main ways. Firstly, while CPR theory underlines that commons operated autonomously (Ostrom 1990; De Moor 2015), the findings reveal 'institutional hybridity'. The commons were – either durably or at times of internal conflict – clearly connected to and influenced by markets, governments, and notions of private user rights. The latter refers to the parcellation practices.[19] These mechanisms allowed a controllable level of peat commercialisation alongside non-commercial extraction, by limiting the risk of free riding and subsequent resource overexploitation. Although the commons were mostly self-managed, the state could exert significant influence. Examples were the princely ordinances on common land use and the decisive direction of court rulings on the use of commons. Hence, the findings show that the hybrid modes of governance that have emerged in the last decades (Lemos and Agrawal 2006, 297), are not new phenomena, but have clear historical precursors. The studied cases showed 'benevolent state coercion' through court rulings and ordinances. These directives aimed at balancing the economic interests of a community (commercialisation in a survival economy) and careful exploitation of a depletable common-pool resource. Today, state coercion is still one of the instruments for co-management of common-pool resources (i.e., joint management of the commons by the community and the state; Howlett 2009). These findings are in line with Carlsson and Berkes's (2005) view that co-management of commons is a continuous problem-solving process rather than a fixed and predetermined situation, and indicate this has been so since at least the early modern period.

A second important contribution of the findings to the commons debate is that prolonged commercialisation of peat from bog commons did not prevent the common-pool institutions from functioning adequately in the longer term. Even in the case of the *Bakelse gemeint*, with a history of conflict between Bakel and the other entitled communities (Boeije and Philipsen 2001, 2002; Van Zalinge-Spooren 2018, 81-82), the communities did not abandon collective resource management until well after 1800. Managing resources collectively rather than privatising them may have given communities a stronger position in relation to both the state and neighbouring communities, while limiting the risk of individual appropriators being played off against one another. Thus, in line with findings by De Keyzer (2018) and Beltrán Tapia (2015), long-term use of common-pool resources could go together with a moderate degree of commercialisation. This finding is of particular relevance to persistent assumptions in

19 In an inverse way, the private peat cutting parcels in our commons resemble the medieval and early modern open fields in Europe, where after harvest communal grazing took place on parcelled arable land held in private property – the 'semicommons' described by Smith (2000).

policy and society that commons can best be managed through wholesale privatisation and commercialisation.[20] This study shows how people through time could improve their living conditions by moderate commercialisation of common-pool resources, in addition to using these for subsistence (e.g. Venter and Witkowski 2013; Weyer, Shackleton, and Adam 2018).

The findings do entail a degree of indirect inference, notably concerning motives for peat commercialisation and actor attitudes towards this phenomenon. This is an important shortcoming. However, even if all potential case studies across the Low Countries could have been analysed exhaustively, the risk of fragmented, imbalanced or biased historical evidence would remain unaffected. Notwithstanding, this study offers interesting perspectives for future research. Our work has identified a threefold division into privatised bogs subject to large-scale commercial peat exploitation, bog commons with partial commercial exploitation, and bog commons where peat was solely exploited for sustenance and domestic use. One interesting avenue for future research could be to investigate whether this division spatially coincided with a gradient from bog regions close (or infrastructurally well connected) to the Low Countries' main urban centres, via more isolated bog regions but with high local fuel demands (due to relatively high rural population densities, the presence of industrial towns and/or locally scarce fuel resources), to predominantly rural regions further away from cities and with relatively good access to local peat supplies for all inhabitants.

2.6 CONCLUSIONS

This study contributes to a better understanding of the nature and significance of early modern market-common connections, providing insights into conditions and drivers for marketing of common-pool resources. Two cases of peat commercialisation from raised bog commons in the historical Low Countries were analysed, whereby thriving marketisation was quantified and shown to exist alongside the use of these bogs as commons. As such, the study adds a new and intermediate category of peat exploitation to the traditional binary subdivision in domestic sustenance peat extraction from commons versus large-scale commercial exploitation of privatised bogs.

20 A recent example is Iceland's fisheries. See Arnason (2005) and Einarsson (2011) for different views on the success of Icelandic fisheries privatisation.

The property and use rights situation of the studied bogs (research question 1) was similar in both cases and fits with the general pattern for continental north-western Europe. Formal property was claimed by the respective territorial lords, who granted permission to neighbouring communities to manage the bog resources as common land.

Bog commons were not economically marginal but of supralocal importance. The significance of peat commerce from commons (research question 2) was in the frequency of its regional occurrence, and – on case study level - in its permanence, recurrence, and/or regional outreach, rather than in its volume compared to total peat extraction. However, we possibly underestimated the total volume of annually commercialised peat.

Concerning the motives for and attitudes towards peat commercialisation from commons (research question 3), the main question was whether the trading of turves was driven by dire necessity or mere opportunity. Taxes and high debts placed communities in dire financial straits, which was one of the motives for peat commercialisation. However, peat commercialisation was of recurrent or permanent nature, stretching out over turbulent as well as more peaceful and prosperous times. Hence, simply wanting to earn some money in a 'commercial survival economy' seemed a plausible additional motive for peat commercialisation. State institutions could markedly influence commons management in times of (internal) conflict. In doing so, they showed a pragmatic attitude towards peat commercialisation, probably to foster social harmony and local prosperity in times of resource contestation and economic hardship.

Regarding the long-term impact of commercialisation on the studied peat resources and common-pool institutions (research question 4), long-term sustenance use of common-pool resources could go together with a moderate degree of commercialisation. Rather than being completely autonomous worlds, commons were – permanently or at times of internal conflict – clearly connected to and influenced by markets, notions of private user rights, and state institutions.

A shortcoming of our study is that it entails a degree of indirect inference, especially concerning motives for peat commercialisation and actor attitudes towards this phenomenon. However, a certain risk of fragmented, imbalanced or biased evidence is inevitable in an historical study such as this. One potential avenue for future research could be to investigate to what degree and how commercialisation of peat taken from commons geographically coincided with spatial distributions of population, peat resource abundance, and early industrial fuel demands.

ADDITIONAL FILES

The additional files for this chapter:

- **Appendix 2.1.** Methodology. DOI: https://doi.org/10.5334/ijc.1054.s1.
- **Appendix 2.2.** Evolution of bylaw rules and fines relating to peat extraction and commercialisation. https://doi.org/10.5334/ijc.1054.s2.

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CHAPTER 3

How bogs made for borderlands: the eastern Low Countries, c. 670 – c. 1900 CE

Based on:

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ABSTRACT

Scholars have radically turned away from the notion of 'natural borders' dictated by nature and now broadly agree that all borders are 'artificial' human constructs. However, there is a need to revisit environmental determinism in its nuances. We analyse the relation between distinct natural features and historical border development, using the notion of affordances and the example of raised bogs in the medieval and modern-period eastern Low Countries. For humans, bog landscapes in these periods functioned as both barriers and passageways through the spatiotemporal variability of these opposite affordances. At the scale of local settlement territories, large bog landscapes had the coercive agency to function as borderlands separating adjacent communities. Such coercion was absent on the larger spatial scale of princedoms. The growing economic importance of peat was a crucial driver for border demarcation at both scales from the late Middle Ages. Diplomatic risk calculation and path dependency explain the spatial concurrence and long persistence respectively of bog boundaries between successive polities.

Keywords: affordance theory; borders; history; natural boundaries; raised bogs

3.1 INTRODUCTION

'Natural boundaries' form a problematic category in the humanities and social sciences. The notion refers to borders coinciding with pronounced natural features such as mountain ridges, rivers, woodlands or wetlands that supposedly hampered human crossing, especially before the advent of late modern infrastructure.[21] A 'natural boundary' connotes nature prescribing the most appropriate boundaries and societies or states following these or striving to do so (Paasi 2009, 217). Much of the concept's problematic nature is due to its prominence in the work of nineteenth-century geographers and naturalists, which was subsequently used to legitimise imperialist expansion (Pratt 1992, 15; cf. Gregory 1994, 282–83). The dramatic consequences of this were manifested in two world wars. Consequently, the post-war period saw a general academic abandonment of environmental determinism (e.g., LeCain 2017, 38). As part of that development, border scholars in human geography have explicitly moved away from describing boundaries as a given, natural phenomenon. Instead, all borders now tend to be conceptualised as 'artificial' or as social and political constructs (Schultz 2005, 1; Van Houtum 2005, 675–76; Wastl-Walter 2009, 332). By and large, environmental historians and archaeologists share these views, and although the term 'natural boundary' is still used occasionally in the latter disciplines, it has lost its coercive, determinist sense (cf. Graybill 2014, 669; cf. Feuer 2016, 42; Gorostiza 2018, 797–823). But to what degree does a purely cultural view of boundaries and the act of bordering fit historical reality? Is a 'natural border' no more than a boundary that happens to coincide with a pronounced feature of the physical landscape?

Drawing inspiration from the 'neo-materialist turn' in the environmental humanities, we use affordance theory to highlight the ecological-material basis of some political and cultural borders.[22] The topics of bordering and 'natural boundaries' are important in environmental history, as these potentially touch upon the core of the discipline: they can often be linked to resource management and conflict, while also enabling detailed analysis of human entanglements with nature's materiality and agency. Our study was carried out from an empirical and theoretical viewpoint and at the interface of environmental history, landscape history and cultural geography.[23] We focused on

21 As is often done, we use *border* and *boundary* synonymously to indicate their separating function between political or administrative entities: Castree, Kitchin, and Rogers (2013).

22 Neo-materialism recognises non-human (historical) agency as exerted by other species and/or by non-living components of our environment: cf. Whatmore (2002); Bennett (2010); LeCain (2017).

23 Landscape history studies how humans have changed landscapes, often from a long-term perspective (and then frequently including archaeological approaches). More so than environmental history, landscape history is by definition spatially explicit.

(former) bog landscapes in the eastern Low Countries from the early Middle Ages until c. 1900 CE.

Raised bogs are peat moss-dominated wetlands consisting of organic soils. Until well into the nineteenth and twentieth centuries, bogs covered large parts of north-western Europe and the Low Countries in particular (Gerding 1995; Rotherham 2009; Vos 2015). Inland bogs were mostly unpopulated, with human settlements restricted to the surrounding drylands or natural mineral soil corridors leading through them. Where bogs have not completely disappeared as a result of peat exploitation or agricultural reclamation, this settlement pattern has generally persisted to this day. In places of more intensive commercial peat exploitation or agricultural bog use, settlement also occurred on the bog itself, for instance as 'peat colonies' (Groenewoudt 2012, 126; Van Beek, Maas, and Van den Berg 2015, 10–11).

Historically, bogs were very distinct natural features. In western and central Europe these wetlands were barren, virtually treeless, often vast and supposedly constraining options for human crossing and habitation (Baaijens 2002; Rotherham 2009; Stoop and Van den Munckhof 2012, 58; Jansen and Grootjans 2019). But instead of avoiding them, people used raised bogs in various ways. Although their economic value became especially prominent during the time of large-scale commercial peat exploitation, bogs were already exploited and contested before, in a commons context (Rotherham 2009, 4; Joosten 2019; Chapter 2). One may readily observe from old maps and the literature that the majority of bogs in western and central Europe have historically been territorial and/or cultural borderlands (Joosten 1991, 91; Collard and Bronowski 1993; Gerding 1995; Jansen and Grootjans 2019; beyond the Low Countries: Gipp 1986, 308; Rotherham 2009; Strohwasser 2018).

Based on this observation, our main research question is: *How did raised bog landscapes afford their development into borderlands?* We elaborate this through two sub-questions:

- How did bog landscapes spatiotemporally function as both barriers and passageways to humans? (Section 3.4)

- How did borders originate and persist over time as a result of human-bog entanglements at local and regional scale levels? (Section 3.5)

The specific ways in which bogs functioned as barriers and borderlands seem more significant in large than in small bogs. Therefore, we concentrated on examples from three large bog regions in the eastern Low Countries. These are the (former) bog

landscapes of the Bourtanger Moor, the Peel and the Hautes-Fagnes (Figure 3.1). The spatiotemporal setting of this study is apt for several reasons. First, bogs in the Low Countries were significant landscapes in terms of areal extent, economic importance and contestation at least from medieval times (Gerding 1995; Jongepier et al. 2011; Leenders 2013). Second, compared to the western Low Countries, large bog landscapes in the eastern Low Countries have to a larger degree survived into late modernity, allowing for long-term analysis of bog-bordering relations. Third, such a long-term perspective is key to understand border evolution and inheritance. Our study spans the period from c. 670 to c. 1900 CE. The first date comes from an early medieval charter describing a border across the Hautes-Fagnes (Kölzer 2001; Schroeder 2010). The temporal endpoint roughly coincides with the termination of large-scale commercial peat extraction in the Low Countries and the run-up to the 'Great Acceleration' in the impact of human activities on the Earth System, driven by an oil- and gas-based global economy (Gerding 1995, 9; Steffen et al. 2015).

This chapter continues with an historiographical overview, relating the idea of 'natural borders' to environmental history branches and discourses. Section 3.3 then introduces affordance theory as a lens for our study, while Sections 3.4 and 3.5 integrate historical evidence and theoretical considerations to answer the research questions. In these central sections, we have opted for a thematic rather than a strictly chronological presentation of the empirical data. The chapter ends with a conclusions section (3.6).

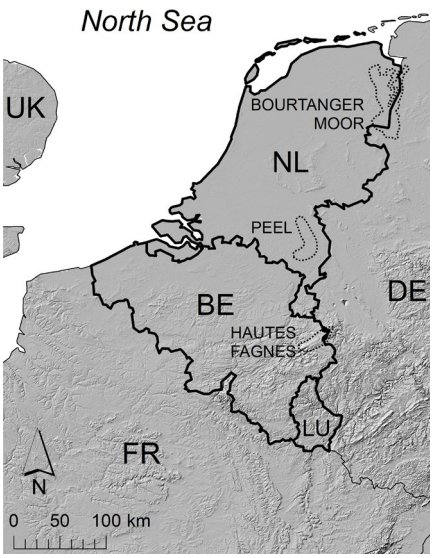

Figure 3.1. Location of the three studied bog regions within the Low Countries (with present-day state borders). Created by the authors.

3.2 'NATURAL BORDERS' IN HISTORIOGRAPHY

The nature-culture relationship is at the heart of both the notion of 'natural borders' and the discipline of environmental history. Throughout the field's history, the question of whether nature or culture prevailed in shaping human societies and their environments has regularly arisen (Radkau 2008, 1–6; Isenberg 2014, 10–11; Ruuskanen and Väyrynen 2017, 464–65). In the discipline's founding decades (c. 1970–2000), the materialist branch laid particular emphasis on nature's role in influencing and shaping societies and the environment (e.g., Worster 1978; 1988). This attracted criticism from the idealist branch, which argued that materialists tended to overlook the importance of conflicts, differences, values and beliefs within human society (White 1990; Cronon 1992). Notably in the last two decades, environmental history has expanded beyond these traditional branches. A cultural offshoot has developed, which shares commonalities with many branches of social and cultural history and studies issues connected to, for instance, class, ethnicity, gender, consumption, mobility, technology and – occasionally – bordering (Locher and Quenet 2009, 7–8; Isenberg 2014, 10; Ruuskanen and Väyrynen 2017, 465).[24] While the fundamental question of nature versus culture seems less central to many studies of cultural-environmental history, it is clear that environmental determinism has long been renounced by most (environmental) historians, geographers and archaeologists alike. While scholars across these disciplines now agree that there is no such thing as nature forcing natural boundaries upon humanity, possibilist views (nature suggests, man chooses) are still widely supported (Schultz 2005, 1; Van Houtum 2005, 675; Radkau 2008, 341; McNeill 2010, 360–61; Mullin 2011; Schneider 2013, 1190; Feuer 2016; Ruuskanen and Väyrynen 2017, 470).

Especially with the advent of a 'neo-materialist turn' in the 2010s, the environmental humanities have witnessed a renewed focus on the cultural entanglements with non-human agency and nature's materiality (Ruuskanen and Väyrynen 2017, 458). However, while the importance of understanding ways in which nature influences culture is generally acknowledged, in practice most environmental historians still work the other way round and focus on human impacts on nature. Studies that do focus on nature impacting human communities often centre on spectacular events such as natural disasters or epidemics, frequently in the context of a backlash of nature resulting from human pressures (Radkau 2008, 5; Isenberg 2014, 10–11; Ruuskanen and Väyrynen 2017, 458). On the other hand, scholars increasingly tend to break down the nature-culture dichotomy, as illustrated by the growing popularity of the term 'natureculture'.

24 Examples include Knoll (2004); Rohr (2013); Dorsey (2014); Graybill (2014).

This notion represents a synthesis of nature and culture that recognises their inseparableness in ecological relationships which are formed both biophysically and socially (Haraway 2003; Malone and Ovenden 2017, 1).

Overall, bordering in general and 'natural borders' in particular have been comparatively marginal topics in environmental history, and published research mostly focuses on the post-1800 period (Lowenthal 2004; Coates 2014; Gorostiza 2018; Dorondel, Serban, and Cain 2019).[25] Yet some studies do touch upon the socio-cultural workings of the border landscape's materiality (Gorostiza 2018; Dorondel, Serban, and Cain 2019). In the present study, we will add to previous research by applying (1) a stronger theoretical underpinning of how nature's materiality influenced human mobility and bordering processes at various spatial scales and (2) a long-term perspective allowing for an understanding of how borders were inherited across successive polities over time.

Most environmental-historical work on bogs, and wetlands in general, concerns their human valuing, resource-making and transformation (Gipp 1986; Derex 2001; Morera 2016; Ruuskanen 2016; Strohwasser 2018; Bruisch 2020; for the Low Countries: Van Dam 2001; Jongepier et al. 2011). Historical work on bogs in the Low Countries and adjacent parts of the north-western European plain has traditionally connected strongly to approaches from historical geography, archaeology and palaeobotany. The aim usually was to reconstruct the location and extent of prehistoric and early-historic bog landscapes, or their (post-)medieval transformation through large-scale intensive peat exploitation or reclamation (Borger 1992; Gerding 1995; Leenders 2013; Van Beek, Maas, and Van den Berg 2015).[26] While a strong historical link between resource use and the act of bordering seems obvious in this context, the topic of bordering is remarkably underexposed in most of this work. By focusing on the way that bog landscapes have historically worked as borderlands, we will build on this work and engage with the (neo-)material and spatial turns in the humanities and social sciences.[27] We will now elaborate on affordance theory as a lens to understand and illustrate this specific historical agency of bog landscapes.

25 Overviews of North American work on borders in Dorsey (2014) and Graybill (2014).

26 For northern Germany: many contributions in *Probleme der Küstenforschung im südlichen Nordseegebiet* (1940–2008).

27 On the neo-material turn in environmental history: LeCain (2017). On the spatial turn: Crang and Thrift (2000).

3.3 AFFORDANCES OF BOG LANDSCAPES AS A THEORETICAL LENS

The theory of affordances was established by James Gibson, a psychologist with a markedly ecological approach to perception (Gibson 1966; 1979). He defined affordances as what the environment offers, provides or furnishes to an animal or human, either for good or ill. By implying the complementarity of the perceiver and the environment, affordances refer to both entities (Gibson 1979, 127). Affordances to Gibson are essentially about the species-specific relationships between organisms and their environments (Gordon 2004, 162).

Even though scholars have critically discussed different aspects and premises of affordance theory, its conceptual power has been acknowledged (Gordon 2004; Ingold 2018). In recent decades, Gibson's theory has been influential in several scholarly domains engaging with human perception, preference and use of landscapes – past and present (Ingold 2018; Ward Thompson 2018, 20). Rather than considering environmental perception as a distanced, abstracted mental process, affordance theory highlights the direct experience of the environment and the potential for action it offers. In this way affordance theory shares affinity with phenomenology in stressing the importance to perception of being-in-the-world, being physically engaged as humans in our environment (Ingold 2018, 39; Ward Thompson 2018, 20).[28]

In a 1992 reflection on affordance theory Tim Ingold stated that 'a relational approach to affordances might give us a language in which to express how people continually bring forth environments, and environments people' (Ingold 1992). From this viewpoint, we consider affordance theory to be an appropriate lens to study how physical bog environments have influenced the process of bordering in spatiotemporally diverse ways. Its conceptual value resides in the ability of affordances to help illustrate and elucidate the paradox of bog landscapes as barriers that simultaneously offer humans specific options for access and passage. After all, affordances as defined by Gibson enable humans to navigate around barriers and find passages within the natural landscape.[29] Moreover, the theory's fundamental character substantiates our *longue durée* perspective on human-environment interactions.

28 The latter author reminds that this aligns with phenomenological theories of landscape experience: Merleau-Ponty ([1945] 2013).

29 'Affordances … are about … avoiding obstacles, … crossing surfaces, and so on.': Gordon (2004, 176).

Affordance theory complements the environmental history approaches used to study the Low Countries over recent decades in two main ways. First, theoretical frameworks in these studies are mostly drawn from political economy or economic history (cf. De Moor 2015).[30] Affordance theory adds a strong specific link with the physical environment. Second, environmental history studies on (former) peatlands of the Low Countries and beyond tend to focus on drastic landscape transformations such as reclamation, commercial peat extraction or 'moor-burning' (Gerding 1995; De Bont 2008; Jongepier et al. 2011; Leenders 2013; Bruisch 2020; Jones 2014; Myllyntaus, Hares, and Kunnas 2002). As will be elaborated in the next section, affordance theory can be an appropriate lens when putting emphasis on less drastic human uses of peatlands, as we do here.

Informative sources on how different actors experienced bog landscapes in their daily practices and in relation to bordering processes are very scarce and increasingly so as one goes further back in time. We therefore approach this issue thematically, by combining and interpreting our sources in the light of specific predefined affordances of bog landscapes. These are the intertwined affordances of resources, support and passage, and of being a barrier. In the following section we argue that these affordances (co-)shaped bogs as borderlands in distinct ways in different places and times.

3.4 THE PARADOX OF BOGS AS BARRIERS AFFORDING PASSAGE

Affordance theory and empirical studies in environmental psychology help to elucidate how near-intact bog landscapes act as barriers while they simultaneously offer options for access and passage. The *affordance of support* of the ground surface is one important aspect. According to Gibson: 'the ground is quite literally the basis of the behavior of land animals', as 'it permits equilibrium and the maintaining of a posture with respect to gravity'. These aspects 'are prerequisite to other behaviors, such as locomotion and manipulation', and 'errors in the perception of the surface of support are serious for a terrestrial animal' (Gibson 1979, 131, 142). Surfaces that are 'sink-into-able' do not offer the affordance of support.[31] The less bogs afford pedestrian passage, the more these wetlands function as barriers. But, as will be illustrated, there is spatiotemporal variation in the *affordance of passage* in bog landscapes. Also, Gibson claims that,

30 Also see contributions in H. Greefs and M. 't Hart (eds), *Jaarboek voor Ecologische Geschiedenis, 2005–2006* (Gent: Academia Press, 2006).

31 Gibson (1979, 127) refers to swamps as an example.

when crossing a landscape, animals (in our case humans) steer into the openings and away from the surfaces that afford injury (Gibson 1979, 132). Accordingly, humans perceive passageways and basic use options as they move through and experience the landscape (from different angles). Gibson's work centred on visual perception, but in particular in bogs the *sound* (and, locally, possibly the *smell*) of walking on soggy ground add to the information used to decide where best to go and which places to avoid (cf. Porteous 1985, 360; Porteous and Mastin 1985). Recent empirical insights from environmental psychology underline that people do not like open landscapes lacking trees or bushes in the near or middle distance, that poor locomotor access is an important predictor of feelings of danger and entrapment, and that landmarks play a key role in navigating both familiar and unfamiliar territory (Ward Thompson 2018, 22–24, 27). These aspects, including the relative paucity of landmarks, generally apply to (pristine) bog landscapes (cf. Pungas and Võsu 2012, 91–94).[32]

This is corroborated by pre-1900 accounts on near-intact bogs in the Low Countries. A description from 1670 stated that the Peel 'has an open watery ground / covered with an upper crust / not passable in most places' (Van Oudenhoven 1670, 14). Indeed, on early modern maps large bog areas are often among the most conspicuously drawn elements, suggesting that these landscapes must have been very remarkable to the human eye (Figure 3.2).[33] The nineteenth century offers more detailed descriptions of near-intact bogs. The Dutch geologist Borgman typified such bogs as 'neither stable ground, nor navigable water'. He presented a bog zonation based on differences in vegetation, microtopography and passability (Figure 3.3). Unlike the central zones, the margins of intact bogs remained accessible during the wet season. Borgman (1890, 47–48) described his uneasy impressions of a large bog, 15,000 hectares in extent, in north-west Germany:

> the feeling of loneliness … degenerate[s] into a certain melancholy, which overwhelms the walker on large bogs …. This extensive bog … gives a sadly uniform impression. All around the walker everything is equal to his immediate surroundings, his footprints even disappear as soon as his foot no longer presses the resilient bog moss. Sometimes particularly beautiful plants are able to attract his attention for a few moments; but … on such large, wild bogs it is very dangerous in some places to walk without a guide, and to stand there for a few moments. Unnoticeably, one sinks deeper into the living *Sphagnum* mat.

32 These authors provide examples of Estonian proverbs in which bogs symbolise barrenness, dead ends, poverty, etc.

33 Martin Uhrmacher (2016, 26) argued that early-modern map makers sometimes accentuated 'natural barriers' while omitting others to suggest a neatly bordered homogenous political-territorial space. This may also have played a role in Hondius' map, but comparison with the palaeogeographic map shows that the Peel was actually the largest bog landscape in the mapped area at the time (Fig. 3.2).

Figure 3.2. Top image: 'A marshy area named the Peel' on a 1639 map of the north-eastern part of the duchy of Brabant. Lower image: Palaeogeographical reconstruction of peat deposits around 1500 CE in the same region. The extensive peat soils in the north-west corner of the lower map, as well as the (linear-shaped) peat deposits in stream valleys are not represented on the top map, since these had largely been reclaimed or cut away by 1639. Sources: Hondius (1639); Vos (2015); Koopmanschap (2015, 408–414). Palaeogeographical map created by the authors, courtesy of the Cultural Heritage Agency of the Netherlands, CC BY 3.0 (https://creativecommons.org/licenses/by/3.0/).

A report of a difficult hike across the central Peel bog landscape contains similar foreboding impressions. In it, the botanist Vuyck (a contemporary of Borgman) explicitly referred to 'smelly mud' and 'an unpleasantly sounding suction' as he was walking. The vast bog was 'a dreadful plain … so awfully bare, so drearily monotonous. … one can imagine oneself at sea'. Vuyck and his companion used distant church towers to orient themselves.[34]

On the Hautes-Fagnes plateau (450–694 metres above sea level) the relatively rough regional climate contributed to the physical barrier aspect of its bogs (Schumacker and Streel 1994, 10). Around 1814, the French imperial prefect De Ladoucette ([1818] 2009, 92) stated:

> The Fagnes are covered in fog all year round, from sunrise to sunset; in winter the snow piles up. Are you caught in a windstorm? Bad luck for anyone wandering around without a guide. He risks perishing in the marshes or in worked-out peat pits. The guides consult the markers that have been placed at intervals; but what to do if these markers have collapsed or been twisted by the storms? Many unfortunate people have already disappeared in the Fagnes.

The barrier effect of large bog landscapes has made it difficult for people to go back and forth between the hinterlands on both sides of the bog. The extent to which bog landscapes hindered human mobility varied spatially, though. This was already illustrated on the level of individual bog expanses (Figure 3.3). In addition, and at a higher spatial scale, large bog landscapes were locally intersected by dryland corridors which were typically used for supralocal overland (trade) routes. Figure 3.4 shows an example from the Hautes-Fagnes bog region. Natural passageways were also found in the Peel region near Meijel, used by the overland route connecting the cities of 's-Hertogenbosch, Roermond and Cologne (Joosten 1991, 91), and in the Bourtanger Moor region near the early modern fortress of Bourtange on the former border of the Dutch Republic and the Prince-Bishopric of Münster (the current Dutch-German border).[35] The presence of castles and other fortifications on various dryland passages indicates the historically strategic importance of sparse passageways through bog landscapes (Lucassen 1991, 13; Spiekhout 2020, 377, 603). Next to dryland corridors, routes along bog streams were locally also used, for instance to access mesotrophic streamside grazing lands (Spek 2004, 431).

34 Laurens Vuyck's manuscript, 'Een botanische excursie in de Peel, sept. 1895', is largely included in Dirkse, Hochstenbach, and Reijerse (2007, 61, 67).

35 The toponym *-tange* refers to a sandy (dryland) ridge. Instituut voor de Nederlandse Taal (n.d.).

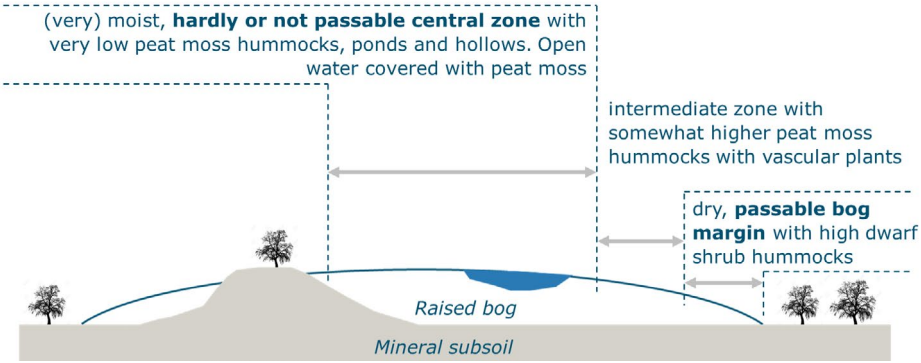

Figure 3.3. Schematic cross-section of an intact raised bog with ecological zonation in relation to passability. Vertical scale exaggerated. Created by the authors, after Venema (1855, 12–13); Borgman (1890, 52–53).

The passability of bog landscapes varied not only in space, but also on different temporal scales. Several early modern maps of the Bourtanger Moor show paths and cart tracks across the bog with inscriptions that some were only passable in summer, but others all year round (Ten Have c. 1649; Mellama et al. [1717–1719] 1751–1754). This suggests the bog crossing of some 7.5 kilometres was difficult or impossible in winter, when the bog surface was too wet.[36] But seasonal variation did not always follow the same pattern. Periods of severe frost could make 'all marshes passable and solid' (Van Rij 1989, 83–85).[37] And while in the summer of 1227 a large army allegedly sank into a marsh and was defeated at the Battle of Ane in what is now the north-eastern part of the Netherlands, in a later year another army 'crossed the [same] marsh without effort, as it had dried out during that summer' (Van Rij 1989, 48–49, 90–91). Another illustration of interannual variation was found in a late medieval regulation for a Peel bog common. It forbade commoners to cut turf sods at the soil surface in 'wet and weak years' when they 'could not use the bog well' (Krom and Sassen 1884, 180).[38]

Unsurprisingly, given their affordance to work as a barrier, some large bog landscapes in the periphery of the Low Countries have had a history as military defence lines. For

36 Similarly, a bog in the Peel region was 'unfordable in wet times': Borgman (1890, 47).

37 Likewise, winter roads in north-eastern Europe allowed shortcuts across peatlands that were difficult to cross in other seasons. Estonian winter roads were used until the mid-twentieth century: Pungas and Võsu (2012, 96).

38 As interpreted by Van Zalinge-Spooren (2018, 138–39).

example, a system of dikes and fortifications was operated in the Bourtanger Moor between c. 1680 and c. 1850. This made the extensive bogs on the north-eastern border of the Dutch Republic even wetter and less passable than they already were (Baas 1995). Between 1934 and 1940, the Peel bogs and surrounding reclamation landscapes also served as a Dutch defence line against enemies from the east (Renes 1999, 361–62).

Bog landscapes in the Low Countries have also worked as cultural borders of different kinds and to different degrees. Bogs have historically influenced marital patterns (Figure 3.5) and separated dialects and religious groups (Weijnen 1966, 74, 447–48; dialect recording Schoonebeek: Meertens Instituut, 2013-2023). While the (re)production of cultural borders has been reinforced by the formation of borders between local communities and notably between political territories, the mere relative barrier working of bog landscapes has added to cultural differences felt on either side of the bog. This is illustrated by an oral history account from the village of Schoonebeek (Bourtanger Moor area). Speakers born around 1900 pointed at the traditional intermarriage links and dialect similarities with the neighbouring former Grafschaft Bentheim (now in Germany), while indicating that the former Bourtanger Moor limited contacts with the remainder of Drenthe. While acknowledging that Schoonebeek was in Drenthe, they pointed at the fact that the term 'Drenthe' was particularly used to denote the province's core region – across the bog landscape (dialect recording Schoonebeek: Meertens Instituut, 2013-2023).

A question still open is how affordances of bogs may have changed over the longer term with significant changes in the bog landscape itself (cf. Casparie and Streefkerk 1992). Due to human use, notably peat extraction, bogs have for centuries (and often to an increasing extent until relatively recently) been subject to drainage. This translated into vegetation changes, but it also impacted accessibility and the (visual) appearance of bogs. As we saw in this section, as late as the 1890s, large stretches of relatively undisturbed bogs were still present in the eastern Low Countries (Borgman 1890; Dirkse, Hochstenbach, and Reijerse 2007). Since then, the (visual) appearance of these bogs has drastically changed due to shifts in use and increasing polluting airborne nitrogen inputs (Frankard et al. 1998, 39–41; Tomassen et al. 2004, 139–40; Joosten 2019, 107).

3.5 THE AGENCY OF BOGS AND HUMANS THAT MADE FOR LASTING BORDERLANDS

Raised bog landscapes of the eastern Low Countries were surrounded by human settlements, often of early medieval origins, that together used the bog landscape departing from an agropastoral sustenance economy (Schumacker and Streel 1994, 12, 16-19; Renes 1999, 182, 184; Spek 2004; Chapter 2). These settlements were on the drier and better mineral soils surrounding the bog, where the village communities had quick and easy access to arable land, hay meadows (in stream valleys), pastures and the bog itself. Although bogs were used in diverse but extensive ways, by and large, humans did not live on the bogs proper (Schumacker and Streel 1994; Renes 1999; Rotherham 2009; Van Beek 2015; Joosten 2019). Hence, as illustrated by Figure 3.6a, the border zone function of bog landscapes to local communities on opposite sides must be as old as the communities themselves.[39]

Even though we know little about bordering in the early Middle Ages, a rare charter relating to the Hautes-Fagnes shows that as early as 670 CE a border was defined across this bog landscape. The document lists conspicuous geographical points recorded by a commission to establish the boundaries of the Stavelot-Malmedy monastic community's domain. The text suggests that this border was not just seen as a diffuse zone, but at least partly thought of as a linear boundary: 'from there … to the Fagnes; then *through the middle of the forest of these Fagnes* to the Mansuerisca way; from there *following that road* to *Sicco Campo*' [i.e., the *dryland* of Botrange, cf. Figure 3.4] (Schroeder 2010, 25, 27; our emphasis).

39 The term *mark* (*marke* in Dutch), used in the north-eastern part of the Low Countries and north-western Germany to denote common land, reflects this situation. Bogs and heathlands were important constituents of these common lands. *Mark* has the original meaning of border area/liminal zone between the villages (cf. English *march*). Instituut voor de Nederlandse Taal (n.d.).

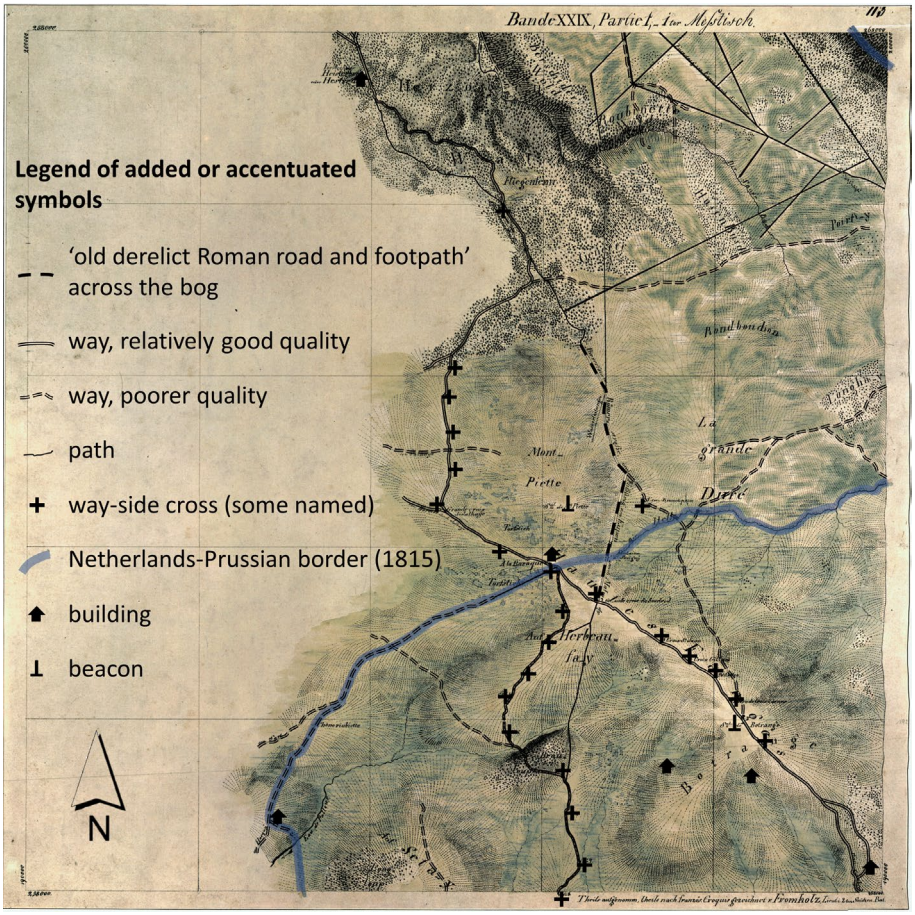

Figure 3.4. Passageways across the central Hautes-Fagnes bog landscape as represented on a map of c. 1818. Light colours indicate dryland zones (e.g., in one case specified by the toponym *Duré,* lit. 'hard, solid ground'). Many of the indicated sideways were dead ends, presumably used as livestock droves or peat extraction tracks. Between 1830 and 1920, the indicated border was between Belgium and Prussia (after 1871 Germany). Each grid cell represents 2 x 2 kilometres. Source: Tranchot and Von Müffling [1803-1820] (1969–1973). Map image use courtesy of Geobasis NRW (Bezirksregierung Köln, Germany).

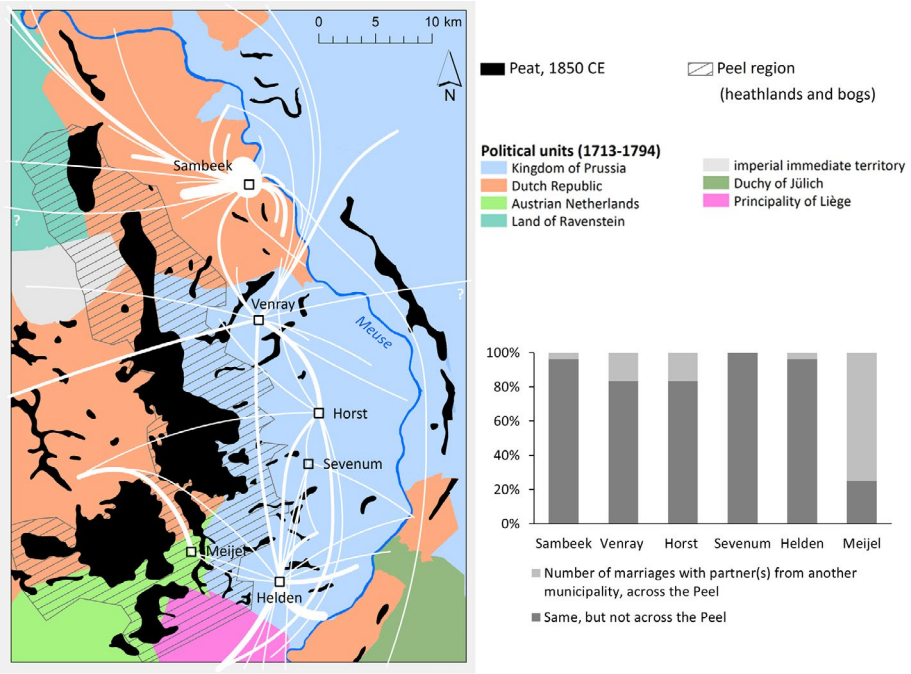

Figure 3.5. Marital patterns in six parishes bordering the Peel bogs, 1707–1726. White arched lines link to the places of origin of partners from outside the parish; line width is a measure of frequency. In most parishes, fewer than 10 per cent of marriages had an outside partner, except Sambeek (34 per cent). The bar graph indicates to what degree outsiders came from the other side of the Peel bogs. Sources: political map after Berkvens (2015, 27-29). Palaeogeographic data (peat distribution) from Vos (2015), courtesy of the Cultural Heritage Agency of the Netherlands, CC BY 3.0 (https://creativecommons.org/licenses/by/3.0/).

Despite this early example, boundary-making in bog landscapes would only gain traction in the late Middle Ages. After all, at the beginning of the early Middle Ages, population numbers were low throughout the Low Countries and Europe at large (Blockmans and Hoppenbrouwers 2018, 88–89; Van der Ree-Scholtens 1993, 159–62). And, although these numbers grew, it seems safe to assume that throughout the early Middle Ages there were enough bog resources for everyone. When in high- and late medieval times bog resources became scarcer due to (demographically driven) intensified land use, more and more resource-related conflicts arose between neighbouring communities. This contributed to the demarcation of local boundary lines (Figure 3.6b).

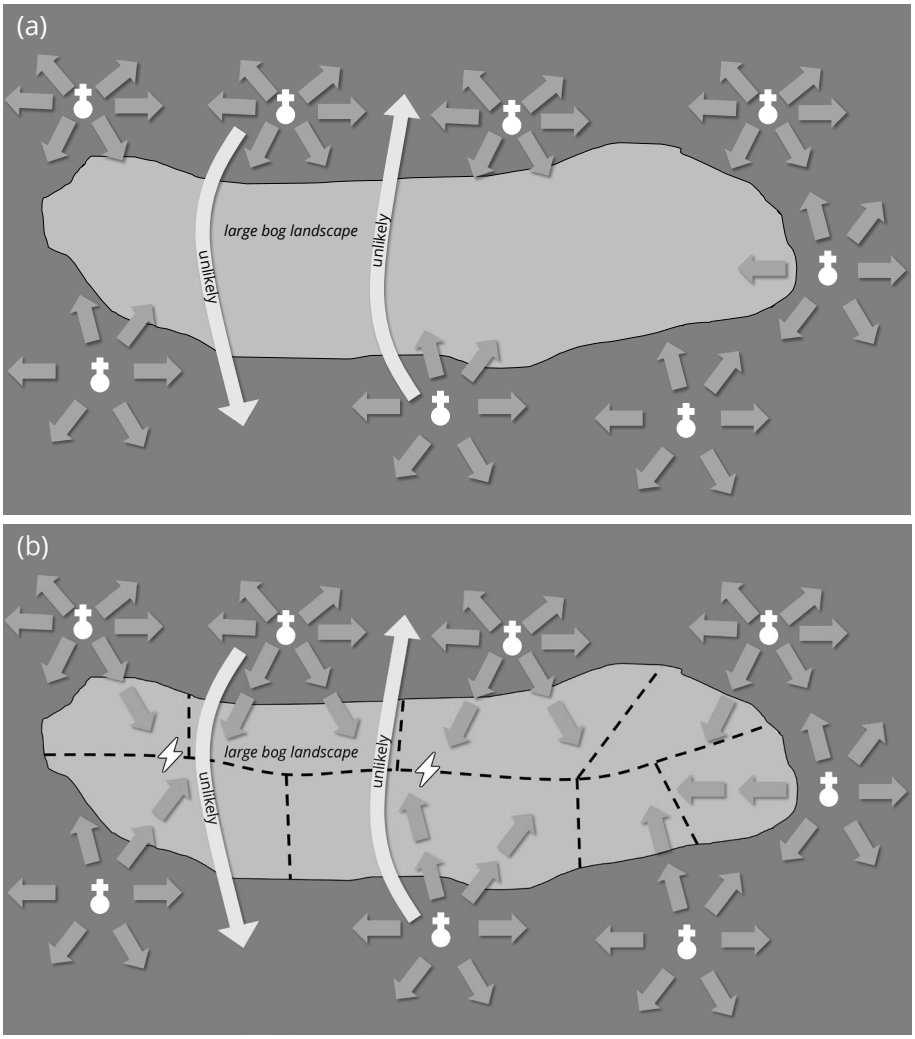

Figure 3.6. Model of local border development in large bog landscapes (light grey area). Surrounding settlements are indicated by white dot-and-cross symbols. Arrows roughly indicate the extent of village (agricultural/sustenance) land-use zones. (a) Early medieval situation with relatively low bog use pressure. The specific bog affordances made land use on the opposite side of the bog unlikely, hence making the bog a border zone. (b) Later medieval and early modern situation. Bog use had intensified due to increasing population size and wood (fuel) scarcity. Hence, increased likelihood of conflict over bog resources (lightning symbol), and increased border demarcation. Graphic created by the authors.

For late medieval Drenthe, a region with extensive bog landscapes (Figure 3.7), Peter Hoppenbrouwers noted a growing tendency to demarcate and delimit heathland and bog commons between adjacent village communities from the early fourteenth century onward. Along with an initial population growth, stagnating in the course of the late Middle Ages, this demarcation process was driven by a trend towards stronger stately institutions for taxation and domination and by the gradual commercialisation of the rural economy (Hoppenbrouwers 2018, 170–73). A similar late medieval trend of growing conflict over use rights and subsequent border demarcation in bog landscapes is observable in the south-eastern part of the Low Countries (Wintgens 1988, 299).[40] Hence, from the late Middle Ages onwards, the *affordance of resources* can be said to have added to large bogs' agency in their making for borderlands. But in this respect the bog affordance of resources was of a weaker and more passive nature than the affordances of support, passage and being a barrier.

These bog-related conflicts highlight the growing (supralocal) economic importance of bogs. Contested local borders could even develop into 'local cultural borders', as the recurrent nature of many such conflicts fuelled processes of 'othering' between neighbouring communities (Boeije and Philipsen 2001; 2002; Nekrassoff 2007, 95–98; Hoppenbrouwers 2018; Van Zalinge-Spooren 2018). This does deserve some nuancing, though. Firstly, bog landscapes and the boundaries therein were never absolute barriers. It frequently happened that village communities had formal use rights across borders (Wisimus 1936, 30; Van der Ree-Scholtens 1993, 172). But, just like boundary delineation, the formalisation of such use rights (in late modern times through the cadastre, for example) can be seen as the outcome of a (bordering) process meant to solve or prevent conflicts between neighbouring village communities. Secondly, by focusing on bogs as historical barriers and borderlands, we risk losing sight of the commonalities between people living on either side of the bog landscape. Boundaries divided people but also united them over common (socioeconomic) concerns related to the bog environment. As Leo Wessels (2015, 282) wrote: 'the Brabant and Limburg peat diggers in the Peel often [felt] closer related to each other … than to the other inhabitants of their respective provinces.'

If large bog landscapes thus had the coercive agency to function as borderlands separating settlement territories, such coercion was lacking on the larger spatial scale of princedoms.[41] Their rulers had relations, friendly or hostile, with close and distant

40 The present-day Dutch-German border partly originates from late medieval boundary ditches dug through peatlands as a result of resource use conflicts: Renes (1999, 125–26).

41 We use the generic term *princedom* to refer to the various political entities constituting the medieval Low Countries.

peers. The geographic size of their political and economic playing fields meant that, to dynasts, large bog areas were not barriers as they were to local communities. For example, in high medieval times, both the county of Guelders and the Land van Cuijk had significant influence and possessions on the opposite, western side of the Peel bog landscape. Over time, the influence of both princedoms west of these bogs was reduced for various reasons, including the rise of the duchy of Brabant's power (Van der Ree-Scholtens 1993, 10, 26–27). In early modern times, the Peel bogs marked the westernmost limit of Guelders and the Land van Cuijk.

Despite the non-coercive relation between bog landscapes and regional-scale political borders, the two often went together, from medieval times, as Figure 3.7 illustrates. The treeless wet bog landscapes with their impressive appearances (Section 3.4) were likely ideally suited to provide clarity about where one polity bordered another. Although bog landscapes tended to be divided by linear demarcated boundaries, notably from the late Middle Ages onward, it is thus not surprising that contemporaries continued to see entire bog expanses as border zones until well into early modern times. This is illustrated by a 1607 account of the border between the duchy of Limbourg and the land of Kornelimünster Abbey (Hautes-Fagnes), and by official documents relating to the delineation and demarcation of the state border between the Dutch Republic and the Kingdom of Prussia (1716–1717) in the Peel bog.[42] But the perceived (legal) borderland status of bogs could change markedly, as illustrated by the example of the Brackvenn (Figure 3.8), a raised bog formerly considered as *terre neutre*, on the crest line of the Hautes-Fagnes plateau. By the 1760s, peat exploitation there had become quite intensive, especially in the eastern part of the bog, which was used by inhabitants of the duchy of Jülich. The authorities of the neighbouring duchy of Limbourg worried that further peat exploitation would be at the expense of what they considered their share of the peat deposits. It was agreed between the respective governments that their shared border in the Hautes-Fagnes would be delineated and demarcated. This border largely followed streams: naturally linear and unambiguous elements. But it also had to cross the watershed where the Brackvenn bog was situated. There, it was necessary 'to make fair arrangements concerning the sovereignty and jurisdiction, until now exercised jointly over the Brackvenn, and the undivided property of this heathland' [sic]. As part of the agreement, the new boundary line was demarcated by a ditch and parallel embankment cut across the Brackvenn bog in 1774 at joint expense. This deep ditch is still clearly visible in the field and presently functions as a local administrative border (Jointe des Terres Contestées 1769–1779; Figure 3.8). This example shows that

42 'on the *fagne* between the land and duchy of Limbourg and the land of Kornelimünster': Wintgens (1988, 337); 'the Peel between those of Brabant and Upper Guelders': Draak and Pedronssin (1716–1717).

actors at local and supralocal levels were mutually dependent. Princes had an interest in solving bog resource disputes between local communities on either side of the political border for the greater good of diplomatic risk management with neighbouring rulers. Conversely, to strengthen their local cases, adjacent local communities often sought support from their respective rulers.

If one boundary category had already been established early on in the bog landscape, it seems logical that other boundary categories were oriented to the first, for reasons of clarity and diplomatic risk management.[43] Theoretically we assume the primacy of local boundaries between village territories (presuming the area subject to bordering was already inhabited). After all, concrete and exact boundary determination mainly came about through daily land-use-related conflicts with neighbours, on the level of local communities. Supra-local political boundaries were then a derivative of these local boundaries. Van der Ree-Scholtens reached a similar conclusion regarding the likely primacy of existing local borders in the process of delineating regional-scale political borders in the north-eastern borderlands of the duchy of Brabant (Van der Ree-Scholtens 1993, 159–60). The early modern cases of boundary demarcation in the Brackvenn (Hautes-Fagnes) and Peel bogs confirmed that (looming) local conflicts over common land borders drove exact boundary demarcation between princedoms or states in bog areas where those borders were previously vague. This is in line with Florian Mazel's findings for medieval French princedoms. Reasoning in terms of centres and peripheries, he too concluded that the borders of these regional political entities remained poorly defined at least until high medieval times (Mazel 2010, 46–47). This is understandable if we assume that regional princes were primarily interested in manorial produce and financial revenues from their subordinate local communities. As long as local communities could deliver without conflicts with neighbouring communities, there was no direct need to invest in border demarcation in the princedom's peripheries. On the other hand, Hoppenbrouwers speculated that the surge of late medieval boundary demarcation in Drenthe common lands (including large bogs) was partly driven by 'the requirement of a better, more sophisticated [local] administrative organization with a view to greater efficiency in domination and taxation that was encouraged by the lord of the Land and his officials' (Hoppenbrouwers 2018, 173).

43 The same reasons, along with collective memory, probably explain why boundaries, once drawn, tended to stay in place for centuries. It typically took large disruptions of the existing power balance between adjacent political entities for the border to significantly shift (as with the Belgian-German border in the Hautes-Fagnes after the First World War).

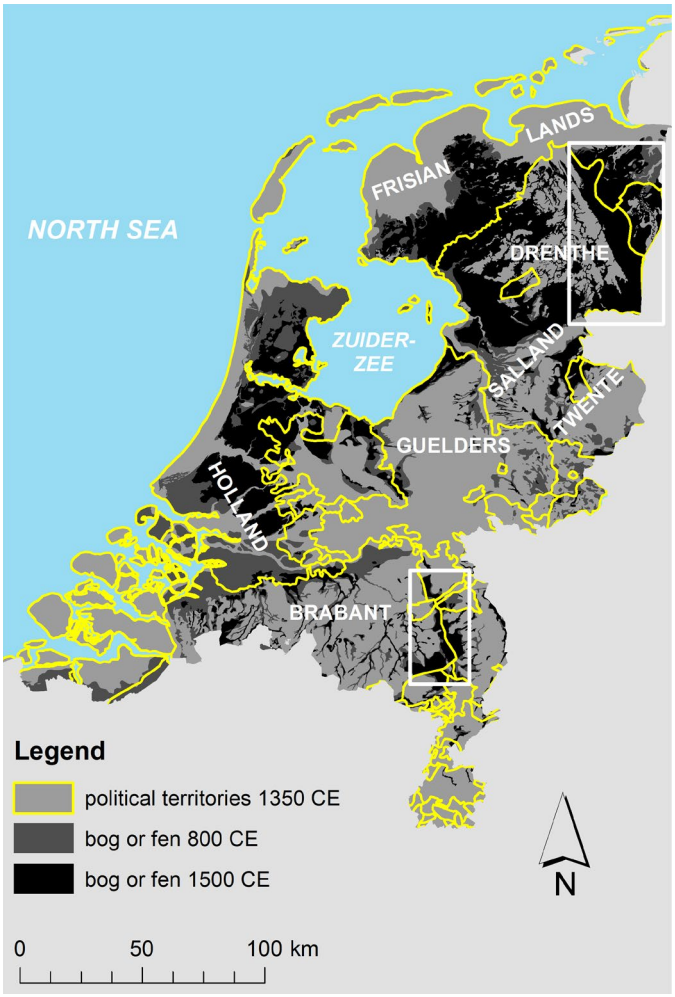

Figure 3.7. Political territories of the northern Low Countries c. 1350 CE within the confines of the present-day Netherlands. Palaeogeographic reconstructions of peat deposits around 800 and 1500 CE are included. The political territories (yellow borders) originated between the latter time points. White-lined frames indicate the Bourtanger Moor (north-east) and Peel bog landscapes (south-east). Many large bog landscapes, notably in the eastern Netherlands, functioned as borderlands between political territories or historical districts therein. Sources: political territories c. 1350 after https://nl.wikipedia.org/wiki/Bestand:Political_map_of_the_Low_Countries_(1350)-NL.svg (accessed 7 June 2021), courtesy of Sir Iain, CC BY 3.0 (https://creativecommons.org/licenses/by/3.0/). Palaeogeographic data from Vos (2015), courtesy of the Cultural Heritage Agency of the Netherlands, CC BY 3.0 (https://creativecommons.org/licenses/by/3.0/).

During late modern times, bordering processes and resource-related conflicts in bog landscapes became less important in the eastern Low Countries for several reasons. Many bogs had by then become subject to large-scale commercial peat extraction. This exploitation happened in the context of privatised bog commons, where the key actors were no longer local communities but peat-extraction companies that had the exclusive rights to exploit a whole bog expanse. By 1850, many bogs had largely disappeared altogether, due to such large-scale commercial peat exploitation and as a result of agricultural reclamation (Thissen 1993, 87, 92–93, 307; Gerding 1995; Joosten 2019, 104–06). Where bog commons remained, peat gradually became less important for sustenance use, as coal became the leading fuel.[44]

The question here is whether large bogs were unique in their agency to make for borderlands – at least between local communities – or if bogs did not essentially differ from other categories of 'natural boundaries' such as rivers, lakes, mountains or forests. On the level of local communities, many of these 'natural' elements functioned as borders between communities on opposite sides. But there were differences in the degree to which those types of 'natural boundaries' worked as barriers, as well as how contested these boundaries were. In a study of historical borderlands between the northern Peel bog area and the river Meuse, Van der Ree-Scholtens found that the bordering situation was very different in the riverine landscapes along the Meuse from that in the Peel bog landscape. In the clayey river area, numerous drainage canals, ditches and levees constituted clear landscape elements that were suited as boundary lines and that, unlike border stones in the Peel, could not so easily be displaced. Compared to the Peel bog landscape, crossing the Meuse was much easier (there were many ferries) and the river's function as a (local) border was largely uncontested (Van der Ree-Scholtens 1993, 163–64, 167; Renes 1999, 124–25). Lakes and forests may have posed fewer problems for access and passage than especially steep or high mountain ridges and large bogs. On the other hand, like bog landscapes, large (lowland) lakes and forests could present inexperienced visitors with orientation problems. And mountains and large bogs in particular did pose limitations to land-use. This often made the poorly accessible and barren mountain or bog landscapes, but also the human communities living there, more marginal than, for example, the landscapes of large navigable rivers.[45] In this respect, James Scott coined the term 'friction of terrain' in his book *The Art of Not Being Governed*, in which he discusses how the hill peoples of south-east Asia

44 Although coal mining had existed since the Middle Ages in the southern, but never in the northern, Low Countries, the timing of the household peat-to-coal fuel transition in bog regions (i.e., after 1850) seems similar across the eastern Low Countries: cf. Hoyois (1953, 558); Gerding (1995, 356–58); Renes (1999, 374, 379).

45 Vuyck's 1895 report provides glimpses of the perceived marginality of people living at the edges of the Peel bogs: Dirkse, Hochstenbach, and Reijerse (2007, 61).

could take advantage of the physical geography as well as the political peripherality of their homelands (Scott 2009, xi). A similar friction of terrain was noted for bogs and other wetlands in Estonia and France (Derex 2001; Pungas and Võsu 2012, 93).[46] But apart from this 'friction of terrain', the mere visual distinctiveness of large rivers, bogs, forests, lakes and mountains alone made all these landscape types appropriate potential borderlands. For that matter, bogs could at some point be reclaimed and fully transformed into very different landscapes with a whole new array of affordances – just as forests and even shallow lakes could.

Once a border – be it of a local village community or of a regional princedom – was in place, it tended to stay there for centuries, often up to the present day – despite many (early modern) border disputes (cf. Van der Ree-Scholtens 1993, 154–55, 257, 267). The watershed that crossed the Peel bogs in the longitudinal direction has likely functioned as a regional ecclesiastical and secular boundary since at least the ninth century (cf. Lucassen 1991, 8–9; Renes 1999, 124–25). A similar situation is found in the Hautes-Fagnes (Wilkin 2015, map on 156). Both there and in the Peel, these regional boundaries also separated village territories on either side of the bog. The path dependency of the (re)production of territorial borders is illustrated by the case of the abbey of Stavelot-Malmedy. In times of land-use conflict with its neighbours, this ecclesiastical princedom kept referring to its boundaries as defined by the commission of 670 CE (Schroeder 2015, 27–28).

Interestingly, this strong persistence of boundaries (whether administrative or experienced cultural borders) can be observed regardless of whether the bog landscape itself has been preserved. For example, in the German-speaking part of the Hautes-Fagnes, and partly connected to different political-territorial histories, people still culturally distinguish the 'Eifeler' to the south from those living to the north of the bog landscape, although its barrier working to human mobility has virtually disappeared (Wenselaers 2008, 8; Wendt 2010, 132; Brüll, Dries, and Quadflieg 2014, 16). Even where peat extraction and bog reclamation have completely transformed the landscape, cultural barriers may thus persist. For instance, different regional identities are still felt by many people west and east of the former Peel bogs. They read different newspapers and until recently commuted to different cities (De Vos 1989). The Land van Cuijk – the only part of the province of North Brabant east of the former Peel bog landscape – is still perceived (and branded) by many as historically and culturally distinct from the remainder of the province (Cybox n.d.; Figure 3.9). In the Hautes-

46 Similar to Scott, the latter authors noted that difficult terrain (in their case peatlands) has historically served as a refuge to outcasts and marginalised people.

Figure 3.8. Aerial photo of the Brackvenn bog (Hautes-Fagnes). The dashed ellipse indicates the approximate former extent of the raised bog. The eighteenth-century border ditch that cut the bog in two is indicated by the boardwalk (northern part), while its southern extension is visible as a lighter-coloured line against the darker brown vegetation of the relatively undisturbed western part of the bog. To the east of the former border ditch, where the old peat deposits have mostly been cut away, the grass-dominated vegetation is of lighter colour and littered with clumps of shrubs and solitary spruce trees. Late-Pleistocene frost mound relics, once buried under the bog surface, are also visible there as circular features. The curved dams and water basins west of the border ditch originate from a recent bog restoration project. Source: Google Maps, *Brackvenn bog* (Mountain View: Google, 2022).

Fagnes, some of the borders also remained the same under successive polities after the end of the French period (1815). However, that region has seen significant border shifts due to the Congress of Vienna (1814–1815), and again after both world wars (Collard and Bronowski 1993, 256–59). Unlike in the early modern period, the specific presence or use of raised bogs in the Hautes-Fagnes region appears to have played little or no role in these late modern border shifts. Besides the progressive decline of the economic importance of bog resources, this can be explained by the fact that these decisions about borders were now made at the level of the European powers, with little involvement of local actors (cf. Scharte and Liemann 2017, 33; Brüll 2019, 69-70).

Figure 3.9. Late modern reclamation landscape in the northern Peel region. The present-day *Middenpeelweg* ('Central Peel Road', N277) approximately follows the former watershed and border that longitudinally ran across the Peel bog landscape. Photo by first author.

3.6 CONCLUSIONS

The topics of bordering and 'natural boundaries' touch upon the core of environmental history, as they can often be linked to resource management and conflict, while also enabling detailed analysis of human entanglements with nature's materiality and agency. Despite a 'return to materialist concerns' in the environmental humanities, historians and geographers alike have rarely gone into detail about how natural environments came to function as borderlands and how border formation evolved over time.

Large raised bogs in the eastern Low Countries have historically developed into borderlands in two main ways. The first is through the specific environmental characteristics of bog landscapes, namely their affordance to work as hindrances (visual and de facto) to human mobility, while also affording options for access and passage. The solution to this paradox of opposite affordances of bogs is in their spatiotemporal variability: at certain places and at certain times bogs were more accessible to human mobility and land-use than at others.

Departing from these bog affordances, we argued that there is a need to revisit environmental determinism in its nuances. At the local scale, large bog landscapes had the coercive agency to function as borderlands separating the territories of surrounding village communities. Such a coercive relation between bog landscapes and boundary development did not exist on the larger spatial scale of princedoms. Nevertheless, since medieval times many large bog landscapes in the Low Countries were crossed by political borders separating princedoms. The treeless wet bog landscapes with their impressive appearances were ideally suited to provide rulers and subjects with clarity about where the boundaries (whether perceived as zonal or linear) between princedoms were situated. This was reflected in regional representations on early modern maps of the Low Countries, where bog landscapes were among the most conspicuous map elements.

The second way in which bog landscapes in the eastern Low Countries have historically developed into borderlands is their economic importance (affordance of resources). The conflicts this generated between neighbouring communities have been strong drivers for border demarcation. This economic importance was originally mainly relevant to village communities surrounding the large bogs. However, as peat fuel became a more valuable resource in late medieval times, the economic importance of bogs was extended to the (supra)regional spatial scale. Actors at local and supralocal scales were mutually dependent. Diplomatic risk management meant that rulers of

princedoms and states had an interest in solving bog resource disputes between local communities on either side of the political border, while conversely, local communities sought support from their rulers.

Boundary reproduction was path-dependent: once a border was in place, it tended to stay there due to historical claims and negotiations of rulers involved. This pattern became less strong in late modern times, when interests of local and regional actors tended to disappear from view at moments when European borders were being redrawn under the guidance of major powers. Still, medieval boundaries in bog landscapes have in many cases survived until the present as administrative and/or experienced cultural borders, even when the bog landscape itself has completely disappeared.

In sum, bog landscapes have made for borderlands through their specific affordances. But this agency was through humans: negotiation, materialisation and meaning of boundaries were human aspects, though always informed by and entangled with the bog landscape's materiality. This complementarity of the environment and humans (as perceivers thereof) is inherent to affordance theory, which we claim can be helpful in approaching and elucidating the nature-culture divide as a core theme in environmental history.

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CHAPTER 4

Place meanings of Dutch raised bog landscapes: an interdisciplinary long-term perspective (5000 BCE-present)

Based on:
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ABSTRACT

Few natural landscapes have been so negatively stereotyped as raised bogs. These stereotypes as well as knowledge gaps on bog perceptions have hampered the development of nuanced and realistic views on humans' historical relations to bogs. We studied variation in eight bog place meanings (attachment, beauty, biodiversity, functionality, risk, admiration, historicity, and mystery) from prehistory to present by integrating qualitative archaeological and historical with quantitative survey evidence on Dutch bog areas. Virtually all place meanings were found in late modern and present-day material. In older periods, functionality, risk, and mystery were dominant. Daytime/night-time differences could explain the co-existence of apparently opposite place meanings. Physical bog landscape characteristics were important place meaning determinants, and similar meaning patterns across different bog areas underlined this. The long co-existence of mystery (and risk) alongside functional meanings may explain the persistent popularity of negative bog stereotypes.

Keywords: place meaning; sense of place; peatland; raised bog; Low Countries; The Netherlands; long-term perspective; archaeology; history; online survey

4.1 INTRODUCTION

Few natural landscapes in Europe have evoked both fascination and negative stereotypes to the extent that raised bogs have (Flint and Jennings 2021; Meredith 1999; Rotherham 2020, 147). These peat moss-dominated wetlands consisting of organic soils once covered large parts of north-western Europe and the Low Countries in particular (Joosten 2019; Joosten and Couwenberg 2001). In the Netherlands and adjacent areas, bogs have largely disappeared since late medieval times due to agrarian reclamation and large-scale exploitation of peat for fuel. However, these peatlands have left an important cultural and socio-economic legacy, reflected among others in numerous toponyms, towns and villages with a peat-colonial past, and specific land parcellation types (Joosten 2019).

Especially in popular literature, persistent clichés describe bogs as remote, hostile, dangerous, and poorly accessible (Gearey, Church, and Ravenscroft 2020; Jarząb 2014; Nekrassoff 2007). Yet, bogs were valuable to people and have been used in multiple ways for millennia, as reflected in archaeological and historical records (Chapter 2; Rotherham 2020, 150; Van Beek, Maas, and Van den Berg 2015). In the Low Countries bogs have been heavily contested landscapes since late medieval times, which further underlines their varied use values to people in the past (Chapters 2 and 3).

The apparent contradiction between persistent negative stereotypes and the obvious socioeconomic value of bog landscapes in the past raises questions about the nature and interrelations of the different meanings of bogs to people. The long history of human-bog interaction undermines simplistic binary views of bog landscapes as good or bad places and demands a nuanced approach recognising the complexities of people's interaction with - and understanding of - these landscapes through time (cf. Flint and Jennings 2021, 165). The societal need for such a nuanced approach lies in the fact that water management at large, and bog conservation and restoration in particular, are increasingly complex social challenges with often divergent and conflicting stances of local stakeholders (Bal 2019, 339; Jacobs and Buijs 2011, 1). Moreover, much effort is going into peatland rehabilitation, but the cultural record is often overlooked as a key component both of the importance and 'valuing' of these landscapes in the present day and the need to protect surviving archaeological remains (Flood, Mahon, and McDonagh 2021; Gearey and Everett 2021).

This chapter addresses past and present human perceptions of bogs using the notion of place meaning, a broad concept that describes how people (individually or as a group) ascribe and preserve meaning to a place. Place meanings can have many forms, e.g., use of a place, its aesthetic value, emotional attachment to, and memories or knowledge

of a place. Place meanings are assigned to places by people, and hence subjective by nature (Jacobs and Buijs 2011). Thus, place meanings inherently vary spatiotemporally in relation to individual and cultural differences (e.g., Relph 1976), which has also been established empirically (Jacobs and Buijs 2011). Most empirical place meaning studies (often labelled as 'sense of place' research) are based on monodisciplinary sources and analyse one case study area in its present-day situation or in a short period of its history (e.g., Jarratt 2015; Shamai, 1991). Such approaches give valuable insights into variation in place meaning patterns within specific areas and time frames, but do not allow inferences about place meaning variation across areas and longer time spans.

This chapter will examine the variation in bog place meanings and how these have developed in the Netherlands from prehistory to present in different specific areas. We do so by integrating qualitative archaeological and historical evidence with quantitative survey evidence. Our research question is: What spatiotemporal patterns in place meanings of bog landscapes occur from prehistory to present?

The interdisciplinary approach we apply connects the present to long-term history and is novel in place meaning research. Each of the three disciplines involved in this study has its own epistemological characteristics, source type, and methodology. This means we can compare and combine the outcomes at the conceptual level of place meanings and not at the level of data. A framework of predefined place meanings, then, fosters interdisciplinary comparison. The analysis departs from five general categories of abstract place meanings labelled as attachment, beauty, biodiversity, functionality, and risk, as an overarching pattern derived from analyses of interviews in two case studies (Jacobs and Buijs 2011). To these, we added three bog-specific place meanings that we expected a priori to be relevant: admiration (not necessarily overlapping with a sense of *beauty*), historicity and mystery. We define *historicity* as traces of past human bog use or as the collective remembrance of specific local histories relating to the bog landscape (that people may or may not feel attached to), while mystery is understood here as something secret or incomprehensible, a truth of faith unintelligible to the mind, or as something relating to a spiritual value. With regard to the latter we are aware that prehistoric and early historic perceptions cannot be 'measured' directly, as we only have the archaeological record to work with, and that it needs to be accounted for that modern-day interpretations of archaeological data inevitably are culturally loaded (e.g. Brück, 1999; Van de Noort and O'Sullivan 2006).

By comparing these eight place meanings this way across time and space, we add a novel aspect to the existing literature, which has predominantly focused on limited temporal and spatial ranges.

4.2 STUDY AREAS

We focused on extant raised bog areas across the eastern half of the Netherlands, where virtually all remaining Dutch bogs are to be found (Bal 2019, 338). For the online survey to record present-day place meanings, six bog areas were selected (two in the north-east, two in the east, and two in the south-east; Figure 4.1). The selected bogs are listed as Natura 2000 reserves. The historical and archaeological analyses of bog place meanings focused on the Peel bog region and the Dutch part of the former Bourtanger Moor bog region (Figure 4.1). Hence, for this part of the study, we concentrated on fewer but larger bog areas. This was for three reasons. First, many historical sources only permit to identify the larger bog region, and not the specific bog areas within these to which the information pertains. Second, it was expected for some of the smaller bog areas that insufficient relevant historical sources and archaeological finds would be available. Third, it would have been too time-consuming to search for and analyse historical and archaeological evidence for all six bog areas.

All study areas are in regions that bear clear evidence of habitation between 5000 BCE and 1700 CE. In prehistoric and Roman times, the settlements consisted of small agrarian hamlets. Villages and towns only appeared from the Middle Ages onwards. These settlements were on higher and drier sandy soils, such as moraine and cover sand ridges (e.g., Gerritsen 2003, 210-213; Spek 2004). The bogs themselves, which until the Middle Ages had not been subjected to large-scale reclamation yet, were too wet for permanent habitation.

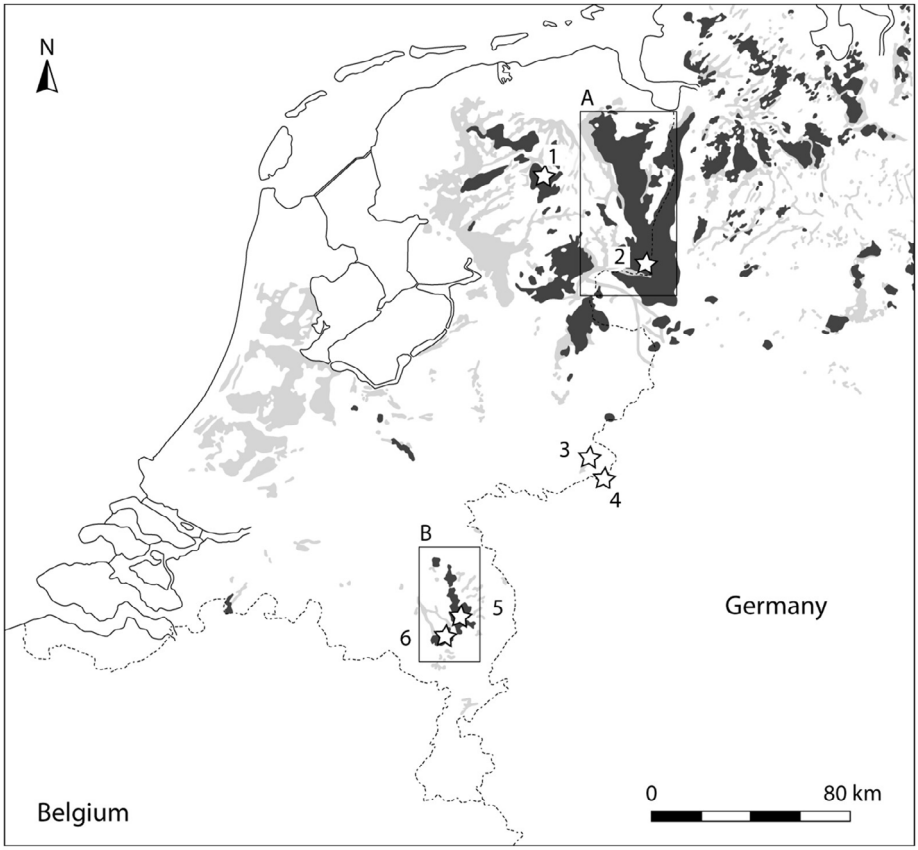

Figure 4.1. Map of the Netherlands indicating early modern peat distribution (dark grey represents bog peat; light grey represents fen peat) and study areas. The historical and archaeological analyses of bog place meanings were based on sources and finds, respectively, from the Dutch part of the Bourtanger Moor (A) and Peel (B) bog regions. Numbered stars indicate the extant bog areas included in the online survey: Fochteloërveen (1), Bargerveen (2), Korenburgerveen (3), Wooldse Veen (4), Deurnsche Peel & Mariapeel (5), Groote Peel (6). Peat distribution map adapted by permission from Springer Nature: Springer, Climatological, stratigraphic and palaeo-ecological aspects of mire development, W. A. Casparie and J. G. Streefkerk, Copyright 1992 (https://doi.org/10.1007/978-94-015-7997-1_3).

4.3 METHODS

4.3.1 Online survey to measure present-day place meanings

A total of 821 respondents completed the online survey designed for this study during March and April 2021. Most respondents lived close to one of the six studied raised bog areas. Potential respondents were approached through local social media groups, articles in local newspapers, and 1000 flyers distributed door-to-door in places near the bogs.

The survey mainly consisted of items to measure the eight predefined place meaning dimensions. Each meaning was measured with three differently formulated items (Appendix 4.1). Respondents indicated to what extent these meanings applied for them to the bog landscape in their neighbourhood on a 5-point scale. Survey forms are available on request.

For each meaning, reliability analysis was conducted to assess how closely related the three associated items were to measure the same place meaning, using Cronbach's alpha as the reliability estimate (Field 2013). The mean score over the three items was computed for each meaning, creating a new index. These indices were used for further analysis. In this chapter, we present descriptive statistics for each of the meanings and bog areas.

4.3.2 Historical analysis of place meanings

The historical analysis was largely based on published sources concerning the Bourtanger Moor and Peel bog regions (Figure 4.1). We collected sources from different categories that together were expected to represent complementary place meanings of bog landscapes (Table 4.1). Largely for reasons of available time, fictional sources and other artworks were excluded, although several of the oral history sources we analysed included folklore.

Table 4.1. Source categories from which individual sources were drawn for the historical analysis of bog place meanings. Appendix 4.2 contains information on the individual sources used.

Source category	Period covered
Oral history accounts by bog area residents	c. 1890 - c. 1975
Travel and excursion accounts and regional descriptions by learned non-locals	c. 1777 - 1895
Scientific or technical texts on peat bogs or bog use	1658 - 1890
Early modern manuscript maps and printed maps	1536 - 1792
Medieval charters and (early) modern bylaws concerning bog common lands (granting use rights, conflict resolution, and user regulations)	1326 – 1822
Medieval chronicles on regional war and conflict against the backdrop of bog landscapes	c. 1233 - c. 1530

Source analysis departed from the general place meanings and bog-specific place meanings examined in the online survey. Source documents were coded in ATLAS.ti 9 (https://atlasti.com/). We coded place meanings and any other information in the sources considered relevant to contextualise and understand the encountered place meanings. Depending on availability, source documents were added to the analysis until saturation of unique codes was observed. Appendix 4.2 lists all source documents and codes included in the historical database. Code co-occurrence tables were created to study how the place meanings varied spatiotemporally and how they correlated with socioeconomic and landscape-related aspects.

4.3.3 Archaeological methodology

The archaeological analysis was largely based on a detailed inventory of published literature on the Bourtanger Moor and Peel bog regions, varying from scientific publications to reports of contract-based research and so-called 'grey' literature. A large number of publications is available for the Bourtanger Moor, which archaeologically is the most intensively investigated Dutch bog landscape (e.g., Van der Sanden, 1999). The Bargerveen bog, in the south of the Bourtanger Moor, was the target area of our online survey but has hardly yielded archaeological evidence because of its relatively intact

state. Nevertheless, we assume that the archaeological data obtained for the adjacent parts of the Bourtanger Moor are representative for the Bargerveen as well. The Peel bogs have traditionally been less studied and have yielded far less documented finds (e.g., Ball and Jansen 2018). To compensate for the scarcity of published literature, an analysis was made of all relevant sites registered in the national Dutch archaeological repository Archis III (https://archis.cultureelerfgoed.nl) from only the Peel bogs. The observed patterns for both case study areas were analysed in the context of the large body of international archaeological literature, specifically with regard to the interpretation of deliberate depositions of objects in bogs and other wetlands (e.g., Bradley 2000).

4.4 RESULTS

4.4.1 Present-day place meanings

Seven of the eight predefined place meanings apply to the study areas, as the positive scores of these means at both the individual area and the aggregate levels suggest, the exception being risk (Table 4.2). Thus, respondents find the respective bog areas places of biodiversity and beauty, they feel attached, find the areas useful, admire the places, and consider these to some extent as historical and mysterious, while not experiencing risk. Among the general place meanings, biodiversity and beauty stand out as the most important. Risk was by far the least intensely assigned meaning, and attachment and functionality in between. By and large, the same patterns can be observed in the general place meanings for individual areas. The order of importance of these meanings is nearly consistent across the areas, and, for each meaning, the means are in a relatively narrow range. Wooldse Veen stands out a bit, with lower scores for the majority of meanings, yet the overall pattern is of similarity. The bog-specific place meanings also show this pattern of similarity across areas. Only the high score of historicity assigned to Fochteloërveen stands out. The other meanings are in a narrow range across areas and the order of importance of the bog-specific place meanings is the same across areas.

Our findings do not indicate that each respondent assigns the same meanings to bog areas. On the contrary, individual expressions vary considerably as the standard deviations in Table 4.2 indicate. Overall, the findings suggest commonalities across areas and differences across individuals, with relatively low scores for the place meanings mystery, functionality, and particularly risk.

Table 4.2. Present-day place meanings of Dutch raised bog areas as recorded in the online survey. Items were assessed on 5-point scales ranging from -2 (extremely disagree) to +2 (extremely agree) with 0 as a neutral point. *M* represents means, *SD* represents standard deviations, *n* is the number of respondents.

		General Place Meanings					**Bog-Specific Place Meanings**		
		Biodiversity	Beauty	Attachment	Functionality	Risk	Admiration	Historicity	Mystery
Raised bog	*n*	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
Fochteloërveen	223	1.52 (0.78)	1.58 (0.78)	0.88 (0.99)	0.90 (0.86)	-1.41 (0.79)	1.16 (0.96)	1.84 (0.82)	0.57 (1.08)
Bargerveen	177	1.58 (0.74)	1.50 (0.93)	1.07 (0.99)	0.95 (0.80)	-1.44 (0.77)	1.20 (0.87)	0.75 (0.91)	0.65 (1.00)
Korenburgerveen	61	1.62 (0.61)	1.60 (0.77)	0.92 (0.99)	0.96 (0.65)	-1.25 (0.82)	1.26 (0.81)	1.01 (0.80)	0.51 (1.08)
Wooldse Veen	29	1.05 (1.06)	0.99 (1.35)	0.49 (1.21)	0.55 (0.94)	-1.21 (0.83)	0.87 (1.14)	0.69 (0.99)	0.30 (1.01)
Deurnsche Peel & Mariapeel	170	1.37 (0.82)	1.33 (0.98)	0.90 (1.08)	0.63 (0.91)	-1.24 (0.91)	0.91 (1.05)	0.92 (0.91)	0.57 (1.09)
De Groote Peel	161	1.58 (0.59)	1.55 (0.71)	0.96 (0.90)	0.81 (0.87)	-1.37 (0.82)	1.07 (0.88)	0.98 (0.83)	0.63 (0.85)
All	821	1.50 (0.75)	1.48 (0.88)	0.93 (1.00)	0.83 (0.86)	-1.35 (0.82)	1.10 (0.95)	0.87 (0.87)	0.58 (1.02)

4.4.2 Place meanings as indicated by historical sources

All eight place meanings were also found in the historical sources, where the number of meanings encountered increased substantially in late modern times. The occurrence patterns of place meanings were generally comparable for the Bourtanger Moor and Peel regions, although some meanings were not found in sources pertaining to the Peel (Figure 4.2).

Functionality and to a lesser degree risk were the most persistent place meanings through time and were dominant meanings in pre-1850 sources. Functionality related to a range of economic bog use forms but mainly peat-cutting. Medieval sources occasionally mentioned the use of (bog) wetlands in the Bourtanger Moor region as battleground sites, notably treacherous for armies not familiar with the area (Van den Hombergh and Van der Werff 2012; Van Rij, 1989), while some early modern sources referred to Bourtanger Moor bogs along the Dutch Republic's border functioning as inundated defence lines. In early modern sources, passages reflecting risk mainly concerned bylaw rules on the possibility of cattle drowning in bogland. In late modern sources, risk was mostly associated with the danger that subsidence or lightning posed to humans crossing bog landscapes.

Place meanings coded as attachment, beauty and biodiversity appeared in our sources after 1850. Venema (1855, 34) suggests that attachment to bogs was experienced by local people who economically depended on bog landscapes. People from various places in the Bourtanger Moor and Peel bog regions, who experienced a sense of loss of biodiversity and scenery due to bog reclamation, related to the meanings attachment and beauty when referring to the pre-reclamation state of 'their' bog landscape (Meertens Instituut 2013-2023).

The bog-specific place meanings mystery, admiration and historicity were not prominent in our written sources. The latter two meanings were found only for the Bourtanger Moor region after 1850. Historicity related to archaeological finds from exploited bogs (Craandijk and Schipperus 2007 [1880], 49) and to the collective remembrance of specific local histories – such as the military past of the former fortress of Bourtange, which once was strategically situated on a natural dryland corridor through the bog landscape (Meertens Instituut 2013-2023). On the one hand, the meaning mystery related to phenomena beyond understanding, e.g., how bogs and the peat fuel they contain had come into being at all (Borgman 1890; Schoockius 1658). On the other hand, several oral history accounts mentioned superstition or folklore phenomena such as fiery men (Dutch: *vuurmannen*, *gloeiigen*) and will-o'-the-

wisps (Dutch: *dwaallichten*). People claimed to have encountered these phenomena typically while out in the bog for work at dusk or dawn (link to functionality). Senses of admiration and beauty similarly resulted from intense human economic engagement with bog environments. Venema (1855, 6, 30, 35), who was positive about buckwheat cultivation on bogs, admired the sight and odour of this crop when flowering, while otherwise describing (non-cultivated) bogs as remote and monotonous.

Next to long-term changes in the prominence of different place meanings (Figure 4.2), shorter-term variability (seasonal, diurnal) was also important. Passages in our sources coded by season or daytime/night-time gave insight into how seemingly contrasting place meanings (functionality versus risk or mystery) could co-exist. In the past, local peasants and workers depended economically on the bog landscape. Especially in spring and summer, during peat exploitation activities, many people would be working in the bog by day (e.g., Borgman 1890; Schoockius, 1658; several dialect recordings from the Bourtanger Moor and Peel bog regions: Meertens Instituut 2013-2023). Because of long and unregulated working days, people were sometimes still in the bog after sunset (functionality). Fears could then arise associated with poor accessibility (risk) and light phenomena (mystery) that could occur naturally in bogs: 'They used to see all sorts of things and nowadays they see nothing. But that was because people were always in the "field", in "nature", even at night. They did not look at whether it was dark or light.' (Dialect recording Valthermond, no. 1: Meertens Instituut 2013-2023).

As evident from several oral history accounts from the Bourtanger Moor region, experiences of fear and superstition would be passed on in the lively storytelling culture that existed among peat workers during mealtimes in the bog and among villagers by the fireplace in wintertime (multiple dialect recordings from the Bourtanger Moor region: Meertens Instituut 2013-2023).

Regularly, bogs were places of hiding and of clandestine activities (functionality), especially at night. Oral history accounts contain many references to (gin) smuggling in the Bourtanger Moor region (which is on the current Dutch-German border) around the First World War. In bog commons, clandestine loading of other people's turves at night occurred frequently as suggested by a bylaw from the Peel region (Gemeentebestuur Someren, 1686-1709). People hiding in bogs were typically intimately familiar with bog topography. At the same time, there likely was a difference of perceived risk of accessing the bog (at night) between those people and the authorities. Peat workers even used the bog landscapes to intimidate less familiar antagonists, as this anecdote from the early twentieth-century Bourtanger Moor region shows:

> When the Reverend De Weerd confronted peat workers of the Scholten firm who drank a lot (and thus left little money for their families), he would receive notes at home telling him to come at midnight to this or that boardwalk, to this or that peat pit. And he would go there, with a lantern! He would go there, and then he would hear people talking, but they would leave him alone. They wanted to see whether he dared to come. (Dialect recording Emmen, no. 1: Meertens Instituut 2013-2023).

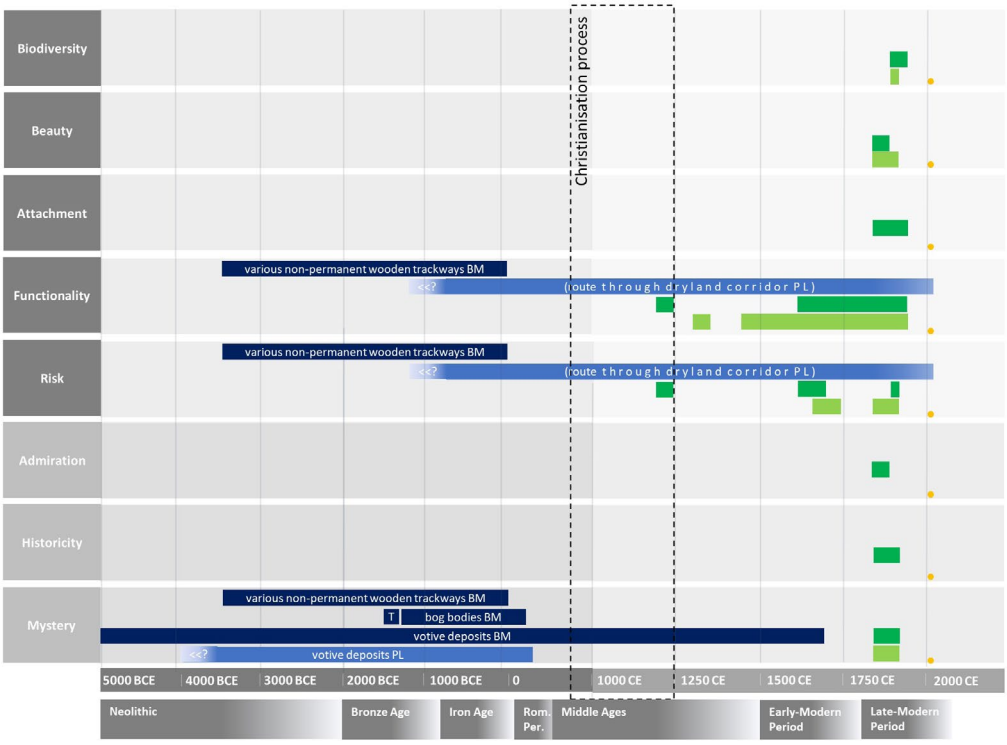

Figure 4.2. Long-term overview of place meanings pertaining to Dutch bog landscapes, as derived from archaeological (blue bars), historical (green bars), and present-day online survey (orange dots) data. Note the time scale difference after 1000 CE, applied to make the pattern of historical bars more readable. Dark blue and dark green bars pertain to the Bourtanger Moor region (BM), while light blue and light green bars pertain to the Peel region (PL). All six bog areas covered by the online survey are here taken together and represented by one orange dot. T = Temple of Barger-Oosterveld (which was probably in use for less than one century).

4.4.3 Place meanings as indicated by archaeological sources

Although the bogs were uninhabited, they were most likely entered and exploited by humans already in prehistory (functionality). Unfortunately, small-scale economic use (e.g., hunting, collection of firewood, peat extraction, sheep grazing) leaves virtually no archaeological traces, or these may be obliterated by later exploitation (Van Beek, Maas, and Van den Berg 2015). However, that bogs were frequently entered is especially clear for the Bourtanger Moor. Various wooden trackways found there date from the period between the Middle Neolithic and the Iron Age (c. 3500 – 19 BCE; Casparie, 1987). Trackways indicate the desire to enter the bogs and to create the circumstances to do so in a safe or at least convenient way (assessment of risk). The trackways vary in length and construction techniques, ranging from narrow wooden paths intended for pedestrians to wide tracks suitable for wheeled transport. They were probably used for a limited time span, perhaps no longer than a few decades, and therefore do not represent a permanent infrastructure. Some are assumed to have been used for the extraction of bog iron ore (Casparie, 1987), but irrefutable evidence for this hypothesis is not available. Remarkably, none of the trackways completely cross the Bourtanger Moor. The fact that they end in the peatland is sometimes taken as an indication that they served a ritual purpose (e.g., Van der Sanden 2001), for example, to make offerings, in line with the mysterious (or mythical) place meaning of prehistoric and early historic peatlands (see below).[47] However, short trackways - apparently suggesting movement within rather than across bogs – might just as well relate to 'functional' activities in the peatland.

Prehistoric wooden trackways are unknown from the Peel bogs. It is unclear whether these were never built or have not been recorded. However, a (long-distance) route apparently passed through the Peel near the present-day village of Meijel (Blankers et al. 2021, 82). This natural corridor, following the highest sandy areas in the wide vicinity, stayed in use until historical times. The Peel bogs have likely been entered in other sufficiently accessible places as well, for economic purposes (functionality).

The prehistoric and early historic place meaning of peatlands that stands out most prominently is mystery. The Bourtanger Moor is well-known for a wide variety of finds, mainly done during peat extraction in the nineteenth and early twentieth centuries, and generally accepted to represent votive offerings (e.g., Fontijn 2003; Van Beek, Maas, and Van den Berg 2015; Van der Sanden, 1999; 2001; Van Vilsteren, 1998). These finds date from a strikingly long time span (c. 5000 BCE - 1700 CE). Additionally, bog

47 'Mythical' is a more common term in archaeological literature.

bodies have been found in five places in the Bourtanger Moor, dating from the period between the Middle Bronze Age and the Iron Age (e.g., Van der Sanden, 1999). An especially famous find is the so-called 'temple' of Barger-Oosterveld. This small wooden building was constructed in the bog between 1478 and 1470 BCE and is assumed to have served ritual purposes (Waterbolk and Van Zeist, 1961). The archaeological find patterns (especially the number, character and location of the finds) clearly indicate that the objects selected for such offerings were not chosen randomly and varied through time (Figure 4.3).

The practice to deposit (oftentimes precious) objects in bogs and other wetlands was a very common practice in prehistoric and early historic Europe (e.g., Bradley 2000; Fontijn 2003). It is generally interpreted as a way of communication with higher powers, specifically to beg for clemency, favours or express gratitude. As such the mysterious (or mythical) dimension of bogs was widely recognised, and highly persistent. Even after the arrival of Christianity such 'pagan' practices, despite being explicitly forbidden by the church, continued until well into the seventeenth century. This is clear from numerous finds from the Bourtanger Moor and other northern Dutch peatlands, including copper kettles, pewter cups, copper dishes, coins, stirrups and stoneware jugs (e.g., Van der Sanden, 1999; Van Vilsteren, 1998). The sheer quantity of these finds, their quality, value, and their consistent find patterns indicate that the large majority of them reflect deliberate offerings rather than lost objects. Van der Sanden (1999) points out that written sources indicate that the (late medieval) rural peasant population did not just worship the Christian God but also believed in the existence of a parallel supernatural world, peopled by beings like forest women, house gods and spirits – which by the church authorities were stigmatised for belonging to the realm of superstition. Just like in prehistoric times, peatlands and other 'natural' places appear to have been considered suitable places for communication which such higher powers. On a more general note, deposition of votive objects was an intrinsic part of everyday life in many pre-modern societies. It was probably considered a practical and effective way of engaging with bogs by the practitioners (cf. Brück, 1999). As such, the place meanings functionality and mystery may well go hand in hand.

The abundant evidence for the prolonged mysterious (or mythical) place meaning attached to the Bourtanger Moor stands in stark contrast to the available data for the Peel bogs. Nevertheless, a small number of prehistoric and Roman-period offering finds are recorded from these peatlands as well. These mainly consist of stone axes (e.g., Blankers et al. 2021, 73-74) and bronze weapons and ornaments (Fontijn 2003, footnote 9 and appendices). The most remarkable finds are an extremely rare bronze ornamental disc dating from around the first century BCE, probably of Thracian origin

(De Grooth, 1987; Roymans, 1988), and an exceptional Roman golden helmet from the early fourth century CE. The latter was wrapped in a leather Roman army tent, along with a number of other finds, and deliberately pressed into the peat near a sand ridge (Van Driel-Murray 2000).

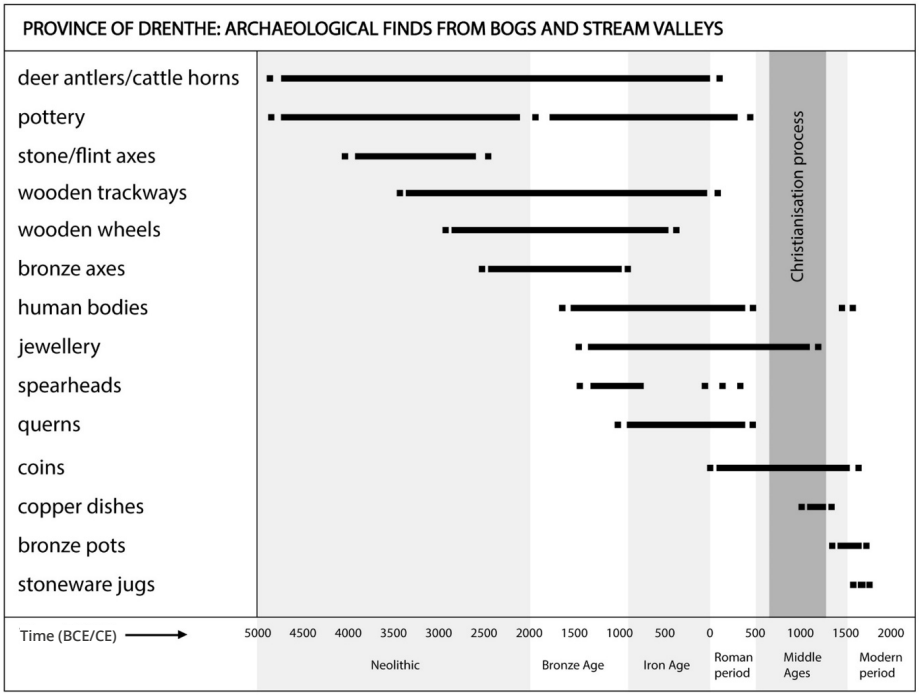

Figure 4.3. Temporal patterns of archaeological find categories from bogs and stream valleys in the Dutch province of Drenthe (including a large part of the Bourtanger Moor region). These finds are interpreted as votive offerings. Adapted by permission from Van Vilsteren (1998).

4.5 DISCUSSION

Our results refute the binary picture of functional but hostile bog landscapes frequent in popular culture (e.g., Gearey, Church, and Ravenscroft 2020). Instead, they show a diverse and nuanced picture of bog place meanings through time and space. This diversity consisted not just of independent place meanings linked to different social groups or individuals with different involvements and interests in bogs. Rather, contradicting place meanings could coexist within social groups or individuals, as governed by, e.g., daytime/night-time differences. The outcomes suggest that specific physical characteristics of bog landscapes such as their peat deposits, openness, sogginess, and luminous phenomena (Meredith 2002, 329-330) were important determinants of place meaning. This aligns with phenomenological viewpoints emphasising the ways in which dwelling in and embodied engagements with the landscape animate its perceived qualities (Merleau-Ponty [1945] 2013; cf. Stedman 2003, 671). After all, throughout history people have intensely experienced the spatial and material dimensions of bog landscapes through their various activities therein. The generally similar place meaning patterns across the different bog areas we studied further underlines the role of the physical landscape of bog ecosystems in determining generic bog place meanings.

4.5.1 Temporal and spatial patterns of bog place meanings

In our study, functionality, risk and mystery were clearly more important bog place meanings in the past than at present. The decreased prominence of functionality and risk relates to the cessation of 'traditional' economic bog use (notably peat exploitation) since the early twentieth century and to late modern infrastructure improvements. Most Dutch bog areas have become protected nature reserves since the mid-twentieth century. Earlier Romanticist influences on society and the advent of leisure time can explain an increase of the place meanings beauty, biodiversity and attachment.

The long-term history of the bog-specific place meaning mystery is remarkable. The substance of this meaning varied over time: from votive deposits to communicate with higher powers via wonder about how bogs and peat deposits had come into being and beliefs in will-o'-the wisps and fiery men to the present-day notion among survey respondents that 'bogs are somewhat mysterious'. Constant factors in this changing notion of mystery seem to be the specific characteristics of the physical bog landscape and the connection to functionality (involving dwelling in the bog landscape). The long co-existence of the place meanings mystery (and risk) next to functionality may also explain the persistence of strong (negative) clichéd images about bog landscapes in popular culture until present.

There was a general background of similarity across the bog areas studied. However, compared to the Bourtanger Moor region, the weaker archaeological signals in the Peel region for - in particular - a mysterious (or mythical) place meaning dimension of bogs stand out. This is generally attributed to differences in reclamation history and scientific attention (Fontijn 2003, 46; Gerritsen 2003, 174). Whether this could also account for the total lack of medieval and post-medieval votive finds so far is difficult to tell.

4.5.2 Addressing methodological issues

Interdisciplinary long-term approaches to place meanings are rare and those that do exist are monodisciplinary history studies (e.g., Corbin 2010). Our method has the potential to transcend limited or one-sided views of place meanings of a particular landscape type. Yet, there are several limitations to this approach. We will discuss four of these.

Firstly, archaeological evidence from Dutch bogs (generally subject to earlier large-scale peat exploitation than elsewhere in Europe) hardly allows to make inferences about place meanings such as beauty, biodiversity, attachment, admiration, and even functionality. It is possible that these place meanings also pertained to prehistory and early history, but the available data do not allow to specify their role.

Secondly, other scholars might prefer to query the source materials in an open-ended way rather than to search for predefined place meanings. The former might indeed have yielded additional bog place meanings. However, our study did not aim at providing an exhaustive overview of all possible meanings and the eight place meanings we studied together cover a varied range of meaning dimensions that we assume to be largely complete. In addition, applying different open-ended approaches for three disciplinary contributions would likely have hampered the potential for comparisons.

Thirdly, for practical reasons, we excluded some potentially relevant source categories from the historical analysis. One of these was toponyms. A previously unpublished analysis of a late eighteenth-century military topographical map concerning the north-eastern part of the Dutch Bourtanger Moor region (Appendix 4.3) showed that toponyms reflecting functional place meanings (in relation to economic use and accessibility of the bog landscape) were by far dominant. Similar pictures emerge from published toponym records of the Belgian Hautes-Fagnes (Collard and Bronowski, 1993) and south German Murnauer Moos bog areas (Strohwasser 2018). Although folk stories in the oral history sources introduced some elements of fiction in our analysis, the exclusion of genuine fiction sources was purposeful. We were primarily interested

in 'factual' place meaning patterns as derived from people using and crossing bog landscapes, often on an everyday basis. Yet, we are aware that fiction literature and other artistic expressions may have influenced people's perceptions of bog landscapes, and other studies clearly show the potential interest of fiction sources for bog place meaning research (e.g., Meredith, 1999; Gearey, Church, and Ravenscroft. 2020).

Fourthly, our aim was to identify spatiotemporal rather than social group-related patterns in past bog place meanings. Nonetheless, the historical cases we presented of smugglers and peat workers intimately familiar with the bog landscape and using that landscape to their advantage in conflicts with authorities are interesting examples of social differentiation transcending the level of merely different place meanings to the level of (subversive) actions. These outcomes align with those of Pungas-Kohv et al. (2015, 247) and Rotherham (2020, 83-84) for peatlands across Europe, which since late medieval times functioned as human refuge sites to escape from (repressive) authorities or war events.

4.5.3 Placing the outcomes in the context of previous studies

The pattern of plurality, ambiguity and nuance in bog place meanings that we found aligns with previous, disciplinary diverse work (Byg et al. 2017; Flint and Jennings 2021; Jedwab 2020; Pungas-Kohv et al. 2015, 254-256). It is clear that the negative stereotype of bogs as dangerous, sterile and inhospitable environments does not correspond to reality, either in the past or at present.

But why has this clichéd image proved so persistent? Two historiographical analyses of bog landscapes in the southern Low Countries show that nineteenth-century writings have been influential in establishing this clichéd image for two reasons. First, while reaching a wider audience than previously possible, these writings often painted a romantic and exaggerated picture of a dangerous wilderness (Nekrassoff 2007, 115-116). Second, part of their authors supported a contemporary political agenda of wetland reclamation (Jedwab 2020, 924). Next to influential nineteenth-century publications, orally transmitted folklore may also have contributed to the persistence of negative bog stereotypes within local communities (cf. Pungas-Kohv et al. 2015, 247). In addition to these explanations, our study emphasises the role of the physical bog landscape as a determinant of contrasting place meanings that could sustain negative clichés about bogs.

4.5.4 Societal relevance and perspective

In bog management and restoration projects across the Netherlands and Europe at large, hydrological and ecological goals are still leading drivers of engagement with and activities in bog landscapes. While years of experience with such measures render many bog restoration projects promising, successful restoration usually demands significant measures to be taken around the nature reserves. These include elevating groundwater levels and conversion of agricultural land into wet buffer zones. These requirements often cause tension or conflict between nature conservancy organisations or government bodies on the one hand and local farmers and residents on the other (Bal 2019, 338-339). Several studies have signalled that for long-term success of peatland conservation, it is vital to pay attention to place meanings and perceptions as present among local stakeholders or the broader public (Byg et al. 2017; Flint and Jennings 2021; Jacobs and Buijs 2011). Our study underlines this need by highlighting the long and complex history of human use and perceptions of bogs. While we found largely similar place meaning patterns between different bog areas, Flint and Jennings (2021, 176) stress the varied local contexts between sites: '[...] there is no single story of the perceptions of peatlands and their heritage, therefore approaches to reconcile and create dialogue between different views is likely to be highly contextual.'

4.6 CONCLUSIONS

This study contributes to a nuanced understanding of place meanings of Dutch bog landscapes from prehistory to present, beyond persistent negative stereotypes of bog landscapes. Our innovative method is promising through its potential to transcend limited or one-sided views of place meanings of a particular landscape type. Limitations to this approach included epistemological as well as practically determined constraints. Virtually all predefined place meanings (attachment, beauty, biodiversity, functionality, risk, admiration, historicity, and mystery) were found in late modern and present-day material. In older periods, functionality, risk, and mystery stood out. Daytime/night-time differences explained co-existence of paradoxical meanings. Physical bog landscape characteristics were important place meaning determinants, and similar meaning patterns across bog areas underlined this. The long co-existence of the meanings mystery (and risk) alongside functionality may explain the persistent popularity of negative clichéd images about bogs. Our study provides knowledge that can be used to address the much-stated need for greater involvement of local stakeholders' visions and perceptions to contribute to successful bog management and restoration in the longer term.

ADDITIONAL FILES

Appendices 4.1, 4.2, and 4.3 of this chapter are available online at https://doi.org/10.1080/01426397.2022.2118246.

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CHAPTER 5

Bridging natural and cultural heritage management: recommendations for present and former raised bog areas

Based on:
Paulissen, M., Van Beek, R. Bridging natural and cultural heritage management: recommendations for present and former raised bog areas, *submitted*.

ABSTRACT

Raised bogs (peat moss-dominated wetlands) are under environmental pressure but valued for their specific biodiversity and climate-mitigating potential. Strong efforts to restore these unique ecosystems contrast with a limited focus on cultural heritage management in bogs, putting their exceptional cultural heritage at risk. We take a new perspective on cultural heritage management in bog remnants and make recommendations for measures synergetic to their natural and cultural heritage. We focus on tangible cultural remains on the surface of bog remnants and surrounding former bog areas in the Netherlands, where bogs have long been under exceptional use and environmental pressure. To reach this objective, we first (1) explore the range and diversity of tangible cultural remains on the land surface through analysis of three case studies, (2) conduct a systematic inventory of how such cultural remains are currently incorporated in land management in and around 17 bog remnants, and (3) based on that develop a range of recommendations for improved integral management. We illustrate how preserving and displaying cultural remains can be aligned with the achievement of ecological goals in bog nature reserves.

Keywords: cultural remains; heritage management; nature management; Natura 2000; raised bogs; The Netherlands

5.1 INTRODUCTION

Raised bogs are peat moss-dominated wetlands that consist of organic soils, and once covered large parts of western and northern Europe and the Low Countries in particular (Gerding 1995; Joosten and Couwenberg 2001; Leenders 2013). However, most bog areas in Europe including the Netherlands, the main focal area of this study, have disappeared since 1000 CE due to large-scale peat extraction and agricultural reclamation (Joosten 2019). In continental western and central Europe, less than 10% of the original peatland area is left (Joosten and Couwenberg 2001). Since 1900, most remaining bogs have become nature reserves. Consequently, their management aims primarily at conserving and restoring the special ecological values (flora and fauna) and ecosystem functioning of bogs. Since conserved and restored bogs may function as net carbon sinks (Gallego-Sala et al. 2018), climate mitigation has become an important additional goal of bog conservation (e.g., Tanneberger and Wichtmann 2011). To achieve these biodiversity and climate mitigation goals, many bog remnants and surrounding former boglands across Europe have over the last decades been subjected to restoration and rewetting projects, which often involve significant landscape interventions (Jansen, Grootjans, and Van Tooren 2019; Tanneberger and Wichtmann 2011).

There is growing awareness that large-scale bog restoration projects can only be successful with the support of local communities (Byg et al. 2017, 181; Jansen, Grootjans, and Van Tooren 2019, 350). Cultural remains of past human landscape practices may contribute to such local support, since these remains constitute an important way in which people feel connected to their environment (Braaksma, Jacobs and Van der Zande 2016, 64). Cultural remains can be both tangible objects or structures from the past, or intangible traditions, stories and placenames connected to the landscape. They may be valued as carriers of meaning, memory, and identity and hence considered as heritage by local residents and/or the general public (Flood, Mahon, and McDonagh 2021). When a landscape is subject to (imminent) change, people often express concern about the handling or the future of this heritage. This is in particular true for bog landscapes subject to new conservation policies or restoration projects. Recent examples across Europe show that fear of loss of tangible or intangible heritage often is a central argument for resistance within local communities (Carroll 2022; Ruber 2022). But despite its evident importance, bog-related cultural heritage has received relatively little attention in bog conservation and restoration management (cf. Jansen and Grootjans 2019; Rotherham 2020, 14).

From a stratigraphic perspective, we can distinguish sub-peat, intra-peat, and supra-peat cultural remains (cf. Gearey et al. 2010, 11; Figure 5.1). The former two categories comprise archaeological features and artefacts, while supra-peat remains include younger human-made structures engraved to the ground surface, built objects, and intangible heritage such as placenames and bog-related stories (Table 5.1). Bog-related cultural remains are not limited to the remaining bogs themselves. The surrounding areas often also harbour cultural remains connected to former peat extraction and/or bog reclamation (Leenders 2013; Van Beek, Maas, and Van den Berg 2015).

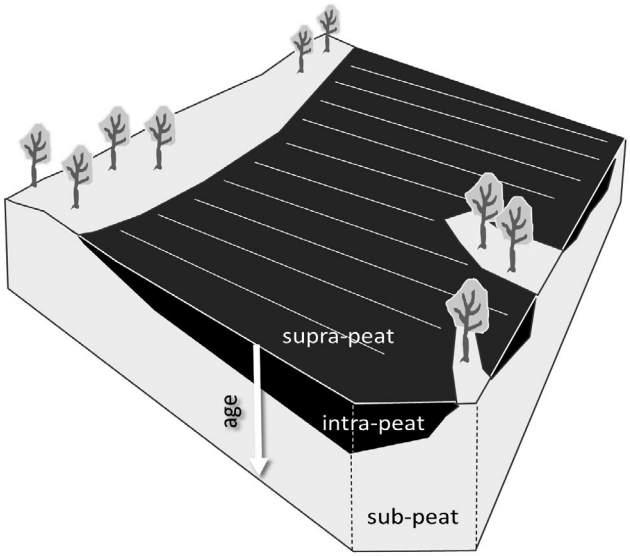

Figure 5.1. Schematic cross-section of a bog remnant with surrounding drylands and indicating the stratigraphical distinction between supra-peat, intra-peat, and sub-peat layers. The three layers harbour different types of cultural remains (cf. Gearey et al. 2010). Mineral soils represented in light grey, peat soils in black.

Table 5.1. Simplified overview of common cultural remain types (with examples) in (former) bog landscapes classified according to bog use stage and stratigraphical position (on land surface, within, or underneath peat deposit). This chapter focuses on visible tangible remains at the land surface (bold text).

	Cultural remains dating from:			
	BEFORE START OF BOG GROWTH	BETWEEN START OF BOG GROWTH AND START OF PEAT MINING	PEAT MINING	AFTER PEAT MINING
SUPRA-PEAT		**Traces of buckwheat burning culture** **-shallow ditch systems** **Traces of *bovenveen* use** **(agriculture practiced on superficially drained bog)** **-elongated narrow strip parcels** **-former house places (e.g., indicated by specific plant species)** **Traces of bog reclamation for agriculture** **Traces of bog use as common land and/ or borderland** **-boundary markers** **Traces of military defence use** **-dikes to retain water in bog (*leidijken*)** **-sconces and other fortifications** Specific placenames Folklore Bog-related stories	***Traces of large-scale commercial peat mining:*** **-local relief differences, disturbed peat profiles** **Infrastructure** **-canals for drainage and transport** **Settlements and industrial buildings (outside bog remnants)** **-churches for peat workers** **-peat-colonial villages** **-peat-processing factories** ***Traces of small-scale peat mining:*** **-local relief differences, disturbed peat profiles (on a relatively small scale)** **-small square or round turf pits** **-shallow peat dredging ponds** **-transport tracks (peat dikes)** Specific placenames Folklore Bog-related stories	**Traces of use as nature reserve** **-blocked drainage ditches** **-dikes for water retention** **Traces of use as recreation area** **-boardwalks, footpaths, vantage points, information boards, visitor centres** **Traces of peat-colonial land use (outside bog remnants)** **-peat-colonial farmsteads** **-regular parcellations** **-infrastructure (e.g., road system, polder pumping stations)** Specific placenames
INTRA-PEAT		Embedded (waterlogged) archaeological remains -wooden trackways, platforms -extraction sites (e.g., fishing stations) -waste dumps -bog bodies -'ritual' sites (e.g., 'votive' offerings)		
SUB-PEAT	Archaeological remains in the mineral soil on which the bog developed -settlement sites (e.g., stone age camp sites) -burial sites (e.g., megaliths)			

Just like the bog ecosystems themselves, the cultural remains stored in their peat deposits or engraved to their surface are under pressure from drainage, atmospheric pollutant nitrogen inputs and climate change (Buckland 1993; Natural England, and Historic England 2021; Gearey and Chapman 2022). In reclaimed boglands land consolidation, large-scale rewetting projects and other land use changes may endanger the cultural remains present there. Large-scale rewetting projects for ecological bog restoration may benefit intra-peat cultural remains, as their long-term preservation also needs permanently wet conditions in the peat deposits. But ecological restoration sometimes requires excavation of mineralised residual peat and this may put cultural remains present therein at risk (Gearey et al. 2010, 35). Consequently, there is a risk that ecological restoration projects have a negative rather than a positive impact on the long-term preservation of bog-related tangible heritage.

Previous research on cultural remains in bogs has mainly focused on archaeology (Gearey and Chapman 2022). This largely concerns sub- or intra-peat remains, which are notoriously difficult to predict spatially and are generally encountered by chance. In contrast, the relatively younger supra-peat remains are often clearly visible in the field as well as on spatial imagery such as aerial photographs and digital elevation models. Studies describing the spatial layout and main landscape structures of medieval bog reclamations and large-scale peat mining landscapes in the Netherlands and adjacent areas (e.g., Wassermann 1985; Borger 1992; De Bont 2008; Leenders 2013; Zomer 2016) worked from a historical-geographical rather than a heritage perspective. The latter perspective was central to Raven's (2015) contribution on the Bargerveen, which had a biographic rather than systematic inventory approach. In sum, while tangible supra-peat remains in and around extant bog reserves are of particular importance to local communities and support for restoration projects, this bog-related heritage category has so far been underexposed in academic research.

Our aim is to take a new perspective on the management of tangible cultural remains at the surface of (former) bogs by indicating how it could be better aligned with ecological objectives. To reach this goal, we first need to understand in more detail the nature and range of tangible supra-peat remains in and around bog remnants, and what role such remains currently play in bog management. We focus specifically on tangible supra-peat remains since tensions between local residents and nature management organisations in bog areas are often related to or even caused by precisely this category of cultural remains as opposed to the more elusive sub- and intra-peat remains (cf. Spek, Brinkkemper, and Speleers 2006). Ultimately, we aim (1) to contribute to improving the conservation and experience of - as well as the

engagement with - bog-related heritage and (2) to increase mutual understanding and support among bog area managers, heritage management agencies, and local residents.

To achieve this objective we formulated the following research questions:

1. What types of tangible cultural remains can we expect on the surface of raised bog remnants and adjacent former bog landscapes?

2. To what extent and how are cultural remains incorporated in current management plans for Dutch raised bog reserves?

3. How can tangible cultural remains on the land surface be integrated into the management of (former) raised bogs in a way that benefits the cultural remains while not compromising ecological and climate mitigation goals?

The Netherlands is a particularly suitable study area, given its varied and comparatively intensive bog use history. Consequently, a very diverse set of bog-related cultural remains can be expected here, representing much of the likely European range of bog-related cultural remains. To answer the first question, we will map tangible cultural remains at the surface of (former) bog areas in three Dutch case studies. To address research question 2, we will carry out a literature survey on all 17 Dutch Natura 2000 areas containing bog remnants (Figure 5.2) and adjacent former bogland areas. To answer research question 3, building on the outcomes of the previous steps, we will assess potential synergies and tensions between nature conservation goals and cultural heritage management in and around bog reserves, and make recommendations for integral future management on a European scale.

5.2 RAISED BOGS IN THE NETHERLANDS: USE HISTORY AND CURRENT STATUS

Bogs were used in many different ways by humans since prehistory (e.g., Van Beek, Maas, and Van den Berg 2015; Rotherham 2020; Gearey and Chapman 2022). This ranged from extensive or local use forms, such as the grazing of livestock or crossing peatlands for travelling or ritual use, to more intensive uses such as peat exploitation or peatland reclamation for agriculture (Chapter 2; De Bont 2008; Zomer 2016). As urban centres, manufacturing and reclamations developed especially from the late Middle Ages (notably in the western Netherlands), firewood became progressively scarcer and was increasingly replaced by peat fuel (Gerding 1995, 497; Joosten 2019, 104-105). Peat was taken from bogs, gradually at ever larger distance from the main urban centres. In many parts of the Netherlands, peat cutting to fuel the country's main cities and industries was on an industrial scale and run by commercial companies. Bogs were often completely cut away, after which the remaining soils were agriculturally reclaimed.

With their progressive decline, the remaining stretches of bogland were increasingly valued. After 1900, and most notably after the Second World War, they became nature reserves. From the 1990s onward, it became clear that the remaining bogs, being negatively impacted by intensive agriculture in their surroundings, could only survive on the longer term if their hydrology was restored. Increasingly large rewetting projects were started in and around many bog reserves, occasionally causing frictions with neighbouring local communities (Spek, Brinkkemper, and Speleers 2006; De Meij et al. 2019). In the last two decades, virtually all Dutch bog remnants (and many European ones) have been designated as Natura 2000 reserves, recognising their importance to European nature conservation (Figure 5.2). In the Netherlands, responsible government bodies (often provinces) draw up six-year management plans for the individual Natura 2000 areas. Raised bog areas within the Dutch Natura 2000 reserves range from 9 ha (Besthmenerveentjes) to over 2000 ha (Bargerveen, Fochteloërveen, Verheven Peel). Oftentimes they are remnants of bogs that originally were far larger. Depending on their state of preservation, these remnants are classified as habitat types 'Active raised bogs (H7110)' and/or 'Degraded raised bogs still capable of natural regeneration (H7120)' (Jansen and Grootjans 2019).

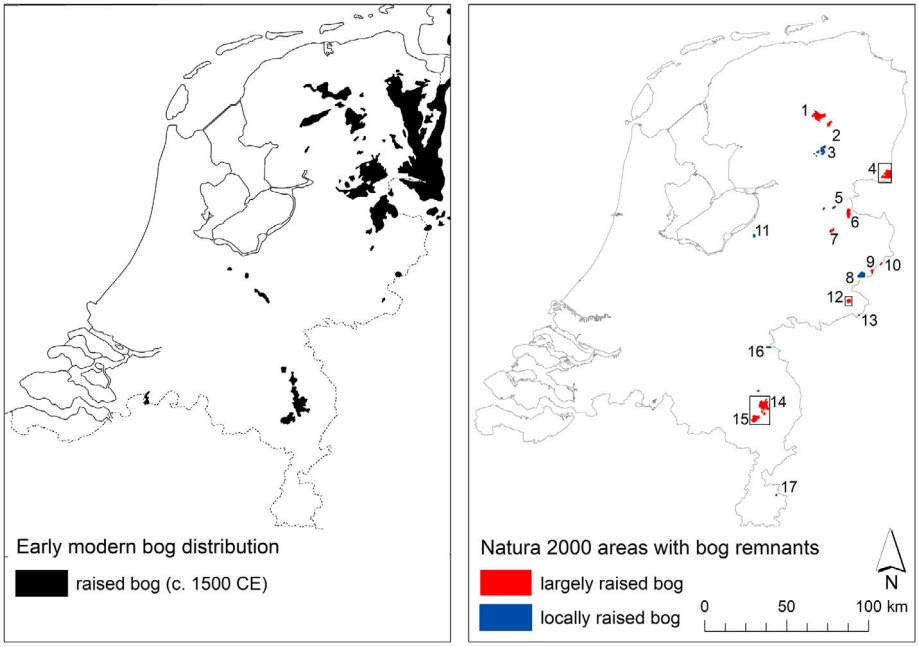

Figure 5.2. Map of the Netherlands indicating (a) bog distribution around 1500 CE and (b) the 17 Natura 2000 areas with bog remnants. The three case study areas of this chapter are indicated with rectangles. The numbers correspond with those in Appendix 5.2. Peat distribution map adapted by permission from Springer Nature: Springer, Climatological, stratigraphic and palaeo-ecological aspects of mire development, W. A. Casparie and J. G. Streefkerk, Copyright 1992 (https://doi.org/10.1007/978-94-015-7997-1_3).

5.3 METHODS

5.3.1 Mapping cultural remains in (former) bog areas

Case study areas

We selected three case study areas from the Natura 2000 reserves with significant bog remains: the Bargerveen, Peel and Korenburgerveen bogs. These represent a geographically even distribution across the eastern Netherlands and reflect the variety in size and use history of Dutch bog areas. The Bargerveen and Peel bog remnants originally were part of much larger, now largely lost bogs. Therefore these case study areas both consist of bog remnants and former boglands. In contrast, the Korenburgerveen represents a smaller bog and its present dimensions largely correspond with its former maximum expansion (Ketelaar and Van 't Hullenaar 2019, 278). Below we present the general characteristics of these case study areas.

Bargerveen area. The Bargerveen bog (2083 ha) is the only significant Dutch remnant of the former vast Bourtanger Moor bog landscape (c. 160,000 ha) in the north-eastern Netherlands, on the border with Germany (Jansen et al. 2019). Between c. 1200 and 1950, agriculture was practiced on the superficially drained bog (in Dutch: *bovenveencultuur*, Verhoeven 1992, 4). Departing from a line of farms constituting a reclamation basis (typically parallel to a stream), narrow strip parcels extended into the bog. Thus, each elongated strip was characterised by an environmental gradient (moisture regime, substrate type, soil fertility) determining which parts were used as meadowland, pastureland, or arable land. Between c. 1650 and c. 1850, the Bourtanger Moor was part of the Dutch Republic's militarily reinforced natural border against foreign incursions. To this end, dike systems ('leidijken') were built to retain surplus water within the bog (Raven 2015). Large-scale commercial peat exploitation only started after 1850 (Gerding 1995; Scholtens 2017). A younger phase of the *bovenveencultuur* also started around 1850, when (generally German) colonists settled in the Bargerveen for peasant farming on the bog (Raven 2015; Scholtens 2017). Buckwheat burning culture was practiced as well. Around the 1900s, the focus of peat exploitation activities shifted to producing peat litter and activated carbon (Gerding 1995; Raven 2015). The stepwise designation of the Bargerveen as a nature reserve started in 1968, but commercial peat exploitation in the area continued until the early 1990s (Jansen et al. 2019).

Peel area. The Peel case study area is located in the south-eastern Netherlands, in the centre of a former bog landscape that once covered c. 55,000 ha including surrounding heathlands. The study area includes two large remaining bog complexes: the Verheven Peel (Deurnsche & Mariapeel, 2734 ha) and the Groote Peel (1348 ha). Subsistence peat

cutting by local residents has been recorded since the late Middle Ages (Blankers and Van Noorden 2019; Van Duinen and Joosten 2019). In early modern times, inhabitants of several villages in the hinterland of the Peel bogs were involved in self-organised turf commercialisation (Chapter 2). In the Verheven Peel large-scale commercial peat exploitation started around 1850, in the Groote Peel in 1889 (Blankers and Van Noorden 2019; Van Duinen and Joosten 2019). Similar to the Bargerveen area, commercial peat exploitation shifted from peat fuel to other turf products around the 1900s (Joosten 1991, 95-97). The Verheven Peel was appointed as nature reserve between 1964-1980 (Blankers and Van Noorden 2019), the Groote Peel between 1951-1982 (Van Duinen and Joosten 2019).

Korenburgerveen area. The Korenburgerveen bog (459 ha) is situated in the eastern Netherlands. Unlike the Bargerveen and Peel bogs, it has not been subjected to large-scale commercial peat exploitation (Ketelaar and Van 't Hullenaar 2019, 278). The bog has been extensively used since the Middle Ages (probably for livestock grazing, and wood cutting in the bog margins). Little is known about the history of peat exploitation and (small-scale) bog reclamation. While subsistence peat-cutting for fuel probably existed earlier, its climax was in the second half of the nineteenth century. By 1909, it had become of minor importance (Ketelaar and Van 't Hullenaar 2019). Since 1918 and notably from 1950 onward, the bog was gradually developed into a nature reserve. The Korenburgerveen is the only case study where part of the bog is managed by a local foundation (Stichting Marke Vragenderveen) rather than a national nature conservancy organisation. This foundation is still rooted in the local farmers community.

Procedure to identify bog-related cultural remains in the case studies

A new procedure was developed to map bog-related cultural remains at the surface (supra-peat) in the three case study areas (Figure 5.3). For each study area a timeline of bog use history was constructed based on descriptions in Jansen and Grootjans (2019). By combining these timelines (Appendix 5.1) with visual analysis of digital terrain models, aerial imagery and post-1850 topographic maps (https://www.topotijdreis.nl/) in ArcGIS Desktop 10.6.1, we created maps of distinct cultural remains zones. The digital terrain models and aerial imagery provided objective and comprehensive 2D palimpsest images of cultural traces and remains, while the timeline information was used to interpret the age and genesis of the cultural remains. Additionally, the listed (built) monuments directly or indirectly related to former bog use were localised and mapped using monument registers (accessible via https://www.cultureelerfgoed.nl/onderwerpen/bronnen-en-kaarten/).

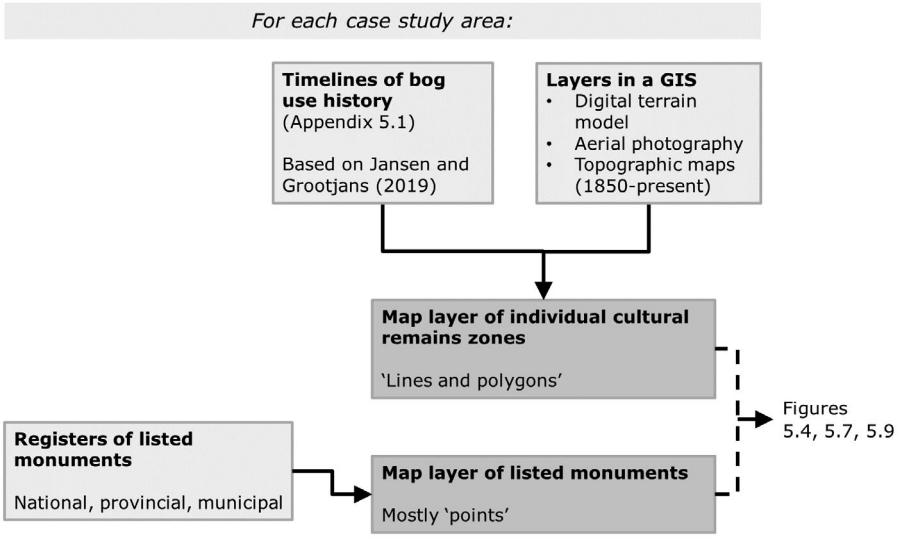

Figure 5.3. Procedure to identify tangible bog-related cultural remains on the surface of bog remnants and surrounding reclamation landscapes.

5.3.2 Literature survey on the role of cultural remains in the current management of (former) bog areas

We performed a basic literature survey for all 17 Dutch Natura 2000 reserves to obtain a general impression of the cultural remains represented in these areas. To this end we consulted available overview studies (e.g., Jansen and Grootjans 2019) and a range of site-specific publications. Subsequently we investigated to which extent cultural remains are incorporated in the current Natura 2000 management plans, which were accessed via https://www.bij12.nl/onderwerpen/natuur-en-landschap/natura-2000-beheerplannen/. This was done through an extensive search for relevant keywords (e.g., heritage, history, archaeology, cultural remains). Additionally, we cursorily analysed to what degree bog-related cultural remains in surrounding reclamation landscapes are incorporated in provincial and regional cultural maps, and if these remains are legally protected. This information was retrieved from online data provided by the Dutch Cultural Heritage Agency (https://www.cultureelerfgoed.nl/onderwerpen/bronnen-en-kaarten/). Appendix 5.2 contains all collated information on the Natura 2000 reserves, the cultural remains they contain, and their management.

5.3.3 Assessment of synergies and tensions between nature conservation goals and heritage management

In order to obtain a systematic and generic assessment of synergies and tensions between nature conservation goals and management of bog-related cultural remains, we developed a matrix table in which the main types of raised bog management and restoration measures were plotted against recommendations for management of (supra-peat) cultural remains (Appendix 5.3, summarised as Table 5.2). The measures were derived from recent overviews for Dutch raised bogs (Jansen, Grootjans, and Van Tooren 2019; Jansen et al. 2019) and are similar to those applied in bog reserves elsewhere in north-western Europe (e.g., Eiseltová 2010).

5.4 RESULTS

5.4.1 Cultural remains in (former) bog areas

Bargerveen area

Cultural surface structures in the Bargerveen area (such as ditch, canal and road systems) and their orientation vary spatially in a block-wise fashion (Figure 5.4). Each block represents a drainage unit, and many carry the placename *Blok*, accompanied by a sequential number (Scholtens 2017; Jansen et al. 2019). Over the twentieth century, new markets demanded new peat types, and new extraction techniques were introduced. In combination with spatial variation in peat types, this explains the diverse zonal pattern of surface structures.

Not all former bog use forms have left physical traces. Some, for instance extensive livestock grazing on the bog, were of a 'non-engraving' nature. Relics of other use forms have been erased by later land use types. For example, the buckwheat burning culture originated in the seventeenth century and was eventually practiced on virtually all large Dutch bogs (Gerding 1995; Joosten 2019). Buckwheat fields covered much of the Bargerveen before commercial peat exploitation started, as still witnessed by the village name *Weiteveen* (literally: 'Buckwheat Bog'). *Bovenveencultuur* was practiced around Nieuw-Schoonebeek and is reflected by the long strip parcellation stretching into the Bargerveen bog.

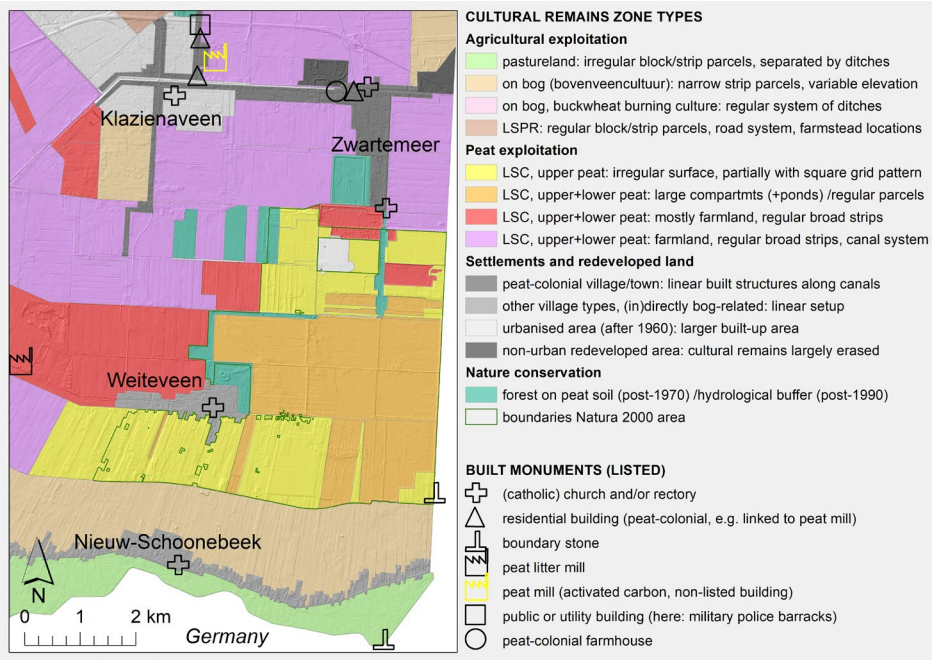

Figure 5.4. Map of the Bargerveen case study area showing the spatial pattern of supra-peat tangible cultural remains zones relating to specific historical use forms, and the location of listed national, provincial and municipal monuments linked to these land use forms. LSPR = Large-scale planned reclamation; LSC = large-scale commercial peat extraction.

The national, provincial and municipal monuments in the area constitute a heterogeneous collection of tangible remains (Figure 5.4). Striking examples are several roman-catholic churches and rectories (Figure 5.5), relating to the influx of German peasant farmers and peat workers after 1800 (Raven 2015, 290). They settled on and near the Bargerveen bog in the hitherto predominantly protestant province of Drenthe and built peasant houses on locations where peat had been cut away (Figure 5.6). During the Second World War these houses were re-used as hiding places. None of them has been preserved, but many former house places are still recognizable by e.g., elevation differences and extant nut trees or other species reminiscent of human habitation.

Figure 5.5. St Antony's church with rectory (built in 1921). In the foreground the former edge of the Bargerveen where turves are being dried. Later these buildings were designated as national monuments partly because of their special location on the edge of the peat-colonial village of Zwartemeer and close to the present-day Bargerveen nature reserve. Photo: J.B. Schröer, Drents Archief (collectie Schröer).

Figure 5.6. Former peasant house (upper image) in a recently rewetted part (lower image) of the Bargerveen nature reserve. The last residents left in 1967. More recently, the building was adapted to function as a habitat to wild animals, until it burned down after a lightning strike in 2018. Upper photo by Albert Raven, taken with permission from Raven (2015); lower image taken with permission from Wanders (2020).

Peel area

In this case study area, too, the varied nature of the mineral and peat subsoil has led to a diverse use and zonal patterning of supra-peat cultural remains. Here, however, some of the most conspicuous traces originate from subsistence peat cutting (Figures 5.7 and 5.8), others from commercial peat exploitation. Traces of the buckwheat burning culture with its shallow ditch systems (cf. Joosten 1991) only locally survived in areas indicated as buckwheat lands on mid-nineteenth century maps (Figure 5.8c). The zonal pattern of bog-related cultural remains is less diverse outside the Natura 2000 area, due to reclamations starting around 1900. After the Second World War, land reallotment schemes were executed in many reclaimed areas. Consequently, peat extraction pits, old tracks for carrying away turves, etc. have been erased. What persists is a diversity in typical reclamation structures such as road and field patterns.

Built monuments and protected townscapes are particularly well represented in the small peat-colonial villages of Griendtsveen and Helenaveen. As peat workers from the north-eastern Netherlands settled in the traditionally roman-catholic Peel area, a protestant church was established in Helenaveen.

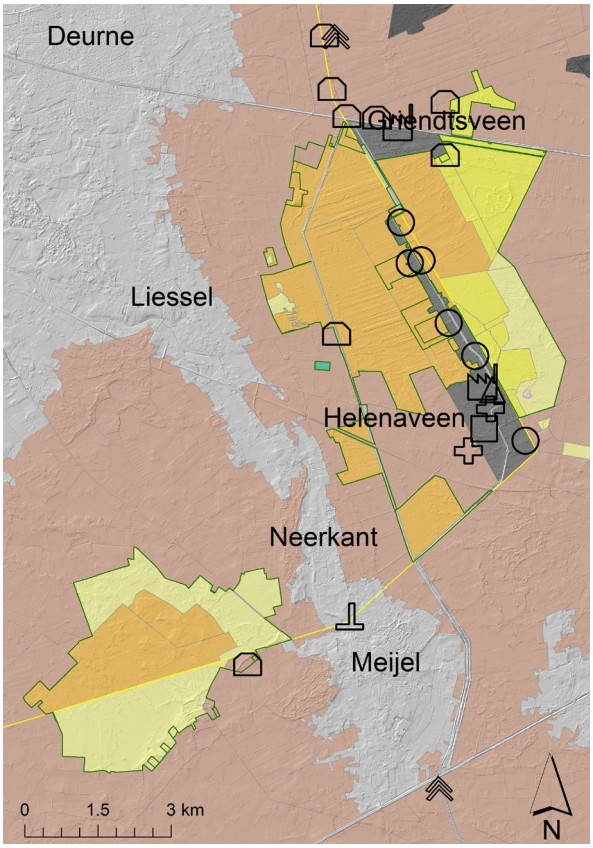

Figure 5.7. Map of the Peel case study area showing the spatial pattern of supra-peat tangible cultural remains zones relating to specific historical use forms, and the location of listed national and municipal monuments linked to these land use forms. (LSP)R = (Large-scale planned) reclamation; S = subsistence peat extraction; LSC = large-scale commercial peat extraction. The medieval villages of Deurne, Liessel, and Meijel are situated on mineral soil drylands (light grey area).

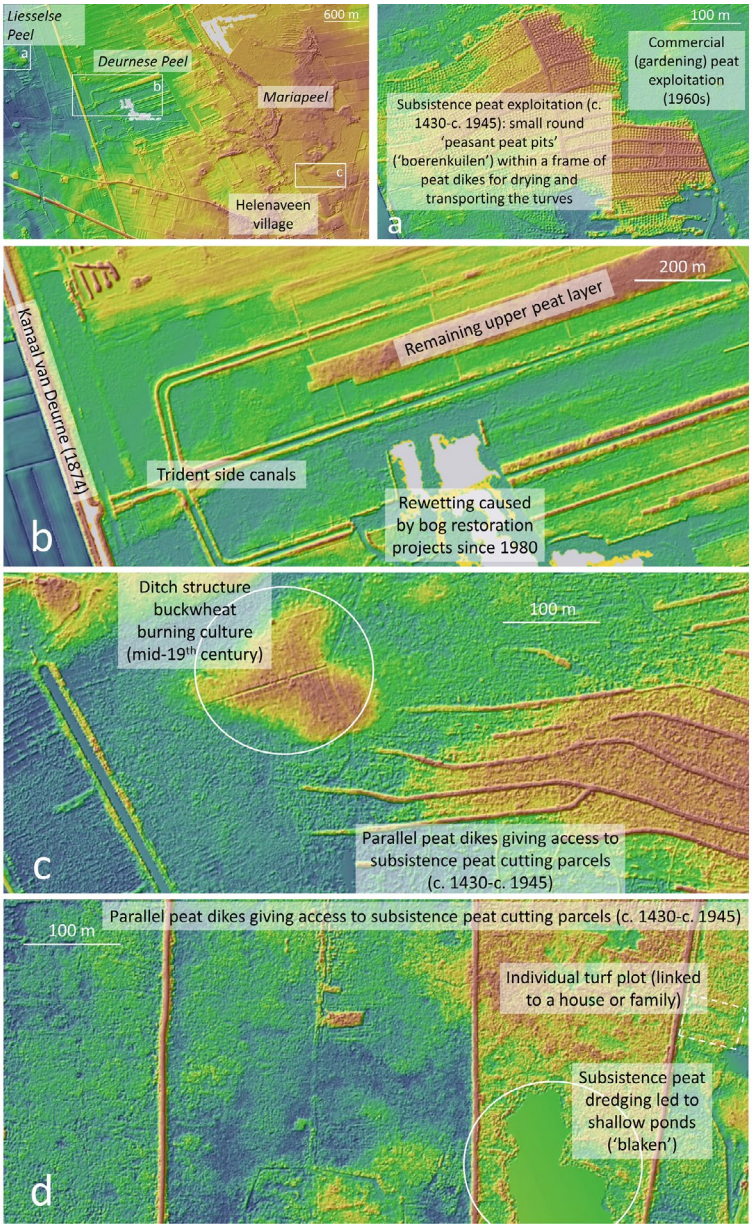

Figure 5.8. Prominent bog-related cultural remains visible on digital terrain models (DTM) of sites in the Verheven Peel (a-c) and Groote Peel (d) nature reserves. The location of the more detailed DTM images a-c is indicated on the top left overview image. Background DTM images courtesy of AHN viewer (https://www.ahn.nl/ahn-viewer), CC0.

Korenburgerveen area

The subarea placenames in the Korenburgerveen bog indicate that its use was divided between three adjacent hamlets (Figure 5.9). This is underlined by the conspicuous 'peat dikes' (linear, unexcavated strips of peat, which served to dry and carry away turves) leading into the bog from three directions. Each individual 'peat dike' bears a name, typically of the family entitled to cut peat next to the respective track. Other conspicuous traces consist of the Middeldijk dike and the regular ditch system south-east of it, in the Corlese Veen subarea. These were created in the early twentieth century in order to reclaim the bog margin into meadows (Ketelaar and Van 't Hullenaar 2019, 279).

There are no designated national or municipal monuments or protected townscapes near the Korenburgerveen relating to past bog use. This likely relates to the historical absence of large-scale commercial peat extraction or agricultural bog reclamations. However, several important Second World War remains are present. These include traces of two hiding places from the Second World War that represent an emotionally charged history to the present day (Wanders 2020; De Raat 2022).

5.4.2 Role of cultural remains in the current management of (former) bog areas

We found that cultural remains are rather underexposed in most Dutch Natura 2000 management plans (Appendix 5.2). In 9 of the 17 Natura 2000 bog areas no reference is made to its human use history or the resulting cultural remains. In four Natura 2000 bog areas, management plans contain a general background paragraph on archaeology and cultural heritage. Only in exceptional cases more detailed descriptions of cultural remains and their importance are provided. Nevertheless, even these management plans lack a clear vision on the practical implementation of such remains in future management. Both for Aamsveen (Worst 2018) and Engbertsdijksvenen (Alink, Coppens, and Worst 2021) separate cultural historical inventories have recently been made, commissioned by the land-managing organizations Staatsbosbeheer and Landschap Overijssel. These reflect an increased awareness of the importance of cultural history and remains in relation to landscape management. However, both reports are inaccessible to the wider public. It is yet unclear to which degree they will lead to changes in practical management.

The relevant provincial cultural historical maps demonstrate awareness of the presence and importance of bog-related cultural remains. Most show at least some of these elements, both in and outside Natura 2000 areas. However, the information is relatively superficial and incomplete. The most frequently mapped category consists of bog reclamation landscapes and relics (different classifications are applied). Some

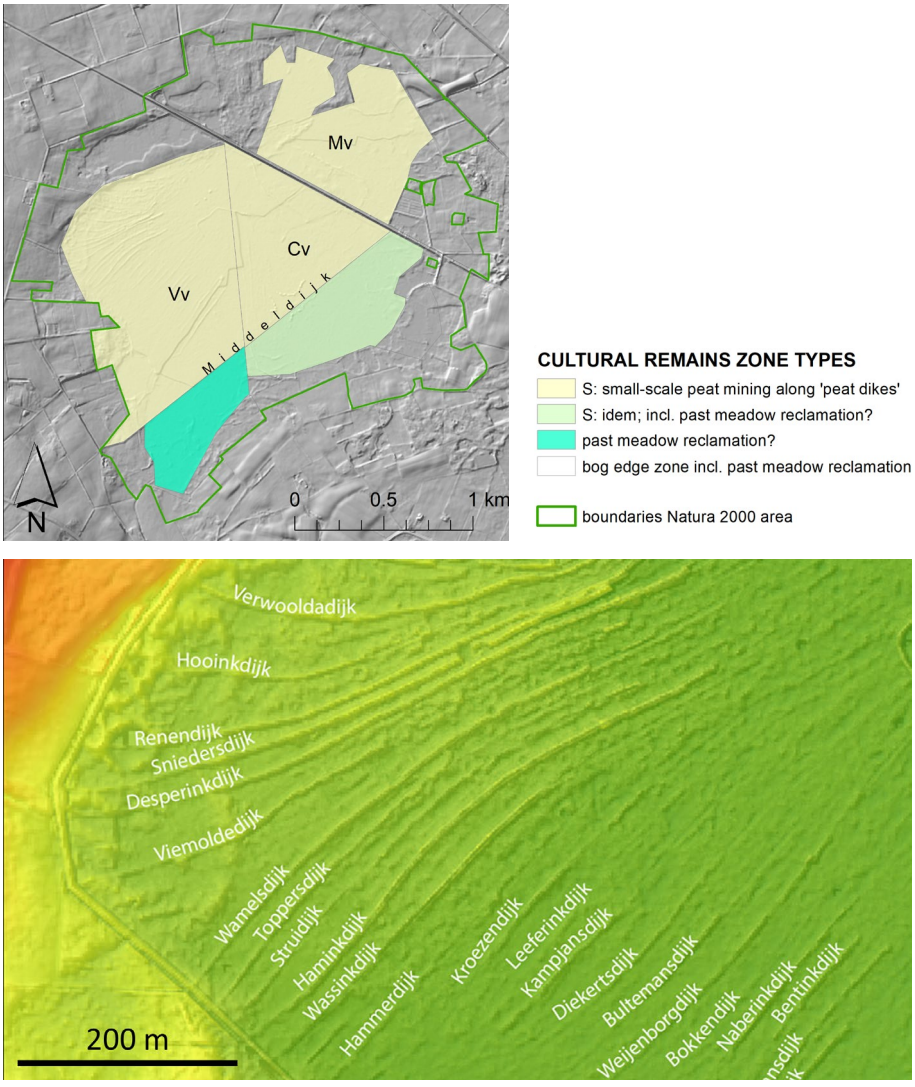

Figure 5.9. Upper image: map of the Korenburgerveen case study area showing the bog's position in a natural depression (indicated by DTM background), and the spatial pattern of supra-peat tangible cultural remains zones relating to specific historical use forms. S = subsistence peat extraction. Vv = Vragenderveen; Cv = Corlese Veen; Mv = Meddose Veen. The former two subareas are separated by an old municipal border. Lower image: map excerpt showing the peat dikes of the Vragenderveen subarea and their names (taken with permission from Wanders 2020).

maps show characteristic regional elements, such as 'Peelbanen' (a regional form of peat dike) in the province of Limburg. Some Natura 2000 areas are included in predictive archaeological maps or municipal heritage maps, occasionally accompanied by reports and policy documents. The predictive archaeological maps (e.g., Goossens 2009) mainly focus on the potential presence of sub-peat and intra-peat archaeological remains, whereas they generally ignore younger supra-peat remains. Some municipal heritage maps have a wider scope and depict a broader range of cultural elements but lack a coherent vision and strategy on their management.

Some Natura 2000 areas and their border zones contain archaeological sites, historical buildings and other landscape elements that have been assigned legal protection. These highly variable locations range from stone age sites in the Peel bogs to the ruins of a medieval monastery at Sibculo that instigated reclamation of the Engbertsdijksvenen bogs (Van Beek, Maas, and Van den Berg 2015, 23). Another case is the 'protected townscape' of Ravenswoud, near the Fochteloërveen peat remnant, which is considered a prime example of an early modern peat colony. Parts of the Groote Peel, Deurnsche Peel and Mariapeel bogland, incorporated in our case study, are labelled as 'Areas of Provincial Cultural Historical Importance'. According to the Monuments Act such 'values and characteristics are to be protected on a spatial planning basis'. How this is practically implemented, also in relation to Natura 2000 management, is not clearly articulated. Local community initiatives to restore, manage and display cultural remains include internment camps (1940s-1960s) near the Fochteloërveen bog (https://www.fochteloo.nl/cultuur-en-recreatie/), and turf-processing sites ('kluunplaatsen') in the Aamsveen bog (Ten Hoopen 2005).

5.4.3 Perspectives for the management of bog-related cultural remains

The case studies show a wealth and large variety of bog-related cultural remains at the land surface. Broadly speaking, their inclusion in current bog management is limited. Building on these outcomes, we propose perspectives for their management that are aligned to measures for ecological bog conservation and restoration (Table 5.2). Appendix 5.3 contains a more elaborate version of this table. In many cases no negative impact of ecological management on cultural remains is to be expected. Where it is, realistic solutions seem possible to protect cultural remains without compromising ecological goals. Positive impacts of ecological management on cultural remains concern, for instance, the accentuation of supra-peat remains by suppression of obscuring grassy or woody vegetation. Conversely, cultural remains or practices can contribute significantly to reaching ecological goals. Former drainage ditches and peat extraction pits, such as those demonstrated in our case study areas, are suitable starting points for the recovery

of bog vegetation in rewetting projects (Figure 5.10, upper image). Such cultural relics need not necessarily be wiped out or obscured when overgrown by recovering bog vegetation. Rather, they may remain visible for decades by vegetation differences (cf. Figure 5.10, lower image). In the 1960s, the nature conservation agency managing the Groote Peel reserve used extant military defence dikes to rewet the reserve (RVO 2017, 73-74). Furthermore, some forms of former bog use, such as the *bovenveencultuur*, have resulted in species-rich grasslands that would otherwise not have occurred in the middle of a bog landscape. More generally, the physical irregularities resulting from supra-peat cultural remains may contribute to ecological gradients and local biodiversity. Similarly, monumental built objects in or near Natura 2000 areas, such as the casemates in the Peel (Figure 5.7) can sometimes be made suitable to serve as shelter or hibernation sites for protected species such as bats.

Table 5.2. Potential synergies between key ecological management measures and heritage management in raised bogs, with accompanying caveats, as summarised from Appendix 5.3.

Ecological measure	**Potential synergy with heritage management**	**Caveat**
Removing trees or shrubs to promote peat moss growth	Lower risk of damage to supra-peat or intra peat cultural remains by deep-rooting shrubs or trees	Avoid using heavy machinery and aim at leaving tree stumps in place to avoid damage to cultural remains
	Improved visibility of supra-peat remains to the public	If tree or shrub growth on cultural remains actually contributes to their visibility: balance desired visibility against risk of damage to cultural remains
Small-scale rewetting	Consider blocking drainage ditches locally rather than filling them completely. This way, while still allowing their function as starting points for bog recovery, they may remain visible for decades and continue to bear witness to the long bog drainage history	
Large-scale rewetting within or outside bog reserve	Rewetting is beneficial to intra-peat and sub-peat cultural remains	If remaining peat deposits have to be removed before rewetting because they are too degraded by oxidation, ensure professional archaeological assistance to salvage intra-peat cultural remains
	Rewetting may accentuate small relief differences, potentially improving visibility of cultural remains structures	Local communities may experience sense of loss of the landscape and/or cultural remains therein. Engage them in the planning phase and aim at allowing them access to the area after rewetting (e.g., via dikes or boardwalks)
		Works to be carried out carefully to avoid unnecessary damage to cultural remains
		Where possible, reuse existing landscape elements such as old dikes

Figure 5.10. Upper image: a former peat pit in the Mariapeel bog reserve recolonised by peat moss and other bog plants (courtesy of Hilde Tomassen). Lower image: an old ditch system in the Bargerveen bog is still visible by the light-coloured purple moor-grass (*Molinia caerulea*) (taken with permission from Wanders 2020).

5.5 DISCUSSION

From a heritage perspective that is relatively unusual to continental north-west European bog management, our study has underlined the very diverse set of tangible cultural remains at the surface of Dutch (former) bog areas, particularly in the commercially excavated bog landscapes where bogs were most damaged ecologically. It has confirmed that coherent and structural visions on their incorporation in landscape management plans are lacking. We have demonstrated that the preservation and display of tangible cultural remains at the surface of (former) bog areas can generally be aligned very well with bog (restoration) management from an ecological perspective. Here, we (1) expand on the character, wealth and importance of bog-related cultural remains, (2) address the counterproductive nature-cultural divide in landscape management and (3) discuss future perspectives.

5.5.1 Bog-related cultural remains: a rich and important resource

Many raised bogs across Europe and beyond have been affected by peat exploitation and drainage. Such activities have left many traces in the landscape (e.g., O'Sullivan 2007; Strohwasser 2018; Bruisch 2020; Natural England, and Historic England 2021). The Low Countries stand out through an early start of commercial-scale peat extraction, in the High and Late Middle Ages (Leenders 2013; Joosten 2019, 105). Within the Low Countries, regional differences in the start of this process, and the relatively intensive nature of other use forms (such as small-scale agricultural reclamations or subsistence peat cutting) have led to a particularly diverse range of cultural remains on a relatively small land area. In the Bargerveen and Peel bog areas, for instance, large-scale commercial peat exploitation added a great variety of cultural remains to the landscape, without completely obliterating older cultural remains. As such, raised bogs are excellent examples of palimpsest landscapes (cf. Mayhew 2015). We endorse previous findings (e.g., Purmer 2018) that the status of protected nature reserve offers a preserving effect on cultural remains to places. To some extent this may be negated by large-scale bog restoration projects, although one could argue that these are merely the youngest layer of cultural remains added to the palimpsest landscape. We plea for more comprehensive studies of, and communication about, bog-related cultural remains. First, these could contribute to improved understanding of the historical backgrounds of and (spatial) interlinks between different types of cultural remains. Second, they could contribute to processes of valuing and prioritising cultural remains in nature conservation and heritage preservation management. Third, they could contribute to underpinning regional-historical narratives, serve the economic potential of former bog areas, and increase local support for bog-related heritage preservation as well as bog restoration (see below).

5.5.2 Bridging the nature-culture divide

The nature-culture divide is evident in both the environmental sciences and the humanities (e.g., Spek, Brinkkemper, and Speleers 2006; Rotherham 2015; 2020). In ecology and nature conservation, humans are often considered primarily as historical disturbants and destroyers of nature, and of peatlands in particular; an old habit that is being sought to reverse (Jansen and Grootjans 2019; Rotherham 2020). The nature-culture relationship, often implicitly seen as an opposition, is at the heart of environmental history as understood by Western scholars (cf. Schama 1995; Radkau 2008, 1-6). Environmental historians often focus on human impacts on nature, starting from the (implicit) notion that humans tend to overexploit or harm nature (Radkau 2008). However, as argued by Mommaas et al. (2017), dividing the world into 'culture' (the human domain) and 'nature' (the wild and pristine domain) is difficult to sustain. Indeed, humanities scholars increasingly break down the nature–culture dichotomy, as illustrated by the term 'natureculture'. This notion recognises the inseparableness of nature and culture in ecological relationships, which have both a biophysical and a social dimension (cf. Haraway 2003; Brown and Verschuuren 2019). Extending this view to bog landscapes, we can consider humans as ecosystem engineers and landscape builders, similar to the key role of peat mosses as bog builders (biophysical dimension; Jones, Lawton and Shachak 1994, 373; Van Breemen 1995). Simultaneously, humans as ecosystem engineers have drawn bogs into their economic and cultural orbit (social dimension). What matters, though, is the extent of human influence. Concerning peatlands, human activities have for centuries been plainly destructive and continue to be so in many places worldwide (Joosten and Couwenberg 2001; Rotherham 2020). Still, many historical examples show that (regulated) human use of natural landscapes can be reasonably sustainable and even enriching to biodiversity (Chapter 2; Rotherham 2015; 2020). Over the longer term, the implicit nature-culture opposition may put both cultural remains and (support for) nature restoration goals at risk. Opposing nature to culture may increase the likelihood of nature conservationists seeing cultural remains as obstacles to achieving ecological restoration goals. In the Dutch and European context, many cases of tension between local residents and nature conservancy organisations are known, for instance over bog restoration projects (Spek, Brinkkemper, and Speleers 2006; De Meij et al. 2019) – which in some cases are thought to 'erase' traces or practices of peat-cutting traditions (Carroll 2022; Ruber 2022). Notions such as natureculture or humans as ecosystem engineers, then, may be suitable discursive tools to help bridging the sectoral gap between ecological and heritage management, as well as between management agencies and local residents.

5.5.3 Future perspectives

We endorse pleas for a more aligned form of landscape management in which synergies are sought between ecological and cultural heritage goals (cf. Spek, Brinkkemper, and Speleers 2006; Purmer 2018; Rotherham 2015; 2020). The Dutch nature conservation sector's institutional embedding and landownership are strong compared to the cultural heritage sector. Given the wealth and diversity of cultural remains, particularly in Natura 2000 bog reserves, we join Spek, Brinkkemper, and Speleers (2006) who see a special responsibility for nature conservation organisations. While Dutch conservation agencies increasingly show awareness of cultural remains in their terrains (e.g., Purmer 2018), more concerted action for integral management is necessary.

Landscape heritage policy has globally been shifting from object-oriented to area-oriented and from expert-driven to collaboration-oriented. Together with the practice approach that has gained traction in the theoretical debate on landscape heritage (Braaksma, Jacobs and Van der Zande 2016, 64-65), this provides openings for increased involvement of local communities in landscape and heritage management. The aforementioned grassroots initiatives from the Fochteloërveen and Aamsveen bog areas are proof of engaged communities. Local residents may engage in landscape practices for very different reasons than heritage care, while still contributing to the preservation and visibility of cultural remains (Braaksma, Jacobs and Van der Zande 2016, 75). Hence, from a heritage conservation point of view, it could be effective if government bodies and land management organisations support such bottom-up commitment. From the perspective of effective and publicly supported nature policy, the involvement of local residents has been advocated as well (Byg et al. 2017; Mommaas et al. 2017, 114). Rotherham (2020) did so specifically with a view to the long-term task of peatland restoration. Instead of a formal, institutionalised approach to heritage management, an informal approach aimed at establishing open, shared or collaborative governance and management structures may then be most appropriate. This may avoid friction with existing, highly institutionalised Natura 2000 practices, while allowing local communities to take ownership and initiative in managing 'their' bog heritage. Ultimately, this may offer the best prospects for achieving ambitious nature, climate and heritage goals in peatland areas (cf. Mommaas et al. 2017). In this sense, studies such as ours could be further expanded and enriched with 'grassroots' local knowledge on tangible and intangible remains.

5.6 CONCLUSIONS

This study has underlined that tangible cultural remains at the surface of (former) bog landscapes are rich and diverse but underexposed in most Dutch Natura 2000 plans. Coherent and structural visions on the incorporation of cultural remains into future landscape management - within and outside these nature reserves - are virtually lacking. Preserving bog-related cultural remains and making or keeping them visible can go well with achieving ecological goals. We have highlighted several potential synergies between cultural remains and ecological restoration goals in Natura 2000 bog reserves, and provided recommendations for better alignment of ecological measures and cultural remains on the bog surface. Additionally, we advocate a more active involvement and co-governance of local communities in bog management, in which cultural remains can help improving local engagement and support.

ADDITIONAL FILES

The additional files for this chapter:
Appendix 5.1. Timelines of bog use history in the three case studies.
DOI: https://edepot.wur.nl/589145.
Appendix 5.2. Information on Dutch Natura 2000 bog reserves.
DOI: https://edepot.wur.nl/589147.
Appendix 5.3. Background matrix to Table 5.2.
DOI: https://edepot.wur.nl/589149.

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CHAPTER 6

Conclusion and discussion

6.1 INTRODUCTION

In this thesis I have examined the history of human relations with raised bogs (*hoogvenen* in Dutch) in the Low Countries - that is, the historical territories that roughly constitute the present-day Netherlands, Belgium, and Luxembourg. Raised bogs (in this thesis mostly abbreviated to 'bogs') are peat moss-dominated wetlands consisting of organic soils (peat). Until the early Middle Ages, bogs covered large parts of north-western Europe and the Low Countries in particular. In subsequent centuries, many of these bogs have been profoundly altered or have disappeared as a result of reclamation for agriculture or of peat extraction that contributed significantly to meeting the lands' energy need (De Zeeuw 1978; Unger 1984; Joosten and Couwenberg 2001; Joosten 2019; Rotherham 2020).

Their distinct material properties have led to a popular image of bogs as natural sponges. The opportunities and constraints that the materiality and spatial layout of bogs have provided to humans, have led to a special cultural history and layeredness from prehistoric times onwards. This cultural history and its material manifestation in the landscape has been explored rather one-sidedly in the context of the historical Low Countries. Looking at the humanities and social sciences literature on bogs in the Low Countries of recent decades in particular, I broadly identified three underexposed aspects relating to bog *uses* as common lands, to bog *meanings* and to the bog-related *legacy* that results from these (Chapter 1).

Departing from these three aspects, the main objective of the present thesis was *to reach a detailed understanding of past human-bog relations and entanglements, and offer suggestions for the future management of raised bog areas and their cultural heritage as visible in the landscape*. As such, this thesis has taken a new perspective by looking at bogs as *cultural* sponges, that is, as places where significant human entanglements with the material properties of bogs have been enacted and engraved into the landscape. It has contributed a deeper cultural-geographical perspective on the history of people's entanglements with bogs.

Central to this study were four themes related to the underexposed aspects of bog uses, meanings and legacy. These themes concern (1) the appropriation of resources from bog commons in the area of tension between private and common interests; (2) bogs as perceived natural barriers and borderlands; (3) the different place meanings that bogs have, and have had, to different people; and (4) the visible cultural remains of human-bog entanglements in the present-day landscape. Each of the central chapters of this thesis (that is, Chapters 2 through 5) addresses one of these four themes. These themes have been selected because of their particular salience in the history

of human-bog relations while, on the other hand, they had thus far been academically underexposed in the context of the historical Low Countries. The four themes continue to be relevant given current questions around energy supplies and costs, responsible and durable use of depletable resources, the increasingly complex social challenges connected to climate adaptation and biodiversity restoration, as well as the desire to protect both the natural and cultural heritage of (former) bogs and other landscapes.

The overall approach has been interdisciplinary and this thesis has thematic, theoretical and methodological connections with landscape history, environmental history and cultural geography. The central chapters are of a primarily empirical nature and each has largely been based on case studies to allow for sufficient depth while ensuring the overall research remained practically manageable. The case studies have generally been selected from three main (former) bog regions in the Low Countries. These were, from north to south, the Bourtanger Moor region, the Peel region, and the Hautes-Fagnes region. Which specific cases were used to underpin each chapter's narrative depended mainly on the availability of source materials of sufficient illustrative quality.

6.2 MAIN CONCLUSIONS

The main conclusions of this study will now be set out by answering the chapter-level research questions as formulated in Chapter 1. The main research question of this thesis will then be answered by combining these outcomes.

Chapter 2 addressed the previously underexposed question to what degree and how peat commercialisation from bog commons was significant, contested and impactful on the commons. Two early modern cases were studied, which showed that the significance of peat commercialisation was in its permanence, recurrence, or regional outreach, rather than its volume share in total peat extraction. Contestation was clear in one of both cases and partly explained by dire financial straits of the local community. In both cases, the opportunity to earn money in a 'commercial survival economy' was a likely additional motive. While long-term subsistence use of common-pool resources could go together with a moderate degree of commercialisation, state influence occurred notably during local conflict among commoners over commercialisation. Hence, our results showed a complex commons context different from the image of autonomous commons purely focused on local needs as held by common-pool resource theory.

Extending the reach of the meanings and uses of bog commons, Chapter 3 examined the question how raised bog landscapes afforded their development into borderlands

using Gibson's (1979) affordance theory as a theoretical lens. For one, the outcomes endorsed existing explanatory models that the increasing economic importance of peat fuel (affordance of resources) drove border demarcation from the late Middle Ages onward (cf. Renes 1999, 125-126; Hoppenbrouwers 2018, 170–173). Conflicts between neighbouring communities over peat fuel extraction were strong drivers for border demarcation. However, the research also underlined how bog landscapes became borderlands through their affordance to work as visual and *de facto* hindrances to human mobility. Paradoxically, bogs also afforded options for access and passage. This was determined by bog landscapes' spatio-material structure and by seasonal and interannual variation in weather conditions, where periods of drought or frost increased access options.

Adding further nuance to the preceding more institutional perspectives, Chapter 4 focused on the question what spatiotemporal patterns in place meanings of bog landscapes occurred from prehistory to present. The concept of place meanings describes how people (individually or as a group) ascribe and preserve meaning to a place (Entrikin 1991; Jacobs and Buijs 2011). Virtually all predefined place meanings (attachment, beauty, biodiversity, functionality, risk, admiration, historicity, and mystery) were found in late modern and present-day material. In older periods, functionality, risk, and mystery stood out. Daytime/night-time differences explained the co-existence of paradoxical meanings. Physical bog landscape characteristics were important place meaning determinants, and similar meaning patterns across bog areas underlined this. The long coexistence of the meanings of mystery (and risk) alongside functionality may explain the persistent popularity of negative clichéd images about bogs.

Moving from use forms and place meanings of bogs to the material legacy of these cultural entanglements, Chapter 5 addressed the question what range of cultural remains can be expected in (former) bog landscapes, how these are currently integrated into the management of (former) raised bog areas, and how conservation and display of these remains can be aligned with nature management. The chapter centred on tangible cultural remains at the surface of (former) bog areas in the Netherlands. Three case studies revealed a large diversity of cultural remains, particularly in bog areas that had been subject to large-scale commercial peat exploitation. Cultural remains currently have an insignificant position in most Dutch Natura 2000 management plans and coherent and structural visions on their incorporation in future landscape management – within and outside these nature reserves – are lacking. It was concluded that preserving bog-related cultural remains and making or keeping them visible can go well with achieving ecological goals. In relation to this, a more active involvement and co-ownership of local communities in bog management was advocated.

Turning to the main research question of this thesis, this was formulated as:

> How have raised bog landscapes historically and through their materiality structured human use and place meanings and how can the resulting cultural remains best be integrated into the management of these (former) landscapes?

Combining the outcomes of the four thematic chapters, this question can be answered as follows.

Raised bogs have been important to surrounding communities from prehistoric times to date. This significance included socio-economical, politico-territorial, and ritual dimensions. In several ways the cultural importance of bogs was connected to the materiality and non-human agency of bog landscapes. First, through the presence of resources – since the late Middle Ages above all peat for fuel - and the spatial variation of the resources' material qualities. Second, the wetness and openness of raised bogs (which in western Europe were naturally non-forested) and their spatiotemporally variable accessibility made these wetlands obvious borderlands at local as well as supralocal levels. Raised bogs' specific and unique materiality may also explain their prehistoric and early-historic ritual significance, which continued even after Christianisation. Seemingly contrasting place meanings of bogs can partly be explained by day-night differences in people's experience, for instance associated with natural luminous phenomena in bogs. In turn, these paradoxes contribute to explaining the persistence of stereotypical and exaggerated images of bogs as dangerous and marginal places shunned by humans.

This long history of human entanglements with raised bogs - manifested in a multitude of place meanings and over time increasingly intensive use forms - has left a rich collection of cultural remains, both in the remaining raised bog areas and in (surrounding) former raised bog areas where peat has disappeared altogether due to intensive peat cutting and/or agricultural reclamation. There are specific opportunities for better and synergetic alignment of natural and cultural history management in bog remnants and bog restoration projects. Rather than trying to protect bog-related cultural remains in a similar – strongly institutionalised - way as natural values, I would advise bog area managers to involve local residents more in the preservation and in making bog-related heritage visible. This may also contribute to increasing local support for bog rewetting and restoration projects.

In sum, this thesis has shown how the *natural spongescapes* that bogs represented have, through their spatiotemporally varying accessibility, resource distribution and

attributed value, informed and co-produced *cultural spongescapes*. The latter have acted as landscape-scale archives storing a broad cultural legacy within their peat deposits but also at their surface. Even where bog spongescapes have been completely 'squeezed out' in the course of history - that is, modified or destroyed by human uses -, a significant bog legacy has largely remained present both in the landscape and in collective memory.

6.3 DISCUSSION OF THE THESIS OUTCOMES

The three cross-cutting perspectives *uses*, *meanings*, and *legacy* linked the four central chapters of this thesis together, and relate to underexposed aspects of past and present human-bog relations (Chapter 1). Here I discuss additional conclusions that can be drawn when looking at the thesis outcomes as a whole considering each cross-cutting perspective. In doing so, I point out links to previous studies and to ongoing academic debates.

6.3.1 Cross-cutting perspective of bog uses

Concerning the perspective of bog *uses*, I conclude that the specific ways in which bogs have, from the Middle Ages to present, been subject to acts of bordering and (notions of) privatisation are at once an expression of the valuation process of bogs (and changes therein), and a sign of their high socioeconomic importance, also beyond the local level. This is not a new view per se in the context of privatisation processes where bog commons were sold to entrepreneurs for large-scale commercial peat exploitation for fuel, a context that has been well studied for the late medieval and early modern Low Countries (Stol 1990; Borger 1992; Gerding 1995; Jongepier et al. 2011; Leenders 2013). Taken together these studies have shown that, as different parts of the Low Countries were consecutively booming economically and demographically speaking, the societal importance of bog peat deposits in those regions grew as well, and consequently land use rights over large bogs changed in many places from common to private property. Thus, demographic growth, urbanisation and commercialisation have been external drivers that caused changing valuation and more intensive use forms of bogs at the regional and local levels.

This thesis broadens the preceding views in two ways. First, by highlighting cases where notions of privatisation and commercialisation influenced the management of bog commons (through boundary-making and parcellation) outside the context of the transition from common to private property rights that precedes large-scale

commercial peat exploitation – in other words, at a time when these bogs were in full function as commons. Acts of boundary-making and parcellation took place *within* the bogs, to promote orderly and uncontested sharing of the bog pie by all entitled parties (Chapter 2 and 3). The thesis contributes to the commons debate by highlighting the specific ways in which bordering processes and notions of privatisation and commercialisation interlinked - and could go together - with common-pool resource governance. Interestingly, it seemed that peat commercialisation from bog commons was a persistent 'tradition' rather a matter of emergencies or incidents. Here I endorse similar views of Grüne, Hübner, and Siegl (2015, 276).

The second way in which the thesis broadens existing views is by extending the preceding to notions of bordering and 'exclusive' bog property in the twentieth century and present day (cf. Chapters 4 and 5). In contrast to the earlier bog commons phase, after the remaining bog remnants had become nature reserves in the course of the twentieth century, it was the *outside* boundary of bogs that gained particular importance. At that moment, boundaries across (that is, situated within) bogs had largely ceased to be of relevance to bog management – with the exception of international borders. This is reflected in the present-day legal and practical significance of the formal boundaries of Natura 2000 reserves: these provide clarity where the dominant land use type transitions from agriculture (outside) to nature (inside). As such, these legally significant outside borders of bogs have in places generated their own dynamic of contestation over external environmental pressures impacting the bog, or – vice versa – over nuisances to neighbouring properties of local residents originating from bog rewetting projects (e.g., De Meij et al. 2019, 222). Also, notions of private rather than common property can be said to persist in current bog nature reserves in the sense that nature organisations (regardless of whether these are public or private bodies) manage bog remnants in ways reflecting exclusive ownership, with restrictive regulations for visitors of the reserves. While the rationale of the latter is understandable and broadly accepted in society, there may be beneficial effects of engaging local communities more in the management of 'their' bogs, in particular of the cultural remains connected to these lands (Chapter 5).

6.3.2 Cross-cutting perspective of bog meanings

Concerning the perspective of bog *meanings*, the thesis as a whole underlines that multiple place meanings of bogs have existed since prehistory, and that (contrasting) meanings not only varied between different social (interest) groups, but could even coexist within social groups or individuals, as governed by, e.g. daytime/night-time differences. Taken together, Chapters 3 and 4 in particular underlined the importance of spatio-material and temporal determinants of bog place meanings. These place meaning determinants

had several cultural effects. First, they structured the economic use of bogs in space and time. Second, they made bogs into obvious borderlands (Chapter 3; cf. Pungas and Võsu 2012). But there was also an interesting social impact, in that bogs acted as refuge sites for marginal groups, such as smugglers, rebellious peat workers (Chapter 4) or people in hiding during wartime (Chapter 5) – again aligning with findings of Pungas and Võsu (2012) for Estonian peatlands. The continued and dynamic coexistence of contrasting bog place meanings in local communities as well as in society at large has likely contributed to recurrent contestation of bogs (this links to the preceding discussion of the bog uses perspective) and persistent stereotype images of bogs.

Two historical studies on bog landscapes in the southern Low Countries (Nekrassoff 2007, 115-116; Jedwab 2020) endorse the multifaceted nature of bog place meanings found in this thesis. Applying a detailed and critical approach to a limited set of written sources, these studies show that narrative construction processes in the Middle Ages and nineteenth century have distorted later interpretations of how bogs were viewed in medieval and early modern times. Although such a detailed source-critical approach was less obvious in the methodologically broad scope of Chapter 4, the findings of both historical studies nevertheless constitute an important caveat.

6.3.3 Cross-cutting perspective of bog legacy

Turning to the perspective of bog *legacy*, I start by noting that recent and ongoing academic debates in heritage studies pay considerable attention to issues of authenticity, dissonance, identity, place, as well as processes of engagement and construction of meaning (Waterton and Watson 2015; Braaksma, Jacobs, and Van der Zande 2016; Egberts 2017). Present or former bog landscapes in the Low Countries, then, constitute an interesting case to deepen and interconnect several of these issues. Take the example of social identities (that is, how people see themselves and express 'who they are inside' to others; Castree, Kitchin, and Rogers 2013). Although this thesis has not looked in detail into past or present-day social identities as connected to bog landscapes, evidence suggests that bog-informed identities exist in larger bog regions and are charged by collective memories, local traditions, and local or family histories (Carroll 2022; Ruber 2022; see also Wessels 2015, 282). In connection to this, the present thesis has shown examples of othering processes between communities in regions on opposite sides of large bog landscapes (Chapter 3) as well as between residents of entire bog regions and 'outsiders' from elsewhere (Wessels 2015, 282; Carroll 2022). A benign illustration of the latter form of othering is the term *fagnard*, which is used in the Hautes-Fagnes area and wider Ardenne region to denote residents and enthusiasts of this bog landscape, but also to name holiday cottages.

Taking such and other intangible examples of bog legacy together with tangible cultural remains as examined in Chapter 5, this thesis has shown a rich and varied bog legacy. It is interesting that large-scale bog transformations through agricultural reclamation (e.g., Wassermann 1985; De Bont 2008; Zomer 2016) or commercial peat extraction (e.g., Borger 1992; Gerding 1995; Leenders 2013) have, in particular, added to the diversity of bog-related cultural remains in the Low Countries, while at the same time these processes have been so destructive to bog landscapes from an ecological point of view (Chapter 5).

Broadly speaking, this tension between ecology and bog-related heritage in (former) bog areas continues into the present (Chapter 5; Carroll 2022; Ruber 2022). And this is where the potential benefit of knowledge about local or regional identities of people living in bog regions comes in: These landscapes lend themselves for exploring ways forward to bridge the nature-culture gap and secure or increase local support for large-scale bog restoration and heritage management exactly by tapping into local people's sense of place, pride, and identity. Advantage can then be taken of previous similar endeavours elsewhere (Krauss 2005; Verschuuren and Brown 2019).

6.3.4 Raised bogs in the Low Countries: an exceptional story?

One may query to what degree the nature, extent and significance of raised bogs' cultural entanglements in the Low Countries were representative for bogs elsewhere in Europe or even beyond. Before the large-scale transformative processes of commercial peat exploitation from privatised bogland and (subsequent) reclamation for agriculture took off, a large share of the Low Countries (and notably of the present-day Netherlands) was covered by bogs. Yet this region was not unique in that sense; bogs also covered large parts of the medieval and early modern British Isles, North European Plain, Baltic states and Scandinavia. Exceptional, indeed, was the comparatively densely populated (Van Xanten and Van der Woude 1965), and economically intensive character of the Low Countries. In this 'high-pressure cooker', bogs were - on a large scale and early on - intensively and commercially used and thereafter often fully reclaimed to agricultural land. This makes the Low Countries such an illustrative case for exploring the range of human-bog relationships and its legacy. At the same time, bogs were far from being shunned by people elsewhere in Europe and beyond (Johnson 2000; Rotherham 2020, 14; Strohwasser 2018), and most bog use forms and place meanings in the Low Countries were also encountered elsewhere in Europe (Gipp 1986; Derex 2001; Joosten and Couwenberg 2001; Pungas-Kohv et al. 2015; Byg et al. 2017; Rotherham 2020; Flint and Jennings 2021). This makes our findings of broader significance than just for the historical Low Countries.

6.4 REFLECTIONS

6.4.1 Use of theory and concepts

The overarching idea of this thesis was inspired by a phenomenological view on landscape as the embodiment of multiple intimate entanglements between culture and nature, in this case between humans and bogs; that is, a view of landscape as 'both the milieu and the activity of dwelling' (Ingold 2000, 201). This conceptual approach to the thesis topic aligned with the prominent position of nature's materiality as a factor structuring human bog *uses* and place *meanings* – in the process contributing to the production of a bog-related cultural *legacy* (Chapter 1). But to what extent could the outcomes of this thesis be explained from a purely cultural perspective, one that focuses on socioeconomic, power, and other cultural contexts as the prime explanatory model of how humans have used and viewed bogs through time? For instance, aren't boundaries in bog landscapes purely 'artificial', cultural constructs (cf. Schultz 2005; Van Houtum 2005)? Socioeconomic and power contexts are surely important explanatory factors - also in the present study, although in some chapters (notably Chapter 2) these factors are more evident than in others (such as Chapters 3 or 4). But even when approaching the thesis topic from a purely cultural perspective, the evidence presented (written sources, archaeological finds, survey data) shows many examples of the way in which bogs' specific materiality and spatial layout have enabled or hampered certain human use forms and informed a multitude of bog place meanings.

Turning now to the four central chapters of this thesis, these have used existing theories and concepts as conceptual lenses. In Chapter 2, common-pool resource theory (e.g. Ostrom 1990; De Moor 2015) served as a reference point, while affordance theory (Gibson 1979) and place meanings (Entrikin 1991; Jacobs and Buijs 2011) were prominent concepts in Chapters 3 and 4, respectively. By considering both people and bog-building plants as ecosystem engineers, this ecological concept (Jones, Lawton, and Shachak 1994) was used in Chapter 5 (although ancillary) as a discursive tool to help bridging gaps between ecological and heritage management, as well as between bog site management agencies and local residents. Such use of theories and concepts proved useful for two reasons. First, it has allowed for new and inspiring ways to look at the empirical evidence and construct a narrative from it. Second, using these conceptual frameworks and lenses has allowed to contribute to ongoing debates and theorisation beyond the mere topic level of human-bog entanglements. The contribution of this thesis, in this respect, is in particular in demonstrating new methodological applications (such as applying the place meaning concept in an interdisciplinary long-term context, Chapter 4) and in adding significant nuance to existing theory using historical empirical evidence (as in Chapter 2).

But using theory has not been wholly unproblematic, as I will illustrate by the example of affordance theory. This theory has been widely adopted outside the immediate field of environmental psychology where it originated – including in design but also in landscape studies (Gordon 2004; Ingold 2018; Ward Thompson 2018). While this suggests affordance theory potentially provides original and useful insights to landscape research, concerns have been raised about its validity and verifiability (Gordon 2004; Ingold 2018, 43). The latter scholar became a critic of the theory since according to him, it starts from a notion of a world of objects already out there, ready to be perceived and to trigger action by the perceiver. Ingold pointed out that 'the world is not always ready and waiting; you have also to be ready and waiting for the world', meaning that landscapes can be dynamic places due to, for instance, meteorological or tidal dynamics. For Ingold, this implied two things. First, that rather than being static, affordances are variable and continuously in a process of becoming. Second, the perceiver also has to wait for the right moment to be able to optimally use a place to their benefit (Ingold 2018). In fact, this thesis has addressed this challenge and offered a way to come to terms with the continuous becoming of both nature and human-nature relations. For instance, the (cyclically) variable nature of the affordance of passage of bogs was fully acknowledged and elaborated on in Chapter 3. Sometimes that affordance is more favourable to humans than at other times, but the better periods are only relatively better and require experiential knowledge (obtained from dwelling in the bog landscape). Seen this way, the value of affordance theory for this thesis remains, and resides in its perspective for a better understanding of the historical, everyday and practical meaning of bog landscapes to people, as well as in demonstrating how nature's materiality has been crucially meshed with man's activities and the development of boundaries in bogs.

6.4.2 Interdisciplinary approach and methodology

The interdisciplinary overall research design of this thesis sets itself apart from previous work on human-bog entanglements and culture-nature relations more in general through its positioning between the three academic subfields of landscape history, environmental history and cultural geography. It complements each of these disciplinary approaches, adding temporal depth to human entanglements with the natural landscape. Landscape historical and historical geographical studies concerning the Low Countries have often applied a monograph approach, focusing on one particular geographic region. Such an approach is particularly powerful in detailing and deepening a given topic within the framework of that region. In contrast, the design of this thesis - with published thematic chapters that apply specific conceptual lenses and draw conclusions from several case study areas – is a priori advantageous for

generalisation and contribution to international (theoretical) debates. Furthermore, by shifting the focus towards nature's subtle but significant impacts on culture, the thesis adds to conventional approaches of environmental history which, in turn, often focus on human impacts on nature, or – if the other way around – oftentimes on spectacular events such as natural disasters or epidemics, frequently in the context of a backlash of nature resulting from human pressures (Radkau 2008, 5; Ruuskanen and Väyrynen 2017, 458). Finally, by adding time depth and starting from historical evidence, the approach of this thesis complements much of the current cultural geographic work.

In sum, the interdisciplinary approach of this thesis allowed for combining the specific advantages of the individual disciplines: historical depth and evidence has been combined with theoretical concepts and linked to the present-day landscape and societal challenge of raised bog restoration and cultural heritage management. The most innovative example of this interdisciplinarity is the methodology of Chapter 4. In it, three very different types of evidence (archaeological remains, historical sources and contemporary survey data) have been compared at the conceptual level of place meanings to arrive at long-term reconstructions.

The interdisciplinary approach in this thesis has, to a certain extent, come at the expense of deeper source-critical analyses of actors' motivations and agendas. This is related to the particular focus of this study on understanding the details of human-bog entanglements and specific influences of nature's materiality on these. In this thesis, these cultural entanglements with bogs' spatial layout and material composition generally tended to weigh more heavily as explanatory factors than underlying agendas and interests of actors, power relations between them, or the wider socioeconomic context. Nevertheless (and as discussed in Section 6.4.1), I have tried to keep an eye on relevant socioeconomic and other cultural factors explaining or contextualising the outcomes, as illustrated, for instance, in Chapter 2.

6.4.3 Suggestions for future research

While this thesis has taken a new perspective on past and present cultural relations of bogs in the Low Countries, there are - inevitably - themes and topics relating to the broad range of historical human-bog entanglements that I have only cursorily or not addressed. Here I suggest two directions for future research. The first follows a 'digital humanities' track and concerns exploring and making better use of the potential offered by large online available collections. Examples include literary sources (possibly combined with other - e.g., visual - art collections), folk tales and historical oral history recordings. To some degree, I have involved the latter in the current research. This was time-consuming,

also because the searchability of these and other online collections has room for improvement – and the latter will likely happen in the future. The inclusion of folklore, fictional sources and other works of art will increase and enrich the potential to study how place meanings and people's identities dynamically connect to (changing) bogs or other distinctive and iconic landscapes (cf. Kama 2017; Pungas-Kohv and Soovik 2019).

The second suggestion for future research follows a more applied track. While in Chapter 4 we looked at contemporary place meanings of raised bogs via a multiple-choice online survey as part of a long-term analysis of place meanings, there is scope – also beyond the context of raised bogs - to deepen the study of how people attribute meanings to and valuate specific places in 'their' landscape (whether in a heritage context or not). This could, for instance, be done through qualitative research using oral history (Ritchie 2015) or deep mapping (Bodenhamer, Corrigan, and Harris 2015) methods. Such research could be designed to also generate insights that can be of use for optimally addressing the important and socially complex spatial planning challenges currently facing European landscapes (biodiversity restoration, climate adaptation, energy and agricultural transition, urbanisation, heritage conservation, and so on).

6.5 WIDER ACADEMIC CONTRIBUTION

In this section the contribution of the thesis to the development of generalised knowledge, that is, to academic debates or science in general is explored.

6.5.1 Contribution of the empirical chapters

Chapter 2 has yielded outcomes of relevance to the broad field of commons scholarship and in particular to the debate about commercialisation of goods taken from common lands. Such commercialisation is considered problematic in traditional commons scholarship. In particular CPR theory argues that institutions for collective action such as commons focus only on the needs of entitled (local) communities and are largely autonomous, experiencing little influence from either the market or the state. Hence, commercialisation and sustainable collective use of common-pool resources are largely considered incompatible. With specific reference to bogs, the harvesting and appropriation of peat fuel through history has hitherto often been seen as a binary phenomenon, placing small-scale domestic subsistence extraction from commons opposite large-scale commercial peat exploitation from privatised bogs (Rotherham 2009, 22; Joosten 2019, 104–106). The results in Chapter 2 show that these views need

to be adjusted. In the past, commons were less autonomous and less separated from markets and states than previously thought. Goods taken from commons were sold by commoners (market-common relation) and in our cases this was apparently not a covert business. As such, commercial peat extraction from bog commons represented a 'third way' of peat exploitation. Also, higher authorities interfered in pragmatic and seemingly benevolent ways in times of internal conflict among commoners about resource commercialisation (state-common relation). Both the commons institutions and the bog resource itself survived the social and physical impacts of peat commercialisation. Hence, it was concluded that modest commercialisation can well be compatible with long-term durable resource management. The latter is potentially relevant to present-day cases of natural resource contestation (cf. Venter and Witkowski 2013; cf. Weyer, Shackleton, and Adam 2018). More so, this finding is of particular relevance to persistent assumptions in policy and society that commons can best be managed through wholesale privatisation and commercialisation (as in the recent example of Iceland's fisheries: Arnason 2005; Einarsson 2011).

The theme of bordering and boundaries (Chapter 3) touches upon the disciplinary core of both cultural geography and environmental history. After all, this theme often links to resource management and conflict, while also lending itself to detailed analysis of human entanglements with nature's materiality and non-human agency through particular power geometries. The latter focus is still comparatively rare in studies on historical boundaries, despite a 'return to materialist concerns' among humanities and social science scholars at large. Bog landscapes were found to have made for borderlands through their specific affordances. But, importantly, this agency was through humans: negotiation, materialisation and meaning of boundaries were human aspects, though always informed by and entangled with the bog landscape's materiality. This complementarity of the environment and humans (as perceivers thereof) is inherent to affordance theory, which I would endorse as helpful in approaching, elucidating, and bridging the nature–culture divide as a current core theme in the social sciences and humanities.

Chapter 4 on variation in place meanings of Dutch bog landscapes over the long term contributes to generalised knowledge in two ways. The first is through considering place meanings at a higher spatiotemporal level (studied in more than one case study area and over a very long period) than has hitherto been usual in research. The resulting conclusion that a certain type of natural landscape (in this case raised bogs) seems to have its own specific and fixed effect on place meanings exceeds the more anecdotal level of existing single-site place meaning studies. Secondly, in a more applied sense, the knowledge resulting from the approach presented in Chapter 4 can be used to

address the much-stated need for greater involvement of local stakeholders' visions and perceptions on 'their' landscape as many urgent spatial planning tasks (such as climate adaptation, the energy transition, housing projects, or managing heritage landscapes) are increasingly complex social challenges (Jacobs and Buijs 2011; Leitão et al. 2019).

While the latter also aligns with one of the conclusions from Chapter 5, this chapter's main academic contribution lies in the new perspective on the historical influence of human exploitation modes on bogs. At the bottom line, this human impact is usually assessed as negative. Indeed, the most intensive and commercial forms of bog use have led to the complete disappearance of raised bogs in some regions. But behind this negative judgement, often implicit in the more scientific studies on bogs, is a strong juxtaposition of nature versus culture. Chapter 5 views human agency in a new way, through the lens of humans as ecosystem engineers (cf. Jones, Lawton, and Shachak 1994). This ecological concept indicates that a species actively transforms its environment into its own optimal habitat. A classic example is peat moss (*Sphagnum* spp.), which constitute the most characteristic bog plants and main peat formers in bogs (Van Breemen 1995; Jansen and Grootjans 2019). In line with Jones, Lawton, and Shachak (1994) and bridging notions such as natureculture (Haraway 2003; Malone and Ovenden 2017), I see the species *Homo sapiens* as an ecosystem engineer as much as one usually sees peat mosses. This allows, a priori, for a more inclusive and productive view of human impact on bogs. Chapter 5 then shows that precisely the human traces in degraded bog remnants, such as ditch systems and old peat pits, have in recent decades proved promising sites for incipient bog restoration (e.g., Jansen and Grootjans 2019; cf. Rotherham 2020, 124).

In sum, rather than being straightforward or one-dimensional, human relations to (natural) environments, as influenced by their materiality, can be complex, paradoxical, and spatiotemporally varying at different scales. This may contribute to certain landscapes being highly contested and bearing plural meanings to different groups of people. The approach of this thesis, using affordance theory and the notion of place meanings, may help in disentangling, understanding and mapping human-environment relations and contrasting interests and stances of different actor individuals or groups, and thus provide grasps for managing and solving landscape- or resource-based conflict, be it for use or non-use.

Doomsaying thinking in environmental history has been in retreat in the last decades, as successes have been achieved in curbing pollution and restoring habitats. This has been reflected in more optimistic environmental histories (McNeill 2010, 359-360). This thesis cautiously joins this optimism. A vast area of raised bog has been lost in the Low Countries and north-western Europe at large, but its use in a commons context

has contributed to delaying and thus preventing complete destruction. Today, most of the remaining bogs are valued and protected, and the first results of rewetting and restoration projects are encouraging. However, long-term development is uncertain, due to partly unknown variables such as climate change and pollutant atmospheric nitrogen deposition (Jansen and Grootjans 2019; Rotherham 2020). This uncertainty also applies to the longer-term societal development of support for both nature conservation and heritage management.

6.5.2 The generative middle ground

On an epistemological level, the concept of landscape is complex and has been approached from very different philosophical and theoretical points of view (Wylie 2007; Edensor 2022). More often than not, scholars identify with merely one such philosophical or theoretical viewpoint. And while each of such viewpoints may be convincing in itself, they can mostly not completely grasp the full complexity of concepts such as nature or landscape. Single theories then run the risk of being one-sided or overstated, rendering debates about landscape 'somewhat reductive', to quote the cultural geographer Tim Edensor (2022, 5). While it is acknowledged that this thesis takes a specific perspective on landscape (inspired by phenomenology), it is precisely the range between the extreme positions represented by competing theories and philosophies that allows for different, insightful perspectives and cogent nuances. In the long-term pendulum movement between fundamentally opposing scholarly viewpoints (e.g., whether nature or culture prevailed in shaping human societies and their environments), timely adjustments are needed to get the pendulum back into the insightful and generative middle ground, for example in the recognition that the nature/culture divide is untenable. The approach adopted in this thesis is an attempt to add such nuance to existing views, thereby trying to move these towards this insightful and generative middle ground. As such, the present work endorses Edensor's (2022, 129) aim to develop more nuanced, richer stories, whilst adding detail and depth with long-term perspectives and mixed methods.

6.5.3 Being attentive to non-academic regional historical sources

Lastly, to be emphasised here is that regional historical publications (often non-academic) and archival sources have an important role in pointing – through local-rooted evidence they provide - to nuances of existing theories and scholarly trends (as illustrated in Chapter 2). This offers opportunities to cultural geographers interested in historical backgrounds or examples of culture-nature entanglements to tap into the rich empirical material handed down from the depths of time.

6.6 SOCIETAL IMPLICATIONS

The introductory example in Chapter 1 illustrated that at present raised bogs are still subject to contestation in parts of Europe, as exacerbated by the pressure of today's global crises. This thesis has highlighted cases where early modern government institutions have exercised active and benevolent influence in times of local conflict among commoners. Looking at the future, governments could take the initiative to pursue a twenty-first-century version of bog governance where local communities co-govern bogs together with the nature conservancy institutions responsible today. The mere coming together of local residents and supra-local institutions in bog management offers a platform for exchange of visions and trust building and may alleviate feelings of 'we're being left with nothing' (cf. Carroll 2022). Conversely, such a governance system could promote awareness and acceptance in peat-cutting communities that nothing lasts forever and that traditions can change – as informed, for instance, by the example of the Low Countries, where peat-cutting at present seems out of the question, while people still may feel connected to 'their' (former) bog landscape.

Such a new bog governance mode also addresses the much-stated need for greater involvement of local stakeholders' visions and perceptions about 'their' landscape as spatial planning projects are increasingly complex social challenges (Jacobs and Buijs 2011; Leitão et al. 2019). For instance, with respect to management and conservation of cultural remains in (former) bog areas (Chapter 5): rather than pursuing a formal, institutionalised heritage management approach in nature reserves, a more informal approach in close cooperation with local residents may be the most appropriate. A benefit may be less risk of friction with existing, highly institutionalised Natura 2000 practices. Overall, such an approach may ultimately offer the best prospects for achieving ambitious nature, climate and heritage goals in peatland areas (cf. Scruton 2017).

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ABOUT THE AUTHOR

Maurice Paulissen was born in Sittard, the Netherlands. After receiving his MSc degree in Biology (specialisation Ecology) from the University of Nijmegen in 1997, he carried out a PhD project at the Landscape Ecology group of Utrecht University about the causes of rapid vegetation changes in Dutch fens between 1940 and 2000.

Maurice received his PhD degree in 2004. In 2005, he started working at Alterra (now Wageningen Environmental Research). Aiming to specialise more in cultural, historical and heritage aspects of Dutch and European landscapes, he embarked on a study of Landscape History at the University of Groningen next to his job in Wageningen. He received his MA degree in Landscape History (cum laude) in 2015.

Early in 2017, Maurice started his second PhD project – now as a landscape historian – at the Cultural Geography group (GEO) of Wageningen University. The present thesis is the result of this project. During his PhD project, he was one of the teachers in the bachelors' course Cultural and Historical Geography for several years, while co-supervising seven BSc and MSc thesis students.

Since April 2023, Maurice works as a postdoctoral researcher on an oral history project at the Faculty of Humanities of the Open Universiteit. The project studies how the phasing out of Dutch peat and coal extraction has impacted the lives of (grand)children of those involved in these extractive industries, as well as the landscape they live in. Maurice is engaged in ancillary activities in the fields of landscape history and landscape heritage management, and as an editorial board member of a scientific yearbook. More details can be found through https://orcid.org/0000-0002-1543-8828. He has a long-standing interest in the cultural history of the south-eastern Low Countries broadly speaking and enjoys cooking, swimming, and family trips.

LIST OF PUBLICATIONS

This list includes all publications that were published or (co)authored during the PhD project that resulted in this thesis.

Peer-reviewed articles

Paulissen, M. and Van Beek, R. Bridging natural and cultural heritage management: recommendations for present and former raised bog areas. *Submitted.*

Paulissen, M., Van Beek, R., De Wit, M., Jacobs, M.H. and Huisman, F. (2022). Place meanings of Dutch raised bog landscapes: an interdisciplinary long-term perspective (5000 BCE–present). *Landscape Research* 47(8), 1071–1086. DOI: 10.1080/01426397.2022.2118246.

Paulissen, M., Van Beek, R. and Huijbens, E.H. (2022). How bogs made for borderlands: the eastern Low Countries, c. 670 – c. 1900 CE. *Environment and History*, DOI: 10.3197/096734022X16627150608050.

Paulissen, M., Van Beek, R., Nekrassoff, S., Huijbens, E.H. and Spek, T. (2021). Dire necessity or mere opportunity? Recurrent peat commercialisation from raised bog commons in the early modern Low Countries. *International Journal of the Commons* 15(1), 100-118. DOI: 10.5334/ijc.1054.

Quik, C., Candel, J.H.J., Makaske, B., Van Beek, R., Paulissen, M., Maas, G.J., Verplak, M., Spek, T. and Wallinga, J. (2020). Anthropogenic drivers for exceptionally large meander formation during the Late Holocene. *Anthropocene* 32, 100263. DOI: 10.1016/j.ancene.2020.100263.

Book chapters and non-peer reviewed articles

Paulissen, M. and Purmer, M. (2023). Het Zuid-Limburgse heuvellandschap. In: Spek, T. (ed.), *Landschappen van Nederland*. Utrecht: Matrijs.

Paulissen, M. (2019). Les « Kinkenwegen » et « kinkenvoerders » du duché de Limbourg et des pays d'Outre-Meuse. Le transport des céréales et du charbon à l'aide de chevaux de bât dans la région transfrontalière d'Aix-la-Chapelle, Liège et Maastricht, aux XVIIIe et XIXe siècles. *Miscellanea Archivistica Studia* 217, 145-176.

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Paulissen, M. (2017). Kinkenwege und Kohlentreiber: Getreide- und Kohlentransport mit Hilfe von Lastpferden im Dreiländereck nahe Aachen und Maastricht im 18. und 19. Jahrhundert. *Siedlungsforschung: Archäologie, Geschichte, Geographie* 34, 317-344.

Blog posts and podcast episodes

Paulissen, M., Huijbens, E.H. and Van Beek, R. (2022). The workings of nature's materiality as seen through the lens of affordances: the example of historical bog landscapes. The White Horse Press Blog. https://whitehorsepress.blog/2022/10/19/the-workings-of-natures-materiality-as-seen-through-the-lens-of-affordances-the-example-of-historical-bog-landscapes/.

Van Laerhoven, F. (interviewer) and Paulissen, M. (2022). Historical commons in the Low Lands with Maurice Paulissen. *In Common* podcast series. https://www.incommonpodcast.org/podcast/ijc-4-dire-necessity-or-mere-opportunity-recurrent-peat-commercialisation-from-raised-bog-commons-in-the-early-modern-low-countries-with-maurice-paulissen/.

Oral papers at conferences

Paulissen, M. and Van Beek, R. (2022). Kulturelles Erbe in heutigen und ehemaligen niederländischen Hochmoorlandschaften. Ein methodischer Ansatz für Bestandsaufnahme und Pflege. Kulturelles Erbe und Naturschutz in Mooren – Spannungsfeld und Synergien, Osnabrück, 8-9 November 2022.

Paulissen, M. (2022). Torfvermarktung aus Hochmoor-Allmenden in den frühneuzeitlichen Niederlanden. ARKUM Tagung, Rothenburg ob der Tauber, 14-17 September 2022.

Paulissen, M. (2021). How bogs made for borderlands: The eastern Low Countries, c. 670 – c. 1900 CE. RGS-IBG Annual International Conference (online), 31 August-3 September 2021.

Paulissen, M. (2019). Hochmoore als natürliche Grenz- und Konfliktzonen in der Vergangenheit. ARKUM Tagung, Saarbrücken, 18-21 September 2019.

Paulissen, M. (2018). Bogs as past commons shaping natural parks. Examples from the Low Countries, 1500-1900. Landscape Archaeology Conference, Durham en Newcastle, 17-20 September 2018.

Paulissen, M. and Van Beek, R. (2017). Reconstructing spatio-temporal trends in bog exploitation and reclamation in the Low Countries. European Association of Archaeologists Conference, Maastricht, 29 August-3 September 2017.

COMPLETED TRAINING AND SUPERVISION PLAN

Maurice Petronella Cornelius Petrus Paulissen
Wageningen School of Social Sciences (WASS)

Name of the learning activity	Department/Institute	Year	ECTS*
A) Project related competences			
WASS PhD research proposal	GEO/WUR	2017-2018	6
Toponymy course	Centre of Landscape Studies, University of Groningen	2018	4
Working with medieval sources	The Netherlands Research School for Medieval Studies	2019	3
Erasmus+ visiting scholarship	Département d'Histoire, Arts et Archéologie, Université libre de Bruxelles	2019	9
B) General research related competences			
Introduction course	WASS	2017	1
Supervising BSc and MSc thesis students	Educational Staff Development	2018	0.8
Critical thinking and argumentation	WGS	2018	0.3
Lecturing	Educational Staff Development	2018	0.8
Start to teach	Educational Staff Development	2018	0.8
Mobilising your scientific network	WGS	2019	1
'Kulturelles Erbe in heutigen und ehemaligen niederländischen Hochmoorlandschaften. Ein methodischer Ansatz für Bestandsaufnahme und Pflege'	Kulturelles Erbe und Naturschutz in Mooren – Spannungsfeld und Synergien, Osnabrück	2022	1
C) Career related competences/personal development			
Brain Training Course	WGS	2017	0.3
Co-organise and present at LGOG symposium and NHC webinars	Koninklijk LGOG and Netwerk Historisch Cultuurlandschap (NHC)	2017-2022	2
Project and Time Management	WGS	2017	1.5
Total			**31.5**

*One credit according to ECTS is on average equivalent to 28 hours of study load

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