# Nature mistaken: economics, emotions and the drainage of peatlands in the Russian Empire and the Soviet Union

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*Abstract* This article addresses the place of peatlands in the commodification and cultural perception of nature in the Russian Empire and the Soviet Union. Drawing upon scientific texts, expert literature and policy documents, I analyse how since the late eighteenth century peatlands were transformed into natural resources and how emotions played a crucial role in this process. As will be shown, the discourse about and the actual treatment of peatlands mirrored changing notions of private property in the Russian Empire and the gradual rise of the state as a key-actor in the management of natural wealth. At the same time, the Russian debate followed that in western and northern Europe, where the drainage of wetlands for peat extraction and their conversion into farmland were embedded in national projects of internal colonization. While important parallels existed with other countries in relation to the cultural perceptions and economic appropriation of wetlands, the Russian / Soviet case exhibited some distinct features as well. Even though the Soviet Union supported international wetland conservation efforts, the state kept promoting extractive and expansive land use practices, while negative attitudes towards peatlands remained influential. Paradoxically, thus, the Russian case confirms and contradicts the argument about the 'fall and rise' of wetlands that has been made in relation to other parts of the world.

Keywords: peatlands, Russian Empire, Soviet Union, Ramsar, land-use change, energy history

## *Introduction*

The fact that the Russian Federation has the largest known peat deposits in the world is not usually listed among the many geographical superlatives relating to the country. Travel guides and geography textbooks often highlight the fact that Russia's territory exceeds that of any other state, that Lake Baikal is the deepest fresh water reservoir of the planet, that Russia is the land with the largest forest and permafrost areas and that it has some of the longest rivers in the world. Peatlands, although they occupy approximately 1.4 million km$^2$ of Russian territory, are not part of the country's public image. Taken together, peatlands and paludified land with only a thin layer of peat even account for 3.7 million km$^2$ or around 20 per cent of the land within Russia's borders

(figure 1).[1] While scientists are well aware that Russian peatlands have a long history of human intervention, historians have largely ignored this fact. By the end of the twentieth century, in the territories previously belonging to the Russian Empire and the Soviet Union, 69 thousand km$^2$ of peatlands had been drained or changed in other ways by human agency. The European part of Russia and the Polesie region in the present-day borderland between Russia, Belarus and the Ukraine were especially affected by drainage and cultivation schemes, while vast peatland areas in Siberia remained intact. Mires and bogs were drained to make way for agriculture and forestry as well as for the extraction of peat, which was used for energy and for a number of agri- and horticultural products. The majority of these changes took place between the late nineteenth century and the 1970s.[2]

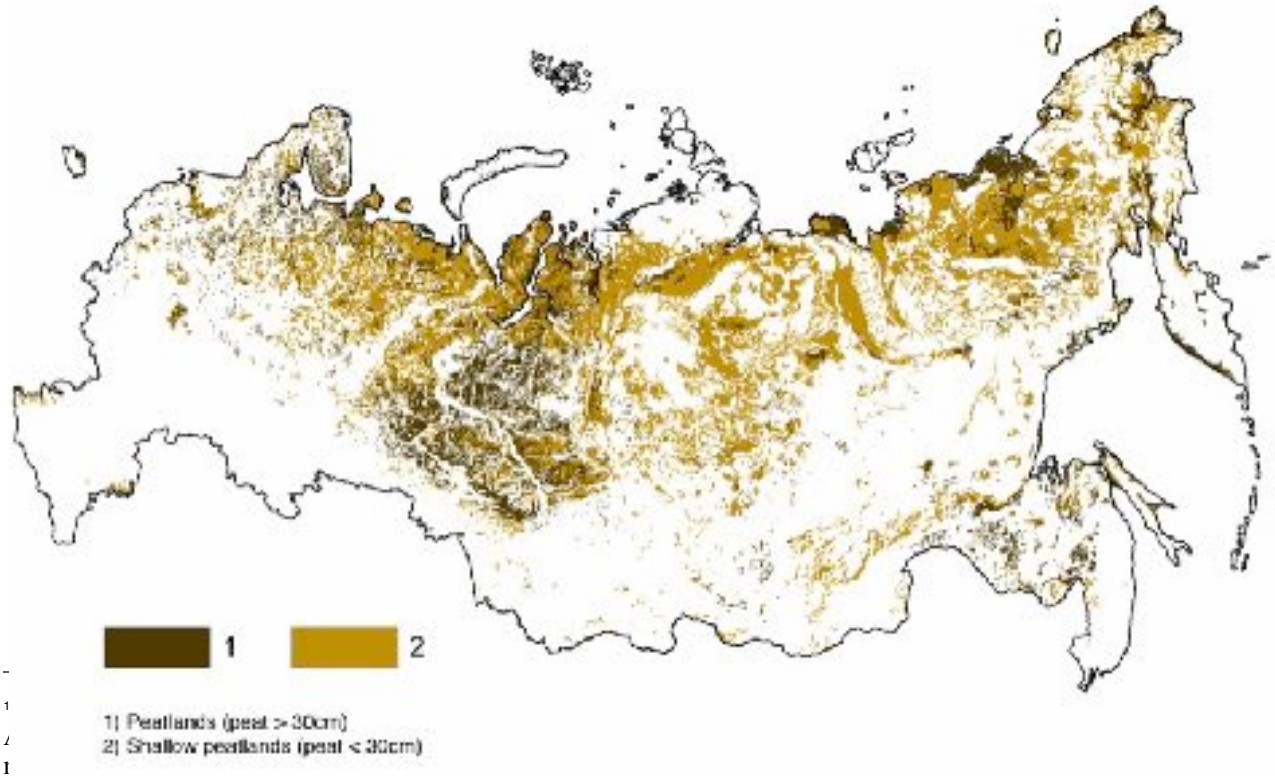


*Figure 1:* Peatlands and shallow peatlands in the Russian Federation (Institute of Forest Sciences, Russian Academy of Sciences), first published in Vompersky et al, 'Estimation of Forest Cover Extent.'

Franziska Tannenberger and Asbjørn Moen (Stuttgart: Schweizerbart Science Publishers, 2017), pp. 5-64, here p. 8. For reasons of simplicity, this paper will subsume paludified lands under the category of peatlands. This is due to a lack of clarity in the historical sources, which often lack information about the thickness of the peat layer in a given place. At the same time, while focusing on peatlands and paludified land, I will also use the more general term wetlands.

[2] S. E. Vompersky, A. A. Sirin, A. A. Sal'nikov, O. P. Tsyganova and N. A. Valyaeva, 'Estimation of Forest Cover Extent over Peatlands and Paludified Shallow Peat Lands in Russia', *Contemporary Problems of Ecology* 4:7 (2011): 734-741; Andrey Sirin, Tatiana Minayeva, Tatiana Yurkovskaya, Oleg Kuznetsov, Viktor Smagin and Yury Fedotov, 'Russian Federation (European Part)', *Mires and Peatlands of Europe*, eds. Hans Joosten et al, pp. 589-6616; E. Maltby and P. Immirzi, 'Carbon Dynamics in Peatlands and Other Wetland Soils: Regional and Global Perspectives', *Chemosphere* 27:6 (1993): 999-1023.

Drawing upon scientific texts, expert literature and policy documents, this article addresses the place of peatlands in the commodification and cultural perception of nature in the Russian Empire and the Soviet Union.[3] I understand the historical transformation of Russian peatlands as an example of what has been termed the 'becoming' or the 'making' of natural resources. The values assigned to the non-human environment are fluid, so that natural objects can acquire various economic, social and symbolic meanings. While things like coal, water, oil or peat exist independently of humans, they turn into resources only once concrete ambitions and practices emerge to utilize them. Resources, therefore, are a 'cultural category into which societies place those components of the non-human world that are considered to be useful or valuable in some way.'[4] Following this argument, I first examine how since the late eighteenth century peatlands were conceptualized and appropriated as natural resources. As the first section of this article will show, contemporaries often believed that the drainage and exploitation of peatlands represented a chance to redress the lack of other important resources such as land, timber and fuel. I therefore pay special attention to changing notions of scarcity and abundance and how they impacted on the economic value of peatlands. In a second step, I demonstrate that at any time this resource-making process was emotionally charged. The idea that peatlands were a mistake of nature, which needed 'correction' through human intervention, shaped debates about and practices of peatland drainage for centuries. Even though arguments in favour of drainage appeared rational from an economic point of view, the values assigned to these landscapes conveyed cultural preferences about different types of ecosystems. Understanding the historical transformation of peatlands therefore requires to consider both the economic and emotional dimension of this process.

The drainage of peatlands in the Russian Empire and the Soviet Union was part of an international trend towards the alteration and reclamation of wetlands that accelerated in the modern period and was driven mainly by two motivations: the wish to extract peat for fuel and / or the need to gain land for farming and forestry. While archaeological evidence proves the use of

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[3] Peatlands are completely absent in the literature on Russian (Soviet) environmental history. See: Paul Josephson, Nicolai Dronin, Ruben Mnatsakanian, Aleh Cherp, Dmitry Efremenko and Vladislav Larin, *An Environmental History of Russia* (Cambridge: Cambridge University Press, 2013). A special issue 'Conceptualizing and Utilizing the Natural Environment: Critical Reflections from Imperial and Soviet Russia' in the *Slavonic and East European Review* is also dismissive of the topic: Jonathan Oldfield, Julia Lajus and Denis J. Shaw, 'Conceptualizing and Utilizing the Natural Environment: Critical Reflections from Imperial and Soviet Russia', *The Slavonic and East European Review* 93:1 (2015): 1-15. An exception is a recent historical account of the Russian peat industry. However, due to a rather narrow focus on technological aspects of peat extraction and processing, social, political and environmental aspects are covered rather poorly. L. V. Kopenkina, *Istoriia torfianogo dela v Rossii* (Tver': Triada, 2015).

[4] Gavin Bridge, 'Material Worlds: Natural Resources, Resource Geography and the Material Economy', *Geography Compass* 3:3 (2009): 1217-1244, here p. 1219; Tanya Richardson and Gisa Weszkalnys, 'Resource Materialities: Introduction', *Anthropological Quarterly* 87:1 (2014): 5-30.

peat for various domestic purposes and manufacturing from the Neolithic period, the first peak of commercial operations turning peatlands into fuel reservoirs occurred during the so-called "Dutch Golden Age" in the seventeenth century, when the attainability of peat and an extended network of water-routes provided the Low Countries with an opportunity to overcome energy shortages caused by deforestation.[5] In Ireland, where turf cutting had been a local practice for centuries, peat turned into a key-source of energy in the context of industrialization and accelerated population growth in the nineteenth century. From the 1930s onwards, the Irish government actively promoted peat harvesting to meet the demand for electric power. A steep rise in industrial peat harvesting after the Second World War left most Irish bogs degraded, sparking debate about the environmental damage from further peat extraction on the island.[6] The conversion of wetlands into agricultural and forestry land became a widespread phenomenon in northern Europe and the United States from the eighteenth century, when population growth put increasing pressure on cultivated land. Wetland reclamation methods included the construction of extensive drainage systems as well as fire clearance, a widely used practice in northern and western Europe. In Finland and in north-western Germany, in particular, peatland burning played an important role until the early twentieth century.[7] Scientific research has shown that human intervention has affected wetlands in Europe more than on any other continent. Over fifty per cent of European mires lost their peat accumulating capacity, while ten to twenty per cent are believed to be destroyed completely.[8]

The strong affective dimension of human attitudes to wetlands and political aspirations were driving factors behind drainage and land reclamation efforts in the modern age. Enlightened ideas of progress and civilizational advance nourished a disregard for all types of wetlands which seemed to threaten human health and to impede social, cultural and economic progress. The marshlands in the eastern parts of Prussia were seen as "wastelands", until Frederick II launched

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[5] J. W. de Zeeuw, 'Peat and the Dutch Golden Age: The Historical Meaning of Energy-Attainability', *A.A.G. Bijdragen* 21 (1976): 3-31.

[6] Proinnsias Breathnach, 'Engineering and Re-engineering Earth: Industrialized Harvesting of Ireland's Peatlands and its Aftermath', *Engineering Earth: The Impacts of Megaengineering Projects*, ed. Stanley D. Brunn (Dordrecht et al.: Springer, 2011), pp. 429-446; Esa Ruuskanen, 'Encroaching Irish Bogland Frontiers: Science, Policy and Aspirations from the 1770s to the 1840s', in *Histories of Technology, the Environment, and Modern Britain*, eds Jon Agar and Jacob Ward (London: UCL Press, forthcoming 2018).

[7] Jan Kunnas, 'A Dense and Sickly Mist from Thousands of Bog Fires: An Attempt to Compare the Energy Consumption in Slash-and-Burn Cultivation and Burning Cultivation of Peatlands in Finland in 1820 – 1920', *Environment and History* 11:4 (2005): 431-446; Elizabeth Jones, 'No Smoke Without Fire: Moor Burning, the Environment, and Social Reform in the German Empire, 1866-1914', *Agricultural History* 88:2 (2014): 207-236. On moor-burning in Northern Germany, see also Blackbourn, *Conquest of Nature*, pp. 156-160.

[8] Hans Joosten, 'Human Impacts: Farming, Fire, Forestry and Fuel', in *The Wetlands Handbook*, ed. Edward Maltby (Chichester: Wiley-Blackwell, 2009), pp. 689-718, here 690.

a large-scale drainage program in the mid-eighteenth century,[9] while feelings of fear and disgust played a central role in the reclamation of the American Midwest.[10] Aesthetic preferences and the rise of nationalism also left their mark on modern wetland perceptions. Nineteenth-century Prussian hydraulic experts linked their efforts to overcome the unruly nature of swamps and river banks with the hope to improve otherwise "unproductive" landscapes and thereby to increase the well-being of the nation,[11] while contemporaries in the Helvetian Republic celebrated the drainage of marshlands in the Linth Valley as a symbol of Swiss national unification.[12] In nineteenth and twentieth century Ireland, peatlands served as a screen onto which various interpretations of the country's colonial experience were projected to define an Irish national identity.[13] Such tendencies gained further momentum in Interwar Europe, when democratic and authoritarian governments alike defined the taming of nature as an issue of political importance. Effectively linking social engineering and internal colonization, political leaders in the Netherlands, Sweden, fascist Italy and Germany used drainage and land reclamation schemes to gain power and prestige. Even though they subscribed to quite divergent political ideologies, these regimes presented the resettlement of people on 'new land' as a way to strengthen the nation and to establish new forms of community life.[14]

The Russian Empire and the Soviet Union occupy an important place in the history of human wetland transformation. Both motives behind modern drainage and reclamation efforts – peat extraction and the acquisition of new land for farming and forestry – informed interventions in wetland ecosystems under Tsarist and Soviet power. While important parallels existed with other countries in relation to the cultural and economic significance attributed to wetlands and the way

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[9] David Blackbourn, *The Conquest of Nature: Water, Landscape and the Making of Modern Germany* (New Haven: W. W. Norton, 2006), pp. 21-41.

[10] Hugh Prince, *Wetlands of the American Midwest: A Historical Geography of Changing Attitudes* (Chicago: The University of Chicago Press, 1997); Ann Vileisis, *Discovering the Unknown Landscape: A History of American Wetlands* (Washington D. C.: Island Press, 1997).

[11] Rita Gudermann, 'Conviction and Constraint: Hydraulic Engineers and Agricultural Amelioration Projects in Nineteenth-Century Prussia', in *Germany's Nature: Cultural Landscapes and Environmental History*, eds., Thomas Lekan and Thomas Zeller (New Brunswick: Rutgers University Press, 2005), pp. 33-54.

[12] Daniel Speich, 'Draining the Marshlands, Disciplining the Masses: The Linth Valley Hydro Engineering Scheme (1807–1823) and the Genesis of Swiss National Unity' *Environment and History* 8:4 (2002), pp. 429-447.

[13] Derek Gladwin, *Contentious Terrains: Boglands, Ireland, Postcolonial Gothic* (Cork: Cork University Press, 2016).

[14] Blackbourn, *Conquest of Nature*, pp. 251-278; Liesbeth van de Grift, 'Cultivating Land and People: Internal Colonization in Interwar Europe', in *Governing the Rural in Interwar Europe*, eds., Liesbeth van de Grift and Amalia Ribi Forclaz (New York: Routledge, 2018), pp. 86-92; ibid. '"On New Land a New Society": Internal Colonisation in the Netherlands, 1918-1940', *Contemporary European History* 22:4 (2013): 609-626; Federico Caprotti, *Mussolini's Cities: Internal Colonialism in Italy, 1930 – 1939* (Youngstown: Cambria Press, 2007).

these were actually treated, the Russian / Soviet case exhibited some distinct features as well. In the last quarter of the twentieth century, the international wetlands discourse changed fundamentally. The 1971 UN (Ramsar) *Convention on Wetlands of International Importance* signalled that wetlands were no longer regarded as useless territories, but rather as highly valued ecosystems that deserved protection. Even though experts from the Soviet Union contributed to and supported the underlying conceptual change, the effect on actual human-peatland relations in the country was rather marginal. The Soviet state kept promoting extractive and expansive land-use practices until the perestroika period, while negative attitudes towards peatlands remained influential. Paradoxically, thus, this article confirms *and* contradicts the argument about the 'fall and rise' of wetlands that has been made in relation to other parts of the world.[15]

*Economics of scarcity and abundance: Peatlands become resources*

The appraisal of peatlands as economic assets began in the eighteenth century, when knowledge about the uses of peat as fuel in the Netherlands circulated in northern and western Europe and became known in the Russian Empire.[16] That western interest in peat excavation fell on fertile ground in Russia was due to the changing social architecture of the empire. The release of the nobility from the obligation to serve the state in 1762 was followed by the establishment of private property on land. As the land rights of the nobility included ownership of the resources below the surface of their lands,[17] the new legal framework created an economic incentive to turn peatlands into resources and resulted in attempts to map, simplify and quantify them. From the 1760s onwards, the Proceedings of the Free Economic Society[18] regularly featured instructions about the drainage of peatbogs for the extraction of peat as well as reports on the experiments of

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15 On California, see Philip Garone, *The Fall and Rise of the Wetlands of California's Great Central Valley* (Berkeley: University of California Press, 2011).

16 Esa Ruuskanen, 'Valuing Peatlands and Wetlands: Mires in Natural Resource and Land Use Policies in Sweden and Finland from the 18th Century to the Present Day', in *Trading Environments: Frontiers, Commercial Knowledge and Environmental Transformation, 1820-1990*, eds. Gordon Winter and Andreas Dix (New York: Routledge, 2016), pp. 118-136; Kopenkina, *Istoriia torfianogo dela*, pp. 9-18.

17 Ekaterina Pravilova, *A Public Empire: Property and the Quest for the Common Good in Imperial Russia* (Princeton: Princeton University Press, 2014), p. 24.

18 The Free Economic Society founded in 1765 under the patronage of Empress Catherine II was the first voluntary association in the Russian Empire. Dominated by landowners it soon became a leading forum for public debate of political and economic affairs. Joseph Bradley, *Voluntary Associations in Tsarist Russia: Science, Patriotism, and Civil Service* (Cambridge MA: Harvard University Press 2009), chapt. 2. For an overview on the Society's publications on peat extraction see Kopenkina, *Istoriia torfianogo dela*, pp. 27-34.

landowners with peat burning.[19] In 1766, the case of a landowner who had found peat in the region of Smolensk and began using it as fuel became known to the noble public. Feodor Tumanskii who reported on this was amazed by the low costs of peat extraction and the long burning duration of peat as compared to firewood. Assuming that more peat deposits would be found, he even speculated about deliveries to Moscow or Saint Petersburg.[20] While exchanging peat for money might not have been a primary concern of the landed gentry, examples from the late eighteenth century clearly show the gradual commodification of Russian peatlands, with previously worthless property acquiring abstract economic value which made them a potentially tradable good. Growing energy demands of towns and proto-industrial factories were crucial for this process. In a letter to the Free Economic Society from 1789, Prince Petr Dolgorukov described his recent discovery of peat in the region of Moscow and the experience of using it in his glass and brick factories.[21] Noble landowners shared Dolgorukov's interest in peat fuel, hoping to circumvent high fuel costs in the city of Moscow, where many of them usually spent the winter season.[22]

The prospects of gaining additional pastures and farmland further contributed to the increased economic value of marshy lands in contemporary perception. Arguments made in favour of drainage and cultivation were embedded in a wider discourse on rational farming as the nobility became increasingly interested in the profitability of their estates. 1769, the Free Economic Society honoured Aleksei Balk, a landowner from the region of Novgorod, for his success in raising grain cultivation by draining his land. Thirty members of the landed gentry and the clergy verified Balk's achievements, emphasizing the usefulness of drainage not only for the sake of increased land rents but also for agricultural progress in a more general sense.[23] Two decades later, Petr Puzyrevskii reported on how he had turned wetlands into agricultural and grazing land in the outskirts of Saint Petersburg. Puzyrevskii adopted the 'paternalist rationalism'[24] so common among the landed gentry at that time, presenting himself as a bringer of wealth and

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[19] Leman', 'O turfe i o perezhiganii onago v ugol'e', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* Ch. 2 (1766): 29-54; T. Lovits, 'Donesenie o Moskovskom torfe', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 52: 4 (1798): 113-115.

[20] Feodor Tumanskii, 'O turfe', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 48:18 (1793): 238.

[21] Kniaz' Petr Dolgorukov, 'Pis'mo o torfe i kamennykh ugliakh im otkrytykh', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 52:1 (1798): 68-75.

[22] Nikita Sokolov, 'Opisanie novykh okolo Stolichnago goroda Moskvy priiskov torfa v 1794 godu', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 52: 2 (1798), pp. 76-83.

[23] 'Atestat', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 13 (1769), pp. 114-117.

[24] Mary W. Cavender, *Nests of the Gentry: Family, Estate and Local Loyalties in Provincial Russia* (Newark: University of Delaware Press, 2010), p. 116.

progress to his serfs. Thus, while the peasants had first refused to support his plan to dig canals trying a to hide in the woods, they eventually returned to their villages when they learned how conditions for livestock and grain farming had improved.[25] In this context, the case of Aristov, a peasant from the Olonets Region in the northwest of the Russian Empire, who generated unexpected rye yields after diverting waters from a mire into a nearby lake, earned special attention as it contradicted established views about the lack of economic interest among the peasantry.[26]

While initially drainage and wetland reclamation had been driven by individuals and their local needs, institutions with larger agendas became more significant in the pre-emancipation period. In 1795, Christian Fribe, an open supporter of reclamation and the author of a prize-winning article 'On the use and harm of mires (*bolota*)', had contended that mires would not become subject to larger drainage or cultivation efforts in the near future. As long as more non-paludified land could be brought into use, as in the southern steppes, drainage would take place only where wetlands caused direct harm for the local economy or human health.[27] Fribe was right in that the agricultural colonization of the steppes was a major social and economic endeavour that ultimately transformed the southern parts of the Russian Empire into a major grain producing region.[28] However, the authorities were also interested in the colonization of the more northern peatlands. In 1817, Tsar Alexander I invited an English Quaker to drain peatlands and mires close to Petersburg, who turned the designated land into grain farming and grazing grounds. In some places new farmsteads appeared on reclaimed land.[29] While initially such measures had been confined to state land holdings, a special section for the drainage of the Saint Petersburg region within the Ministry of State Domains announced the expansion of drainage projects onto lands 'whomever they belonged to' in 1841.[30] The aspiration to incorporate private wetlands into state-driven drainage efforts paralleled simultaneous attempts to install state control in forest

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[25] Petr Aleksandrovich Puzyrevskii, 'Ob osushenii bolotnykh mest', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 68 (1816): 17-28.

[26] 'O bolote, nakhodiashchemsia v Olonetskoi gubernii, Petrozavodskago uezda i votchiny, pripisnoi k Olonetskim zavodam, vbliz derevni Tivdii, osushennom i obrabotannom krest'ianinom Aristovym', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 3 (1834): 68-71.

[27] Khristian Fribe, 'Otvet na vopros O pol'ze i vrede bolot', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 50 (1795): 250-305, here 286.

[28] David Moon, *The Plough that Broke the Steppes: Agriculture and Environment on Russia's Grasslands, 1700 – 1914* (Oxford: Oxford University Press, 2013).

[29] 'Kratkoe Istoriko-Statisticheskoe obozrenie osusheniia i vozdelaniia nekotorkyh bolot i pustoshei, nakhodiashchikhsia v okrestnostiakh Sankt-Peterburga i Tsarskago sela', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 1 (1835): 1-21.

[30] A. Dzhunkovskii, 'Ob osushenii i obrabotke bolot v okrestnostiakh S. Peterburga', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* (1843): 161-169, here: 169.

management, which foreshadowed the erosion of what Ekaterina Pravilova has called the 'enclosure of natural resources'[31] later in the nineteenth century.

Pressure on natural resources due to population growth and industrialization added to the shift from private to institutionalized approaches to wetland management. In 1873, the Ministry of State Domains commissioned two drainage expeditions in the western borderlands and the Russian northwest. The rationale was to make more lands accessible for agriculture, particularly animal husbandry, and forestry as well as to increase the profitability of the state's land holdings. In the following years, drainage canals were laid out, rivers deepened, roads built and fields and forests planted on reclaimed lands in Polesie, the Novgorod, Petersburg and Pskov provinces as well as in the Moscow, Riazan', Vladimir and Tver'. The results of these undertakings were remarkable. Taken together, peatlands of more than 1.3 million hectares and an even larger area of paludified forests and meadows had been drained by the turn of the century.[32] The expeditions were a significant event, in that they turned peatland reclamation from initially local schemes into a supra-regional and even national project. According to a report published by the Ministry of State Domains in 1879, the financial burden was shared between the state which invested in the main drainage canals and local landholders who paid for lower-level canals on or close to their estates. The same report mentions that in some places, peasants were willing to contribute free labour and even money to the reclamation works. While it is hard to assess how expenses were actually shared, the official depiction suggests that the drainage and economic colonization of peatlands were now imagined as a public endeavour. Examples of local self-governing bodies (zemstvos) granting their administrative and financial support further adds to this picture.[33]

These efforts to drain and cultivate wetlands mirrored the rise of the 'agrarian question' in the late Russian Empire, when the central state, local administrative bodies and an increasing number of experts searched for means to modernize the countryside. Measures included attempts to abolish communal peasant land ownership, the spread of agricultural knowledge and the creation of incentives for market-oriented agriculture.[34] In this context, drainage and reclamation projects attempted to address shortages of agricultural land that since the emancipation of the peasants in 1861 had been causing widespread anxiety among the elites. 'Mire cultivation' (*kul'tura bolot*), a

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[31] Pravilova, *A Public Empire*, p. 25, 47-54.

[32] B. S. Maslov, A. V. Kolganov, G. G. Guliuk and E. P. Gusenkov, *Istoriia Melioratsii v Rossii,* vol. 1 (Moscow: FGNU 'Rosinformagrotekh', 2002), pp. 299-313.

[33] 'Osushenie bolot', in *Sbornik svedenii zemledeliia i sel'skoi promyshlennosti po departamentu*, ed. Ministerstvo gosudarstvennykh imushchestv (Saint Petersburg: n/a, 1879), pp. 79-133.

[34] Ilya V. Gerasimov, *Modernism and Public Reform in Late Imperial Russia: Rural Professionals and Self-Organization 1905 – 1930* (Houndmills, Basingstoke: Palgrave Macmillan, 2009); Katja Bruisch, *Als das Dorf noch Zukunft war: Agrarismus und Expertise zwischen Zarenreich und Sowjetunion* (Köln: Böhlau, 2014), chapt. 1.

translation of German *Moorkultur*, that also received much attention in northern Europe,[35] was adopted as a way to extend the amount of farm and grazing land in the European part of the empire.[36] With the financial support of the government, zemstvos initiated drainage works, established amelioration credits to encourage peasant reclamation initiatives and advised the local population on the agricultural appropriation of drained land.[37] Symbolizing a symbiosis of state, private and public interests, these activities were also symptomatic of the strong link between perceived land scarcity and the anthropogenic transformation of wetland ecosystems.

Rising timber prices and fears of forest depletion further triggered the transformation of peatlands into resources. While peat had already lost its role as an important energy source in western industrialized countries, it was increasingly appreciated in the Russian Empire, where coal production remained at a low level until late into the nineteenth century.[38] Demand for peat fuel rose in particular in the industrial regions around Moscow and Saint Petersburg, where private entrepreneurs and railway companies employed wage labour to extract peat to get cheap energy. According to an account from 1897, 30 thousand men and 20 thousand women, mainly landless peasants, were employed in peat mining during the summer months every year.[39] Increased interest in peat also reflected a public awareness of the finiteness of natural resources. Parallel to growing demand by private businesses, government and zemstvos encouraged peasants to utilize peat instead of firewood so as to preserve the country's forests.[40] Peat was even recommended for urban houses as it tended to produce fewer flying sparks than other fuels and would therefore cause less harm to ceilings or carpets.[41] While eventually peat ranked lower than firewood and coal in the overall energy balance of the Russian Empire, the rise of the 'Forest Question' clearly

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35 Ruuskanen, 'Valuing peatlands', p. 124.

36 *Rukovodstvo po kul'ture bolot B. Bersha. Perevod s nemetskago. 2-oe izdani*e, Petrograd: Sodruzhestvo, 1914, pp. III-V; *Razvitie kul'tury bolot za poslednie 25 let (Voprosy iz oblasti bolotnago dela* (Saint Petersburg: Tipografiia V. O. Kirshbauma, 1910).

37 A. Dubakh, 'Po bolotam Bogorodskogo kraia', *Vestnik sel'skogo khoziaistva* 49 (1908): 6-7; N. Ryzhov, 'Organizatsiia i deiatel'nost' kul'turtekhnicheskago biuro pri Tverskoi Guvernskoi Zemskoi Uprave', *Zemledel'cheskaia gazeta* 9 (1913): 267-270; N. Ryzhov, 'Organizatsiia i deiatel'nost' kul'turtekhnicheskago biuro pri Tverskoi Guvernskoi Zemskoi Uprave (Okonchanie)', *Zemledel'cheskaia gazeta* 10 (1913): 301-307.

38 Arguing that 'cheap energy' was a major factor in the rise of capitalism, Jason W. Moore mentions the importance of easily extractable peat for the early modern Dutch economy. Jason W. Moore, *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (London: Verso, 2015), p. 185.

39 P. S., 'Torf na Vserossiiskoi Promyshlennoi i Khudozhestvennoi vystavke 1896 g. v N.-Novgorode', *Torfianoe delo: Obzor vydaiushikhsia novostei po kul'ture bolot i torfodobyvaniiu za poslednee vremia*, ed. P. M. Solov'ev (Saint Petersburg: Berman i K°, 1897), pp. 114-129.

40 P. S., 'Torf na Vserossiiskoi Promyshlennoi i Khudozhestvennoi Vystavke'.

41 S. V. B., 'Ob otaplivanii torfianym briketom pechei v S.-Peterburge', in *Torfianoe delo*, pp. 79-82.

accelerated the transformation of peatlands into energy landscapes.[42]

In the wake of the 1917 Revolution, the economics of peatland transformation tilted even more towards peat extraction. After it had prevented the collapse of energy supplies in Moscow and Petrograd[43] during the civil war period, the new political leaders included peat into their efforts to turn the provision of energy into a pillar of their power. Sparking the construction of a number of peat-based power stations, the GOĖLRO plan for the electrification of Russia that was initiated in 1921 signified the government's ambition to promote peat as a local source of fuel also during peace times.[44] During the first Five-Year-Plan (1928-1932), the peat fuel industry acquired a solid place within the Soviet economy. Mirroring the Stalinist top-down-approach to economic management, peat mining trusts started working in many regions of the Soviet Union. In the Russian Soviet Federative Socialist Republic (RSFSR), Rostorf ('Russian Peat'), a centralized structure linked to the Russian Ministry of Fuel Industry, was put in charge of coordinating the sector as a whole. At the same time, Soviet propaganda presented peat as a means that would fuel the industrializing economy and, as a fertilizer, boost agricultural yields on the newly created collective farms (Figure 2).

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[42] On concerns about forest depletion in the nineteenth century, see Jane Costlow, 'Imaginations of Destruction: The 'Forest Question' in Nineteenth-Century Russian Culture', *Russian Review* 62: 1 (2003): 91-118.

[43] Saint Petersburg was renamed Petrograd in 1914 during the First World War and Leningrad in 1924, following V. I. Lenin's death.

[44] Jonathan Coopersmith, *The Electrification of Russia, 1880-1920* (Ithaca: Cornell University Press, 1992), pp. 132-137; Heiko Haumann, *Beginn der Planwirtschaft: Elektrifizierung, Wirtschaftsplanung und gesellschaftliche Entwicklung Sowjetrußlands 1917 – 1921* (Düsseldorf: Bertelsmann Universitätsverlag, 1974), p. 126-132.


*Figure 2:* 'PEAT - the energetic fundament of industrialization and collectivization' (Soviet poster, 1930, unknown artist)

The Soviet peat economy developed unevenly across space and time. When transported over long distances, peat was not competitive with other fuels, especially coal, so that it was usually mined close to where it was consumed. As a consequence, most excavation sites were located in the more densely populated regions in the European part of the Soviet Union, while the vast Siberian peatlands remained largely untouched. Peat was of rather low importance for the Soviet energy balance as a whole. After the Second World War, its share in total energy production declined steadily from 2.9 per cent in 1960, to a negligible 0.4 per cent in 1980.[45] However, taking into account the steady growth and the spatial diversity of the Soviet energy sector, this picture looks slightly different. In fact, gross fuel peat production in the RSFSR, Belarus and the Baltic republics increased steadily until the mid-1970s. Thus, while of little importance from an All-Soviet perspective, peat could play a significant role on the republican or regional level.[46] At the same time, Soviet peat production was unsurpassed by any country in the world. In 1980, when the decline of the Soviet industry had already begun, the Soviet Union still accounted for more than 90 per cent of globally extracted peat.[47] Suggesting that in the second half of the twentieth

[45] David Wilson, *The Demand for Energy in the Soviet Union* (London: Croom Helm, 1983), pp. 12, 30-31.

[46] See the relevant chapters in *Mires and Peatlands of Europe*, eds. Joosten et al.

[47] Bord na Móna, *Fuel Peat in Developing Countries* (World Bank Technical Paper Number 41) (Washington DC: The World Bank, 1985), p. 8.

century most peatland transformation through extraction occurred in the Soviet Union, these numbers real the high environmental impact of the Soviet peat economy. Moreover, given that around sixty per cent of Soviet peat was for agricultural use, it has to be acknowledged that the interests of both the agricultural and the energy sectors were behind the extensive mining.

The drainage of peatlands for agriculture and forestry was subject to different dynamics. After Stalin had violently promoted the collectivization and the mechanization of farming, his successors paid increasing attention to the expansion and the improvement of agricultural land. The Virgin Lands campaign, which Nikita Khrushchev (1953-1964) adopted to promote agriculture in the south-eastern Russian and northern Kazakh steppes, was the most important expression of this shift.[48] Under general secretary Leonid Brezhnev (1964-1982), land amelioration (*melioratsiia*), which had been part of regular agricultural policies since the early years of Soviet power, turned into a project of national scale. The 23rd Party Congress in 1966 decided that large-scale land improvement measures be carried out to boost agricultural growth. Aimed to counter rural-urban migration and to support the farming sector in the European part of the RSFSR, the 1972 Development Program for the Non-Black Earth Region[49] confirmed the government's wish to make more and better land available for agriculture. Projecting far-reaching irrigation measures and the drainage of nine to ten million hectares of land by the year 1990, the program turned large areas in the European part of Russia into targets for economically motivated landscape change.[50] The rhetoric of abundance that had characterized the public promotion of drainage since the pre-revolutionary period clearly served to support these large-scale land amelioration efforts. Highlighting the 'colossal potential opportunities' of the Non-Black Earth region, Brezhnev described the program as an attempt 'to conquer new Virgin Lands (*osvoit' novuiu tselinu*) in the European part of the Soviet Union'[51]. In 1976, an official publication stated that the land improvement measures were meant to 'significantly weaken the dependence of agriculture on the elemental forces of nature'[52]. The government thus promoted anthropogenic environmental change as a response to problems whose origins where in fact political and social.

Late Soviet enthusiasm for land amelioration soon acquired ecological significance.

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[48] On the ecological impact of the campaign, see Josephson et al, *Environmental History of Russia*, pp. 146-152.

[49] The term Non-Black Earth Region refers to the northern, western and central parts of European Russia. It was developed in demarcation of the Black-Earth Region which is famous for its high soil fertility and encompasses the regions Voronezh', Lipetsk, Oriel', Tambov and Kursk.

[50] *Kompleksnaia programma razvitiia nechernozem'ia* (Moscow: Izdatel'stvo politicheskoi literatury, 1977), p. 34.

[51] Ibid, p. 6.

[52] *Perspektivye razvitiia ėkonomiki i kul'tury nechernozemnoi zony RSFSR* (Moscow: Sovetskaia Rossiia, 1976), p. 113.

Mechanization of drainage and irrigation works made it possible to transform areas much larger than in previous periods, when land amelioration had mainly been carried out manually. Heavy machinery to move soils, dig canals, transport and install drainage tubes, or clear up reclaimed wetlands became commonplace and featured prominently in the Soviet iconography of land amelioration.[53] The architecture of Soviet statistics also reflected the new focus in agricultural politics. Following the 23rd Party Congress, the statistical yearbook of the RSFSR contained a special section on land drainage. Since 1974, Soviet statistics also provided separate data on the Non-Black Earth region. Although vague in their classification of land, the official records show a clear increase in drainage activities, particularly in the European part of Russia. Between 1960 and 1983, the area of drained land managed by agricultural companies grew by 93% from 2.41 million to 4.65 million hectares in the RSFSR. In the Non-Black Earth Region, drained land of the same category increased from 1.24 to 3.18 million hectares, or 156%, which clearly reflected the attention that the region received during Brezhnev's rule.[54] Even though these numbers may contain inaccuracies as to the absolute extent of drained land, when seen together with bureaucratic accounts, they prove the growing importance of wetland amelioration during the late Soviet period. At the same time, they reveal a more fundamental feature of the Soviet economy, namely its strong reliance on resource-based growth and the continuous expansion of ecological frontiers.

*Anger, fear, hatred: Strong feelings about peatlands*

With surprising continuity over centuries, emotions had a strong impact on how Russian peatlands were depicted and conceptualized. Enlightened notions of progress and the belief in mankind's mastery over nature informed the promotion of drainage by landlords and scientists in the late eighteenth century. Peatlands were associated with backwardness, in economic and cultural terms, as well as with a lack of reason and order. Their conversion into economically useful, carefully arranged landscapes was therefore equated with the advance of civilisation. The Free Economic Society's awarded article on the uses and harm of mires from 1795 celebrated human transformation of nature with Promethean enthusiasm: 'Man is the principal inhabitant of the world […] with his forces, he defeated even what, it seemed, nature had put against him.' That there were 'still many swamps' (*eshche mnogo bolot*) in Russia thus appeared as the result of human neglect rather than natural phenomena.[55] Ideas of what constituted a 'progressive

[53] See for example the specialized journal Hydrology and Amelioration (*Gidrotekhnika i melioratsiia*).

[54] *Narodnoe khoziaistvo RSFSR v 1983 godu: Statisticheskii ezhegodnik* (Moscow: Finansy i statistika, 1984), pp. 135, 162. This source does not contain any information about drainage on other types of land.

[55] Fribe, 'Otvet', 251, 254.

landscape' included a strong aesthetic component as well. According to a contemporary account, Alexander I's invitation to English experts to drain marshland around Saint Petersburg was motivated by the Tsar's amazement at the 'perfection' (*sovershenstvo*) of the landscape outside London that he had seen during his visit to England in 1814. From the perspective of the time, cropped fields and gardens aligned much more with visions of a modern environment than the 'impenetrable swamps' (*neprokhodimye bolota*) of the Russian north-west.[56]

Fears played an important role in supporting plans for wetland transformation. Peatlands were reputed to be the reason behind intermittent fever and scurvy among people living nearby.[57] The close association between wetlands and human disease corresponded to an internationally accepted theory about the origins of malaria. Until the discovery of parasites in the late nineteenth century, gases released from marshy regions were believed to trigger the infection. Ever since malaria had first been documented in Northern America in the late seventeenth century and particularly after an epidemic which killed around 75 per cent of the native population in California's Central Valley in 1833, this assumption featured prominently in arguments that favoured wetland drainage.[58] Echoing these ideas, Russian contemporaries asserted that in peatlands, particles of decaying material entered the air and subsequently penetrated the human body. The Free Economic Society's prize-winning author Fribe argued in 1795 that mires produced a 'rotten vapour' (*gniloe isparenie*) which hampered breathing and caused severe diseases. For him, the level of danger depended on the type of mire. Thus, 'stinking (*voniuchiia*) mires', where reeds grew and fogs descended before sunrise and after sunset, were the most harmful.[59] Concerns about a direct link between mires and public health helped justify plans to expand the state's drainage efforts close to Saint Petersburg beyond state-owned territories in the early 1840s,[60] while reports on foreign research proving positive effects of drainage on human life expectancy served to put fears of marshy landscapes on a scientific basis.[61] Although environmentally deterministic perceptions came under pressure with the rise of social hygiene later in the century, contemporaries were reluctant to abandon established views

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[56] 'Kratkoe Istoriko-Statisticheskoe obozrenie', 1.

[57] Fribe, 'Otvet', 261.

[58] Vileisis, *Discovering the Unknown Landscape*, p. 43-44, 63; Garone, *The Fall and Rise*, p. 47-58.

[59] Ferdinand Aleksandr Graf fon' Garsh, 'Otvet na zadachu Imperatorskago Vol'nago Ekonomicheskago Obshchestva v S. Peterburge 1794s go goda', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 51 (1796): 50-85, here 58-60.

[60] Dzhunkovskii, 'Ob osushenii', 169.

[61] 'Deistvie osusheniia bolot na prodolzhitel'nost' chelovecheskoi zhizni', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 1(1844): 322.

about the damaging impact of wetland environments on human health. Thus, whilst admitting that some diseases in marshy regions had to be understood with regards to social rather than natural factors, one contemporary author contended in 1874 that swamps were 'harmful from a sanitary perspective', pointing to a perceived disease-causing 'moist atmosphere polluted by gas-producing substances from decaying organic solids'[62].

The fact that their cool and humid microclimate became fundamental to their negative image was also due to increased public attention to climate and weather phenomena since the early modern period. In contrast to current concerns about global warming, the origins of the cold occupied the minds of educated elites in many parts of Europe at the beginning of the eighteenth century. In Russia, this interest was a response to cooling climate during the Little Ice Age as well as to the colonization of Siberia, in the course of which a growing number of people from the European part of Russia experienced extreme cold.[63] When peatlands came to be appreciated as potential farming areas in the late eighteenth century, widespread concerns about the cold climate translated into expectations that local temperatures would rise as a result of drainage. For people at the time, this was quite an appealing prospect. In an atmosphere of enlightened euphoria about humans' ability to control the forces of nature, climate engineering seemed all but utopian: 'Whether he wants to create himself a harmful or healthy climate almost always depends on man himself.'[64] Apart from making more land accessible for cultivation and grazing, drainage also promised improved climatic conditions for farmers as higher soil and air temperatures would extend the growing season. With the rise of the 'agrarian question' in the late nineteenth century, numerous publications highlighted the warming effect of drainage on microclimate. In the same way that the planting of trees was said to make the steppe climate more moderate,[65] 'climate improvement' (*uluchshenie klimata*) was a commonly accepted reason to support drainage. Experiments confirming higher soil temperatures in drained wetlands served to back related claims.[66]

Language and images were crucial in communicating the idea that mires and bogs had to be

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[62] N. Titov, 'Po povodu snariazhennoi v 1873 godu Ministerstvom gosudarstvennykh imushchestv ėkspeditsii s tsel'iu osusheniia bolot poles'ia', *Trudy Vol'nogo Ėkonomicheskogo Obshchestva* 3 (1874): 320-337, here 333.

[63] Julia Herzberg, 'The Nature of Cold: Russia's Climate and the Academy of Sciences in the Eighteenth Century', forthcoming.

[64] Fribe, 'Otvet', 258.

[65] Moon, *The Plough the Broke the Steppes*, p. 177-178.

[66] *Razvitie kul'tury bolot za poslednie 25 let (Voprosy iz oblasti bolotnago dela). Perevod s nemetskago pod redaktsiei uchenykh agronomov E. A. Didrikilia i V. N. Shteina*, ed. G. U. Z. i Z. Departament Zemledeliia (Saint Petersburg, Tipografiia V. O. Kirshbauma, 1910), p. VII; N. Tiulenev, 'Osushka bolot i zabolochennykh ugodii', *Zhurnal zemledel'tsa* 1 (1913): 17–22.

fundamentally transformed. Since landowners and scientists had discovered the potential value of peatlands, these came to be described in terms of what they lacked, as opposed to the ecological features that actually defined them. The rhetoric of lack concerned the fact that if left untouched, peatlands impeded farming, forestry or extraction. Late imperial agricultural experts often labelled marshy regions as 'uncultured' (*nekul'turnye*)[67], implying that they were waiting to be upgraded by the great work of human culture. It was also common to classify wetlands as 'non-suitable' (*neudobnye*)[68], pointing to their inability to comply with the assumed 'natural' purpose of land, namely the delivery of usable goods. This way of seeing wetlands was common among state agents and landowners alike. Moreover, zemstvos and officials recorded growing peasant interest in potential economic returns from drained marshlands at the beginning of the twentieth century. Peasants from the Minsk region expressed how an 'abundance of economically useless (*bespoleznye*) swamps' motivated them to participate in a course on mire and grassland cultivation in 1913. During the course, they claimed afterwards, they had been delighted to find out 'that you can turn a mire into a nice pasture which will be of great benefit for our peasants who live in marshy areas.'[69] This same belief in the convertibility of wetlands was inherent in the notion of their great 'potential value' (*potentsial'naia tsennost'*)[70] in N. Ia. Kats' textbook on mires and peatlands from 1942 and also in the imperative to turn them into 'productive landscapes' (*produktivnye landshafty*)[71] in late-Soviet scientific writing. The image of an industrial excavation site published in 1972 neatly illustrates the view that conscious human intervention made peatlands economically valuable: the huge peat-mining field is devoid of any similarity with a wetland. Instead, it is a 'legible'[72] modern landscape dominated by straight lines and even ground, reduced to a role of providing commodities (Figure 3).

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[67] A. P. Chernyi, 'Otdel kul'tury bolot i lugovodstva na Kievskoi vserossiiskoi vystavke v pavil'one Departamenta Zemledeliia', *Zemledel'cheskaia gazeta* 5 (1913): 135-140.

[68] *Perspektivye razvitiia,* p. 113.

[69] A. A. Sedletskii, *Otchet o kursakh po kul'ture bolot i lugovodstvu v d. Slobode, Borisovskago uezda, Minskoi gubernii v 1913 godu* (Minsk: Ėlektro-Tipografiia Il'ia Kaplan, 1913), p.10-11.

[70] N. Ia. Kats, *Bolota i torfianiki* (Moscow: Uchpedgiz, 1941), p. 19.

[71] B. N. Sokolov, *Torf v narodnom khoziaistvste* (Moskau: Nedra, 1988), p. 256.

[72] On legible landscapes in the modern period, see James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), chapt. 1.

*Figure 3:* Peatlands as 'productive landscapes' in the Soviet period. Image from *Torfianaia promyshlennost' SSSR: Al'bom,* ed. Ministerstvo toplivnoi promyshlennosti RSFSR (Leningrad: Nedra, 1971).

Even though arguments in favour of wetland drainage often appeared value-neutral, appealing to scientific standards and economic motives, they reflected collective preferences about the desirability or otherwise of certain types of landscapes. Ideas about the essential nature of water were central to the low regard in which peatlands were held until the late twentieth century. According to widespread conviction, movement was the natural condition of water, making wetlands with their static water appear as a constructional fault in the architecture of the non-human world. The 1879 report by the Ministry of Agriculture on the drainage expeditions in western and northern Russia mentioned that 'waters (were) desperately locked in the swamps' (*zamknutye bezvykhodno v bolotakh vody*).[73] Diverting waters thus became an act of liberation that would eventually restore an imagined natural equilibrium. While some scientists had advocated a cautious approach to wetland drainage in the late Imperial period, emphasizing possible ecological repercussions, the belief that wetlands hampered the natural flow of water remained a trope in hydraulic literature until the late twentieth century. In their 1985 monograph Amelioration and Nature Protection (*Melioratsiia i okhrana prirody*), leading experts B. S. Maslov and I. V. Minaev argued that even though swamps (*bolota*) were a 'natural historical phenomenon,' they had to be 'cured' (*lechit'*). Despite no longer being suspected of causing diseases, wetlands were now treated as a natural disorder in themselves:

> 'Swamps form as a result of a complex process related to the disturbance (*narushenie*) of the cycle of matter in some places of the earth's surface. They can be classified as a disease (*bolezn'*) of the biogeocenosis [… ] The first medicine to prevent an outbreak of this disease is the diversion of superfluous water [… ].'[74]

Following the idea that they constituted a 'mistake' by nature, peatlands were often juxtaposed

[73] 'Osushenie bolot', 89.

[74] B. S. Maslov and I. V. Minaev, *Melioratsiia i okhrana prirody* (Moscow: Rossel'khozizdat, 1985), p. 20.

with forests, which occupied a special position in Russian imagination. The belief that a revaluation of peatlands could be beneficial to the country's forests had been expressed as early as the mid-eighteenth century. In his On the Layers of the Earth (*O sloiakh zemnykh*) from 1763, Russian polymath Mikhail Lomonosov argued that the importance of peat fuel in the Dutch economy should be 'comforting for those people here in Russia, who are – in some instances even too much – anxious about the maintenance (*sberezhenii*) of forests.'[75] From, the early nineteenth century, the colonization of the southern and Central Asian peripheries were accompanied by attempts to introduce forests. While afforestation measures were intended to provide timber, improve the local climate by preventing evaporation or to prevent soil erosion, they also mirrored settlers' perception of what a 'normal' landscape was.[76] After the onset of industrialization in the late nineteenth century, peat was increasingly regarded as a substitute for timber. Concerned by the rocketing demand for fuel and building materials, educated elites claimed that the preservation of forests was not only an issue of management, but also of Russian identity.[77] Against this background, the use of peat appeared as an indirect measure in forest protection. As one author stated in 1897, railway companies should make use of the peat deposits along their lines to lift pressure on valuable forests: 'The fight against forest destruction (*lesoistreblenie*) would be so much more successful, if peat briquettes received citizenship on our railways.'[78] Emotional attachment to forests and alarmist warnings of their imminent depletion relegated peatlands to a lower rung within the mental hierarchy of landscapes and ecosystems. With no apparent cultural worth and only negative economic value, the industrial exploitation of peatlands seemed completely logical. Peatlands were not explicitly included in the nature protection efforts of the late Russian Empire. Their case thus confirms how closely conservation and expansive resource use were intertwined in the period of industrialization.[79]

An extreme form of the juxtaposition of forests and peatlands presented them as rivalling ecosystems. Anger, fear and disapproval of peatlands often centred on the phenomenon of paludification, the accumulation of organic matter enabling the growth of peat bogs. From the

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[75] M. V. Lomonosov, 'O sloiakh zemnykh', in: *Polnoe Sobranie Sochinenii, vol. 5: Trudy o mineralogii, metallurgii i gornomu delu 1741-1763gg.* (Leningrad: Izdatel'stvo Akademii Nauk SSSR, 1954), pp. 530-631, here: 606-607.

[76] Moon, *Plough*, pp. 173-205; Jennifer Keating, '"There are Few Plants, but They are Growing, and Quickly": Foliage and the Aestetics of Landscape in Russia Central Asia, 1854-1914', *Studies in the History of Gardens & Designed Landscapes* 37:2 (2017): 174-189.

[77] Costlow, 'Imaginations of Destruction'; Pravilova, *Public Empire*, p. 72.

[78] V. Karsakov, 'Chem otaplivat' parovozy? Zametka o vozmozhnom razvitii torfianogo dela v sviazi s nuzhdami gosudarstvennogo i zheleznodorozhnogo khoziaistva', in *Torfianoe delo*, pp. 68-79, here p. 76.

[79] Donald Worster has recently pointed at this connection with regards to the United States. Donald Worster, *Shrinking the Earth: The Rise and Decline of American Abundance* (New York: Oxford University Press, 2016), chapt. 6.

late Imperial period, contemporaries outlined the dramatic scenario of forests shrinking due to the ongoing spread of peatlands. Lamenting the expansion of wetlands at the expense of forests, the governor of Riazan' in his report from 1875 made a case for incorporating his province into state-led drainage schemes.[80] There is evidence of continuous peat bog growth during the Holocene in the North of what would become part of the Russian Empire.[81] However, the focus on paludification as a problem did not reflect the fact that this process had been in train for thousands of years. Rather, it was rooted in the cultural perceptions of wetlands.

In line with established negative ideas about these landscapes, scientific research provided arguments for ambitious drainage programs until the late twentieth century. Nikolai I. P'iavchenko (1902-1984) was a leading authority in Soviet geobotany who had begun his career as an engineer in the peat mining industry before becoming a scientist. His interest in paludification was driven by a strong commitment to industrial forestry and the expansion of agricultural land. In a 1955 contribution to the popular science journal Nature (*Priroda*), he emphasized the 'irreversible, progressive character' of paludification in raised bogs. In his view, human action was a prerequisite to effective protection of forest reserves.[82] For P'iavchenko, drainage and land amelioration completely aligned with the goal of protecting valuable mires and peatlands that a number of Soviet scientists and the government adopted in the 1970s. In a draft article called Drainage and Nature Protection the scientist framed paludification as the attack of wetlands on defenceless forests: '[…] peatlands should not be seen as static natural formations in the boreal zone: They are extremely dynamic and aggressive ecosystems.' For him, it was therefore 'obvious, that only drainage (*osushitel'naia melioratsiia*) can stop this aggression of peatlands.'[83] P'iavchenko's statement is symptomatic, as it shows how in the late Soviet period the changing international wetland paradigm was integrated into Prometheanist visions of nature improvement. Regardless of his awareness about potential damage from excessive draining and a generally supportive attitude towards nature protection, P'iavchenko was still bound to the emotional framework of the historical wetland discourse.

A citizen's letter addressed to party general secretary Nikita Khrushchev from 1964 proves the extent to which negative feelings animated Soviet perceptions of wetlands. In his message,

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[80] 'Osushenie bolot', 119.

[81] L. I. Inisheva, K. I. Kobak and I. E. Turchinovich, 'Evolution of the Paludification Process, and Carbon Accumulation Rate in Bog Ecosystems of Russia', *Geography and Natural Resources* 34:3 (2013): 246-253; Nathalie Pluchon, Gustaf Hugelius, Nea Kuusinen and Peter Kuhry, 'Recent paludification rates and effects on total ecosystem carbon storage in two boreal peatlands of Northeast European Russia', *The Holocene* (2014): 1-11.

[82] N. I. P'iavchenko, 'Osvoenie osushennykh bolot', *Priroda* 44:8 (1955): 98-101, here 98.

[83] N. I. P'iavchenko, 'Osushitel'naia melioratsiia i okhrana prirody' (draft article, not before 1979), Archive of the Russian Academy of Sciences (ARAN), f. 1920, op. 1, d. 69, l. 5.

Nikolai Ostashev warned that land amelioration programs in Ukraine could not meet the economic expectations that were put on them. Instead of draining wetlands, new approaches should be found to use these landscapes properly. Ostashev was obviously nervous that his objection might displease the authorities. Thus, in order to prove that his position was aligned with the official policy, he hurried to clarify: 'This is not the letter of a protector of mires (*bolot*). I also hate mires and all living beings in the empire of mires, except for wild ducks […]'.[84] While Ostashev's remark is reminiscent of duck hunters in California lobbying against the irrigation and reclamation projects pursued by the Bureau of Reclamation in the 1940s,[85] his letter clearly illustrates the extent to which negative feelings about peatlands were part of the Soviet common sense. In this case, ironically, they served as an argument to justify a more cautious approach to their use.

*Changing approaches to wetlands in the late Soviet Union*

Initially celebrated as a proof of man's power in correcting a mistake of nature, the drainage and reclamation of wetlands have undergone fundamental reassessment in the second half of the twentieth century. After being treated as wastelands for centuries, wetlands have become recognized as valuable habitats as well as for their functions in the regulation of water cycles and for flood prevention.[86] The change was first marked in the *Convention on Wetlands of International Importance, especially as Waterfowl Habitat* which was adopted at the 1971 Ramsar conference and paved the way for internationally coordinated protection efforts under the auspices of the United Nations. To date, 168 states have signed the declaration, while more than 208 million hectares of wetlands have been designated for protection.[87] In addition, previously drained areas all over the world have been included in restoration and rewetting initiatives even without being acknowledged as Ramsar sites.[88] Spurred by recent concerns about global climate change, increasing emphasis in wetland conservation is being put on peatlands and their role as long-term carbon stores and sinks. As peatlands contain a third of the world's soil carbon, their

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[84] N. A. Ostashev, Letter to N. S. Khrushchev (1964), State Archive of the Russian Federation (GARF), f. A-616, op. 1, d. 288, l. 114.

[85] Garone, *Fall and Rise*, pp. 165-183.

[86] Edward Maltby, 'The Changing Wetland Paradigm', in *The Wetlands Handbook*, ed. Edward Maltby (Chichester: Wiley-Blackwell, 2009), pp. 3-43.

[87] 'Contracting Parties to the Ramsar Convention on Wetlands', available online under: http://archive.ramsar.org/cda/en/ramsar-about-parties-parties/main/ramsar/1-36-123^23808_4000_0__ (accessed 12 February 2018).

[88] Roland Bobbink, Boudewijn Beltman, Jos T. A. Verhoeven und Dennis F. Whigham, eds, *Wetlands: Functioning, Biodiversity Conservation, and Restoration* (Berlin, Heidelberg: Springer, 2008).

destruction through drainage, peat excavation or conversion into farmland may seriously impact on global climate.[89] In international climate negotiations this fact receives growing attention. After the drainage of wetlands had already been listed among the anthropogenic drivers of global warming, the Intergovernmental Panel on Climate Change acknowledged wetland restoration among relevant actions to mitigate climate change.[90] As a consequence, rewetting initiatives are now regarded as an instrument of climate policies which can help decrease greenhouse gas emissions.

Despite large-scale drainage programs which continued until the perestroika period, the Soviet Union did not remain untouched by international trends in the re-evaluation of wetland ecosystems. British ornithologist G. V. T. Matthews, a leading actor in wetland conservation, recalled that since the mid-1960s, the Soviet Union was closely involved in negotiations which led to Ramsar.[91] It has been shown for the debate around desertification and the dissemination of the biosphere concept, that Soviet scientists were active in generating ecological knowledge and feeding it into international debates.[92] The same seems true for the paradigm change in the scientific wetland discourse. Contacts with foreign researchers ensured that Soviet contributions to wetland sciences were acknowledged across the world. In 1968, Leningrad hosted an international meeting on the protection of waterfowl.[93] K. E. Ivanov's Water Movement in Mirelands (*Vodoobmen v bolotnykh landshaftakh*) from 1975 appeared in English translation in 1981 and soon became an important reference for understanding the hydrological functions of mire ecosystems. Acknowledging mires and peatbogs as an 'important link in the chain of interconnected and interacting parts that compose our environment', Ivanov's book argued that they 'should not be regarded as features of the earth's surface that militate against land use and

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[89] Ana Maria Roxana Petrescu et al, 'The Uncertain Climate Footprint of Wetlands under Human Pressure', *PNAS* 112:15 (2015): 4594-4599 (doi: 10.1073/pnas.1416267112).

[90] *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands. Methodological Guidance on Lands with Wet and Drained Soils, and Constructed Wetlands for Wastewater Treatment*, eds. Takahiko Hiraishi, Thelma Krug, Kiyoto Tanabe, Nalin Srivastava, Baasansuren Jamsranjav, Maya Fukuda and Tiffany Troxler, available online under: http://www.ipcc-nggip.iges.or.jp/public/wetlands/pdf/Wetlands_Supplement_Entire_Report.pdf (accessed 12 February 2018).

[91] G. V. T. Matthews, *The Ramsar Convention on Wetlands: its History and Development* (Gland: Ramsar Convention Bureau, 1993), p. 15-28.

[92] Marc Elie, 'Formulating the Global Environment: Soviet Soil Scientists and the International Desertification Discussion, 1968–91' *The Slavonic and East European Review* 93:1 (2015): 181-204; Jonathan D. Oldfield and Denis J. Shaw, 'V.I. Vernadskii and the Development of Biogeochemical Understandings of the Biosphere, c.1880s–1968', *British Journal for the History of Science* 46:2 (2013): 287-310.

[93] *International Regional Meeting on Conservation of Wildfowl Resources, Leningrad, USSR 25 – 30 September 1968. Proceedings*, ed. Y. A. Isakov (Moscow, 1970). I am grateful to Anna-Katharina Woebse for drawing my attention to this source.

the life and activities of man'.[94] M. S. Botch and V. V. Mazing, two leading Soviet wetland biologists, developed a similar position in a chapter on mires in the USSR that was published in 1983 as part of the multi-volume compendium Ecosystems of the World.[95]

The international TELMA Project, a UNESCO initiative for the protection of peatbogs, provided Soviet scientist with a platform to coordinate their efforts in putting peatland protection on the political agenda. In 1968, a Soviet TELMA group lead by peatland scientist A. A. Nitsenko started identifying peatlands that deserved protection. Nitsenko was soon followed by V. V. Mazing, who hurried to present lists of valuable peatlands to the Soviet government.[96] The promoters of wetland protection understood that they were acting in a political climate characterized by enthusiasm for land amelioration and a general belief in the uselessness of peatlands. In their Mire Ecosystems in the USSR (*Ėkosistemy bolot SSSR*) from 1979, M. S. Botch, an active member of the Soviet TELMA group, and Mazing stated openly that the government's recent encroachment on wetlands had increased the need for a more comprehensive understanding of these landscapes. Following Ivanov, the biologists defined the value of peatlands not in economic, but ecological terms, emphasizing the negative impacts of human behaviour on their ability to regulate water flows and to provide habitat for highly-adjusted animal and plant species.[97]

More detailed research will be required to understand how wetland conservation gained recognition, and how successfully it was implemented under Soviet power. It seems undisputable, though, that scientists were not alone in their worries about the loss of mires through peat extraction and the expansion of agricultural or forestry land. In 1976, *Literaturnaia Gazeta*, an important voice of environmentalist criticism since the Thaw period, published an article by Iurii Vronskii, in which the writer lamented the 'pointless death' of bogs. Echoing some of the concerns that were simultaneously raised in academic publications, Vronskii warned that drainage of raised peatbogs destroyed the natural habitat of cranberries and that it caused the shallowing of rivers.[98] Publications like this confirm that the Soviet nature discourse entailed both Promethean visions of human dominion over nature and more holistic approaches acknowledging the intrinsic

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[94] K. E. Ivanov, *Vodoobmen v bolotnykh landshaftakh* (Leningrad: Gidrometeoizdat, 1975), p. 5; *Water Movement in Mirelands*. Translated from the Russian by Arthur Thomson and H. A. P. Ingram (London: Academic Press, 1981), p. xxvi.

[95] M. S. Botch and V. V. Masing (Mazing), 'Mire Ecosystems in the USSR', *Mires: Swamp, Bog, Fen and Moor,* ed. A. J. P. Gore (Ecosytems of the World, Vol. 4B: Regional Studies) (Amsterdam et al: Elsevier, 1983), pp. 95-152.

[96] M. S. Boch, 'Vesoiuznoe soveshchanie po voprosam okhrany bolot (Leningrad, 15 maia 1974g.)', *Botanicheskii zhurnal* 61:2 (1976): 291-295.

[97] M. S. Boch and V. V. Mazing, *Ėkosistemy bolot SSSR* (Leningrad: Nauka, 1979), pp. 139-149.

[98] Iu. Vronskii, 'Ostorozhno: Boloto', *Literaturnaia Gazeta* No. 14 (1st of April 1976), p. 2.

value and the fragility of the non-human world.[99] Ultimately, however, economic rather than ecological concerns initiated a fundamental change in Soviet approaches to wetland ecosystems. During the perestroika, it became widely known that the economic benefits of the government's ambitious land improvement efforts remained far behind official promises. Public anger about the Ministry of Land Amelioration and Water Management and its far-reaching competences got so intense, that in 1990 leading amelioration experts approached Mikhail S. Gorbachev to voice their discontent with the changing image of land amelioration and serious budget-cuts in the field. The experts acknowledged that drainage and irrigation measures had been largely economically disappointing and ecologically harmful. In their view, however, the state's withdrawal from land amelioration would do more harm than good: '… the state's caring for the soil is the most important condition for the sustainable development (*ustoichivoe razvitie*) of the agricultural sector …'[100] Ironically, thus, by taking on the rhetoric of sustainable development, Soviet land amelioration experts who sought to avoid the decline of their profession now offered to solve the problems that large-scale interventions in dryland and wetland ecosystems had only created.

*Conclusion: A not-so-special special case*

The drainage and economic exploitation of peatlands was an important chapter in the environmental history of the Russian Empire and the Soviet Union. Mires and bogs gained public attention from the late eighteenth century onwards, their fate being discussed in relation to economic utility, energy security, rural development, public health and aesthetics. The discourse about and the actual treatment of peatlands mirrored changing notions of private property in the Russian Empire and the gradual rise of the state as a key-actor in the management of natural wealth. At the same time, the Russian debate followed that in western and Northern Europe, where the drainage of wetlands for peat extraction and their conversion into farmland were inspired by hopes to boost the national economy and later by discourses of internal colonization. Towards the end of the nineteenth century, the Tsarist government invested large sums in land amelioration to make the marshlands in the north-western and western regions of the empire suitable for economic use. Similarly, the Soviet government approached peatlands as resource reservoirs, expecting that their exploitation would help to meet ambitious targets for industrial and agricultural growth. Ideas of nature, in particular the idea of nature's wrongdoing, played a central role in the debates about peatlands and in the concrete attempts to extract economic benefit from them. While the drainage of peatlands was usually presented as a response to

[99] Andy Bruno, *The Nature of Soviet Power: An Artic Environmental History* (Cambridge: Cambridge University Press, 2016).

[100] RGAĖ (Russian State Archive of the Economy) f. 4372, op. 67, d. 9534, l. 12-19, here l. 15.

pressing economic problems, it also reflected collective sentiments about these landscapes that had been translated into economic values and scientific concepts.

Regardless of whether their integration into larger economic contexts made a significant contribution to economic growth in the Russian Empire and the Soviet Union, peatlands clearly became a resource frontier in the modern period.[101] The development of agriculture and industry at local and imperial levels determined when contemporaries regarded the drainage and exploitation of these landscapes as economically reasonable and necessary. As in other cases of expansive resource use, notions of scarcity and abundance were of decisive importance in this regard. Experts and state agencies promoted peat extraction in periods of increasing energy demand or shortages, such as during the onset of industrialization, the revolutionary period or during the two world wars. The large-scale drainage campaigns of the nineteenth and twentieth centuries on their part coincided with periods of intense debate about rural affairs and fears that the available land was insufficient to guarantee secure food supplies. The imperial government launched the expedition for the drainage of the swamps in the western and northern provinces as part of a series of efforts to develop the countryside, while intensified drainage efforts from the mid-1960s onwards were embedded in a larger strategy to improve the performance of the Soviet farming sector. In both cases, the wish to gain more and better land figured prominently to justify large public investments into land amelioration. Against this background, it seems that the state-driven efforts to drain peatlands in the late Imperial and the post-Stalinist periods reflected concerns very similar to those behind the resettlement of peasants to Siberia at the turn of the twentieth century or the Virgin Lands Campaign launched during the Khrushchev period.

Paradoxically, the Russian case confirms *and* contradicts the idea that the cultural perception and economic treatment of wetlands has undergone a fundamental transition in the late twentieth century. While there is strong evidence of intellectual change beginning in the late Soviet period, the overall picture is ambiguous. In a global comparison of carbon emissions from degrading peat published in 2008, the European part of Russia ranked second only to Indonesia, where tropical peatlands are currently subject to large-scale drainage to set up plantations.[102] In some Russian regions, peat fires on abandoned excavation sites constitute a recurring threat for local

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[101] Edward B. Barbier, *Scarcity and Frontiers: How Economies Have Developed Through Natural Resource Exploitation* (Cambridge et al: Cambridge University Press, 2011). Complementary to Barbier's view, Donald Worster argues that the myth of natural abundance was decisive for abusive resource use by European colonial powers and, ultimately, for the rise of the United States. Worster, *Shrinking the Earth*.

[102] Hans Joosten, *The Global Peatland CO2 Picture: Peatland status and drainage related emissions in all countries of the world* (Wetlands international, 2010), p. 8. Available online under https://www.wetlands.org/publications/the-global-peatland-co2-picture/ (accessed 12 February 2018).

communities and ecosystems.[103] A number of initiatives demonstrate that these problems are being taken seriously. Thus, peatlands have been included in national nature protection schemes, while Russian governmental and scientific institutions are involved in protection, conservation and restoration projects.[104] Yet, the fact that peat mining and land expansion retained some national-economic relevance until the late Soviet period meant that in Russia "the reviled (did not become) the revered"[105] as it did in other regions of the world. Moreover, even though extraction has been in decline since the last decade of Soviet power and large areas of formerly agricultural land were abandoned during the transition period, the idea that peatlands can potentially serve the national economy still receives support at the highest political level. In July 2016, the Russian president Vladimir Putin approved an amendment to the Law on Electric Energy. Including peat in the list of 'renewable sources of energy', this law implies that using peat for fuel is ecologically sustainable.[106] Following this logic, state officials promote peat extraction, while peat fires on abandoned excavation sites are often monitored poorly or even covered up by local authorities.[107] Evidence of an ongoing disregard for the multiple ecological functions of peatlands, these trends highlight the damaging impact that cultural perceptions of nature and economic interests may have on local and global environments. The fact that nature was not 'mistaken' when creating peatlands therefore deserves further recognition, while a travel guide acknowledging the wealth of Russia's peatlands remains to be written.

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[103] Tatyana Minayeva, Andrey Sirin and Glenn B. Stracher, 'The Peat Fires of Russia', in Glenn B. Stracher, Anupma Prakash and Ellina V. Sokol (eds.), *Coal and Peat Fires: A Global Perspective, vol. 2: Photographs and Multimedia Tours (*Amsterdam et al: Elsevier, 2013), pp. 376-394.

[104] Minayeva, Sirin and O. Bragg, *Quick Scan*, p. 38-41; *National Report on the Implementation of the Ramsar Convention on Wetlands of the Russian Federation* (2015), available online under: http://www.ramsar.org/sites/default/files/documents/library/cop12_nrform_e_russian_federation.pdf (accessed 12 February 2018).

[105] John R. McNeill, 'The State of the Field of Environmental History', *Annual Review of Environment and Resources* 35 (2010): 345-374, here, p. 364.

[106] http://pravo.gov.ru/proxy/ips/?docbody=&nd=102403349&intelsearch=%F2%EE%F0%F4 (accessed 3rd April 2017).

[107] http://www.greenpeace.org/russia/ru/news/2015/13-05-podmoskovye/ (accessed 3rd April 2017); https://ria.ru/economy/20160704/1458288755.html (accessed 12 February 2018); http://t.rbc.ru/tyumen/27/01/2017/588b14779a794737739d6e37 (accessed 12 February 2018).

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