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Forest policies, administration, and management of the Leiria pinewood in Portugal (13th-18th centuries)

Koldo Trapaga-Monchet  and Raúl Romero-Calcerrada 

Departament de Ciències de la Educació, Universidad Rey Juan Carlos, Madrid, Spain

ABSTRACT

The pinewood of Leiria is the most renowned Portuguese woodland. This article aims to shed light on the forest policies, administration, and governance of the pinewood from its blurry origins in the late 1200s to the late 1700s. By the early 15th century the state (Monarchy) had established a permanent bureaucracy for its management, with the main purpose of ensuring the availability of timber for shipbuilding. Throughout the Early Modern Age, the Portuguese Monarchy carefully managed the pinewood, paving the way for 19th-century scientific forestry. The fire of 1613 marked a turning point in the management of the pinewood, further linking the fate of the pinewood to the royal navy. The pinewood of Leiria is an ecosystem that has resulted from centuries of sound management by the Portuguese state. To unravel its history, this article combines the methods and materials of history, geography, and historical cartography.

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Introduction

Over the past decades, human-induced ecological degradation has drawn increasing scholarly attention. Within the field of environmental history authors such as McNeill (2003, 35) and Radkau (2008, 4–5) have rightly noted that there has been a tendency to construct an overly negative focus on environmental destruction caused by human societies. The history of the Portuguese woodlands, including the pinewood of Leiria addressed here, has been included in this narrative.

Human societies have spurred global change through disturbance and deforestation processes associated with the development of socioeconomic activities. Territorial dynamics are evident a) whenever there is a change in occupation and land use (e.g. from forest cover to agricultural cover) and b) in forest management itself and in disturbance processes (both natural and of human origin) that entail the reduction or suppression of plant cover at certain times. It seems evident that by planning territory through governance, forestry management/protection actions, and forestry policies/guidelines allows for greater control of the transformations and the adjustment of sustainable objectives for said spaces at all times (Condé et al. 2022; Humphries et al. 2012; Lippe, Rummel, and Günter 2022). For example, the establishment of protected natural areas, indigenous land titling, and the sanctioning of selective logging

activities have succeeded in limiting forest disturbances and deforestation and contribute to conserving forest ecosystems. What seems evident is that the land use policy currently being pursued (e.g. Protected Areas) serves to protect the Peruvian Amazon (Oliveira et al. 2007), Brazil's Amazon and Atlantic Forest (de Assis Barros et al. 2022).

The National Woodland of Leiria (*Mata Nacional de Leiria*) is a prominent example of human management aimed at protecting a forested area, as socioeconomic and political activities carried out by the state and the local inhabitants from at least the 13th century have positively contributed to its preservation. This woodland constitutes the most emblematic Portuguese forest. In October 2017, a fire razed 9,476 hectares – around 86%—of this woodland (Departamento de Gestão de Áreas Públicas e de Proteção Floresta (DGAPPF) 2017). The destruction of the Leiria woodland triggered huge societal and political reactions, as it has been regarded as part of the Portuguese national identity (Arroteia 2018, 11–14; Pinto 1938, 2 vols). The Portuguese government commissioned an independent group of experts to draw up a technical report outlining the best reforestation program. Although the report provided well-devised strategies for its recovery, it is a prime example of the two arguments that mainly contributed to the disregard shown by authors for pre-Enlightenment Portuguese state (that is, of the Monarchy) forestry. Indeed, these arguments have been paramount in establishing a negative historical account of the interactions between societies and the environment (the pinewood of Leiria). Firstly, the report made no reference to the evolution of the management and policies for the conservation of the Leiria pinewood before the Enlightenment. Secondly, it repeatedly noted that the shipbuilding industry caused an overexploitation of forest resources throughout the Early Modern Age (Observatório Técnico Independente (OIT) 2020). These are still the predominant narratives among the scholars who have addressed the history of the pinewood of Leiria and the Portuguese woodlands, which this article seeks to challenge.

Concerning the former, in the 1790s, Johann Heinrich Friedrich Link and Johann Centurius Graf von Hoffmannsegg claimed that since the planting of the pinewood at the end of the 13th century, nothing had been done to foster its conservation (Oliveira 2014, 287–288). Silva (1815, 14–20) indicated that the Portuguese forests had been destroyed (especially in the 18th century) despite the extensive array of measures adopted by different Portuguese kings. The main issue was the lack of a centralized authority to channel all the policies for the protection and conservation of the woodlands. Silva and Batalha (1843) stated that the modern management of the pinewood had only begun in the 1790s, and that shipbuilding contributed to its destruction. Fernow (1911, 360–363) pointed out that the pinewood of Leiria was not only 'the pride of the Portuguese foresters,' but that it was also the 'only really well-managed forest' where over 50 men were employed. The first serious attempts at a real state forestry did not begin until the 1860s. Fernow overlooked the empirical forestry practiced in Portugal since the Middle Ages. Duffy (1955) noted that the royal pine forest of Leiria was planted during the reign of Dinis I to supply timber for the Royal Navy but made no further reference to its evolution (Duffy 1955, 1). More recently, Radkau (2008, 134–136) has argued that in Mediterranean Europe forests – with very few exceptions – had not been a foundation of power. The centralized powers ('relevant authorities') did not establish institutions committed to preserving the woodlands.

With regard to shipbuilding, Silva and Batalha (1843) were among the first authors to blame this industry for destroying Portuguese forest cover. This argument has been reiterated up to the present day. Since the mid-20th century, scholars who address Portuguese maritime history have noted that by the 16th century the quality of the wood used in Lisbon shipyards was poor due to an overexploitation. Mauro (1959, 200) drew attention to the lack of high-quality timber by the first half of 16th century. Boxer (1977, 56) argued instead that suitable timber for shipbuilding was not readily available in Portugal, and that the pinewood of Leiria did not 'produce wood of a very lasting quality'. Devy-Vareta (1985, 1986) states that the pinewood of Leiria was destroyed throughout the 15th and 16th centuries, with shipbuilding playing a significant role. Costa (1997, 191–192, 307–308) claimed that by the mid-16th century supplies of shipbuilding timber were beginning to run low, and that by the last quarter of the century the state was using green wood in the shipyards of Lisbon due to the lack of good-quality timber. Reboredo and Pais (2012, 2014) likewise argue that shipbuilding was the leading cause of forest destruction from the 13th to the 19th centuries.

This interconnected combination (lack of forest management, and shipbuilding as the main driving force of deforestation) has been conducive to the construction of a highly negative narrative on the historical management of the pinewood of Leiria. However, Mauch (2019, 18–41) has drawn attention to the need for environmental history to create new stories of changes imbued with 'slow hope' when addressing the interactions between human societies and the environment. This recent research is thus a historical showcase for viewing forest management as a set of human actions that did not 'destroy' an ecosystem. The material needs of the Portuguese state and the local inhabitants had encouraged the Portuguese Monarchy to establish forestry policies and a permanent administrative staff to protect the pinewood. We argue that the material uses given by the state from at least the 13th century were an incentive to protect and to manage the pinewood of Leiria. This article therefore sets out to shed light on the creation and evolution of the institutional management of the pinewood from its blurry origins, in the 13th century, to the late 18th century. The pinewood of Leiria is another example of 'slow hope' for current concerns on conserving forest ecosystems through human agency.

Materials and methods

Description of the study-area

The pinewood of Leiria (*Mata Nacional de Leiria*) is located in the central region of Portugal, around 140 kilometers north of Lisbon. It encompasses 11,062 hectares, of which 10,177 are covered with woodlands. *Pinheiro-bravo* (*Pinus pinaster*) is the principal tree species, accounting for 73% of the *Mata Nacional*. The other species are 'Pinheiro-manso, acacias, eucaliptos, carvalhos and sobreiro' (ICNF, Mata Nacional de Leiria). *Pinheiro-bravo* is a fast-growing tree species that can reach up to 20 or 40 meters in height, and is suitable for poor soils like the sandbanks where the pinewood of Leiria is located (Correia, Oliveira, and Fabião 2007, 18–25). According to early 19th-century forestry treatises, *Pinus pinaster* requires around 60 to 80 years in order to produce quality timber for shipbuilding (Silva and Batalha 1843; Varnhagen 1836).

Materials

This article results from the combination of materials and methods of history, cartography, and geography. It draws on historical documents, which can be grouped into five different type of sources: 1) forestry legislation; 2) information concerning appointments, mismanagement, and privileges of the administrative staff; 3) reports on and inquiries into the management and conservation of the pinewood; 4) data on the material uses to which the pinewood was put, with particular emphasis on timber supply; 5) historical maps.

Portuguese forestry legislation mainly detailed a large array of prohibitions on uses of and accesses to the pinewood and the forest resources, as well as the penalties for breaching these norms. It also provides an idea of the administrative staff appointed to enforce the legislation on the ground, and the reasons pursued by the Monarchy for its approval. In this connection, the most important forestry laws are the forest codes of 1524, 1605, and 1751. The first ordinance for the preservation of the Leiria pinewood, which is housed in the *Biblioteca da Faculdade de Direito da Universidade de Lisboa* (BFDUL, Ms. 2-12-6), was issued in 1524.¹ The ordinance of the *Monteiro-mor* of 1605 contains information on the woodlands and royal forests of the forest district of Leiria (Silva 1854, 120–121). The regulations of 1751 provided a great deal of knowledge concerning the limits, administrative staff, and governance of the pinewood, and the felling, processing, and transporting of wood and timber for shipbuilding (Silva 1830, 68–89).

The Portuguese Crown relied on an administrative staff to enforce the legislation for the protection of the pinewood. The related historical information concerns the appointments of the guards and their privileges and duties, as well as inquiries into mismanagement. These sources were paramount to unraveling the origins of the administrative staff and in their obligations (among others) of creating firebreaks to ensure the protection of the pinewood (Neves 1993, 6 vols). Carlos Baeta Neves's six-volume book contains thousands of original historical sources that has proved essential for analyzing the pinewood from the late 13th century to 1580 (Neves 1993, 6 vols). The *Arquivo Nacional Torre de Tombo* (ANTT) is the central archive for addressing the period from 1640 to 1750 as it holds data on the appointments of the foresters entrusted with preserving the pinewood (*Registo Geral das Mercês* section)

The reports on and inquiries into the management (and mismanagement) of the pinewood of Leiria are essential because they provide information on the condition of the pinewood and the dynamics of the state and the local inhabitants in connection with the uses of and accesses to the forests resources. Unfortunately, there is a shortage of historical sources for the period before to 1580. For the period from 1580 to 1640, the *Reino* section of the *Conselho Ultramarino* of the *Arquivo Histórico Ultramarino* was our primary source of information. Here we examined documents related to the pinewood of Leiria, and gleaned data from a few of them concerning its management, timber supply for shipbuilding, and natural disturbances such as the fire of 1613 (AHU, CU, Reino, box 1a/62). This fire triggered extensive inquiries from the Monarchy with a long-lasting effect on the governance and administrative staff of the pinewood. We likewise turned to the *Arquivo Nacional Torre de Tombo* for policies on improving its preservation and management from 1597 to 1614 (ANTT, Coleção de Cartas, Núcleo Antigo, 878, doc. 10; Manuscritos Livraria, 1113).

The Portuguese Crown was interested in ensuring the sound management of the pinewood of Leiria because it provided essential services and natural resources to the state and the local inhabitants. To put it succinctly, the state regarded the pinewood of Leiria mainly as a place that supplied timber of excellent quality for shipbuilding and other industries. These sources enhance our understanding of the reasons for the state's actions and its perceptions of the pinewood, as well as of the dynamics between the state and the local inhabitants. Whereas the forestry legislation basically prohibited almost all uses and access to the pinewood by the local inhabitants, these sources tell a very different story. The state not only found it necessary to appeal to the population to settle in the surroundings of the pinewood but also required the cooperation of the local inhabitants when it came to harvesting, processing, and transporting timber from the pinewood to the shipyards. To cite a few sources, we turned to the *Secretarias Provinciales* section of the *Archivo General de Simancas* for shipbuilding and the management of the pinewood (AGS, SSP, books 1466, 1472, 1512, 1519), and to the *Manuscripts* section of the *Biblioteca de Ajuda* for timber supplies for shipbuilding (BA, Ms. 51-VI-28).

Historical maps. The historical sources for points 3 and 4 are very scarce from around 1643 to the third quarter of 18th century, hindering our possibility of creating a detailed account of the management of the pinewood and its material uses. However, the historical maps we retrieved provide information on these points, despite the fact that the Portuguese state did not create cartographic records of the pinewoods of Leiria until the second half of the 18th century. Specifically, we relied on the maps created during the 1760s that are kept in the *Direcção Geral do Território, Cartoteca Antiga* (DGT, IGP, CA, 111, 112), and the map depicting the northern part of the Leiria pinewood in 1826 located in the *Cartografia Manuscrita* section of the *Arquivo Histórico Ultramarino* (AHU/CARTM/Reino/0076/00032).

Methods

The materials used here do not directly provide information on the state of the pinewoods from an environmental approach as the Portuguese administration was chiefly concerned with preserving the pinewood of Leiria from the utilitarian perspective of having a reliable source of sturdy timber for shipbuilding. To glean such information, this paper employs the methodology of environmental history, a field of study that explores the interactions between human societies and the environment on which they are dependent, as well as on how those interactions have affected both (McNeill 2003; Warde, Robin, and Sörlin 2018). Environmental history has been divided into three interconnected layers: 1) a material focus on the uses to which natural resources are put; 2) a political environmental history that considers state policies toward nature; 3) a cultural/intellectual environmental history, which addresses the perception and representation of nature, and how this has affected the uses assigned to nature (McNeill 2003, 5–9).

This paper examines all three layers of environmental history to unearth the history of the pinewoods of Leiria. Firstly, it turns to administrative and economic records to unravel the material uses to which the pinewoods were put by the Portuguese state and local inhabitants, as these practices had been paramount to the protection and preservation of the pinewoods due to the utilitarian approach adopted by Portuguese society. Secondly, it draws on dozens of laws and administrative documents on the

policies implemented by the Portuguese state to ensure the preservation of the pinewood of Leiria for material purposes. Thirdly, the perception of the Portuguese state and local inhabitants concerning the pinewood of Leiria was evident: it provided primary natural resources for the survival of the local inhabitants, as well as for the Royal Navy.

The historical materials were examined from the perspective of all three layers of environmental history to piece together an account of the creation and evolution of state administration of the Leiria pinewood and its administrative staff, and the evolution of its boundaries, as well as providing some data on the importance of shipbuilding as a driver for its preservation, and the evolution of forest cover. However, as already noted, the information provided by historical sources on the management and the material uses given to the pinewood of Leiria from around 1643 to mid-18th century is quite sparse. Historical maps have been used to provide insights into the evolution of the forest cover of Leiria and the landscape that result from the management conducted by the state, and the territory in which the pinewood is located. Therefore, the article sheds light on the space of the Leiria pinewood by combining historical sources and methods with the use of geography and historical cartography.

Main historical milestones of the administration of the Leiria pinewoods

The Portuguese Crown had an administrative staff to manage the pinewood of Leiria before King Dinis I (1288–1325) granted permission to the local inhabitants to withdraw wood and ‘louros’ (*Laurus nobilis*) from the kings’ pinewood (Neves 1983, vol. 4, 106). To do so the Crown had already established a royal forest incorporating the pinewood, delimiting access to it and the use of its forestry resources (*coutada*). This resembles England’s legal forest (Rackham 2006, 141–142). The royal forest of Leiria was a legal forest, which included the pinewood of Leiria and other non-wooded areas, as shown on map 2.

The Crown harvested timber for shipbuilding from at least the 14th century onward (Pinto 1938, vol. 1, 129–136, vol. 2, 439). In 1357, King Pedro I (1357–1367) acknowledged all the privileges granted to 20 foresters (*besteiros*) of Leiria by his predecessors (Neves 1980, vol. 1, 79–81). King Fernando I (1367–1383) extended privileges to the local inhabitants of Pederneira for transporting timber from the Leiria pinewoods (Pinto 1938, vol. 1, 113).

Information on a permanent network of foresters for the protection of the royal pinewood of Leiria dates back to the late 14th century. In 1407, King João I reduced from 40 to 20 the number of *besteiros* with the obligation of cultivating the King’s lands (Pinto 1938, vol. 1, 115–116). In 1442, King Afonso V (1438–1477) confirmed the privileges given by King João I (1385–1433) to the bailiff (*almoxarife*) and the 16 foresters entrusted with managing the royal pinewood of Leiria. Their primary duty was to ‘aseirar’ the pinewood, which entailed creating and clearing straight and wide lanes to prevent fires spreading (firebreaks) (Pinto 1938; vol. 1, 211–212; Neves 1982, vol. 2, 45–46). In 1455, the representatives of the city of Leiria claimed at the *Cortes* of Portugal that agriculture was being abandoned because the local inhabitants preferred to work on harvesting, sawing, and transporting timbers from the royal pinewood to Santarém, Lisbon, Montemor-O-Velho, and other parts of Portugal (Devy-Vareta 1986, 20).

Table 1. Main events of the history of the Leiria pinewoods.

Event	Reason/Purpose	Year	Source
Creation of the legal royal forest in the Leiria pinewoods	Royal itinerancy Game preserves To halt coastal sands	Not clear, very likely prior to Dinis I's reign	Neves (1983), vol. 4, 106.
Confirmation of the privileges of the 20 <i>besteiros</i> of the Leiria region	Confirmation of the former privileges granted by the kings	1357	Neves (1980), vol. 1, 79–81.
First historical evidence of a permanent state administration for the King's pinewood. The foresters were entrusted with creating and clearing firebreaks	Shipbuilding	1442 (acknowledgment of grants made by João I)	Neves (1982), vol. 2, 45–46
The representatives of the city of Leiria complained about shipbuilding	Conservation of the pinewood, mainly for shipbuilding	1455	Devy-Vareta (1986), 20
First ordinance for the main guard of the Leiria pinewood	Conservation for shipbuilding	1524	BFDUL, Ms. 2-12-6
João III restored the royal forest of Leiria	Conservation for shipbuilding	1534	Neves (1990), vol. 5/2, 120-121
Felipe II extended the limits of the royal forest for plantings. The number of junior guards was increased to 33	Conservation for shipbuilding	1596–1598	ANTT, Coleção de Cartas, Núcleo Antigo, 878, doc. 10; AHU, CU, Reino, 1/62 and 6/34
A fire destroyed a large part of the pinewood	Conservation for shipbuilding	1613–1615	AHU, CU, Reino 6/34
The Crown began inquiries, and new firebreaks were created	For the benefit of the Royal Treasury and the Royal Navy	1640–1641	ANTT, Registo Geral Mercês, Mercês da Torre do Tombo, book 3, ff. 231 v-232 r
The Crown increased the number of junior foresters from 33 to 40	Conservation of the pinewood for shipbuilding, pitch, and other industries	1751	Silva (1828), 68–89; Melo Forthcoming
Approval of the ordinance of 1751	To improve knowledge of the state of the territory and forest resources	1765–1769	IGP, CA, 111, 112; Leite (2016).
First two maps of the pinewoods of Leiria and other nearby woodlands	To improve the management of the pinewoods for public works, shipbuilding, mining	1783	Silva (1828), 328–331.
The regulations of 1751 were disbanded			
The traditional administrative body of Leiria's pinewood was dismissed		1783 and 1790	Pinto (1938), vol. 1, 163, 234–245; Silva (1828), 592–600.

In 1524, the Crown issued the first ordinances regulating the duties and privileges of the main guard (*guarda-mor*) of the pinewood and its conservation (BFDUL, Ms. 2-12-6). In 1525, King João III (1521–1557) disbanded the royal forest of Leiria, a decision that lasted until 1534, when he restored the legal royal forest with the penalties detailed in the ordinances of 1524 (Neves 1990, vol. 5/2, 120–121). Between 1530 and 1598, the King's pinewood staff increased from 20 to 33 foresters (AHU, CU, Reino, box 6/34; Neves 1990, vol. 5/2, pp 74–75).

In 1597, Felipe II (1580–1598) extended the boundaries of the royal pinewood of Leiria to conduct new plantings in the area of Camarçã, which became known as 'the new pinewood' (*O Pinhal novo*) (ANTT, Coleção de Cartas, Núcleo Antigo, 878, doc. 10; AHU, CU, Reino, 1/62, 6/34). The plantings were performed twice in the early 17th century (AHU, CU, Reino, 1/62, 6/34). In September 1613, a fire destroyed a large part of the Leiria pinewood (AHU, CU, Reino, 1a/19). As a result, the Crown carried out inquiries, and the foresters were temporarily dismissed (AHU, CU, Reino, 6/34).

During the Braganza dynasty, João IV (1640–1656) raised the number of foresters from 33 to 40 (ANTT, Registro Geral Mercês, Mercês da Torre do Tombo, book 3, ff. 231 v-232 r). In the following century, the Crown continued appointing dozens of officers to look after the pinewood. In 1751, new regulations came out to preserve the pinewood and the production of timbers for the Navy and other industries (Melo [Forthcoming](#)). By means of royal decrees issued in 1783 and 1790, the traditional administrative system of the royal pinewood of Leiria was disbanded, and its boundaries were considerably stretched (Pinto 1938; vol. 1, 163–165, 234–245; Silva 1828, 328–331, 592–600).

Discussion

On the origins of state forest policies for the Leiria pinewood (c. 1250–1385)

Main accounts of the origins of the Leiria pinewood

Much has been written about the origins of the Leiria pinewood. Mariz (1597, f. 99 v) stated that the pinewood of Leiria dated back to the reign of Dinis I and was created to ensure the future availability of timber for shipbuilding. In the 1790s, following their journey across Portugal, Link and Hoffmannsegg reproduced Pedro de Mariz's argument. In addition, they maintained that since the planting of the pinewood at the end of 13th century nothing had been done to ensure its conservation. Nuno Olivera questioned these assertions, and claimed that the pinewood dates back to the Neolithic Age, albeit without providing further evidence (Oliveira 2014, 288).

Silva and Batalha (1843) noted there was no certainty as to its historical origins. Consequently, they expounded the two main theories. According to the first, the pinewood was planted and institutionally created as a state forest by King Dinis I for the benefit of the royal navy, as well as to prevent sand from spreading inland because it jeopardized agriculture. In contrast, the second theory claimed that the pinewood had been founded in the times of Sancho II (1223–1248).

Carlos Neves sought to unravel the mystery concerning the origins of the Leiria pinewood. He claimed (Neto 2011, 1–3) that the pinewood was created during the reign of Sancho I (1185–1213), and that Pedro de Mariz started the legend that D. Dinis had founded it. Regardless of which of the theories is more accurate, it seems that the pinewood of Leiria already existed, and that humans acted upon what was already there. This is likely to be the case. Therefore, the discussion revolves around the legal establishment of the royal forest of

Leiria – in other words, when did the state begin to take conscious action on the landscape planning of the Leiria pinewood and surrounding area?

Pinto (1938, vol. 1, 69–70, 112–121, 159) noted that the pinewood existed prior to the reign of Dinis I, who founded the royal forest, and his wife Queen Leonor, who had brought *Pinus pinaster* seeds from southern France. There is a longstanding debate on whether *Pinus pinaster* is indigenous to the country or whether it was introduced (for a literature review see Figueira 1995, 441–454; Pinto 1938, vol. 1). However, the presence of *Pinus* has been confirmed in Portugal during the Holocene; for example, *Pinus pinaster* and *Pinus pinea* coexisted in the Tejo estuary area in this period (Gomez-Orellana et al. 2014). According to Granja et al. (2022, 49), the expansion of *Pinus* (including *Pinus pinaster*) in the Cavado river estuary originated from plantations of local *Pinus* for the shipbuilding industry. These plantations, which dated back to the late Roman period or the Suevian Kingdom of Gallaecia, are the oldest pollinic evidence of forest crops in the Iberian Peninsula.

Based on charcoal analysis and palynological studies, Figueira (1995, 441–454) notes that *Pinus pinea* is native to the north and central parts of Portugal. In the area of Leiria, *Pinus pinea* was widely distributed from the Upper Paleolithic, and not just confined to the coastal sands (Figueira 1995, 441–454). Pollen analysis confirms the presence of forest species and their evolution in the present and in different historical periods (Connor et al. 2021; Danielsen et al. 2012; Pereira, Ribeiro, and Abreu 2020). For example, it tells us that pine-woods of *Pinus halepensis*, *Pinus pinaster*, and *Pinus pinea* would have grown in littoral and sandy environments (Currás et al. 2021), such as the ‘Mata de Leiria’ area; and that the reforestation process on coastal dunes was initiated in the region 300 years ago (e.g. Mata de Leiria) and locally along the coastal strip between 1924 and 1940 (Danielsen et al. 2012). Connor et al. (2021) found a convincing correlation between the decline in pine volume and ecological models involving multiple stressors; however, according to Connor et al. (2021), management decisions made determine future ecosystems, such as the pinewood of Leiria.

The foundation of the pinewood of Leiria as a royal forest was related to the Portuguese Monarchy, and more particularly to royal itinerancy and the enhancement of its power over the territory. From roughly the 12th to the 15th centuries, monarchs constantly traveled around Portugal, as medieval society attached great importance to the physical presence of the King (Gomes 2003, 291–295). As a result, they founded many accommodations (castles and palaces) scattered across Portugal. The royal family also required estates to ensure their families’ wellbeing, and hunting grounds. As the royal family used to visit the area of Leiria from the 12th to the 15th centuries, a permanent staff likely managed the woodlands located in the forest district of Leiria. Therefore, by 1310, the palace of Monte Real had been built near Leiria close to the Liz River in the ‘Reguengo da Camarinha’ (lands that belonged to the royal patrimony) where there were settlements of cultivators (Gomes 2003, 315, 334–337).

A historical source supports the theory that the royal forest of Leiria was legally created in the times of Dinis I. In September 1497, King Manuel I (1496–1521) confirmed the privilege granted to the inhabitants of Leiria by Dinis I, João I (1385–1433), and Afonso V (1438–1477) whereby they were permitted to withdraw wood and ‘louros’ (*Laurus nobilis*) from the king’s pinewood (Neves 1983, vol. 4, 106). Therefore, from the 13th century at least, the landscape of Leiria’s pinewood was consciously transformed and maintained by the state (Monarchy) to meet the industrial (mainly shipbuilding) requirements of the Monarchy and the daily needs of the local inhabitants.

The pines of Leiria were especially suitable for the production of planks, as they were large, tall, and flexible, and did not crack easily, and their sap was water resistant (Castro 2005, 105–142, 174–175; Domingues 2004, 92). State forestry was designed to ensure the future existence of easily accessible timber for the royal navy. At this point, as with the Republic of Venice (Appuhn 2000), state forestry devised four intertwined policies.

Firstly, several laws were passed to preserve the pinewood by limiting access and uses to local inhabitants. Secondly, the Monarchy set up a legal royal forest ('coutada' in Portuguese) encompassing more areas than just the physical woodland, where several economic activities that were regarded as detrimental to shipbuilding (see map 2) were forbidden or restricted. Thirdly, the kings established a permanent forest staff run by the Monarchy to implement the policies on the ground. Fourthly, from time to time, the Crown appointed some officers entrusted with extraordinary duties ranging from forest inspection to planting policies.

Concerning the first point, although historical sources are very scarce, the Portuguese Crown adopted the first policies to protect the pinewood in the 13th century. It is likely that the founding of the pinewood attributed to Dinis I was, in reality, the establishment (or confirmation) of the legal royal forest of Leiria, as at that time the same policy was adopted for other woodlands such as Botão (Neves 1980, vol. 1, 29–37).

The first references to the establishment of a permanent forest staff to manage the forests of the Leiria region date back to the 14th century. In 1357, Pedro I (1357–1367) was proclaimed King of Portugal. In accordance with the political culture of the time, the new sovereign must have endorsed the privileges the previous kings had granted. Thus, the monarch confirmed all the privileges bestowed on the guards (*besteiros*) of the Leiria region as it is shown in Table 1 (Neves 1980, vol. 1, 79–81). There were 20 *besteiros* under the command of the *anadal*, a post which entailed hunting activities (Bluteau 1789, vol. 1, 89). The foresters were duty bound to serve the kings when their presence was requested, usually for the chase. It is very likely that this staff was related to the aforementioned royal itinerancy (Neves 1980, vol. 1, 79–81). It is not possible to ascertain whether their obligations included protecting the pinewood of Leiria.

Devy-Vareta (1985, 68) lists more than 20 royal preserves in the district of Leiria during the 15th century, including the pinewood of the King. At this point, three main hypotheses are plausible: 1) the state administration made up of 20 *besteiros* and the *anadal* was established to assist the royal family when they stayed in Leiria. Over time they were also entrusted with the management of the royal pinewood. 2) The royal pinewood did not yet have a permanent bureaucracy. 3) There were two separate administrations, one for the pinewood of the King, and the other for the remaining forests in the Leiria district.

The pinewood of Leiria during the Avis dynasty (1385–1580)

State forest policies and the consolidation of a permanent administration (1385–1494)

Under João I (1388–1433), state forestry policies were stepped up significantly all over Portugal, extending to the royal forests of the Leiria region (Barros, 1914, vol. 3, 25–35; 1922, vol. 4, 72–88). By the early 15th century, a bailiff (*almoxarife*) and 16 foresters managed the pinewood of the King, constituting a separate administration (Neves 1982, vol. 2, 45–46). They were entrusted with 'aseirar' the pinewood, which entailed

creating and clearing straight and wide lanes to prevent fires spreading to the pines (firebreaks). There were two kinds of firebreaks. Firstly, an outer firebreak surrounding the whole pinewood was created and kept for centuries, as shown in Figure 2. Secondly, there were inner firebreaks with the same purpose.

During the ensuing decades, it is very likely that the administration of the King's pinewood was either neglected or left in the hands of other institutions. In February 1450, Afonso V confirmed all the privileges of the bailiff (Gonzalo Anes) and the four foresters (Domingos Salvado, Pero do Ribeiro, Estêvão Martins, Martin Gomes)

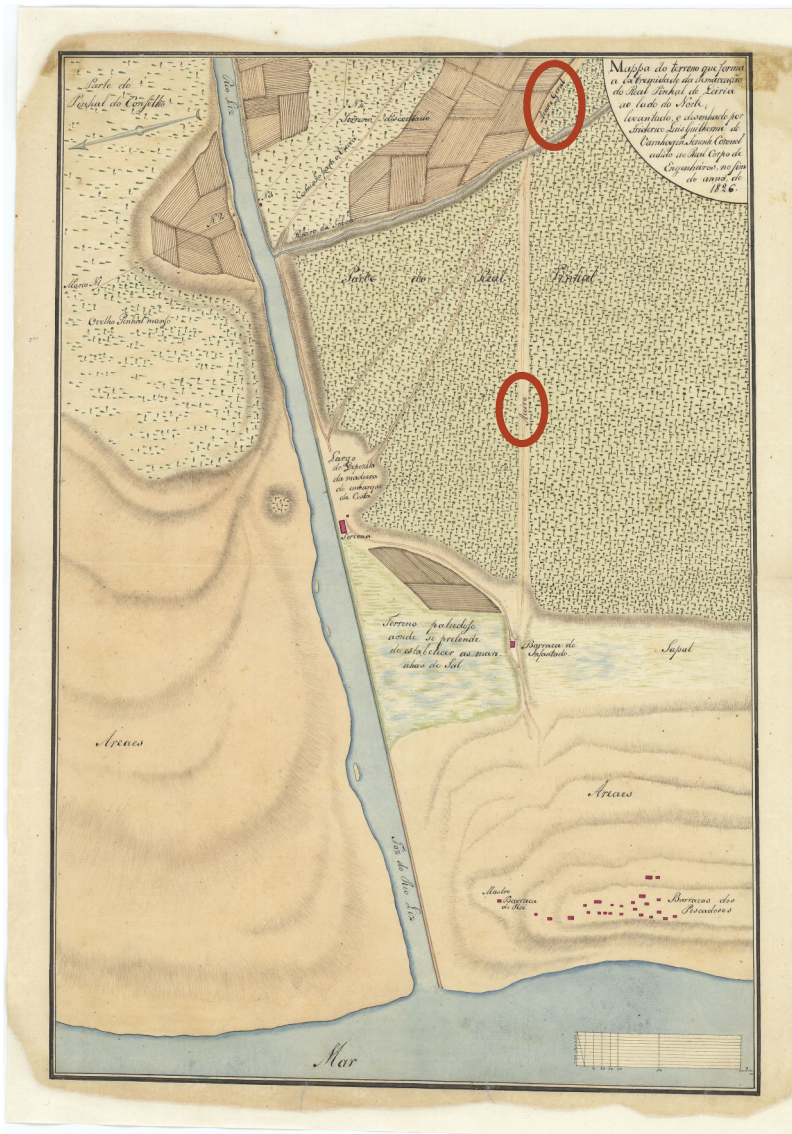


Figure 2. Details of the firebreaks (“aceiro” and “aceiro geral”) according to the map of 1826 (AHU/CARTM/Reino/0076/00032).

who remained from the times of João I. The governor (*alcaide*) of the castle of Leiria was responsible for appointing up to 16 foresters to conserve the King's pinewood (Neves 1982, vol. 2, 45–46). During these years, there were several guards to protect the forests of the district of Leiria, as shown in Table 2. This table contains data on the foresters (*monteiros*) whose posts had been confirmed in 1441 when King Afonso V came to the

Table 2. Foresters of Leiria's district forests.

Guard	Forest to protect	Confirmation Date
Rodrigo Anes	Matas de Valverde y Arnua	June 23 rd 1441
João Gonçalves Machão	Mata das Porcas	June 26 th
Pedro Afonso	Mata do Paul do Toro	June 26 th
João Martins	Mata de Navalhas	June 27 th
Pedro Anes Docinho	Mata da Morzeleira	June 27 th
Pedro Anes Alvão	Mata das Portas de Alagoa, Mouta do Bregio das Sovereiras, paul (marsh) do Ortigosa e Molhadoiro dos Carvalhais	June 28 th
João Dias	Matas de Lapedo	June 28 th
Alvaro Dias	Mata de Lapedo	June 28 th
João Oliveiros	Mata das Colmeias y das Pontas	August 13 th
João Martins	Mata do Colmeal	September 3 rd
Alvaro Rodrigues	Torre das Colmeias e Rede Moinhos	October 19 th
Martin Vasques	Mata de Pomares	December 1 st
Diogo Lourenço	Mata e Paul de Maiorga, and Paul do Valado	April 16 th 1442
João Anes Franco	Mata of Paul da Pedra	October 17 th

Source: Compiled by the authors from Neves (1982), vol. 2, 29–44.

Portuguese throne. Consequently, from at least the outset of the 15th century, the pinewood of the King was managed by a permanent forest bureaucracy separate from the foresters of the Leiria district.

It is essential to ascertain who the junior foresters of the pinewood of Leiria were. The foresters' appointment letters show that the state did not pay them a permanent wage. Instead, junior foresters were drawn from among the pinewood's local inhabitants. They were granted privileges for their positions, as in the duchies of Venice and Württemberg (Appuhn 2009, 150–152; Neves 1982; vol. 2, 33; Warde 2006, 185). This meant that the foresters' activity was restricted to their town of residence. Moreover, as the state did not provide them with a permanent wage, the foresters were likely compelled to meet their basic needs elsewhere. This leads us to think that the junior foresters were farmers who combined the obligations of maintaining their households with their forestry duties.

Therefore, Portuguese state forestry was based on strategies of cooperation and confrontation with the local inhabitants. The scarcity of manpower was more acute when it came to felling, harvesting, and transporting timber from the forest to the dockyards. From the times of Fernando I at least (1367–1383), the inhabitants of Pederneira were granted some tax exemptions to ensure they participated in felling, processing, and transporting the timbers (Pinto 1938, vol. 1, 113). The royal forest of Leiria thus contributed to increasing the number of inhabitants of the area (Pinto 1938, vol. 1, 174–175). For instance, in 1834 the administration of the National Pinewood of Leiria enlisted 337 people for the tasks of felling, sawing, harvesting, and transporting timber

from the pinewood (Biblioteca Central da Marinha-Arquivo Histórico, Documentação Avulsa, caixa 4). Although the workforce demand was likely higher in 1834 than throughout the 16th-17th centuries, this document provides insights into the Portuguese Monarchy's need to engage the local inhabitants to ensure a steady flow of timber to the shipyards.

Consequently, it is necessary to recall two features of state forestry up to the end of the 18th century. Firstly, although the state had a forest staff entrusted with managing the royal forest of Leiria, it needed to turn to the local inhabitants to ensure the sound management of the woodland. Secondly, the state could not harvest, process, and transport timber and wood without engaging the local communities, a process for which it granted them several privileges. For instance, in 1450, Afonso V permitted all the dwellers of Leiria to withdraw wood from the royal forests of the Leiria district except the royal pinewood of Leiria and the forests of Lapedo, As Capelas, and Das Fontes (Neves 1982, vol. 2, 76).

It is crucial to consider that the pinewood of Leiria was located in an area that was ill-suited to farming. At the Portuguese Cortes of 1455, the representatives of the city of Leiria claimed that local agriculture was being abandoned because farmers preferred to work on harvesting, sawing, and transporting wood to Santarem, Montemor-o-Velho, and other parts of Portugal from which they brought back bread (Devy-Vareta 1986, 20).

During the second half of the 15th century, the pinewood of Leiria remained under state management, as attested by references to the appointment of several foresters, such as Alvaro Pires and Pedro Lourenço, who were given their posts in 1469; and Lope Peixoto, whose position as main guard of the forest district of Leiria was confirmed in 1482 (Neves 1982, vol. 2, 164; 1982, vol. 3, 32).

Strengthening the state forestry policy for the Leiria pinewoods (1495–1580)

The advent to the throne of Don Manuel I (1496–1521) witnessed a shift in state forestry. At the Cortes of 1495, the representatives of the city of Lisbon complained about the significant extension of royal forests. Consequently, the monarch began an ambitious program of disbanding the royal preserves across Portugal (Devy-Vareta 1986, 21–26; Labrador Arroyo 2009, 225–227). Although there are no references to the pinewood of Leiria, in 1502 the King confirmed the privileges of the main guard and the 16 junior foresters of the pinewood (Neves 1988, vol. 5/1, 11).

According to Nicole Devy-Vareta, at the outset of the 16th century, the pinewoods located in Ribatejo, Pederneira, and Leiria were diminished due to fires and overcutting (Devy-Vareta 1986, 28). Surprisingly, the first thorough ordinances approved for the pinewood of Leiria in 1524 made no reference to the reduction or destruction of forest cover. Instead, they claimed there were no ordinances regulating either the duties and privileges of the forest staff, or how the pines needed to be preserved (BFDUL, Ms. 2-12-6). Both aspects were addressed using traditional practices, which entailed handing down empirical forestry knowledge from generation to generation. As was typical of other European powers, the regulations established 'negative forestry' (a term coined by Appuhn) legislation limiting and forbidding many forest uses to preserve timber for the state (Appuhn 2000, 871–873).

The ordinances of the Leiria pinewood banned the felling of large trees (*pãos*) located inside the limits of the outer firebreak and also poaching, because hunters started fires that could quickly destroy the pinewood (BFDUL, Ms. 2-12-6). However, the ordinance acknowledged that the pinewood had been a space with multiple uses where the inhabitants of Portugal had been allowed to cut trees for shipbuilding, construction, and other purposes such as making pitch. With these ordinances, the state sought to closely monitor the felling of trees through a permissions system. Anyone who was interested in cutting trees was required to obtain a license from the main forester (*guarda-mor*) detailing the place where it was to be carried out. A forester would accompany the beneficiary to ensure that the felling was performed in accordance with the license (BFDUL, Ms. 2-12-6).

The main guard of Leiria had legal predominance over the governor (*alcaide*), bailiff (*meirinho*), and the remaining officers of the city of Leiria. In contrast, in the mid-15th century the governor of Leiria had been acknowledged as the head of the administrative staff of the pinewood with power to appoint the junior guards. The ordinances of 1524 stated that the main guard could appoint up to 16 junior foresters (BFDUL, Ms. 2-12-6). The income of the main guard was divided into payments in kind (logs, fallen branches, and dry wood) and in cash (20 *reis* for each license granted).

Besides establishing harmful forestry legislation, the ordinance of 1524 took some steps toward conserving the pinewood. Although these measures did not entail a complete break with former forest policies, it is important to note that they were regarded as key strategies to ensuring sound forestry. After Easter all the foresters were entrusted with clearing the firebreaks inside the pinewood and the outer firebreak. The main forester was allowed to establish new firebreaks provided that he requested permission to do so (BFDUL, Ms. 2-12-6).

In August 1523, Jorge da Costa replaced Gonçalo Rodriguez, his father-in-law, as main guard of the Leiria pinewood. As Gonçalo Rodriguez had no male heir to whom the post could be passed, the King had provided that it be handed down to the man who had married his daughter: Jorge da Costa (Neves 1988, vol. 5/1, 69–70). In 1567, João Rodrigues Barba was appointed main guard of Leiria after wedding Helena da Costa, the daughter of Jorge da Costa (Neves 1993, vol. 6, 55–56). In 1577, the office passed to Jorge da Silva, Helena da Costa's nephew (Neves 1993, vol. 6, 101–102). In the early 17th century, the post was held by Jorge da Silva Costa (AGS, SSP, lib. 1472, ff. 246 r-247 r). It is very likely that throughout the 16th and 17th centuries (if not earlier) the office was held by the same family, paving the way for the creation of dynasties of foresters as in the Spanish Monarchy and other European regions (Warde 2006; Wing 2015).

In 1525, King João III disbanded the royal forest of Leiria. This meant, among other things, that hunters could now engage in the chase inside the boundaries of the pinewood. During the following years, the main guard of the pinewood complained about this decision, as hunters started fires that could spread quickly (Neves 1990, vol. 5/2, 120–121). In 1530, the Crown increased the number of guards from 16 to 20 because the pinewood was too large to control (already 24 kilometers, four leagues), and it was necessary to create and maintain firebreaks to prevent fires from destroying it (Neves 1990, vol. 5/2, 74–75). In 1534, the King restored the royal forest with the penalties specified in the regulations of 1524, and confirmed all the privileges granted to the administrative staff (Neves 1990, vol. 5/2, 117–121).

Meanwhile, the pinewood of Leiria continued to supply timber for shipbuilding to Lisbon, Lagos, and Pederneira. In 1530 the main guard claimed that the pinewood was excessively large to be managed by only 16 junior guards (Costa 1997, 320–335; Pinto 1938, vol. 1, 138–145). Around this time Early Modern states developed permanent naval forces, which, in turn, increased the need for timber (Glete 2000). This also occurred in Portugal, further linking the fate of the Leiria pinewood to the royal navy.

The pinewood of Leiria during the Habsburg dynasty (1580–1640)

Expanding the royal forest of Leiria: plantings and shipbuilding (1580–1612)

The advent of the Habsburg Dynasty entailed an administrative modernization of Portugal, including forest policies (Hespanha 1989, 50–73; Devy-Vareta and Alves 2007, 64–66). By early 1596, the archbishop of Leiria, Don Pedro de Castilho, proposed that King Felipe II plant large numbers of pines near the church of Nossa Senhora da Nazaré in Pederneira in view of the shortages of timber for the royal navy (ANTT, Coleção de Cartas, Núcleo Antigo 878, doc. 10).

In July 1597, the monarch ordered the reforestation of the Leiria pinewood due to the importance of relying on large reserves of pines for the Navy. For this purpose, the boundaries of the pinewood were stretched in the South from the old pinewood as far as Nossa Senhora da Nazaré. Moreover, the King appointed eight new foresters to conserve the new pinewood and pinecones (AHU, CU, Reino, box 6, folder 34; Pinto 1938, vol. 1, 159–162). It is clear that by the late 16th century, the common good of the inhabitants of the Portuguese Empire, and what we refer to nowadays as a matter of ‘state security,’ were related to the future existence of pinewood for the Navy (Appuhn 2009, 109–111).

The red line on the map of 1769 (Figure 3) represents the legal boundaries of the royal forest of Leiria. Forty-six landmarks (*marcos* in Portuguese) physically demarcated the outer limits of the royal forest.

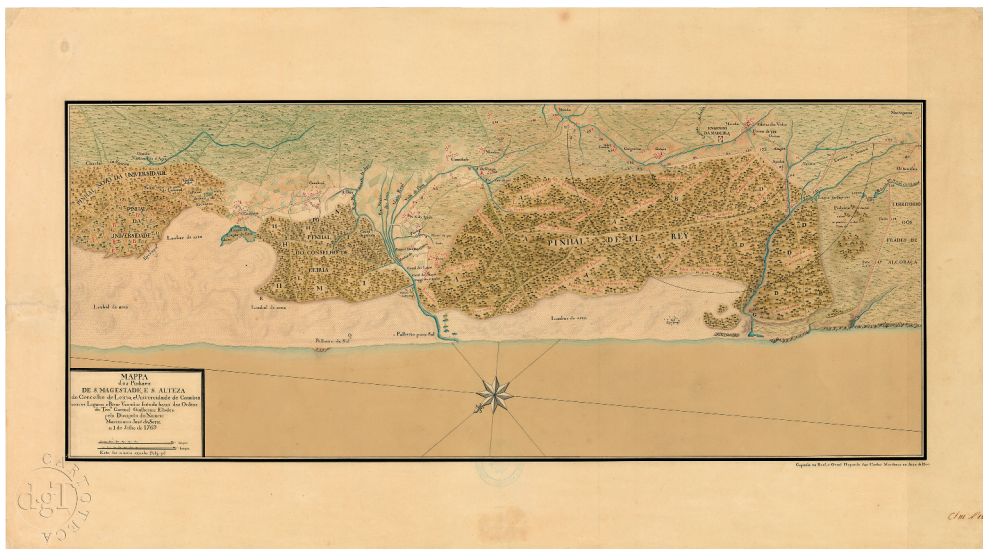


Figure 3. Map of the pinewood of His Majesty in Leiria, 1769 (DGT, IGP, CA-112).



Figure 4. The extension of the pinewood decreed by Felipe II, which was still the southern limit of the royal forest in 1769 (DGT, IGP, CA-112).

Figure 4, in contrast, represents part of the second map, and shows the new boundaries established by Felipe II in 1597 and 1598. This royal forest was a legal strategy by which the Crown claimed the use of the territory and banned some (or all) economic activities.

Once the legal royal forest had been established, the Crown performed two large-scale plantings of *Pinus pinea* in Camarção. This area was named 'the new pinewood' (*O Pinhal Novo*) (AHU, CU, Reino, box 1/62, 6/34). The seedlings did not thrive because the soil was not suitable for this tree species (AHU, CU, Reino, box 1, doc. 62). It is doubtful whether this failure prompted Felipe III (1598–1621) to change his mind, as he did not reduce the royal preserve to its former size. This triggered a massive dispute with the Benedictine monastery of Alcobaca that was still ongoing by the late 18th century, as shown in Figure 4.

In 1605, one of the most comprehensive forest ordinances in Portuguese history was passed aimed at regulating the uses of all royal forests, as well as gathering knowledge on the private woodlands that the state officers would manage (Silva 1854, 109–124; Trapaga Monchet 2017, 18–21). Only two royal pinewoods were listed in the forest district of Leiria. The first one – the pinewood of Leiria – extended along the coast for four leagues (24 kilometers) from the mouth of the Liz River up to ‘Picotos, e Ribeira do Vinagre, e Casal de Martim Gança,’ and contained a large amount of *Pinus pinea* and *Pinus Pinaster*. The second woodland was called Ervedal [Ervedeira], and was located north of the Liz River. Furthermore, private woodlands of oaks and pines were recorded, including the pinewood located north of the Liz River that belonged to the city of Leiria (Silva 1854, 120–121) and is currently part of the National Woodland of Leiria. The staff of Leiria’s forest district was made up of the main guard (*guarda-mor*), 24 junior foresters, a clerk (*escrivão*), a warehouseman (*almoxarife*), a bailiff with one assistant (*meirinho*), and the doorman (*porteiro*) to protect the wood warehouse (Silva 1854, 121).

In addition, there were at least three key officers directly connected to the foresters. They were in charge of selecting, harvesting, and processing the wood, as well as stockpiling and transporting it: the timber factor of Pederneira and São Martinho do Porto (*Feitor das madeiras dos Portos da Pederneira, e S. Martinho*), the timber clerk of Pederneira and S. Martinho (*Escrivão das madeiras dos Portos da Pederneira, e S. Martinho*), and the bailiff of the river and ports of Pederneira and S. Martinho de Porto (*Meirinho da Ribeira, e Portos da Pederneira, e S. Martinho*) (Sousa 1785, vol. 3, 106–109; Silva 1830, 86–89). They were directly related to the dockyards and warehouses of Lisbon, a fact that highlights the interconnections between the forestry of Leiria and the royal dockyards of Lisbon.

In this respect, several references confirm that timber harvested from the Leiria pinewood was sent to the shipyards of Lisbon. In 1607, the Crown entered into a contract with Diogo Lobo, Pero Fernandes Lobo, Antonio de Freitas Lobo, and Duarte Araujo for them to supply hundreds of pine logs from the King’s pinewood (AGS, SSP, lib. 1466, f. 152 v; 1472, 252 v). The following year, Jorge da Silva da Costa, main guard of the Leiria pinewood, committed himself to supplying many pine components. In 1609, he likewise undertook to provide timber for the construction of three ships and repairs to other ships (AGS, SSP, lib. 1472, ff. 243 r-v, 246 r-247 v). In 1612, the Crown again hired Jorge da Silva da Costa to supply timber for shipbuilding (BA, Ms. 51-VI-28, f. 45 v).

The fire of 1613 and its impact on forestry policies

On 27 September 1613, an unexpected fire broke out in the Leiria pinewood. The judge of Leiria, Manoel Veloso Cabrao, worked hand in hand with the foresters of Leiria and other authorities made firebreaks in the north from ‘Lagoa limpa onde se chama a Carreira das Sellas’ to the sea to halt the spread of the blaze (Figure 5; AHU, CU, Reino, 1a/19).

The fire had been brought under control by September 29, and the first enquiries began soon afterward. According to Manuel Veloso Cabral, the fire started in the new pinewood: ‘na coutada do pinhal de pinto do lugar da Coucinheira’ (AHU, CU, Reino, box1a, folder 19). During the following years, the Crown continued to withdraw timber from the royal pinewood, but by 1621 it was being taken from private pinewoods of

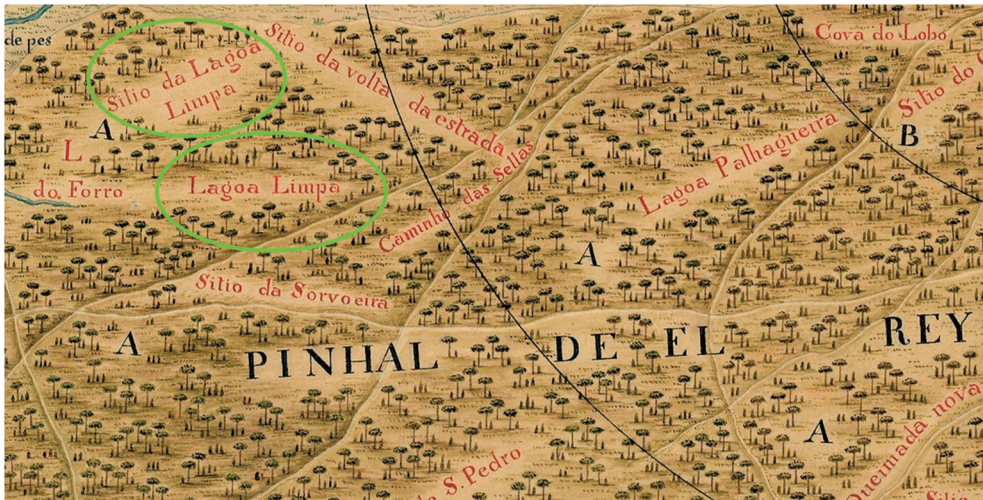


Figure 5. The place “Lagoa limpa” where a firebreak was created after the fire of 1613 (DGT, IGP, CA-112).

Batalha to give a respite to the royal pinewood (AHU, CU, Consultas do Serviço Real, cod. 476, f. 170 r-v).

A report of 1634 stated that the fire of 1613 had spread from the mouth of Liz River to São Pedro de Muel (AHU, CU, Reino, box 6, folder 34). This meant that the pinewood was largely destroyed, and the huge inquiries it triggered from the Monarchy had a lasting impact on the governance of the pinewood. The Monarchy commissioned Doctor Gonzalo de Sousa to initiate an investigation into the matter. He gave orders for all the foresters of the pinewood to be prosecuted on charges of negligent management, as they had not kept the firebreaks clear, making it easier for the flames to spread. The prosecution lasted for several months, and afterward the ministers in Lisbon and Madrid gathered to draw up new regulations for conserving the pinewood and harvesting timber. Gonzalo de Sousa would be entrusted with their enforcement (AGS, SSP, lib. 1512, f. 6 r).

However, a few months later, Doctor Jerónimo de Souto replaced Gonzalo Sousa in overseeing the construction of the new firebreaks from the mouth of Liz River up to ‘Lagoa Limpa’ and from Nossa Senhora de Nazaré to the ‘Lagoa Sa Pinha.’ He then summoned all the foresters of the Leiria pinewood before him in the presence of well-known authorities, such as the bishop of Leiria, and the main guard of the pinewood. The pinewood foresters were asked whether they wished to be given their posts back. If they accepted, they would not only have to clear and keep the old firebreaks free of underbrush but also to make new firebreaks. Each forester would be responsible for 150 *palmas* [33 meters]² of the firebreaks without receiving any wage, being granted some privileges and tax exemption. To ensure a sound management of the pinewood, not only were unreliable foresters dismissed, but the King also confirmed that there would be 40 foresters (AHU, CU, Reino, box 6, folder 34). In actual fact, they continued to number 33.

From the 1610s onwards, the forestry legislation on state pinewoods was vastly increased to establish a sound management of the woodlands and ensure an ongoing supply of timber for shipbuilding. In this connection, from 1623 to 1625 a new set of regulations was drafted to improve the preservation of the Leiria pinewood. Although the

ordinance was not issued, it contained more than 80 chapters, which gives an idea of the high level of detail (AGS, SSP, lib. 1519, f. 66 r). According to the historical documents, the Crown did not withdraw timber from the Leiria pinewood until the mid-1630s (Trapaga Monchet 2019, 120).

The administration and management of the Leiria pinewoods during the Braganza dynasty (1640–1790)

Policies and forest cover prior to the Enlightenment (1640–1750)

When João IV (1640–1656) seized the throne of Portugal in 1640, he attempted to reinforce state forestry (Labrador Arroyo 2009, 241–242). A few months later, he confirmed the number of foresters at 40, as Jerónimo de Souto had ordered in 1615, to create and maintain the new firebreaks in the Leiria pinewood. João IV claimed that he was prompted to increase the number of foresters from 33 to 40 for the sake of the Royal Treasury and the Royal Navy, and the significant shortages of timber Portugal was encountering (ANTT, Registro Geral Mercês, Mercês da Torre do Tombo, book 3, ff. 231 v-232 r).

During the next century, the Crown appointed dozens of foresters to preserve the King's pinewood in Leiria. For instance, in October 1723, King João V (1706–1750) confirmed the privileges that had been granted to the 40 foresters of Leiria on several occasions, such as in 1641 and 1662 (ANTT, RGM, Mercês de D. João V, book 15, f. 245 r). The same is true of the officers directly related to timber cutting and transportation from Leiria to the ports of Pederneira and São Martinho de Porto. Regarding the post of timber factor of Pederneira's and São Martinho woods (*feitor das madeiras da vila de Pederneira and S. Martinho*), in 1707 the office was held by Luís Inácio Pereira (ANTT, Registro Geral de Mercês, Mercês de D. João V, book 2, f. 108), who in 1739 was permitted to pass on the office to whomever he wished (ANTT, Registro Geral de Mercês, Mercês de D. João V, book 2, f. 108). In 1755, the same privilege was granted to António de Almeida e Sequeira, and just one year afterward, the position was bestowed on António Ribeiro Salvado (ANTT, Registro Geral de Mercês, Mercês de D. José I, book 9, f. 210 r-v).

There is a dearth of historical data concerning the pinewood and timber supply for the second half of 1600s and early 1700s. However, historical cartography provides some information on the forest cover of the pinewood. The map of 1769 divided the pinewood into 11 areas, each of which is referred to with a letter that stands for the age of the pines (Figure 6). The pinewood of Leiria is surrounded by a discontinuous red line that extends further than the actual pinewood and represents the boundaries of the royal forest. The northern part of the pinewood, which amounted to around 55% of its area (see Table 3), was populated with pines aged around 80 years.

According to Silva and Caetano, it took around 70–80 years for a pine in Leiria to grow to a size suitable for shipbuilding (Silva and Batalha 1843). The second part of the pinewood was mainly populated with pines around 30–40 years old, with a tiny area of new pines (letter C). Moreover, in the southern part adjacent to the beach, there were two new pinewoods belonging to the King, possibly the new plantings performed during the years prior to 1765 (DGT, IGP, CA-111).

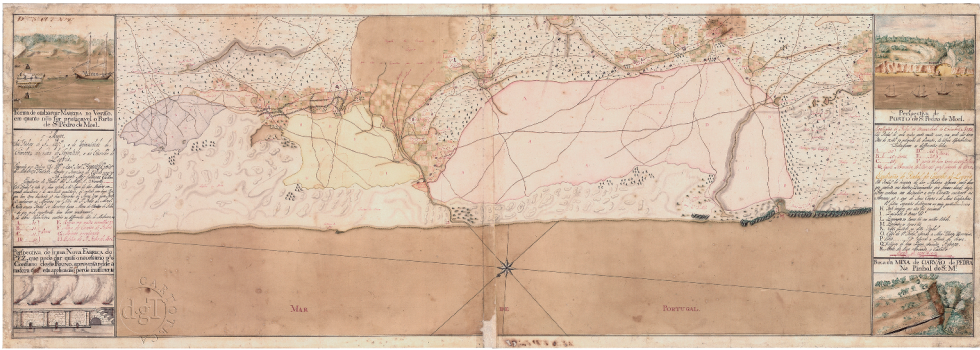


Figure 6. The pinewood of Leiria and other pinewoods (1769) (DGT, IGP, CA-111).

Table 3. Forest cover of Leiria's pinewood in 1769.

Code or letter on the map	Ha	%	Age of the pines	Year of planting (reference year: 1769)
A	4000	55	80	1689
B	80	1	30	1739
B	700	10	30	1739
D	2400	33	60	1709
C	125	2	10	1759

Source: The authors from DGT, IGP, CA-111. The surface values are approximate because the original map has no projection system.

This map also provides information about two large pinewoods located north of the Liz River. The first, the pinewood of the city of Leiria (*Pinhal do Conselho de Leiria*), was not suitable for shipbuilding because the local inhabitants had burned it down in the last 20 years to produce firewood, charcoal, and materials for their homes. In contrast, the pinewood of the University of Coimbra (*Pinhal da Universidade de Coimbra*) could supply around 5,000 trees of 12 to 14 inches in width (*polgadas de diametro*) despite being a very young forest. Only a small portion of the pinewood was populated with 50-year-old pines. It was estimated that around a quarter or a third of the pinewood contained pines aged 40 years (DGT, IGP, CA-111).

Also listed were the pinewood of the people of Ervedeira (*Pinhal de Povo da Ervedeira*) and the pinewood of the Lourçal (*Pinhal novo do povo do Lourçal*), for which no further information was provided except their outer limits (DGT, IGP, CA-111).

Consequently, sound empirical forestry kept the pinewood of Leiria well preserved by 1765, and it could have produced enough timber to meet the demands of the navy, a subject that will be addressed in a future paper. Timber was cut and transported across the river basin to two water-powered sawing mills. In São Pedro de Moel there was a port where the timber could be loaded onto ships (DGT, IGP, CA-111; Leite 2016, 85–90). The state of the pinewood depicted in them is a reflection of the empirical forestry, whose roots can be traced back at least to the 14th century. This empirical forestry laid the foundations for the modern scientific state forestry of the 19th century, which began with the policies adopted in the second half of the 18th century.

The path toward modern state forestry (1751–1790)

Silva and Batalha (1843) argue that the modern management of the pinewood did not begin until the 1790s. In 1790, the minister Martinho de Mello e Castro visited the pinewood of Leiria, and a royal order issued the same year disbanded the administration headed by the main forester (*guarda-mor*) with the 40 foresters who had managed the pinewood since the early 15th century at least. The law of 1790 stated that the several policies adopted during the last years had not only failed to curtail the mismanagement of the pinewood, but also exacerbated corruption and the damage it caused the pinewood (Silva 1828, 592).

The royal decree of 1790 set out to disband the forest policies outlined in the ordinances of 1751 and 1783, which were designed to improve and regulate the empirical forestry practiced in the pinewood for centuries. In two recent contributions, Cristina Joanaz de Melo has revisited the regulations issued in 1751 (Melo [Forthcoming](#)).

The regulations of 1751 not only transferred responsibility for supervising the pinewood to the Secretary of State and the Navy (*Secretaria de Estado da Marinha*), but also brought about a considerable improvement in the forest policies. State forestry aimed not only to stem the advance of coastal sands, but also to establish better management of the existing woodlands to ensure the ongoing production of sturdy timber for the royal dockyards of Lisbon (Melo [Forthcoming](#)). In this connection, the ordinance of 1751 emphasized two forestry techniques that had somehow continued to be practiced for centuries. Firstly, the creation of firebreaks and the clearing of underbrush to prevent the spread of fires. The main guard and the junior foresters were forced to clear the firebreaks twice a year, around Easter and on the eve of Saint Bernard's feast day (August 20). While this measure was not new, as it had been laid down in the regulations of 1524, the ordinance of 1751 provided technical details on how it should be performed (Silva 1830, 69).

Secondly, anybody was permitted to freely enter the pinewood of Leiria to withdraw 'lenha seca, ou rama, mato, e cepa' without paying any fees or requesting permission, well before this was ordered by João VI (1799–1826) at the beginning of 19th century (Pinto 1938, vol. 1, 167). Melo ([Forthcoming](#)) notes that a leap forward in the management of the pinewood took place, as the regulations of 1751 provided significant details on techniques for preserving the pines.

Moreover, these regulations provided for the planting of pines in new areas near the pinewood of Leiria that were parallel to the coast (Melo [Forthcoming](#)). These areas might be the 'new pinewood' specified on the maps of 1765–1769, as shown in [Figure 7](#) (DGT, IGP, CA-111).

Consequently, so-called modern forestry did not begin in Leiria during the 1790s. The regulations of 1751 entailed a leap forward in Portugal's forestry legislation, although it is not clear whether they systemized empirical forestry techniques that the staff of Leiria had been practicing for decades, perhaps even centuries. They furthermore marked a break with the policies implemented in two fields. Firstly, the sustained effort of transforming sands into forests halted the spread of the coastal sands that harmed the crops. Secondly, and closely connected to the former point, this made it possible to transform forest areas into agricultural lands, as occurred in the last decades of the 1700s and the early decades of the following century (Pinto 1938, vol. 1, 167–169).

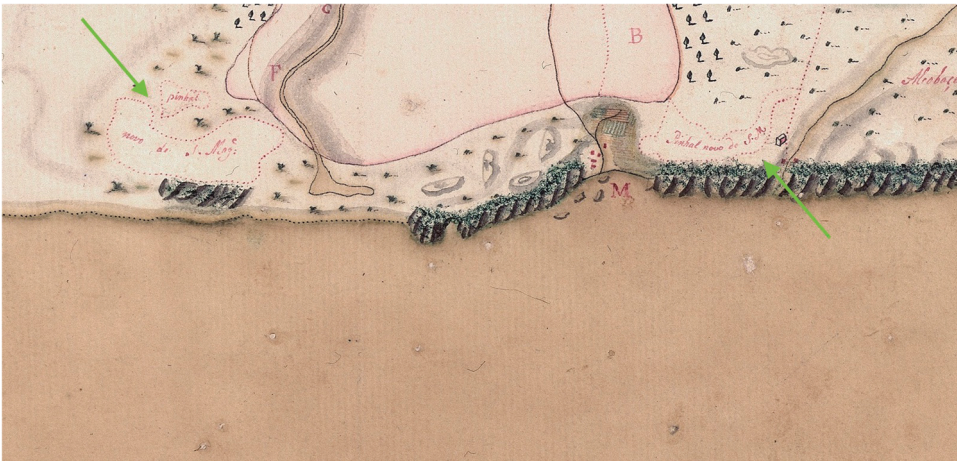


Figure 7. New pinewoods by 1769 (DGT, IGP, CA-111).

From 1777 to 1800, steps toward a significant transformation of the state forests were taken to reinforce the woodlands for industries such as shipbuilding and mining (Melo 2019, 477–481). By means of royal decrees of 1783 and 1790 the Crown aimed to disband the traditional administrative system governing the Leiria pinewoods (Silva 1828, 328–331, 592–600). During the 1790s the Crown increased the areas managed by the guards of the Leiria pinewood (Pinto 1938, vol. 1, 163–165, 234–245).

Conclusions

Existing studies on Portuguese forest management have not only regarded shipbuilding as the main driver of deforestation in Early Modern Portugal, but have also overlooked Portuguese forest policies for preserving the forest canopy prior to the Enlightenment. This consensus has transcended the academic environment. However, archival sources and historical cartography have made it possible to revisit the history of the Leiria pinewood, and demonstrate how the origins of state management of the Leiria pinewood were related to the visits conducted by the royal family during the 12th and 13th centuries. Although the shortage of historical records has blurred the origins of state administration, it is very likely that by the reign of Dinis I there was a permanent network of foresters for the conservation of the forested areas of Leiria.

At some point, the King's pinewood administration became separate from the forest district of Leiria. By the early 15th century, the King's pinewood had been equipped with a permanent administration made up of the main guard and 16 foresters, and it was likely in place even before that. Their primary duty was to clear the firebreaks in the pinewood to prevent fires spreading quickly; this was the main forest management technique employed up to the 18th century. This meant that the firebreaks of the Leiria pinewood had been created and maintained for centuries by a permanent administrative staff run by the state, which steadily increased to 40 foresters.

The permanent staff and the existing regulations were the two main focuses of the strategies the Portuguese Crown relied on for the maintenance of the pinewoods of Leiria.

While the efforts to conserve the pinewood were far from springing from ‘ecological concerns’, they clearly fulfilled the primary objective of securing a continuous supply of forest resources to the present day and resulted indirectly in forest conservation. It was the wish to commodify the pines and put them to industrial uses that motivated the monarchs to take steps toward, and optimize, the protection, conservation and management of the pinewood, and it is thanks to these efforts that Portugal currently has such an emblematic forest. Although the Crown pursued the maintenance of the pinewood mainly for shipbuilding purposes, it took into account other strategic industries and the needs of the local inhabitants. As the pinewood of Leiria and its surroundings were situated in a dune system, Portugal’s inhabitants might not have been particularly enthusiastic about the idea of living in these areas. The Crown therefore resorted to different strategies to encourage local inhabitants to play a role in the management of the pinewood (mainly granting privileges and tax exemptions and allowing them to use the forest resources), such as enlisting them as foresters of the pinewood as well as involving them in harvesting, processing, and transporting timber from the pinewood to the shipyards.

While it is difficult to provide information on the expansion and regression of forest cover, historical cartography dating from the 1760s offers essential information on this matter. The historical maps show that the pinewood of Leiria was populated with pines aged between 30 and 80 years, many of which were suitable sources of timber components for the Royal Navy. Consequently, the empirical forestry established by the Portuguese state successfully governed the pinewood of Leiria, paving the way for late 18th- and 19th-century forest management.

Notes

1. The authors are grateful to professor Isabel Graes for providing this document.
2. One *palmo* is equivalent to 22 cm, Castro (2005), 191.

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Notes on contributors

Koldo Trapaga-Monchet is an associate-professor of Early Modern History at Universidad Rey Juan Carlos. He holds a PhD in Early Modern History from the Universidad Autónoma de Madrid. His main research interests lie in the history of the Iberian woodlands and royal forests during the Early Modern Age, and the governance of the Spanish Monarchy in the 17th century through the performance of Don Juan José de Austria and his households.

Raúl Romero-Calcerrada is Associate professor at Rey Juan Carlos University. He holds a Bachelor’s Degree and Doctorate in Geography from Alcalá University. His research line focuses on analysing and diagnosing the environmental effects of human activity on rural areas with high natural values or natural protected areas supported by Geographic Information Systems and Remote Sensing.

ORCID

Koldo Trapaga-Monchet  <http://orcid.org/0000-0003-4120-1530>

Raúl Romero-Calcerrada  <http://orcid.org/0000-0002-5700-2184>

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