Whales Lost and Found: Rescuing a history of biodiversity loss in early modern Brazil

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Abstract

Worldwide, whales have been hunted to the brink of extinction. In Brazil, whaling was a royal monopoly between 1614 and 1801. Within the dynamics of the Portuguese Empire, it was a stimulus that promoted wealth and the circulation of knowledge, practices, and products. The development of whaling stations in four coastal sites fostered the construction of littoral spaces, shaped the ways people perceived and used the ocean and marine animals, and left an impact on whale populations in a truly entangled history between humans and the non-human world. In this article, we aim to identify the main target species and number of animals caught through the analysis of historical sources from the 17th and 18th centuries. Southern Right Whale and Humpback Whale were the main target species, to a different extent, between the north-eastern and south-eastern whaling sites, but occasionally hunted simultaneously. We accounted for a total of 9080 animals captured in 41 years, between 1627 and 1801, and addressed hunting loss and calf-securing practices. In discussing biodiversity loss in the era of the Anthropocene, we expect to contribute to a better understanding of early impacts on marine life in the 1600-1800 period.

Keywords: whaling; southern right whale; humpback whale; Portuguese Empire; marine environmental history

Introducing Whales and the Early Modern Whaling of Brazil

Around 1614 a whaling monopoly was established in Brazil which lasted until 1801. It began at a time of union between the crowns of Portugal and Spain (1580-1640) and benefited from its origins from Basque whaling techniques and from the abundance of whales in those coastal waters (**Hansen, 2016; Vieira, 2018a**). From 1640 onwards, the activity was managed and expanded by the Portuguese crown, its officials and settlers, within the context of European expansion in South America (**Ellis, 1969; Vieira, 2020a**). The establishment and development of whaling stations on shore fostered the construction of coastal spaces in Bahia, Rio de Janeiro, São Paulo, and Santa Catarina, and shaped the ways people perceived and appropriated marine animals (**Castellucci Junior, 2009; Comerlato, 2011; Vieira, 2020a**). This activity worked as a strategy and a stimulus to the production of wealth and to the circulation of knowledge, practices, and products to be consumed both in South America and in Lisbon. Whale oil was used mainly as fuel to light houses, sugar mills, workshops and, later, also the streets of the main cities in Brazil (**Ellis, 1969; Castellucci Junior, 2009**). Contrary to what has been assumed, whale oil was also an important commodity arriving in Lisbon. At least from the second half of the 18th century, regular shipments of whale oil arrived from about half of the total production produced. Baleen was also used and sent entirely to Lisbon (**Vieira, 2020a**).

This early modern whaling operation had an Iberian matrix in South America, harvested South Atlantic whale populations and was performed by European settlers and African enslaved people. This is a case that emphasizes the role of the ocean and of natural marine populations as forces at work in the 'wet globalization' (**Mentz, 2020**) and that demonstrates the interconnection between empire-making and environmental change.

Since then and until 1986, the hunting of whales has been practiced in Brazilian waters sustaining human coastal dwellers and leaving its impact on South Atlantic whale populations. Whale species inhabiting the waters of Brazil have been the target of different hunting operations, from American whaling offshore to Norwegian and Japanese factory ships **(Castellucci Junior, 2009; Hart & Edmundson, 2017**). This long duration activity has left its wound in South Atlantic whale populations which are still today recovering from centuries of exploitation.

In the scope of marine environmental history, and while analysing biodiversity loss, it is useful and necessary to understand historical changes in marine ecosystems, namely in the period of 1600-1800, much before the Great Acceleration of the 20th century which jump-started the Anthropocene (**McNeill & Engelke, 2014**). Globally, whaling was one of the

most extensive and intensive activities of marine extraction in the long term and one of the most profitable industries ever undertaken. It was probably the extractive activity that, more than any other, impacted marine life in pre-industrial times, which is why understanding whaling history is essential to any analysis of the human impact towards the ocean (**Reeves & Smith 2003; Holm, 2022**).

Although research and literature on whaling is extensive, more focus has been given to the Northern Oceans catches (**e.g., McLeod et al., 2008; Jones, 2013; Richards, 2014**) or whaling operations from the second half of the 18th century onwards, mainly referring to the American style and based on the exhaustive logbooks that resulted from it (**e.g. Smith & Reeves, 2006; Smith et al., 2012; Smith, n.d.**). In recent years, an effort has been developed to cover whaling history in the waters of the South Hemisphere (**e.g., Castellucci Junior & Quiroz, 2018; Jones & Wanhalla, 2019; Quiroz, 2020**). While some authors have attempted to estimate how many whales were captured in Brazilian waters (**e.g., Morais et al., 2017; Romero et al., 2022**), data in those studies come mostly from literature review, not digging into primary historical documentation, and not including catches for periods before the mid-18th century. Within the dynamics of the Portuguese Expansion of the 1600-1800 period, whaling has been an understudied theme so far and the extension and impact of this operation is still not known.

Although it is increasingly accepted that humans had a significant long-term impact on marine ecosystems' structure and functioning, we are still ignorant of the long history of depredation towards the ocean (**Thurstan, 2022**). Great whales – the non-taxonomic group comprising baleen whales and the sperm whale (the largest toothed whale) – had a major influence on marine ecosystems before commercial whaling and their profound decline has likely altered the structure and function of the oceans (**Roman et al., 2014**). Studying encounters, extraction, and significance of marine animals allows us to identify anthropogenic impacts and ecological changes of the past, highlights the agency of the more-than-human (oceanic) world, and uncovers 'ghosts', signs of past ways of life, traces of human and more-than-human histories, as proposed by Anna Tsing and colleagues (**2017**). Whales of the past are our ghosts, since we are not certain about which species were hunted in each whaling site nor the extent of that exploitation.

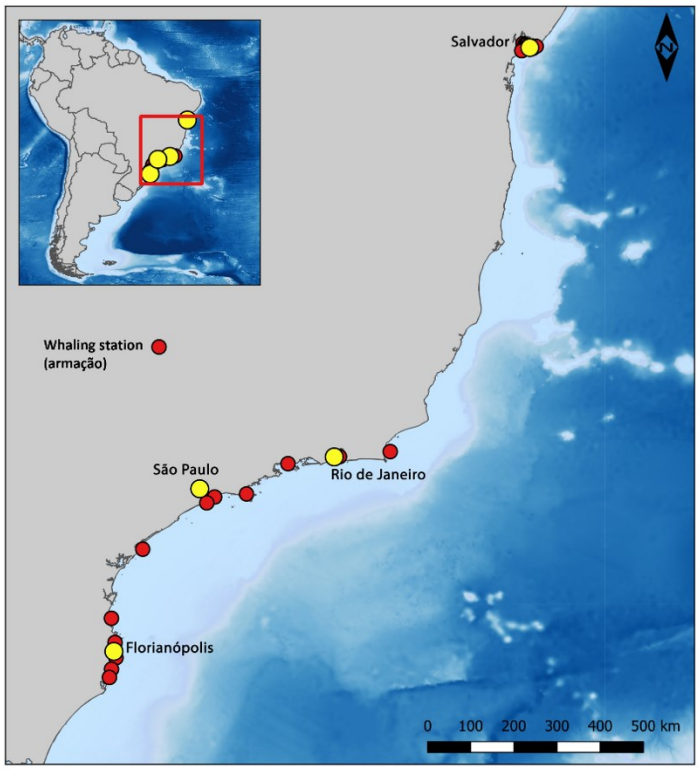
Our aim in this article was to analyse and discuss data from archival evidence of the 17th and 18th centuries with the goal of identifying target whale species and estimate number of animals caught in Brazil. Our historical research included mostly written sources complemented with iconography. One of the most important digital collections used in this

study was that of the Arquivo Histórico Ultramarino (AHU) [Overseas Historical Archive], through the project 'Resgate de Documentação Histórica Barão do Rio Branco'.[i] From here, around 440 documents (mostly manuscripts) related to whales and/or whaling were identified, which include correspondence, letters, petitions, contracts, and royal orders, among others, covering the period between 1613 and 1821. These references were collected and made available in an open access supporting document (**Vieira, 2020b**). Additionally, a wide range of typologies of sources was used, namely natural history memoirs, chronicles, economic essays, among others.

Identifying Species in Written and Visual Sources

During the monopoly period, four whaling sites were developed along the Brazilian coast – Bahia (1603), Rio de Janeiro (c. 1620), São Paulo (c. 1730), and Santa Catarina (c. 1740) (**Figure 1**). It is commonly accepted that, along the monopoly period, the target species were two baleen species (Mysticeti) – the Southern Right whale (*Eubalaena australis* Desmoulins, 1822) and the Humpback whale (*Megaptera novaeangliae* Borowski, 1781) – and for a short period also a toothed species (Odontoceti), the Sperm whale (*Physeter macrocephalus* Linnaeus, 1758) (**Ellis, 1969; Reeves & Smith, 2003; Richards, 2009; Comerlato, 2010; Morais et al., 2017**). Some authors suggest discrimination in the species targeted between the northern whaling region (Bahia) – Humpback whales – and the southern whaling region (Rio de Janeiro, São Paulo, and Santa Catarina) – Southern Right whales.

Figure 1: Map of the whaling sites in Brazil during the monopoly period (1614-1801), based on Ellis (1969). Authorship: Nina Vieira and Patrick Hayes, 2019.



Despite the in-depth literature review that these studies present, species identification is often based on studies of ecology and distribution patterns that have begun since the end of the 20th century or based on the whaling data from the 19th century onwards. These assumptions can lead to a collective unawareness of past marine ecological changes and can result in a gradual accommodation of the disappearance of a species or population and in appropriate reference points for evaluating losses or identifying targets for rehabilitation (the shifting baseline syndrome) (**Pauly, 1995; Thurstan, 2022**).

Southern Right and Humpback whales are migratory species, performing annual movements between polar and circumpolar waters to tropical and subtropical regions. The Southern Right whale, limited to the Southern Hemisphere, is in everything very similar to its counterpart North Atlantic Right whale (*Eubalaena glacialis* Müller, 1776), one of the main targets of Basque whalers in the Bay of Biscay and North Atlantic, providing more oil and better baleen plates than other species (**Laist, 2017**). On the South American Atlantic coast, its current area of occupation covers the waters of Brazil and Argentina. Santa Catarina is the region with the highest concentration of animals where whales remain for weeks or several months to give birth or accompanied by juveniles, occupying bays and areas sheltered from south-easterly winds, in the proximity of estuaries, sandy bottom areas and not very steep slopes, preferentially in very

shallow areas, and close to the breaching zone (**Simões-Lopes & Ximenez, 1993; Seyboth et al., 2015; Groch, 2018**).

The Humpback whale is a cosmopolitan species with a global distribution, and Brazilian waters are one of the breeding areas for the South Atlantic population. The species appears in large numbers in the Abrolhos Bank, a protected area under the Abrolhos National Marine Park in Bahia. This is a preferential zone for females to give birth, or for mother-calf pairs, due to the calm waters and the low depth of that bank. However, although its distribution along the coast is poorly known, this population appears to extend along the Brazilian coast, between the northern coast of Bahia in the north and the waters of São Paulo in the south (**Zerbini et al., 2004; Martins et al., 2013**).

For the most part of the studied period (17th and 18th centuries), whales were named by their common generic Portuguese name *Baleas* or *Balleyas* (the current typing form being *Baleias*). In 1767, the whaling contractors hired Martins Dhiribarren, a French expert in refining whale oil, for a period of four years with the mission of finding sperm whales and demonstrating the proper methods of transforming blubber and spermaceti into good quality and highly priced products. His first-hand account, 'Relation véridique' (**Dhiribarren, n.d.**), resultant from his journey through several whaling stations along the Brazilian coast, is one of the few documents providing nomenclature for the species targeted and making a clear distinction between the animals caught. [ii] Dhiribarren stated that all the animals hunted in Bahia (northeast coast) were *Gibarts* / *Gibars* (**Ibid: fls. 3, 9**) and in Santa Catarina (southeast coast) they were *Sardes* whales (**Ibid: fls. 5, 9**). A partner of the whaling contract, Baltazar dos Reis, who accompanied Dhiribarren in his mission and was possibly influenced or informed by him, would write some years later that '*in the seas of Bahia they don't fish Sardas Whales, which are the ones with baleen, but only Gibartes'* (**AHU_ACL_CU_021, Cx. 6, D. 405**).[iii]

The *Gibarts*=*Gibars*=*Gibartes* whales are Humpback whales. We will also find a contemporary mention of *Gibartes* in the Portuguese economics publication *Diccionario Do Commercio* of Alberto Jacqueri de Sales (1761-1773), which is an adaptation of the contents of the *Dictionnaire universel de commerce* by Jacques Sabary des Bruslons, published in 1741. This is a miscellany of information about species from the northern and southern hemispheres, with Portuguese and French nomenclature, but again it reinforces the exploitation of the Humpback whale in Bahia.

A few decades later two renowned academic scholars and naturalists, Domenico Vandelli (**1789**) and José Bonifácio de Andrada e Silva (**1790**), affirmed in their essays that the 'Balaena physalus of Linneo' was probably the species caught in Brazil. It is worth reinforcing that Andrada e Silva was

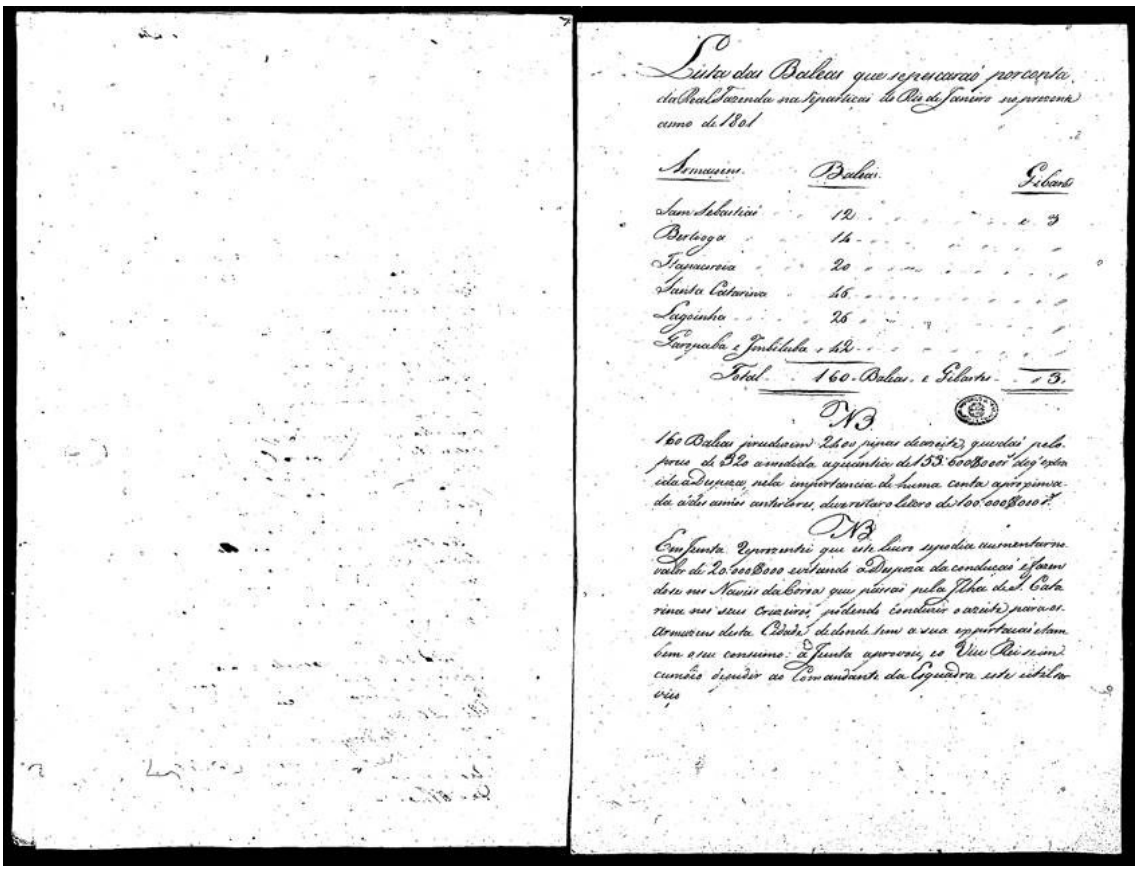
born and lived in Brazil until the age of 17, and 'has seen and observed' the work at the whaling factories as he himself wrote in his text. Nevertheless, it seems very unlikely that a balaenopterid whale, which was said to produce less and poorest oil, and which had aggressive behaviour towards the boats, has been actively chased at sea by rowing boats and stroke by hand-harpoons. Balaenopterid species like the Fin whale (*Balaenoptera physalus* Linnaeus, 1758), the Blue whale (*Balaenoptera musculus* Linnaeus, 1758), the Bryde's whale (*Balaenoptera edeni* Anderson, 1879), or the Minke whale (*Balaenoptera acutorostrata* Lacépède, 1804), among others, became targets of industrial whaling of the 20th century in South Atlantic, including in the waters off Brazil, with the introduction of the mechanical harpoon and the steam whaling boats that could keep up with the speed of the animals and support their huge size (**Andriolo et al. 2010; Hart & Edmundson, 2017**). The *Gibbar* whale – and not Gibarte or Gibart – appears in the works of Mathurin Jacques Brisson (**1756: 352**) and Bonnaterre (**1789: 4**) as a counterpart of the *Finfish* or the *Fin-whale* of Linnaeus (1758), so we may question if Andrada e Silva was misinterpreting the species based on the works of coeval naturalists and due to the similarity in nomenclature. For its part, *Sardas* is the name given by Basque whalers to the North Atlantic Right whales (**Van Beneden, 1886; Du Pasquier, 1986; Loewen, 2009**), and that was then applied to its counterpart of the South Atlantic, the Southern Right Whale.[iv]

Considering the analysis of visual material of two representations of whaling stations in São Paulo and Rio de Janeiro (**Figure 2**), and although the animals are not detailed in their morphological characteristics, their pectoral fins appear to be short in relation to the length of the body, resembling those of Right whales.

Figure 2: Depictions of whales in São Paulo (left) Source: Detail of Plan no. 19 'Obras novas da fortaleza da Barra de Santos' in Cartas Topograficas do Continente do Sul e parte Meridional da America Portugueza.[v] *; and Rio de Janeiro (right) Source: Detail of the painting 'Pesca da Baleia na Baía de Guanabara' by Leandro Joaquim, 18th century, National History Museum Collection, Rio de Janeiro.*[vi]

In the administrative documentation an important document discriminating the species can be found for the year 1801. This was the last year of the whaling monopoly, and the profit of the activity was being discussed among estate administrators. The list presented here (**Figure 3**) refers to the numbers of whales caught in the whaling stations of Rio de Janeiro and discriminates between *Baleas* and *Gibartes*, respectively Right whales and Humpback whales.

Figure 3: List of the whales caught in the year 1801 in different whaling stations of Rio de Janeiro, with a clear distinction between Baleas and Gibartes, or Right whales and Humpback whales, respectively. Source: AHU_ACL_CU_017, Cx. 197, D. 14021.



We can count 160 *Baleas* and 3 *Gibartes*, all captured by the whalers of one single whaling station, Armação de S. Sebastião. The difference in numbers between the two species leads us to believe that the first species would be preferred while the second would be caught in the absence of the first. Note also that it was the whaling station with the lowest number of catches and that Humpback whales (*Gibartes*) represented ¼ of the total catches (n=12).

In fact, even in Bahia it is possible that the two species were occasionally captured. A memory written by the representative of the whaling company can give some clues on that since the author points to the reasons that led to the end of the monopoly and state that the profits of the whaling stations of Bahia were low because 'they consist of fishing *Gibartes* (one of the twenty or so species of whales) which only yield 8 to 12 barrels of oil, the baleen being useless, and much by chance a whale of the South Sea [*Baleia do mar do Sul*] is fished in those seas, more profitable in oil, and with a useful baleen' (**Jacinto Jorge dos Anjos Correa, 1820 in Araujo, 1822**). An article in the newspaper *Musaico*, of 1845 reported that in the early years of 1800 Right whales were captured in Bahia. The author referred to those whales as '*peixe verdadeiro*' – literally translated as 'real fish' – of extraordinary greatness and giving an excessive quantity of very

good oil (**Moscoso, 1845: 244**). The same designation was also found in a document of 1675 describing that five 'real fishes' have been hunted, among 50 animals characterized as being females, males, and calves (**AHU_CU_005-02, Cx. 22, D. 2640-2641**).

This new data points to the possibility of both species being hunted, processed and their oils mixed. In this way, two distinct species may have become a 'single' whale. Both are large baleen whale species with a thick layer of fat, providing significant amounts of oil. The way to access the animals, to hunt, kill and process them may have been identical. Moreover, the two species are sympatric, i.e., their occurrence overlaps. Currently, Humpback whales seem to appear in the coastal waters of the states of São Paulo, Rio de Janeiro and Espírito Santo, mainly between July and October, with a high percentage in the presence of mother-calf pairs (**Lodi & Rodrigues, 2007**).[vii] Plus, off Salvador (Bahia), both Humpback and Right whales have been sporadically reported together in the past (**Richards, 2009**), and the latter may not occur in large numbers today because historical habitats may have not yet been re-occupied by the recovering population (**Morais et al., 2017**). All of this reinforces the idea that whale populations are enlarging their range of distribution off Brazil and occupying the waters they inhabit since before the early modern whaling era and that is why historical data is so important to track signs of ecological change.

Regarding the Sperm whale, within this whaling operation, an effort to chase the species in open waters was made between 1774 and 1777, which resulted in 186 animals being processed (**Vieira et al., 2019; Vieira, 2020a**). The higher investment required to catch this species does not seem to have paid off and no further information has been found so far. Thus, an in-depth study on this issue deserves to be developed in the future.

Animals Caught, and Animals Discharged

The number of animals captured depended on numerous factors concerning both the people who hunted and those who managed the activity. Along the four whaling sites, the stations had different sizes and capacities, depending on the investment, the number of boats, the workforce, and the facilities. For the 17th century and early decades of the following, it has proven to be very difficult to determine capture levels with accuracy. Nevertheless, data from non-systematized documentation such as chronicles and administrative correspondence was compiled and analysed, from 1627 to 1801. As different types of sources were consulted, some data obtained refer to only one whaling region (Bahia, Rio de Janeiro, São Paulo, or Santa Catarina), while others refer to the total

catches of a particular year for all whaling stations, as identified in the following graph and table (**Figure 4; Table I**).

Within the administrative correspondence, requests from whaling contracts asking the discharge of taxes and fees due to the low income of certain whaling seasons are often found. These documents are important in the absence of systematised records since they provide information on the number of whales captured in years of low yield, allowing us to distinguish between an ideal number of animals or a low number that led to the failure of the contract in a year or period. The contractors' testimonies differ on what should be a good catch rate, some pointing that no less than 20 whales were caught, others around 70, sometimes reaching 100 captured animals. This fluctuation in the numbers reported is consistent with other operations of the second half of the 17th century, namely that of Long Island in the Atlantic coast of North America (**e.g., Reeves & Mitchell, 1986**).

Figure 4: Numbers of baleen whales captured in Brazil between 1627 and 1801.

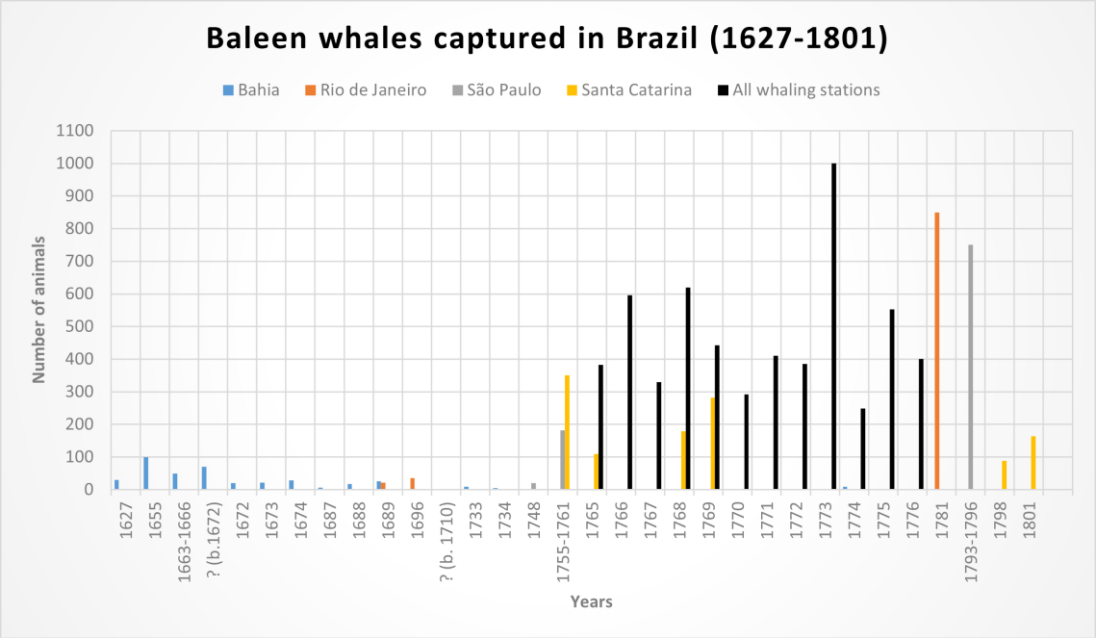


Table 1: Reported number of baleen whales captured per whaling region and in all whaling stations, in Brazil between 1627 and 1801.

	Bahia	*Rio de Janeiro*	*São Paulo*	*Santa Catarina*	*All whaling stations*
1627	30	-	-	-	-
1655	100	-	-	-	-
1663-1666	50	-	-	-	-
? (b.1672)	70	-	-	-	-
1672	20	-	-	-	-
1673	22	-	-	-	-
1674	28	-	-	-	-
1687	6	-	-	-	-
1688	17	-	-	-	-
1689	25	22	-	-	-
1696	-	35	-	-	-
? (b. 1710)	-	-	-	-	-
1733	9	-	-	-	-
1734	5	-	-	-	-
1748	-	-	20		
1755-1761	-	-	182	350	
1765	-	-	-	110	383
1766	-	-	-	-	596
1767	-	-	-	-	329
1768	-	-	-	179	619
1769	-	-	-	282	442
1770	-	-	-	-	292
1771	-	-	-	-	410
1772	-	-	-	-	385
1773	-	-	-	-	1000
1774	9	-	-	-	249
1775	-	-	-	-	552
1776	-	-	-	-	401
1781	-	850	-	-	-
1793-1796	-	-	750	-	-
1798	-	-	-	88	-
1801	-	-	-	163	-

By the second half of the 18th century, the number considered enough to satisfy the demand was much higher in Bahia than previously, reporting catches of 120 or 130 animals each year, sometimes 200, other times only 50, and that a minimum of 60 or 70 whales allowed the contract not to be detrimental (**AHU_ACL_CU_005, Cx. 45, D. 8440**). In the 1760s decade, it was reported that in the stations of São Paulo around 60 whales were captured in each whaling season (**AHU_ACL_CU_023-01, Cx. 23, D. 2167**) and in Santa Catarina around 200 animals (**AHU_ACL_CU_017, Cx. 62, D. 5931**). Despite being the captaincy with the shortest time of whaling operation, the stations in Santa Catarina were the largest and best equipped, which, consequently, led to the largest number of animals captured during their time of operation.

Only one document has been found with a systematized record of baleen whales captured, 'Mapa do q' tem porduzido as 12 pescas de Baléas abaixo declaradas' (**AHU_ACL_CU_017, Cx. 103, D. 8770**) concerning the period 1765-1776, which can be justified by the establishment of the Whaling Company 'Companhia da Pescaria das Baleyas' in 1765, and corresponding to a new logic of economic, scientific, and administrative development in Portugal and overseas. This source relates quantities of oil and baleen plates produced with the number of animals, totalizing 5,668 whales processed in the four whaling sites for that period.

Counting the total period, from 1627 to 1801, and considering that data is only available for 41 years, the total of 9080 animals would mean around 220 animals per year. We should not rule out the hypothesis of contractors declaring different numbers from those that had been caught but in the absence of more robust data to date we are assuming these data as proxies of animals processed, contributing to the overall understanding of this activity in the period under study. We also believe these numbers must be conservative, since there is a hunting loss associated with this type of open boat/hand-harpoon whaling considering the number of animals struck and lost (**Reeves & Mitchell, 1986; Vighi et al., 2000**) as also an unquantifiable number of animals killed or captured but not processed. This occurred in small whaling stations where there were not enough boilers and tanks to process and store the oil of all the whales caught and it was reported that 'in taking two animals one was lost' (**AHU_CU_017-01, Cx. 11, D. 2065-2068**). With no capstans available to hoist all the animals or tanks filled to their maximum capacity, whales ended up being dumped on the beaches. Several times the only utility was the baleen which was removed, cleaned, and packed in bales to be transported to Lisbon. The rest of the animal was discharged on the beach, decomposing and rotting in the adjacent intertidal area, a situation that caused great discomfort to the population, due to the smell of putrefying remains and even led to the proposal of a fine for the contractors (**Vieira, 2020a**).

This was a constant during the monopoly period, being reported in the documentation of 1600 and 1700 regarding different whaling areas, and that by the mid-18th century drew the attention of the captaincies' governors. The exploitation of whales beyond the capacity to process them began to be seen as excessive with consequences for the profit of the activity and for the Crown. A governor wrote, in 1759, that 'this exorbitant fishing will drive the whales away, and in future years we will experience a shortage of whales, which is infallible because of the present waste' (**AHU_ACL_CU_005, Cx. 55, D. 5423**). And years later another governor advised that 'it is much more convenient, for example, to kill two [whales] in each day, and take advantage of them, than to kill four, and lose them all for lack of time' (**Mourão, 1896 [1766]).** Of course, those men were interested in a long and profitable industry but, simultaneously, their statements and administration measures appealed to an extraction with less loss and waste, and somehow the administration of the monopoly ended up resulting, in a certain way, in a measure of resource management.

The whales that were captured but not processed can hardly be accounted and result in underestimated catch rates, a fact that must be taken into consideration in a future estimative of whale populations in the Brazilian seas of the past. Another very important issue is the capture of calves and juveniles as a way of keeping the adult female nearby to be harpooned more easily. This was a practice also inherited from the Basque whaling techniques and that is mirrored in the documental sources, and eventually illustrated in the figure above (Figure 2 - left), where animals of different sizes can be seen. In some cases when the numbers of hunted animals have been recorded, different designations are found, namely for females (*madrigios*), females that had recently given birth (*paridos*), suckling calves (*seguilhotes*) and juveniles (*baleotes*). As an example, in the whaling season of 1768 in Bahia, a total of 179 were caught, 146 being female and 33 calves (**AHU_CU_005-01, Cx. 47, D. 8789-8796**).

In a very rough assessment from four documents where a discrimination of animals exists (**AHU_CU_005-02, Cx. 22, D. 2640-2641; AHU_CU_005-02, Cx. 30, D. 3888; AHU_CU_005-02, Cx. 29, D. 3705-3706; AHU_CU_005-01, Cx. 47, D. 8789-8796**), referring to 1663-1665, 1672-1674, 1688-1689, 1768 and 1775, we estimated a rate of around 40% of offspring/juveniles killed. If this percentage is confirmed in a future study with more robust data, this is a very high capture rate that must have had a significant impact on the population dynamics of these animals. At the end of the 18th century, the practice of hunting mainly females and calves would be pointed out by some naturalists (**Câmara, 1789; Silva, 1790**) as highly destructive. The authors warned that diminishing the offspring would affect whale populations but also the whaling activity itself, which was

conducted in a non-sustainable way. Touching current concepts of ecology and conservation biology, their works articulated economy, science, and ecosystem dynamics with empirical and scientific knowledge and were at the basis of 18th century's emergent notions regarding resource management (**Pádua, 2004; Vieira et al., 2020**).

Final Remarks: Whales lost in history and now found

Through a deep collection and analysis of historical sources of 1600-1800, we presented here an attempt to infer about target species and catch rates of baleen whales in the waters of Brazil. It was clear that a dispersed and non-systematized documentation of that period does not allow a precise identification of the species along the four whaling sites but, nevertheless, some conclusions can be drawn. It seems most likely that the Southern Right whale has been the preferred species in southern Brazil (Rio de Janeiro, São Paulo, and Santa Catarina), as reinforced by other studies (**e.g., Morais et al., 2017**) but the historical evidences here provided also point to the simultaneous capture of both Southern Right and Humpback, even if sporadically, in all regions. Also, in accordance with Morais and colleagues (**Ibid**) it is likely that Humpback whales constituted the main target species in the north-eastern coast (Bahia), at least for the 18th century. However, the fragmentary information concerning 17th century documentary sources prevent us from asserting with confidence which species was targeted. Thus, to prevent the gradual shift of the baseline and a collective unawareness of past marine ecological changes, one must keep questioning if, as we have done elsewhere (**Vieira, 2018b**), a decrease in the availability of one species may have provoked a sequential change in the preferential target, from the Southern Right to the Humpback whale.

Considering the number of animals captured, this study was a new and updated attempt to calculate catches from such an early period. Our estimate of 9080 animals processed, between 1627 and 1801, should be interpreted as an underestimate catch number because this only refers to data from 42 years within that period, also due to hunting loss and calf-securing practices. This coastal whaling operation may seem the least intensive in terms of catching effort, compared to the following, but its two centuries of duration meant that its impact on natural whale populations must represent a total cumulative removal of thousands of animals, as asserted also by Reeves and Smith (**2003**).

This study makes clear that whales and whaling had an important role, as agents and as a stimulus, in the imperial dynamics of Portugal in South America and were part of the scientific, economic, and political agendas. These animals and their exploitation are intrinsically connected with the construction of littoral spaces, patterns of consumption, construction of

scientific knowledge, and even with nature management and conservation.

Since 2008, the conservation status of the Southern Right whale and Humpback whale species, by the IUCN, is 'Least Concern', having evolved since 1965 from 'Endangered' and 'Vulnerable' categories. Whaling is a paradigmatic case of marine exploitation and of the relationships of people with the ocean worldwide (**Jones, 2013; Richter, 2015; Brito et al., 2019**), but many other aquatic and oceanic animals have been profoundly affected in Brazilian waters (**Vieira et al., 2020; Brito, 2019, Brito, 2022**). We expect to have drawn attention to the importance of going deeper into historical data to understand patterns of change, trajectories, and responses of both human and animal populations to each other.

Digging into the past can allow us to understand when an ecosystem moves outside of its historical range of variability, or when influences upon ecosystems move from being dominated by natural to human drivers (**Thurstan, 2022**). Historical data is particularly relevant while discussing biodiversity loss within the concept of the Anthropocene. It requires a deeper assessment of environmental changes and impacts and to do that we should prevent our current knowledge from interfering in such assessment about the past of natural populations (**Lotze & Mcclenachan, 2014; Tsing et al., 2017**). Pre-industrial levels of extraction of living marine organisms are being revealed in the last years with increasing detail and revealing greater impacts on populations and ecosystems than previously known (**e.g., Holm et al., 2019**). We can only measure the long-term interaction of humans with the sea by, besides keeping an open mind, acknowledging that deeper and multiple relationships have been occurring throughout history (**Holmes et al., 2020; Brito, 2022**).

In this framework, supported by the ongoing United Nations Decade of Ocean Science for Sustainable Development (2021-2030), Humanities are being called to act. New efforts such as the Manifesto: Humanities 4 the Ocean[viii] and the *Human Oceans Past* research agenda are expected to lead to a fundamental revision in our understanding of the historical role of marine resources in the development of human societies (**Holm et al., 2022**).

Humanities can give a unique contribution by rescuing understudied historical events, building on what was lost or modified, appealing to empathy for those beings with whom we share the past and the present world, contributing to rethinking and rewrite the history of oceans and marine animals, where human and non-human agencies are intrinsically involved. Here is our story of whales lost from the sea and now found.

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Nina Vieira has a training background in Biology and Marine Ecology and holds a PhD in History. She is a researcher at CHAM-Centre for the Humanities (NOVA FCSH), where she is a member of the Executive Board and a team member of the ERC Synergy Grant *4-Oceans: A human history of marine life* and of the UNESCO Chair *The Ocean's Cultural Heritage*. She is currently the regional representative of Portugal at the Environmental Society for Environmental History. Her research focuses on interactions between people and marine animals, mainly on the exploitation of marine mammals and their economic, cultural, and ecological significance.

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AHU_ACL_CU_017, Cx. 62, D. 5931. CARTA do provedor interino da Fazenda Real do Rio de Janeiro, desembargador João Cardoso de Azevedo, ao rei [D. José], informando seu parecer sobre o requerimento de Lopes Loureiro, solicitando a atribuição de algum dinheiro para custear o contrato [da Pesca] das Baleias, bem como licença para se proceder à alteração de algumas condições desse contrato, AHU_ACL_CU_017, Cx. 62, D. 5931 (9 March 1761).

AHU_ACL_CU_017, Cx. 103, D. 8770. MAPA da demonstração do que produziu a pesca dos cachalotes ou espermecetes desde 11 de Outubro de 1773 até 30 de Junho de 1777 e do que produziu a pesca das baleias de 1765 a 1776, citando os navios que transportaram tais gêneros do Rio de Janeiro para Lisboa (post. 1777).

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Endnotes

[i] This is available online at: http://resgate.bn.br/.

[ii] At this point, we are not aware about the academic background, or the knowledge Martins Ghiribarren possessed, nor the literature he consumed. Since this document has not been studied in detailed, we are still conducting preliminary research on the author's bibliography and his mission to Brazil.

[iii] Items with the AHU ACL CU preface are archival documents from the Arquivo Histórico Ultramarino (Overseas Historical Archive), Administração Central, Conselho Ultramarino. For access link see note [i] above.

[iv] Following Loewen (**2009**) the meaning of *Sarda* was a generic Basque name for a large group of fish or animals that was first given to the population of Basque whalers encountered off Canada.

[v] Available at the Digital collection of the National Library of Brazil, via http://bdlb.bn.gov.br/acervo/handle/20.500.12156.3/427497.

[vi] Online exhibition available at https://artsandculture.google.com/partner/museu-historico-nacional.

[vii] Cf. *RIO DE JANEIRO TEM GRANDE NÚMERO DE JUBARTES REGISTRADAS*, available online at: https://www.baleiajubarte.org.br/post/rio-de-janeiro-tem-grande-n%C3%BAmero-de-jubartes-registradas

[viii] This is available online at: https://www.tcd.ie/tceh/projects/manifesto/.