

Estimating American 19th Century Catches of Humpback Whales in the West Indies and Cape Verde Islands

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ABSTRACT.—The American whaling fleet sailing out of southern New England ports took many humpback whales (*Megaptera novaeangliae*) from breeding areas in the eastern and western North Atlantic during the second half of the 1800s. The number of voyages destined for ‘Atlantic’ whaling grounds and the products obtained are well known, but the number of whales killed by region is difficult to estimate partly because of uncertainty about the relative magnitude of whaling effort in the West Indies, Cape Verde Islands, and South Atlantic Ocean. We examined a random sample of logbooks from whaling voyages sailing from 1865 to 1886, stratified by port of departure and amount of whale oil returned. Based on the logbook data, we estimated the proportions of voyages that whaled for humpbacks in the West Indies and the Cape Verde Islands. We also estimated the average number of humpback whales landed in those areas per voyage. The proportions of voyages and average numbers of whales were multiplied by the total number of voyages in each stratum to estimate the number of North Atlantic humpbacks landed. The resulting estimates for the West Indies were higher than those reported by Mitchell and Reeves in 1983 and the estimates for the West Indies and the Cape Verde Islands were lower than those reported by Smith and Reeves in 2002. Our findings generally corroborate the assumptions of previous authors but improve the accuracy of removal estimates and provide measures of precision lacking in earlier studies.

INTRODUCTION

Accurate information on the history of whale catches is important for assessing the ecological effects of whale fisheries (Smith 2002). Catches during the American (‘Yankee’) non-mechanized whale fishery (as defined by Reeves and Smith 2002) are of particular interest because of the fishery’s long duration (mid-18th through early 20th centuries) and global reach.

Increasingly complete voyage-by-voyage data were collected from the early 1800s until the fishery ceased around 1928. Among the more important sources of such data are: (1) Lists of voyages, including port; vessel name, class and tonnage; names of master and owner; sailing and return dates (month, day and year); announced destination (generally by ocean basin); and amounts of sperm oil, whale oil, and whalebone (baleen) landed (Starbuck 1878; Hegarty 1959). (2) Broadly similar lists of voyages for New Bedford, 1783-1906 (Dias undated), and for various ports, grounds, and time periods (Clark 1887). (3)

Regularly updated status reports on whaling voyages between 1843-1914, including dates and locations where a vessel was observed or ‘spoken’ and how much whale oil, sperm oil, and whalebone were on board at the time (Whalemen’s Shipping List and Merchants’ Transcript [WSL], published in New Bedford). (4) Voyage ‘abstracts’ compiled by a New Bedford insurance executive for a 38-year period when the fishery was at its height (Wood 1831-73, MS).

In their inventory of whaling logbooks and journals (hereafter called ‘logs’) held in public collections, Sherman et al. (1986) included some of the same information presented in the Starbuck (1878) and Hegarty (1959) lists, but indicated the dates covered by the logs rather than the voyage sailing and arrival dates (which did not always match) and the actual instead of the announced destinations (which again did not always match). They also identified the collection holding each log. Lund (2001) included fewer details about individual voyages than the above sources but she

corrected some of their information and identified additional voyages and logs. Lund listed vessel name, years sailed and returned, whether a log of the voyage existed, and if so in what collection(s); she also indicated that logs were extant for more than 4500 of the nearly 16000 American voyages known to have sailed since 1751. Voyage logs vary in content but many contain daily entries, including descriptions of weather and sea conditions, crew activities, observations of fauna (especially cetaceans), whales chased, struck or killed, port calls, and positions either by reference to landmarks or latitude/longitude coordi-

nates. Some documents contain sketches of scenes from the voyage, but humpback whaling is very rarely depicted (Fig 1).

The data sources described above have been used to obtain information about catches from several whale populations: humpback whales (*Megaptera novaeangliae*) in the western North Atlantic (Mitchell and Reeves 1983), right whales (*Eubalaena glacialis*) in the North Atlantic (Reeves and Mitchell 1986), sperm whales (*Physeter macrocephalus*) on several whaling grounds (Best 1983; Bannister et al. 1981; Davis et al. 1997; Hope and Whitehead 1991), bowhead

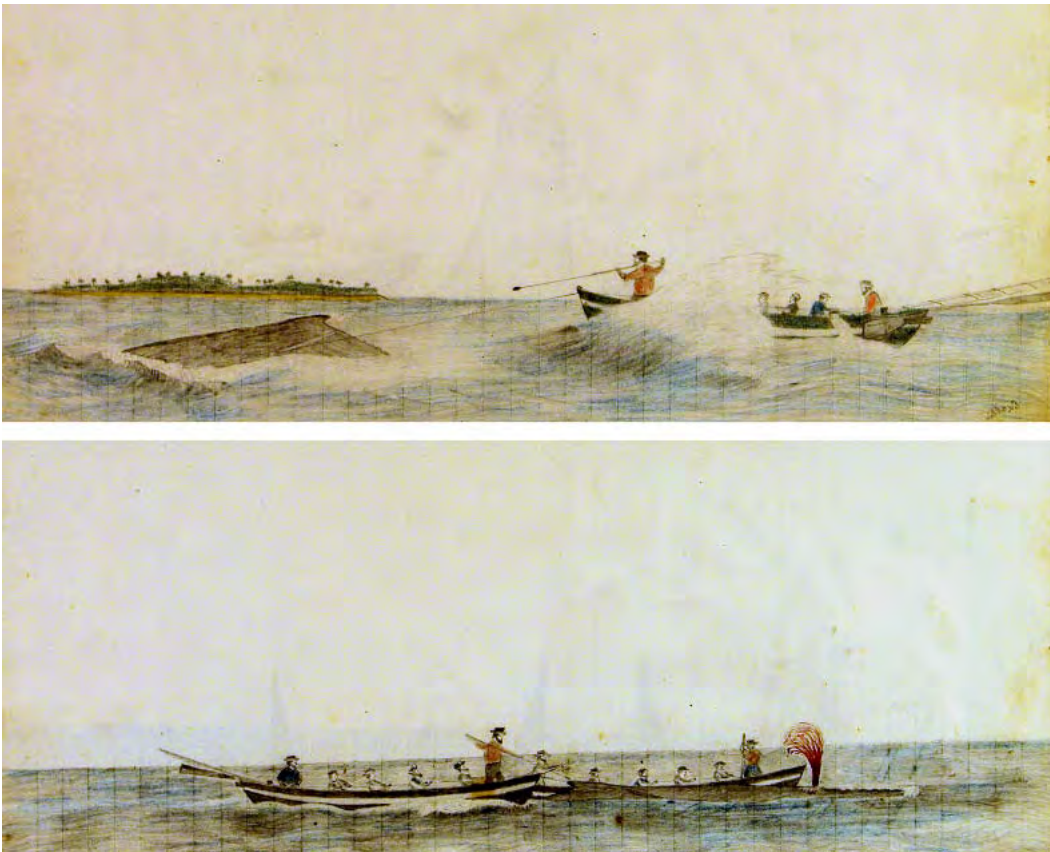


FIG. 1. Scenes from humpback whaling on the Vaquez Ground near Norfolk Island and Tongatabu, South Pacific, July 1871. The standard equipment and procedures of 19th century humpback whaling on the tropical breeding grounds are well illustrated. Once fast to the whale, the boat and crew were taken for a "Nantucket sleighride" (top). As the whale became weak and exhausted, the boats closed on it for the *coup de grace* (bottom). Note that the whale in the lower panel is "spouting blood," a sure sign that death is imminent. Colored pencil sketches from the back pages of Edward Akin's journal as boatsteerer in the bark *Napoleon* of New Bedford, William C. Fuller, Master, 20 May 1868-11 June 1872 (Old Dartmouth Historical Society Log #183). Courtesy of Kendall Institute, New Bedford Whaling Museum.

whales (*Balaena mysticetus*) in the western Arctic (Bockstoce and Botkin 1983) and Hudson Bay (Ross 1974, 1975), and right and other baleen whales worldwide (Best 1987). Some of these studies relied heavily upon logs, others upon tabulated voyage lists such as those of Starbuck (1878) and Hegarty (1959), and others upon tabulations of within-voyage data such as the WSL and the Wood abstracts. Some studies have drawn from multiple sources (e.g., Bockstoce and Botkin 1983) but few investigators have structured their access to and use of the material to allow evaluation of the statistical properties of the catch estimates.

The present study combined the use of logs and voyage lists to estimate humpback whale catches on two North Atlantic breeding grounds, the West Indies and the Cape Verde Islands (Fig. 2). Stratified random samples of logs were examined to determine within-voyage whaling activities, specifically whether humpback whales were hunted during a given voyage and if so, how many were taken and where. This information was used to estimate catch rates and proportions of voyages, which were in turn applied fleet-wide to estimate numbers of humpbacks taken on these grounds during a portion of the 19th cen-

ture. The estimates of total landings of humpback whales given here for the American 19th century whaling fleet were developed for and used by the Scientific Committee of the International Whaling Commission, in combination with data on catches by other whaling operations (e.g., those from shore stations in Trinidad [Reeves et al. 2001a], Grenada [Romero and Hayford 2000] and St. Vincent and the Grenadines [Adams 1971; Mitchell and Reeves 1983; Price 1985]), to assess the status of humpback whale populations in the North Atlantic (IWC 2003).

MATERIALS AND METHODS

Published voyage lists (Starbuck and Hegarty), supplemented in the case of Provincetown with data from Lund, were used to compile a list of voyages with a nominal 'Atlantic' or 'North Atlantic' destination that sailed between 1865 and 1886, inclusive. Based on various sources, it was assumed that most humpback whaling in the North Atlantic was conducted by vessels that gave 'Atlantic' or 'North Atlantic' as their intended destination. For only two voyages in this study did the intended destination prove to be incorrect. The period

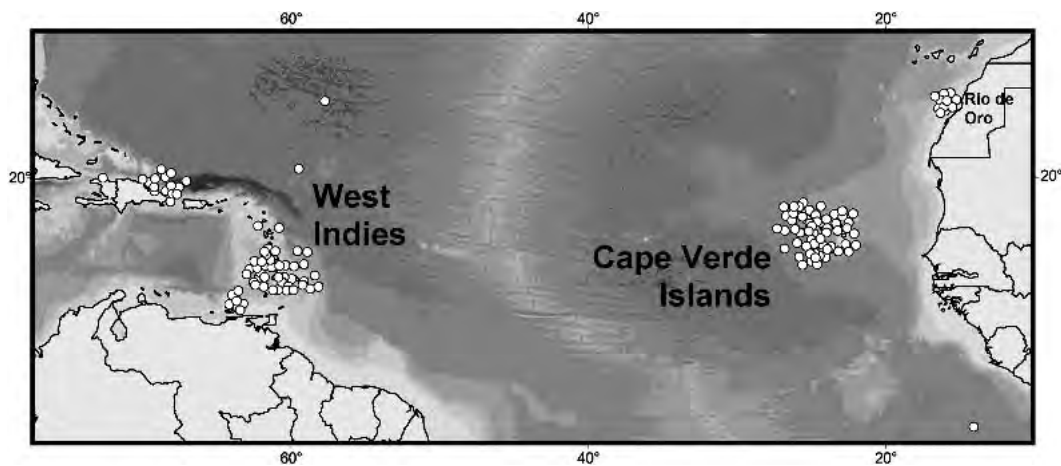


FIG. 2. The locations of whaling vessels on days when humpback whales were taken around the West Indies and Cape Verde Islands extracted from Townsend (1935). Points near Rio de Oro on the northwest coast of Africa more likely represent catches of right whales (Reeves and Mitchell 1990). The shading is based on the ETOPO-2 2-min gridded elevation data (www.ngdc.noaa.gov/mgg/fliers/01imgg04.html) with darker shades corresponding to deeper water.

1865-86 was chosen because it spanned the years of the most intensive humpback whaling by the Yankee fleet in the West Indies (Mitchell and Reeves 1983) although it appears that humpback whaling was also relatively intensive in the Cape Verde Islands from the mid-1850s to mid-1860s (Reeves et al. 2002). East-coast voyages that originated in ports outside the state of Massachusetts (e.g., Sag Harbor, New London, New York, and Stonington) were omitted because these ports had no known history of humpback whaling on the North Atlantic breeding grounds. The remaining voyages were stratified into those from Provincetown and those from all other Massachusetts ports. Provincetown vessels whaled extensively in the North Atlantic humpback breeding grounds, especially the West Indies (Mitchell and Reeves 1983), while vessels from other Massachusetts ports apparently did so less frequently or less consistently.

The two strata were further subdivided into voyages with reported returns of 20 or more barrels (bbl) of whale oil and those with reported returns of less than 20 bbl of whale oil (including oil listed as 'sent home', i.e., transshipped from a distant port). The 20 bbl threshold was chosen because the average yield from a humpback whale on the North Atlantic breeding grounds was 25 bbl (Mitchell and Reeves 1983); thus it was assumed that voyages with less than 20 bbl were unlikely to have taken a humpback whale. Some evidence was found indicating that the Starbuck and Hegarty lists were not entirely reliable for landings. For example, those lists occasionally did not report or under-reported whale oil that was mentioned in voyage logs or other sources. For this reason, samples of logs from the Provincetown with less than 20 bbl and non-Provincetown with less than 20 bbl strata were checked to evaluate the extent of humpback whaling during such voyages.

To estimate the proportions of voyages that attempted to take humpback whales in the North Atlantic breeding grounds, the lists of voyages were randomly ordered within each of the four strata. The selection of logs for reading was based upon: (1) the

random order, (2) whether the log was available in a public collection (per Sherman et al. 1986; Lund 2001), (3) the document's completeness and legibility, and (4) access to the collection (influenced by the availability of microfilms via interlibrary loan, institutional lending policies, locations of collections, and the ongoing consolidation of the Old Dartmouth Historical Society and the Kendall Whaling Museum collections at the New Bedford Whaling Museum).

Logs were read to determine whether the voyage included any humpback whaling effort in the West Indies or Cape Verde Islands (hereafter called 'humpbacking voyages'). Notes for some logs read for previous studies (Mitchell and Reeves 1983; Reeves et al. 2001b, 2002) were used when available, and some logs were found to cover only a portion of the voyage or to be illegible or otherwise unreliable. For logs that included humpback whaling effort, the number of whales taken was tallied (Appendix). The log data were used to estimate the proportion of humpbacking voyages in each stratum and the average number of whales landed during those voyages. Average catch per voyage was estimated differently for the two breeding areas: for the West Indies, only reports from sampled logs were used; for the Cape Verde Islands, the larger data set from Reeves et al. (2002) was also used.

The number of humpbacking voyages in each stratum was estimated separately for the two breeding grounds as the number of Atlantic/North Atlantic voyages in the stratum multiplied by the proportion of the read voyages from the stratum known to have attempted humpback whaling. The number of humpbacks landed was estimated as the number of humpbacking voyages multiplied by the average number of humpbacks taken per voyage. The stratum estimates were totaled for each area and variances were approximated using the delta method (Seber 1973).

A total of 853 Atlantic-bound whaling voyages were considered for this study. The number of voyages sailing annually varied over the time period, with a sharp peak in 1867 and an equally sharp decline

thereafter (Fig. 3). The temporal patterns also varied among the four strata, with an increase after 1875 corresponding to non-Provincetown voyages. Most of the voyages were in the Provincetown 20 bbl or more and the non-Provincetown less than 20 bbl strata. At least 220 complete logs exist for the 853 voyages, with roughly three times as many available for non-Provincetown as for Provincetown voyages. The total number of logs read was 141, or roughly 64% of those potentially available, representing 17% of the total voyages (Table 1). Of the 141 'read' voyages, 35 humpbacked in the West Indies and 17 in the Cape Verde Islands (Table 1). One voyage humpbacked in both North Atlantic breeding areas but it spent more time in the West Indies and was therefore assigned to that area.

RESULTS

Estimated proportions of voyages to the two breeding grounds are shown by stratum in Table 2. The highest proportions were for Provincetown voyages to the West Indies followed by Provincetown voyages to the Cape Verde Islands. The mean number of humpbacks taken per voyage was highest for Provincetown ≥ 20 bbl voyages (Table 3). The mean number of humpbacks taken per voyage for non-Provincetown voyages was similar regardless of which

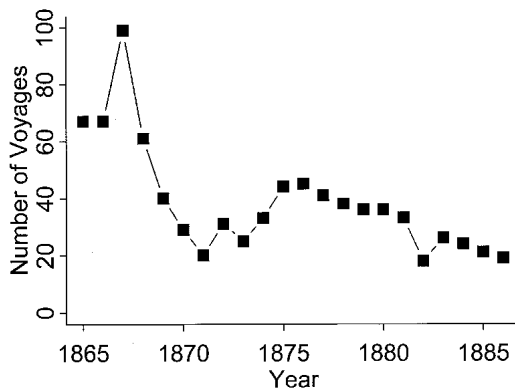


FIG. 3. The number of Atlantic-bound Yankee whaling voyages that departed from Massachusetts ports annually from 1865 to 1886.

ground the voyages visited or how much oil they returned.

Most of the estimated 285 voyages to the West Indies were by Provincetown vessels (Table 4). This was also true of voyages to the Cape Verde Islands, although Provincetown's dominance there was far less evident and extreme. Provincetown voyages accounted for most of the 1617 humpbacks estimated to have been landed in the West Indies; one fourth as many humpbacks (441) were landed in the Cape Verde Islands. The estimate of total humpbacks landed by Yankee whalers in the West Indies was more statistically precise than that for the Cape Verde Islands (coefficient of variation 17% vs. 29%).

DISCUSSION

The estimates of humpback whale landings given here for the West Indies and Cape Verde Islands improve on previous estimates because they are based on two types of historical data (voyage lists and voyage logs) and on a stratified random sampling approach, thus better accounting for differences in voyage characteristics (e.g., port of departure, duration, and whale oil returns). This methodology allowed us to estimate statistical uncertainty and provided useful insight into the dynamics of the Yankee whale fishery.

Our estimates of landings for the West Indies are higher than the 'conservative' estimates of Mitchell and Reeves (1983). Although those authors also used a combination of logbook data and information on voyage characteristics from Starbuck (1878) and Hegarty (1959), their logbook sample was intentionally biased towards selecting documents with evidence of humpback whaling in the West Indies. They described their estimates as 'conservative', recognizing that their stratification and extrapolation criteria were almost certain to exclude some voyages that took humpbacks in the West Indies. Their estimate of total West Indies landings for 1865-86 (1309; obtained from the figure of 2421 in their Table 12 and accounting for the struck/lost component, thus $2421/1.85 = 1309$) was approximately

TABLE 1. Numbers of Atlantic-bound whaling voyages (Voyages) departing between 1865 and 1886 from Provincetown and Non-Provincetown ports that returned 20 barrels or more (≥ 20 bbl) and less than 20 barrels (< 20 bbl) of whale oil, numbers of complete extant and read logbooks, and the percentages of voyages and extant logbooks read. Also shown are the numbers of voyages determined to have humpbacked in the West Indies (WI), the Cape Verde Islands (CVI), and neither.

	Provincetown		Non-Provincetown		Total
	≥ 20 bbl	< 20 bbl	≥ 20 bbl	< 20 bbl	
Voyages	264	120	187	282	853
Extant Logs	31	22	80	87	220
Logs 'Read'	26	19	50	46	141
% of Voyages	9.8	15.8	26.7	16.3	16.5
% of Extant Logs	83.9	86.4	62.5	52.9	64.1
Number of Voyages in:					
WI	19	8	5	3	35
CVI	5	3	5	4	17
Neither	2	8	36	34	80

TABLE 2. Estimated proportions of Atlantic-bound voyages that whaled for humpback whales in the West Indies and Cape Verde Islands, with standard errors and sample sizes, by the port and landed whale oil strata (see Table 1).

	West Indies				Cape Verde Islands			
	Provincetown		Non-Provincetown		Provincetown		Non-Provincetown	
	≥ 20 bbl	< 20 bbl	≥ 20 bbl	< 20 bbl	≥ 20 bbl	< 20 bbl	≥ 20 bbl	< 20 bbl
Proportion	0.730	0.420	0.110	0.070	0.190	0.160	0.110	0.100
Std. error	0.087	0.113	0.046	0.041	0.077	0.084	0.046	0.046

TABLE 3. Estimates of mean numbers of humpback whales landed on voyages to the West Indies and Cape Verde Islands, with standard errors and sample sizes, by the port and whale oil strata (see Table 1).

	West Indies				Cape Verde Islands			
	Provincetown		Non-Provincetown		Provincetown		Non-Provincetown	
	≥ 20 bbl	< 20 bbl	≥ 20 bbl	< 20 bbl	≥ 20 bbl	< 20 bbl	≥ 20 bbl	< 20 bbl
Mean	7.4	0.9	3.1	4.0	5.1	2.4	4.0	2.1
Std error	1.03	0.42	1.79	3.08	0.79	1.26	0.55	0.60
Sample size	19	8	5	3	15	4	17	5

19% lower than our estimate of 1617 landings for that area.

Our estimates of humpback landings for the West Indies and Cape Verde Islands were lower than those of Smith and Reeves (2002). Those authors used data from Starbuck (1878) and Hegarty (1959) to estimate humpback removals in both breeding grounds and assumed that vessels meeting certain criteria did not hunt humpbacks in the North Atlantic breeding areas, and that

those that did whale there landed an average of six whales per voyage. Their estimates were based on the assumption that any Atlantic voyage returning less than 20 bbl of whale oil or any whalebone was not humpbacking in either North Atlantic feeding ground. They also excluded voyages by the largest class of vessels ('ships'), voyages from ports with no known history of humpbacking, and voyages that spanned more than three Northern Hemisphere

TABLE 4. Estimated numbers of Yankee whaling voyages that sailed between 1865 and 1886 and hunted humpback whales in the West Indies and Cape Verde Islands, and estimated total numbers of humpback whales taken (landed) by those voyages, with standard errors (SE).

	West Indies				Total	Cape Verde Islands				Total
	Provincetown		Non-Provincetown			Provincetown		Non-Provincetown		
	≥20bbl	<20bbl	≥20bbl	<20bbl		≥20bbl	<20bbl	≥20bbl	<20bbl	
Voyages	193	51	20	21	285	51	19	20	28	118
SE voyages	23.0	13.6	8.6	11.5	30	20.4	10.0	9.6	13.1	28
Whales	1427	44	63	83	1617	256	46	80	59	441
SE whales	261.5	24.6	45.1	78.4	278	110.9	33.9	35.7	32.3	126

winter seasons. Their estimates for the West Indies and the Cape Verde Islands (1719 and 567, respectively) were 6 and 28% larger than those obtained in the present study.

The fact that the three sets of estimates (Mitchell and Reeves 1983; Smith and Reeves 2002; this paper) are so similar reflects the fact that the primary contribution to humpback removals in both areas was made by the stratum consisting of Provincetown vessels returning 20 bbl or more of whale oil. That the present set of estimates lies between the previous two suggests that the earlier methods, while being less statistically robust, were not particularly misleading. Our data suggest that Mitchell and Reeves (1983) correctly assumed that non-Provincetown voyages and voyages that returned less than 20 bbl of whale oil took few North Atlantic humpback whales. According to our present results, those classes of voyages took less than 13% of the total humpbacks. Our data also confirm the suggestion by Reeves et al. (2002) that the Cape Verde Islands humpback whaling fleet was more heterogeneous than the West Indies humpback whaling fleet. Nonetheless, Provincetown vessels predominated in the Cape Verde Islands, accounting for more than 60% of the humpback whales taken on that ground.

The catch estimates in the present paper are based on data from voyages that lasted 1-3 yr. Thus the average number of whales taken per voyage is larger than the average per year or per 'vessel-season' (cf., Mitchell and Reeves 1983). Because year of departure (rather than year of return) was used to define the study period, our estimates

probably include some captures that occurred after 1886. However, since humpback whaling by North American vessels was declining rapidly in the West Indies and Cape Verde Islands by the 1880s (see Mitchell and Reeves 1983; Reeves et al. 2001b, 2002), the consequent upward bias in the catch estimates presented here is probably very small.

As noted earlier, we used two types of historical data, as did Bockstoe and Botkin (1983) in their study of the western Arctic bowhead whale fishery. Our method differed, however, in that we relied on Starbuck (1878) and Hegarty (1959) to identify Atlantic-bound voyages and logbooks to determine humpbacking activity, whereas Bockstoe and Botkin relied on the WSL and Wood abstracts to identify voyages going to the Bering-Chukchi-Beaufort Seas ground and logbooks from those voyages to determine the numbers of bowheads taken. The WSL and the Wood abstracts provide within-voyage information on locations and whaling activities, and thus their use for the present study might have allowed greater precision in determining the proportions of voyages that whaled in the West Indies and Cape Verde Islands. We examined this possibility by extracting data from the WSL on locations and cumulative amounts of sperm and whale oil on board, over the course of several randomly selected voyages for which we had read a logbook. We did not find sufficient information to determine whether humpbacking took place in one or the other of the two areas of interest. Thus, while this source occasionally provides information that facilitates such determinations (cf., Reeves et al.

2001b, 2002), it does not do so as consistently as logbooks. More generally, the value of such data sources for assessing the spatial distribution of whaling appears to depend upon the specific region of interest, and perhaps upon the economic importance of whaling in that region. For example, while it would be reasonable to expect the WSL and the Wood abstracts to be consistent in noting whether a given voyage included whaling for bowheads in the western Arctic, they would be less likely to make explicit references to relatively low-value, between-season humpbacking in areas like the West Indies or Cape Verde Islands.

Due to practical considerations, we read a higher proportion of logs from some collections than from others. For example, we read more logs from the Old Dartmouth Historical Society collection than from the Kendall Whaling Museum or Providence Public Library collections. It would be useful to investigate to what extent the different logbook collections are representative of the American whale fishery in terms of ports of departure, time periods covered, voyage destinations, etc.

The present study and that of Bockstoce and Botkin (1983) confirm the value of using voyage lists and logbook data to estimate the numbers of whales secured by Yankee whalers on particular grounds. We are developing similar approaches for using both of types of sources, plus the voyage abstracts (e.g. Wood) and contemporary newspaper reports (e.g. the WSL), to study other whale populations targeted by the Yankee fleet.

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Museum) for bringing the Akin sketches in Fig. 1 to our attention, and for facilitating their acquisition and reproduction. Several of the logbooks had been read for previous projects in which the junior author collaborated with other authors (Ed Mitchell, Steve Swartz and Phil Clapham) and we therefore acknowledge their contributions to the present work. We also acknowledge Elizabeth Josephson for helping us evaluate the potential value of the Whalemens' Shipping List. Jacqueline Riley and Heather Fletcher of the Northeast Fisheries Science Center cheerfully assisted us in obtaining microfilm copies of logbooks. We are also indebted to Gillian Woolmer of the Wildlife Conservation Society for preparing Figure 2 using her digitized dataset of the locations of whaling ships from Townsend's (1935) chart. Finally, we appreciate the useful comments of the three referees. This work was supported in part by the National Marine Fisheries Service of the US Department of Commerce and the Alfred E. Sloan Foundation through its Census of Marine Life.

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APPENDIX. The North Atlantic humpback whale breeding grounds visited (Breeding Ground) and numbers of humpback whales landed (Landings) for 141 American whaling voyages whose logs were examined for this study, arranged alphabetically by vessel name and numerically by year of sailing. The breeding grounds are coded as WI for West Indies, CVI for Cape Verde Islands, and NO for voyages that did not whale for humpbacks in either area. The four strata are for voyages originating from Provincetown and from other ports that returned less than 20 barrels (bbl) baleen whale oil and 20 or more bbl baleen whale oil (all according to Starbuck, 1878, or Hegarty, 1959). The year that some voyages returned is not known.

Vessel name	Port	Year sailed	Year returned	Breeding ground	Landings
20 or more bbl whale oil, Provincetown					
A. Clifford	Provincetown	1866	1866	WI	7
A. Clifford	Provincetown	1867	1868	WI	5
A. Clifford	Provincetown	1867	1867	WI	7
A. Clifford	Provincetown	1868	1870	WI	10
A. L. Putnam	Provincetown	1866	1867	CVI	0
Agate	Provincetown	1869	1870	WI	13
Agate	Provincetown	1871	1871	WI	10
Agate	Provincetown	1872	1872	WI	10
Alleghania	Provincetown	1869	1869	WI	3
C. L. Sparks	Provincetown	1876	1877	CVI	5
D. A. Small	Provincetown	1886	1888	WI	17
Ellen Rizpah	Provincetown	1875	1875	WI	8
Express	Provincetown	1878	1878	CVI	8
Gage H. Phillips	Provincetown	1881	1883	NO	0
J. Taylor	Provincetown	1866	1867	WI	10
N. F. Putnam	Provincetown	1868	1869	WI	8
Quickstep	Provincetown	1873	1874	CVI	1
Rising Sun	Provincetown	1875	1875	WI	2
Rising Sun	Provincetown	1876	1876	WI	5
Rising Sun	Provincetown	1877	1877	WI	3
Rising Sun	Provincetown	1879	1880	WI	5
Rising Sun	Provincetown	1879	1879	WI	0
Rising Sun	Provincetown	1883	1883	WI	14
S. R. Soper	Provincetown	1865	1866	NO	0
Walter Irving	Provincetown	1865	1866	CVI	2
Winged Racer	Provincetown	1868	1869	WI	4
Less than 20 bbl whale oil, Provincetown					
Albert Clarence	Provincetown	1868	1870	CVI	4
Alleghania	Provincetown	1868	1868	WI	1
Alleghania	Provincetown	1870	1870	WI	0
C. H. Cook	Provincetown	1867	1868	NO	0
Clara L. Sparks	Provincetown	1878	1879	NO	0
Clara L. Sparks	Provincetown	1879	1880	WI	0
D. A. Small	Provincetown	1875	1876	NO	0
E. H. Hatfield	Provincetown	1865	1866	CVI	0
E. H. Hatfield	Provincetown	1867	1868	NO	0
E. H. Hatfield	Provincetown	1876	1876	WI	0
Gage H. Phillips	Provincetown	1878	1880	NO	0
J. Taylor	Provincetown	1867	1869	WI	3
L. P. Simmons	Provincetown	1868	1870	NO	0
N. F. Putnam	Provincetown	1867	1868	WI	0
N. F. Putnam	Provincetown	1869	1870	CVI	6
Quickstep	Provincetown	1871	1870	NO	0
Rising Sun	Provincetown	1878	1878	WI	2
Rising Sun	Provincetown	1881	1881	NO	0
W. A. Grozier	Provincetown	1866	1867	WI	2

20 or more bbl whale oil, not Provincetown					
Adeline Gibbs	New Bedford	1875	1878	NO	0
Adeline Gibbs	New Bedford	1878	1880	NO	0
Admiral Blake	Marion	1868	1871	NO	0
Alice Knowles	New Bedford	1883	1884	NO	0
Attleboro	New Bedford	1880	1883	NO	0
Charles W. Morgan	New Bedford	1878	1881	NO	0
Cicero	New Bedford	1879	1881	NO	0
Clarice	Edgartown	1875	1876	NO	0
Clarice	Edgartown	1875	1878	NO	0
Cornelia	New Bedford	1866	1868	NO	0
Desdemona	New Bedford	1873	1876	NO	0
Desdemona	New Bedford	1876	1877	NO	0
Draco	New Bedford	1868	1871	NO	0
Draco	New Bedford	1872	1875	NO	0
Draco	New Bedford	1878		NO	0
E. B. Conwell	New Bedford	1880	1882	NO	0
E. B. Conwell	New Bedford	1885	1887	NO	0
Edith May	Wellfleet	1867	1869	NO	0
Emma Jane	Edgartown	1879	1881	NO	0
F. H. Moore	Boston	1868	1870	WI	1
Falcon	New Bedford	1865	1867	NO	0
Franklin	New Bedford	1883	1885	WI	7
George and Mary	New Bedford	1877	1879	NO	0
Golden City	New Bedford	1881	1882	NO	0
Greyhound	New Bedford	1885	1887	NO	0
Henry Taber	New Bedford	1866	1868	NO	0
Hope On	New Bedford	1881		NO	0
Louisa	New Bedford	1878	1881	NO	0
Mattapoissett	Westport	1866	1868	NO	0
Mattapoissett	Westport	1871	1872	NO	0
Mermaid	New Bedford	1883	1885	NO	0
Ohio	New Bedford	1872	1875	WI	0
Osceola 3rd	New Bedford	1865	1866	CVI	2
Osceola 3rd	New Bedford	1866	1868	NO	0
Ospray	New Bedford	1868	1871	NO	0
Pacific	New Bedford	1865	1867	NO	0
Pacific	New Bedford	1867	1868	WI	1
Petrel	New Bedford	1865	1866	CVI	3
Pioneer	New Bedford	1877	1880	NO	0
Sarah	New Bedford	1873	1876	NO	0
Sarah B. Hale	New Bedford	1877		NO	0
Sea Ranger	New Bedford	1876	1879	NO	0
Solon	New Bedford	1865		CVI	3
Stafford	New Bedford	1865	1867	CVI	5
Tamerlane	New Bedford	1877	1880	NO	0
Triton	New Bedford	1868	1871	NO	0
Tropic Bird	New Bedford	1878	1881	NO	0
Union	New Bedford	1882	1883	WI	7
Vigilant	New Bedford	1865	1867	NO	0
Washington Freeman	Fairhaven	1868	1870	CVI	2
Less than 20 bbl whale oil, not Provincetown					
Amelia	New Bedford	1877	1879	WI	1
Andrew Hicks	New Bedford	1881	1883	NO	0
Ansel Gibbs	New Bedford	1867	1868	NO	0
Ansel Gibbs	New Bedford	1869	1870	NO	0

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Benjamin Franklin	New Bedford	1866		NO	0
Catalpa	New Bedford	1875	1876	NO	0
Draco	New Bedford	1866	1868	NO	0
E. B. Conwell	New Bedford	1884	1885	NO	0
E. B. Conwell	New Bedford	1885	1885	NO	0
E. H. Adams	Edgartown	1885	1887	CVI	2
E. H. Hatfield	Edgartown	1880	1882	CVI	1
Emma Jane	Edgartown	1882	1883	NO	0
Eschol	Beverly	1869	1870	NO	0
Eschol	Beverly	1871	1872	WI	2
Eschol	Beverly	1873		NO	0
Franklin	New Bedford	1880	1881	NO	0
Golden City	New Bedford	1878	1880	NO	0
Golden City	New Bedford	1880	1881	NO	0
Golden City	New Bedford	1882	1884	CVI	3
Janet	New Bedford	1875	1876	NO	0
Janet	New Bedford	1877		NO	0
Lottie E. Cook	New Bedford	1885	1887	NO	0
Merlin	New Bedford	1881		NO	0
Mermaid	New Bedford	1880	1882	NO	0
Ohio 2d	New Bedford	1875	1878	NO	0
Ospray	New Bedford	1877	1879	NO	0
Pacific	New Bedford	1868	1869	NO	0
Pedro Varela	New Bedford	1881	1883	NO	0
Pedro Varela	New Bedford	1885	1886	NO	0
Perry	Edgartown	1874	1877	CVI	3
Perry	Edgartown	1877		NO	0
President	New Bedford	1875	1876	NO	0
President 2d	New Bedford	1875	1877	NO	0
Rainbow	Dartmouth	1866	1867	WI	4
Rainbow	Dartmouth	1867	1868	NO	0
Rainbow	Dartmouth	1869	1870	NO	0
Sarah	New Bedford	1876	1878	NO	0
Star Castle	Fairhaven	1867	1868	WI	9
Tropic Bird	New Bedford	1867	1868	NO	0
Tropic Bird	New Bedford	1876	1878	NO	0
Union	New Bedford	1874	1875	NO	0
Union	New Bedford	1875	1876	NO	0
Wave	New Bedford	1867	1869	NO	0
Wave	New Bedford	1871	1873	NO	0
Wave	New Bedford	1874	1876	NO	0
Wave	New Bedford	1876	1879	NO	0
