Appendix I

Multispecies Days-at-Sea Leasing

FY 2004

Groundfish Plan Development Team
December 29, 2005

Days at Sea Leasing

The days- at- sea (DAS) leasing program was implemented as part of Amendment 13 in order to mitigate the economic impacts of the Amendment 13 reductions in days-at-sea. Provisions of the program included leasing of only "A" days at sea, restrictions on the exchange of DAS between vessel sizes, and notification of the lease to NMFS 30 days before it took place.

This document summarizes the lease market for fishing year 2004. Information on the leasing program was compiled from the NMFS DAS database which tracks DAS allocations, transfers, and use. The report includes summary information on the number and cost of leased DAS, as well as the movement of leased DAS between states. Species landed by lessee vessels are described. The dealer and VTR databases were used to estimate the impacts of the leasing program on mortality of specific stocks. Finally, the impact of the leasing program on break-even levels of groundfish fishing vessels is estimated.

The DAS leasing program was widely used in FY 2004, with nearly 15 percent of allocated Category A DAS changing hands through the leasing market. Most DAS were acquired by vessels that have been the most active in the groundfish fishery between FY 1996 and 2001. There is evidence that the leasing program is not conservation neutral, though the impacts differ among stocks. The leasing program helped many vessels use more DAS than estimated to break-even.

General Information

From May 1, 2004 – April 30, 2005, over 6,000 days were leased, at a value of $2.5 million. The average price per day per lease was $364, but as will be shown later, there was a large amount of variability in these prices. The average number of days leased was 24, and there were 174 lessors and 163 lessees. Additionally, there were at least 36 intra-company leases. Most days at sea were leased by trawl vessels, although there were some leases by gillnet vessels. In terms of port groupings, vessels from Portland leased 1,570 days (roughly 26%), New Bedford vessels leased 1,060 days (18%) and Gloucester vessels 800 (13%).

Vessels

For this analysis, vessels were grouped into four classes based on length. The length classes are the same as those used in Amendment 13 to summarize fishing activity, and were developed in consultation with the Groundfish Oversight Committee. Most vessels leased days to vessels within their own size category (Table 1), although days were leased to both smaller and larger length classes. (Leasing to a larger class is possible since the restrictions on leasing DAS based on length are determined by permit baselines, and vessels are allowed to lease to vessels with a baseline that is 10 percent greater). The average length, gross tonnage and horsepower for lessee vessels were all slightly lower than for the lessor vessels (Table 2).

Days leased generally stayed in the same state, based on the vessel homeport as reported on permit applications (Table 3), although there was a slight gain in days by Massachusetts vessels (confidentiality prohibits releasing further details). Most DAS were acquired by vessels with homeports in either Maine (26.5 percent) or Massachusetts (62 percent). Vessels also list a principal port on a permit application, described as the city or state where most landings occur. The movement of DAS by principal port state is summarized in Table 4. Both Maine and Massachusetts show a slight gain in DAS as a result of the leasing program based on principal port state.

In order to determine if the vessels likely to lease DAS are those that are most active in the groundfish fishery, vessels were divided into three quantiles based on FY 2004 DAS allocations. Under Amendment 13 regulations, the vessels that were most active in groundfish fishing during the period FY 1996 through FY 2001 were allocated the most DAS. The first quantile had zero baseline "A" days, while the second quantile had between 0.75 and 48.2 days, and the third quantile had 48.3 – 98.4 days. In FY 2004, vessels in the third quantile leased over 5,600 days (92%) of the total days leased (Table 5).

Prices

Prices peaked in June, and then declined gradually over the year, although there was a spike in the maximum price paid in December 2004 (Figure 1). When tracked together, both the mean days leased and the mean price declined between June 2004, and February 2005 (Figure 2). The prices paid for days ranged between $0 and $2,000 per day. Further examination of the prices paid for days leased show that nearly as many days were leased at less then $1 per day as were leased at $700 per day (Figure 3). Leases were then grouped into two price groups – less than or equal to $350 per day and greater than $350 per day and examined for price trends. The average price for leases greater than $350 per day peaked in June, and then gradually declined over the fishing year, while those between $1 and $350 slowly increased until November, and then stabilized (Figure 4).

Price paid also depended on gear type (Figure 5). Lease prices above $1 were stratified into three groups -- $1-$350, $350-$700, and greater than $700. Otter Trawl vessels leased the most days at sea at the higher prices, while at the lower prices gillnet vessels leased nearly as many days as otter trawl vessels. The three main ports leasing days at sea were Gloucester, Portland and New Bedford. On average, vessels in New Bedford paid the highest price, followed by vessels in Portland and Gloucester (Figure 6). This occurred because vessels in New Bedford were generally bigger and had greater fishing power than those in Portland and Gloucester, as shown by vessel horsepower and length (Figure 7).

Economic theory predicts that in a market setting prices paid for a productive asset are related to the potential income that would be generated over time from that asset. For a lease market, the potential income stream would be limited to the term of the lease. To examine the extent to which the performance of the DAS leasing market was

consistent with expectations a simple linear regression was run where the dependent variable was the average lease price per day leased (total lease price divided by days leased). Independent variables included the average revenue per day on groundfish trips and a monthly time trend. Note that average revenue per day was calculated from prices derived from dealer weighout and VTR reported landings for FY2003 by those vessels that leased days. The time trend was included to account for the declining trend in average prices noted above.

A total of 179 trades were included in the model where the reported lease price was greater than $1. The R-square value for the model was low at 0.24 (Table 6) reflecting the large amount in variability in the data. However, the F-test that all variables are insignificant was rejected, and each independent variable was found to be statistically significant. Groundfish revenue per day was found to be positively related to the average daily lease price indicating that lease prices were consistent with income potential of the lessee vessel. That is, vessels with higher groundfish income potential paid more for a lease than vessels with lower income potential.

Vessels that leased days to others (lessors) at a price of one dollar or less were identified, and their 2004 fishing activity summarized. There were 73 vessels in this category, and the majority (55) had no landings of any species in 2004. Eighteen vessels had landings of both groundfish and non-groundfish species, or only non-groundfish species.

Species Landed

During calendar year 2004, the top five species landed by lessee vessels were haddock, monkfish, pollock, cod and yellowtail flounder (Figure 8). For comparison purposes, landings by lessor and lessee vessels in calendar year (CY) 2003 were examined. This was the last full year before the implementation of days at sea leasing. The top five species for lessor vessels were Atlantic herring, silver hake, loligo squid, monkfish and cod, while the top five species for lessee vessels were monkfish, cod, haddock, pollock and loligo squid (Figure 9 and Figure 10).

Impact on Break-Even Levels

The economic impact of Amendment 13 included a break-even analysis which showed the number of days required for vessels to meet overhead costs, and the additional days needed to meet a certain level of crew salary (Table 213, Page I-622). This level of days means the boat is just meeting their expenses, and does not include profit, or return to capital. In order to assess whether the leasing program provided some regulatory relief for the lessees, their allocation of “A” days plus the number of days they leased were examined. Vessels were first assigned a gear group based their 2004 landings history, and then stratified by length based on the same groupings used in the Amendment 13 analysis. There were two gillnet size classes, and three trawl size classes. Results showed that for all groupings on average, lessees were allocated enough “A” days to meet their overhead expenses, but not enough to meet their crew expenses given an annual crew salary of $35,000 (Table 7). Using the mean days leased in each category, the sum of the mean allocated “A” days and the days leased was enough to meet

overhead and crew expenses, with the exception of under 50 foot trawl vessels. For the small trawl fleet, the difference between the sum of leased and allocated days, and breakeven days was small enough (seven days) that it is likely these vessels were also meeting their overhead plus crew expenses. The overall impact of the leasing program provided regulatory relief for lessee vessels because it allowed them to lease enough days to continue to fish, meet their overhead expenses, and pay their crew.

Use of Leased DAS

The number of DAS used by vessels that leased DAS was compared to the baseline allocation (allocation before leasing) and the net allocation (allocation after leasing, sanctions, transfers, etc.). The leasing program enabled 145 vessels to fish more than their baseline allocation of DAS. Some vessels that leased DAS did not use all the DAS they had available. Thirty percent of the vessels that leased and used DAS used only eighty percent of the DAS available or less, fifty-seven percent used ninety percent or less, and about 43 percent used more than ninety percent of the DAS available. In addition, a small number of vessels that leased DAS did not use any groundfish DAS Table 8). Of the 160 vessels that leased and used DAS, forty-six (28.8 percent) also used either Category B (regular) or Category B (reserve) DAS.

There is an interest in determining whether leasing changed the use of DAS as a percentage of DAS allocations. The rate of DAS use bears on determining the number of DAS to allocate to achieve a particular level of DAS used. These rates have been routinely reported in MSMC reports since 1996, and were updated in Amendment 13 through 2001. During the development of Amendment 13, the ratio of Category A and Category B DAS was adjusted to account for an increase in DAS as a result of leasing. This adjustment assumed that 3,000 DAS would be used as a result of the leasing program. Of the 6,000 DAS that were leased, 5,615 DAS were used (note that the leasing program assumes a vessel first uses its DAS acquired through leasing). Even though the number of leased DAS that were actually used was greater than the number assumed to be used by Amendment 13, the total DAS use in 2004 (leased DAS and other DAS) was less than were used to estimate the biological impacts of the Amendment 13 management measures. As described in the section of this report labeled “Use of Leased DAS,”, the overall use of DAS increased to 69 per cent of the baseline allocations, compared to 59 per cent in FY 2003. The DAS use rates assumed in the Amendment 13 analysis of estimated mortality reductions were 78 per cent, 85 per cent, and 95 per cent.

In order to compare FY 2004 to prior years, permits must be grouped into consistent categories. Permit categories have been used in the past, but Amendment 13 revised the permit categories for multispecies vessels. The most important change is that most vessels now possess individual DAS permits, whereas under Amendment 7 the largest permit category was the fleet permit category. These changes complicate comparing the use of DAS in FY 2004 to prior years. An additional complication is that it is not possible to separate the impacts of leasing on DAS use from other Amendment 13 measures.

This problem can be partially addressed by summarizing FY 2004 DAS use for permits based on the Amendment 7 permit category held by that vessel. Because of the structure of the databases, it is difficult to track every permit back to its earlier permit category and account for every DAS allocated and used. This is because permits are transferred during the course of a fishing year – sometimes more than once – making it difficult to prevent double-counting of allocated or used DAS. As a result, the following tables do not represent a complete census of all DAS allocated and used in FY 2004, but is a snapshot of the data at a particular time. While 30,063 Category A DAS were used in FY 2004, the table accounts for only 27,731 used DAS – ninety-two percent of the actual total (Table 9). Similarly, this table only accounts for ninety-eight percent of the Category B (regular) DAS used in FY 2004 and ninety-seven percent of the Category B (reserve) DAS used in FY 2004. Ninety-one percent of the allocated Category A DAS (44,126) are also reported. The table accounts for 674 of approximately 749 permits that used DAS in FY 2004.

Table 10 shows DAS use, by Amendment 7 permit category, based on the information in Table 9. There are three different rates shown. For FY 2004, the rate based on baseline allocations compares the DAS used to the original Amendment 13 DAS allocations, prior to any sanctions, transfers, or leases. The rate based on final allocations is based on allocations after taking into account all sanctions, leases, transfers, etc. Finally, the last category shows DAS use only for those vessels that actually used a DAS, based on final allocations.

The overall use of DAS increased to sixty-nine percent of the baseline allocations, compared to fifty-nine percent in FY 2003 and the FY 1998-2003 average of forty-four percent. The rate is seventy-one percent of the final allocations – this difference may be due in part to the previously described difficulty in tracking all permits, as well as the fact that only whole DAS can be exchanged in the leasing program. Note that the leasing program allowed Amendment 7 Category A vessels to use one hundred six percent of their baseline allocation. Clearly the leasing program is at least partly responsible since that is the only way vessels acquired additional DAS in FY 2004. Both Amendment 7 Category A and Category B DAS vessels increase DAS use compared to 2003 and the six-year average.

Biological Impacts

The biological impacts of the leasing program were difficult to separate from the other management changes that took place. In order to characterize biological impacts, several steps needed to be taken. First, for each vessel with landings in the time period 2001-2003, the percent of their groundfish landings from each stock area, and their effort in those areas, was calculated based on VTR data. Landings from the dealer logbooks were then allocated to specific areas based on the percent landings calculated from the VTR data. All three years in the time period were combined, and average landings per day at sea for each vessel in each area was calculated, as was percent time fished in each area. Total landings attributed to the leasing program was then calculated for both lessors and lessees by multiplying the actual days leased by the landings per day at sea in each area and by the percent time spent fishing in each area. Total potential landings by lessors

were then subtracted from the totals by lessees to arrive at a difference in potential landings between the two groups. Results showed an increase in mortality for all stocks, with the exception of windowpane flounder (Table 12). On a percentage basis, increases ranged from 0.1% (southern New England and Mid-Atlantic yellowtail) to 7.6% (redfish).

To summarize the biological impacts, it is unlikely that the DAS leasing program is conservation neutral. The biological impacts are not the same for every stock. The relative magnitude of the impacts, however, may be imperfectly described by the information in Table 12 because of the assumptions used and the difficulty in separating the impacts of the leasing program from the impacts of other management changes.

Conclusions

The DAS leasing program resulted in an active market in the exchange of DAS, with nearly 15 percent of the baseline allocations being transferred through the leasing program. The primary users of the program were those vessels that received the highest DAS allocations in FY 2004, showing that the leasing market was mainly used by active groundfish vessels, the group predicted to have the largest reduction in fishing revenues under Amendment 13. The leasing program provided regulatory relief which allowed lessee vessels, on average, to fish enough to cover their overhead and crew expenses. Consistent with the analysis of Amendment 13, DAS tended to move to the primary groundfish fishing states of Maine and Massachusetts. While the leasing program may have benefited some southern New England and mid-Atlantic stocks, it may have contributed to increased catches of several GOM and GB stocks. The differing impacts on different stocks illustrate the difficulty in levying a conservation tax in order to attain conservation neutrality. The levy would need to be stock or area specific and would have unintended consequences for other stocks. Additionally, other management measures that are implemented and their expected impact on the fleet would need to be considered.

Sources of Uncertainty

These analyses are subject to the following sources of uncertainty:

- The price paid for a leased DAS is reported by the lessee vessel and may not accurately reflect the actual price paid. There is anecdotal information that some lease agreements are based on a share of the catch, which would not yet be known when the lease report is provided to NMF.

- It is difficult to separate the biological impacts of other management measures from the impacts of the DAS leasing program.

- A key assumption when estimating biological impacts is that all fishing activity of a lessee vessel takes place in the broad management area (GOM/GB/SNE) where most of the vessel's trips occurred. This will bias the results. As additional data become available, it may be possible to refine this analysis.

Table 1 - Number of days at sea leased by vessel baseline size category

Lessor baseline length category	Lessee baseline length category				
	Less than 30	30-50	51-75	Over 75	Total
Less than 30					
30-50		1,522	88		1,610
51-75		487	1,548	233	2,268
Over 75	5	40	497	1,702	2,244
Total	5	2,049	2,134	1,935	6,123

Table 2 - Mean physical characteristics of lessor and lessee vessels

	Lessor	Lessee
Gross Tons	82	79
Length	62	59
Horsepower	489	441

Table 3 - Number of days at sea leased by vessel homeport state.

Lessor home port state	Lessee home port state						
	ME	NH	MA	RI	NY	DE	Total
ME	1,189	10	544			83	1,826
NH	94	251	99			20	464
MA	107	24	2,412				2,543
RI	44		245	117			406
CT		13	23				36
NY	25		212		56		293
NJ	169	19	130	106			423
PA			9				9
VA			53				53
NC			24				24
FL			46				46
Total	1,628	317	3,796	223	56	103	6,123
Net Change	(198)	(147)	1,253	(180)	(237)	103	

Table 4 - Number of days at sea leased by vessel principal port state.

Lessor principal port state	Lessee principal port state					
	ME	NH	MA	RI	NY	Grand Total
ME	1,639	38	184			1,861
NH	124	261	89			474
MA	174		2,374			2,548
RI	44		232	130		406
CT		13	40			53
NY	67		153		56	275
NJ	169	19	113	106		406
VA			53			53
FL			46			46
Grand Total	2,216	331	3,284	236	56	6,123
Net Change	355	(143)	736	(170)	(219)	

Table 5 - Number of days at sea leased by vessel DAS allocation quantile

Lessor DAS Allocation Quantile	Lessee DAS Allocation Quantile			
	Lessee 1st DAS Allocation Third	Lessee 2nd DAS Allocation Third	Lessee 3rd DAS Allocation Third	Total
Lessor 1st DAS Allocation Third				
Lessor 2nd DAS Allocation Third		132	1,749	1,881
Lessor 3rd DAS Allocation Third	5	347	3,890	4,242
Total	5	479	5,639	6,123

Table 6 - Summary of Linear Regression of Lease Price on Potential Income

Variable	Coefficient	Standard Error	t-Value	Probability > t
Intercept	328.26	95.13	3.45	0.0007
Groundfish Revenue per Day	0.103	0.016	6.31	<0.0001
Time	-32.66	9.58	-3.41	0.0008
Adjusted R-Square = 0.24 F Value = 29.51 Probability > F < 0.0001 N = 179				

Table 7 - Average "A" Days Leased and Allocated by Gear and Size Class Compared to Breakeven

Vessel Length (feet)	Number	Allocated "A" Days Mean	Leased "A" Days Mean	Total "A" Days Mean	Breakeven Days Overhead	Breakeven Days with $35k Crew Salary
Gear						
Gillnet <40	14	51	22	73	14	68
Gillnet >=40	39	52	35	87	16	64
Trawl <50	19	54	26	80	26	87
Trawl >=50 and <70	43	59	37	96	37	94
Trawl >=70	46	71	51	122	50	115

Days.

Table 8 – DAS use by vessels that leased DAS, as a percent of baseline and net allocations

%Baseline			%Net		
% of Baseline Allocation	*Frequency*	*Cumulative %*	*% of Net Allocation*	*Frequency*	*Cumulative %*
0%	0	0%	0%	0	0%
10%	0	0%	10%	0	0%
20%	0	0%	20%	0	0%
30%	0	0%	30%	1	1%
40%	0	0%	40%	0	1%
50%	1	1%	50%	2	2%
60%	0	1%	60%	5	5%
70%	1	1%	70%	11	12%
80%	5	4%	80%	28	30%
90%	8	9%	90%	44	57%
100%	12	17%	100%	65	98%
110%	12	25%	More	3	1009%
120%	16	35%			
130%	12	42%			
140%	16	52%			
150%	13	60%			
160%	20	73%			
More	43	100%			

Table 9 - Fishing Year 2004 Days-at-sea (DAS) baseline and final allocations and usage by Amendment 7 permit category. Category B DAS include carry over.

A7 Permit Cate-gory	Number of vessels	Baseline Allocation (before leasing or transfers) with carryover			Final Allocation (after leasing or transfers)			Number of Vessels Using DAS			DAS Final Allocation to Vessels Using DAS			DAS Used		
		A	B1	B2	A	B1	B2	A	B1	B2	A	B1	B2	A	B1	B2
A	129	9,417	3,771	3,139	11,141	3,705	3,083	114	68	62	10,946	3,378	2,823	9,937	1,319	878
B	959	28,851	18,094	9,616	26,156	17,017	8,992	520	42	48	23,616	11,365	7,011	16,814	338	370
C	2	34	30	11	34	30	11	1	0	0	34	20	11	27	0	0
D	71	916	987	305	845	933	282	23	1	2	666	450	222	352	0	9
E	39	733	612	244	636	602	244	10	3	1	452	218	144	392	17	4
F	2	82	47	27	29	47	27	1	0	0	29	20	10	26	0	0
G	7	222	126	74	252	126	74	5	1	0	223	99	67	183	1	0
TOTAL	1,209	40,254	23,667	13,418	39,092	22,460	12,713	674	115	113	35,967	15,548	10,288	27,731	1,676	1,261

Table 10 – FY 2004, percentage of DAS used by Amendment 7 Permit Category

A7 Permit Category	**Percentage of Baseline Allocation Used**			**Percentage of Final Allocated DAS Used**			**Percentage of Allocated DAS (to vessels that called in) used**		
	A	B1	B2	A	B1	B2	A	B1	B2
A	106%	35%	28%	89%	36%	28%	91%	39%	31%
B	58%	2%	4%	64%	2%	4%	71%	3%	5%
C	78%	0%	0%	78%	0%	0%	78%	0%	0%
D	38%	0%	3%	42%	0%	3%	53%	0%	4%
E	53%	3%	2%	62%	3%	2%	87%	8%	3%
F	32%	0%	0%	91%	0%	0%	91%	0%	0%
G	82%	1%	0%	73%	1%	0%	82%	1%	0%
TOTAL	69%	7%	9%	71%	7%	10%	77%	11%	12%

Table 11 – Past rates of DAS use by Amendment 7 permit category

Permit Category	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Average
A - Individual	85%	89%	88%	91%	89%	91%	89%
B - Fleet	30%	29%	34%	37%	51%	53%	39%
D - Hook Gear	10%	10%	11%	14%	25%	22%	15%
E - Combination	51%	43%	47%	47%	40%	44%	45%
F&G - Large Mesh	32%	38%	52%	62%	69%	68%	54%
Total	34%	34%	38%	42%	58%	59%	44%

Table 12 - Estimated Difference in Landings Due to Leasing Program by stock area and species

Stock Area & Species	Difference M.T.'s Live-Weight	2001-2003 Average Landings Live-Weight	Percent Average Landings
GOM			
Cod	131	4,182	3.1%
Winter Flounder	14	633	2.2%
Haddock	71	1,209	5.9%
CC & GOM Yellowtail Flounder	52	2,110	2.5%
GB & GOM Windowpane	-0.40	25	-1.6%
GB			
Cod	290	8,759	3.3%
Winter Flounder	50	2,177	2.3%
Yellowtail Flounder	16	3,200	0.5%
Haddock	332	5,508	6.0%
SNE & MA			
Yellowtail Flounder	0.53	740	0.1%
Winter Flounder	85	3,416	2.5%
Windowpane	-0.35	59	-0.6%
Redfish	28	363	7.6%
White Hake	169	3,728	4.5%
Pollock	295	4,162	7.1%
Witch Flounder	142	3,110	4.6%
Plaice	170	3,426	5.0%

Figure 1 - Average Price per Day Leased FY2004

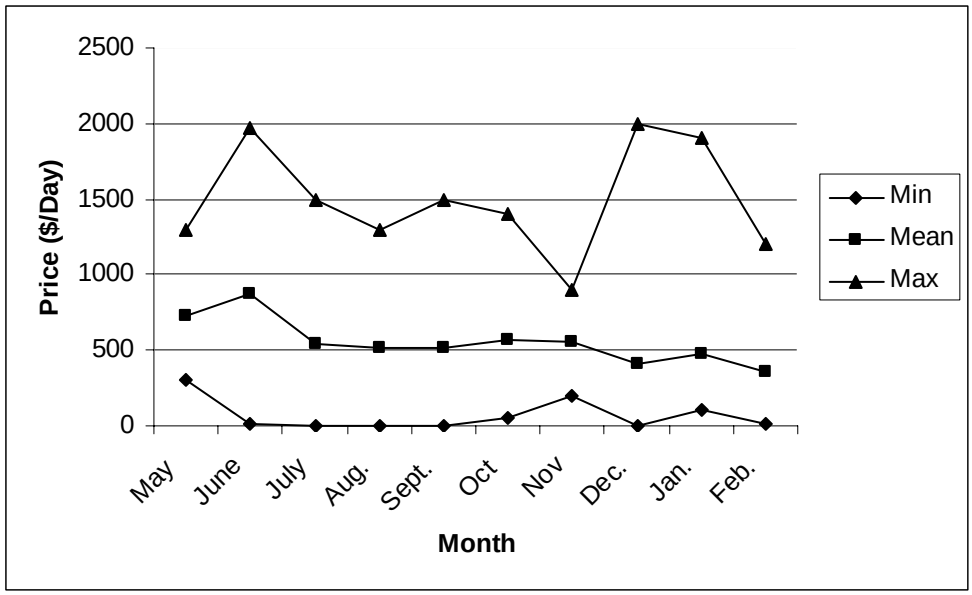

Figure 2 - **Mean Price and Mean Days Leased per Month FY2004**

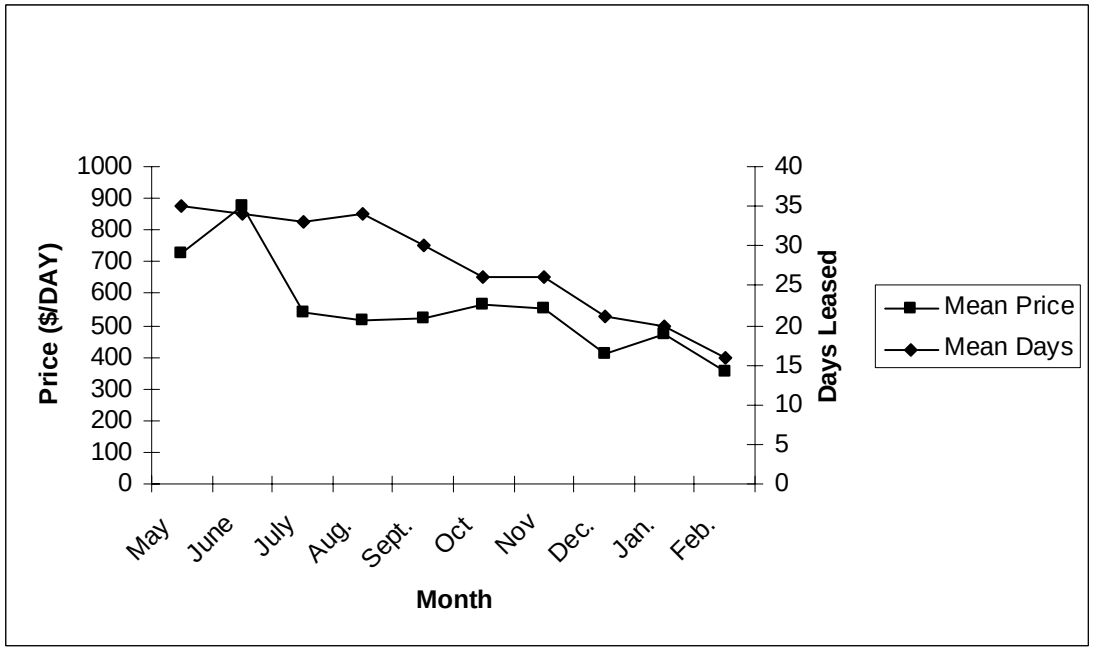

Figure 3 - **Number of Days Leased by Price Range**

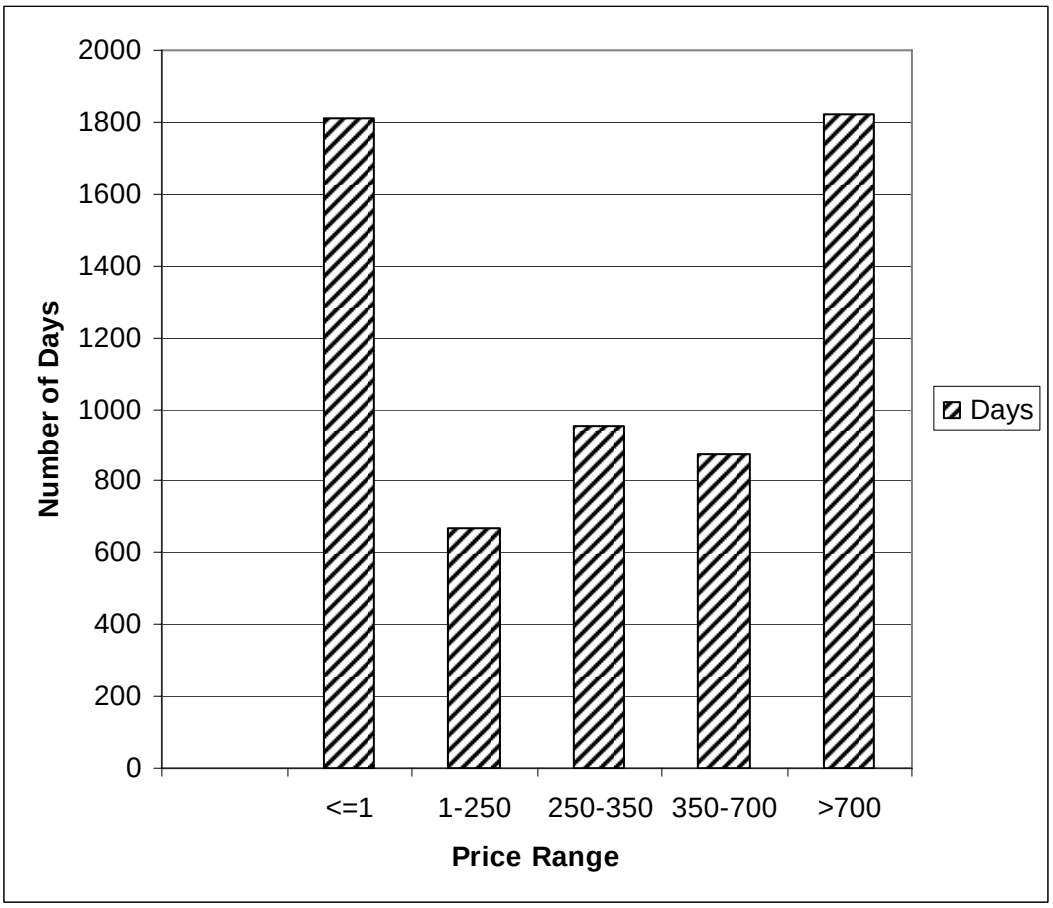

Figure 4 - **Average lease Price by Month for all leases > $1.**

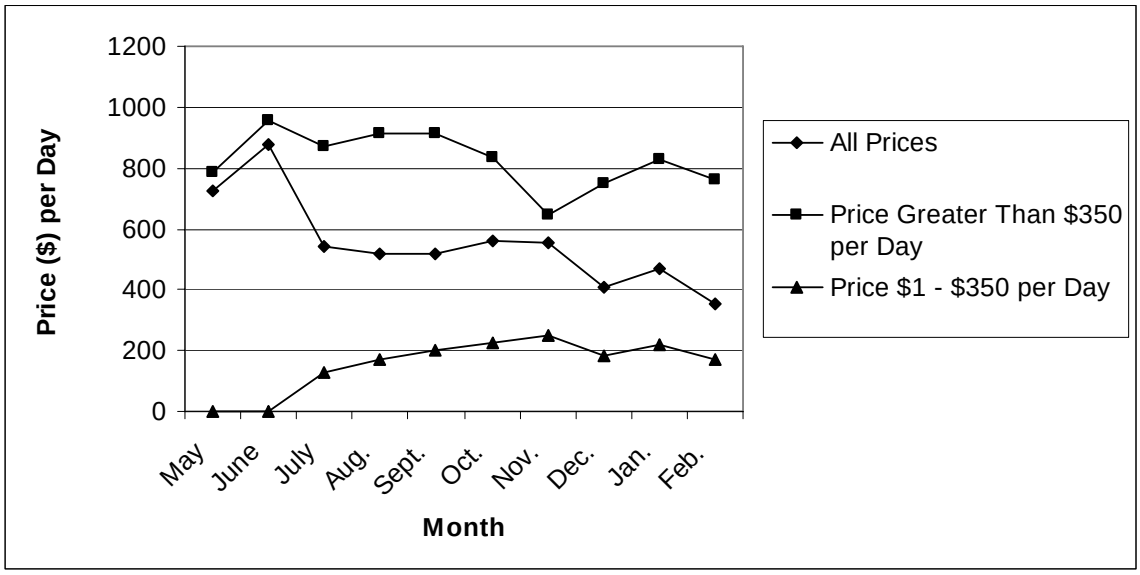

Figure 5 - **Days Leased by Gear type in each price Range**

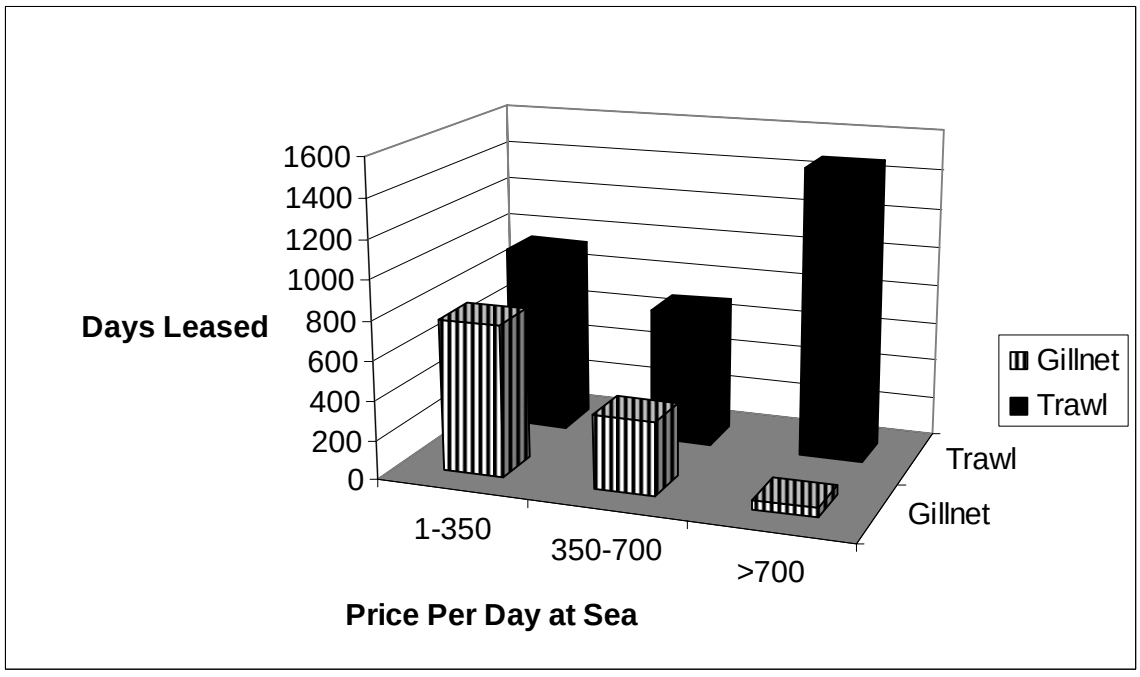

Figure 6 - **Average Price per Day in the Major Ports**

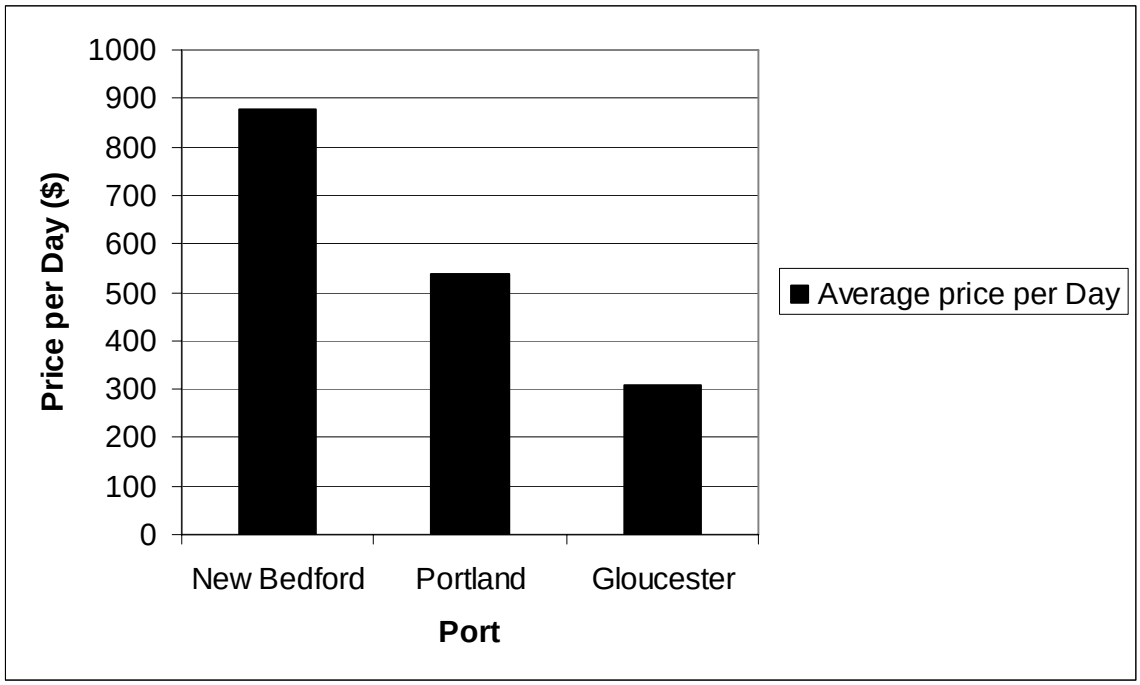

Figure 7 - **Vessel Length and Horsepower by Major Port.**

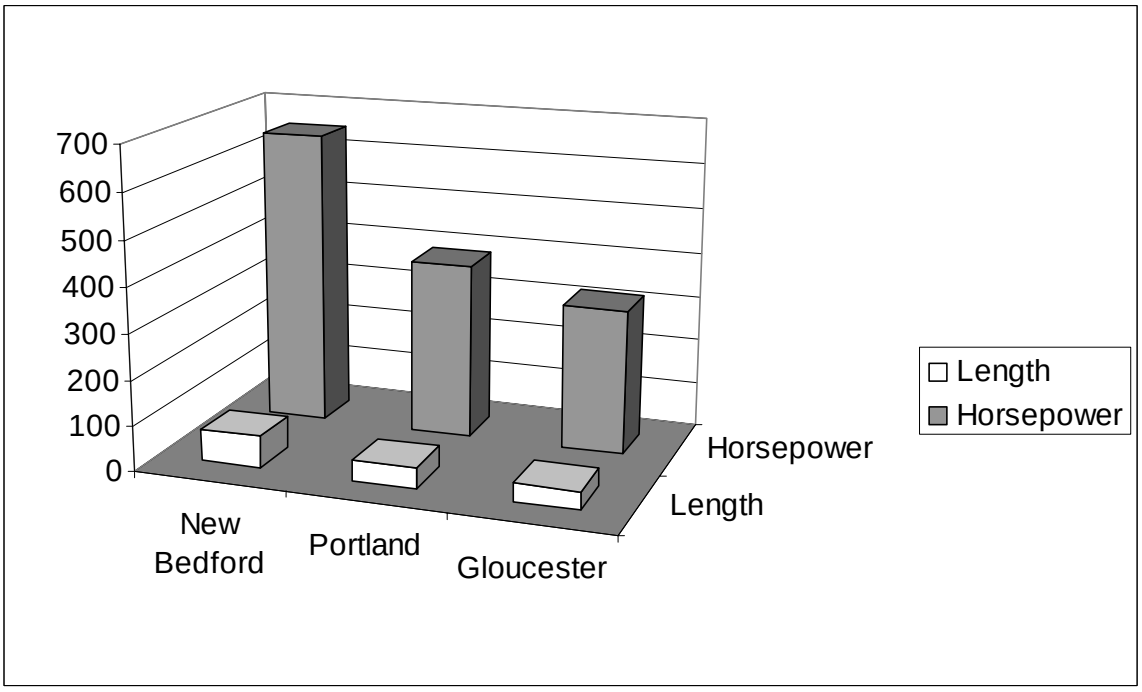

Figure 8 - **Top Five Species Landed by Lesee Vessels in 2004**

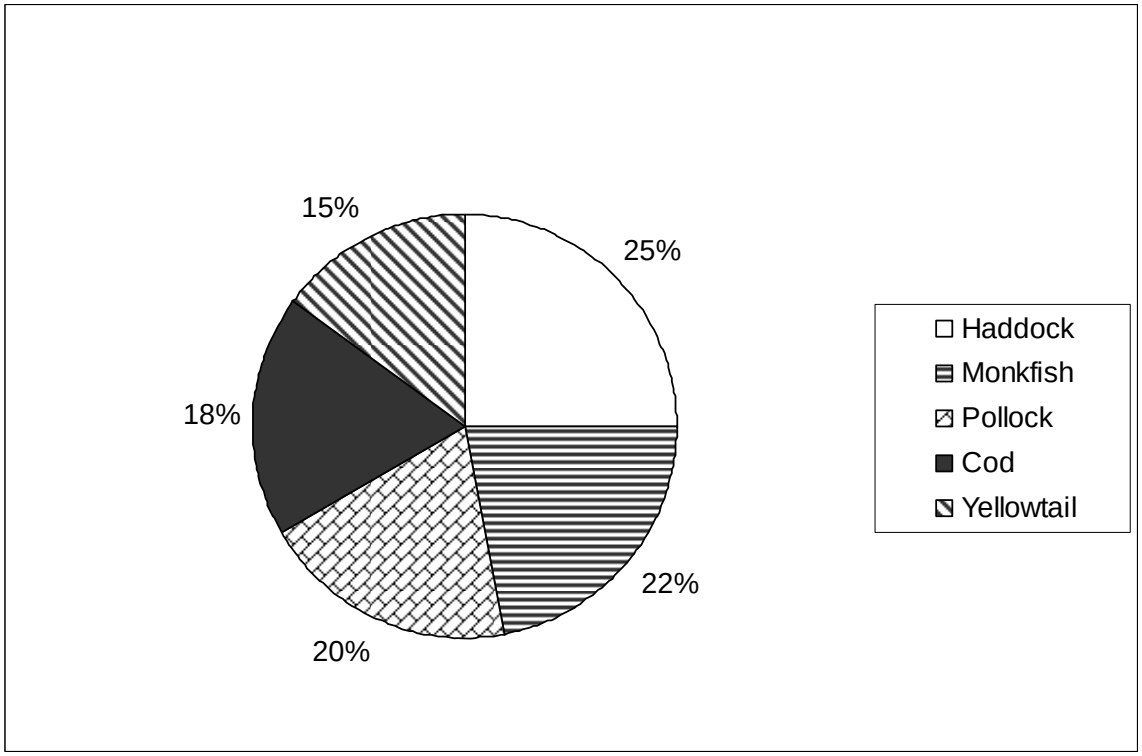

Figure 9 - Top Five Species Landed by Lessor Vessels in 2004

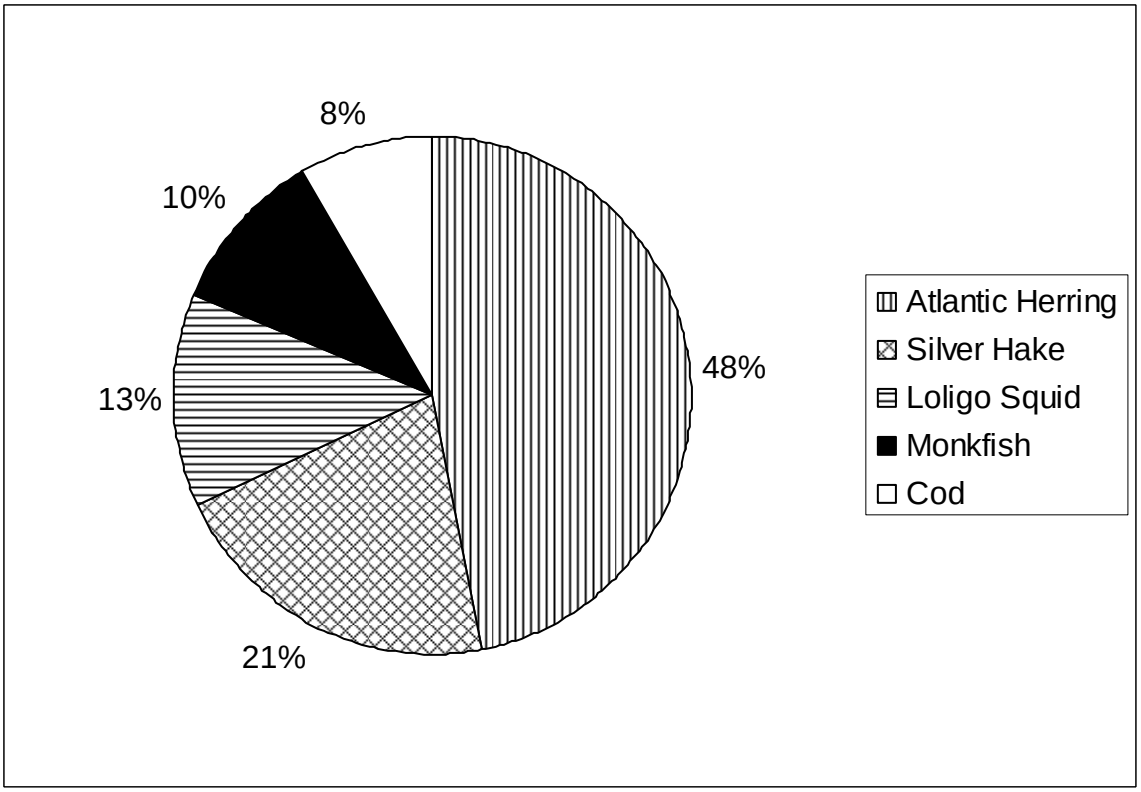

Figure 10 - **Top Five Species Landed by Lessee Vessels in 2003**