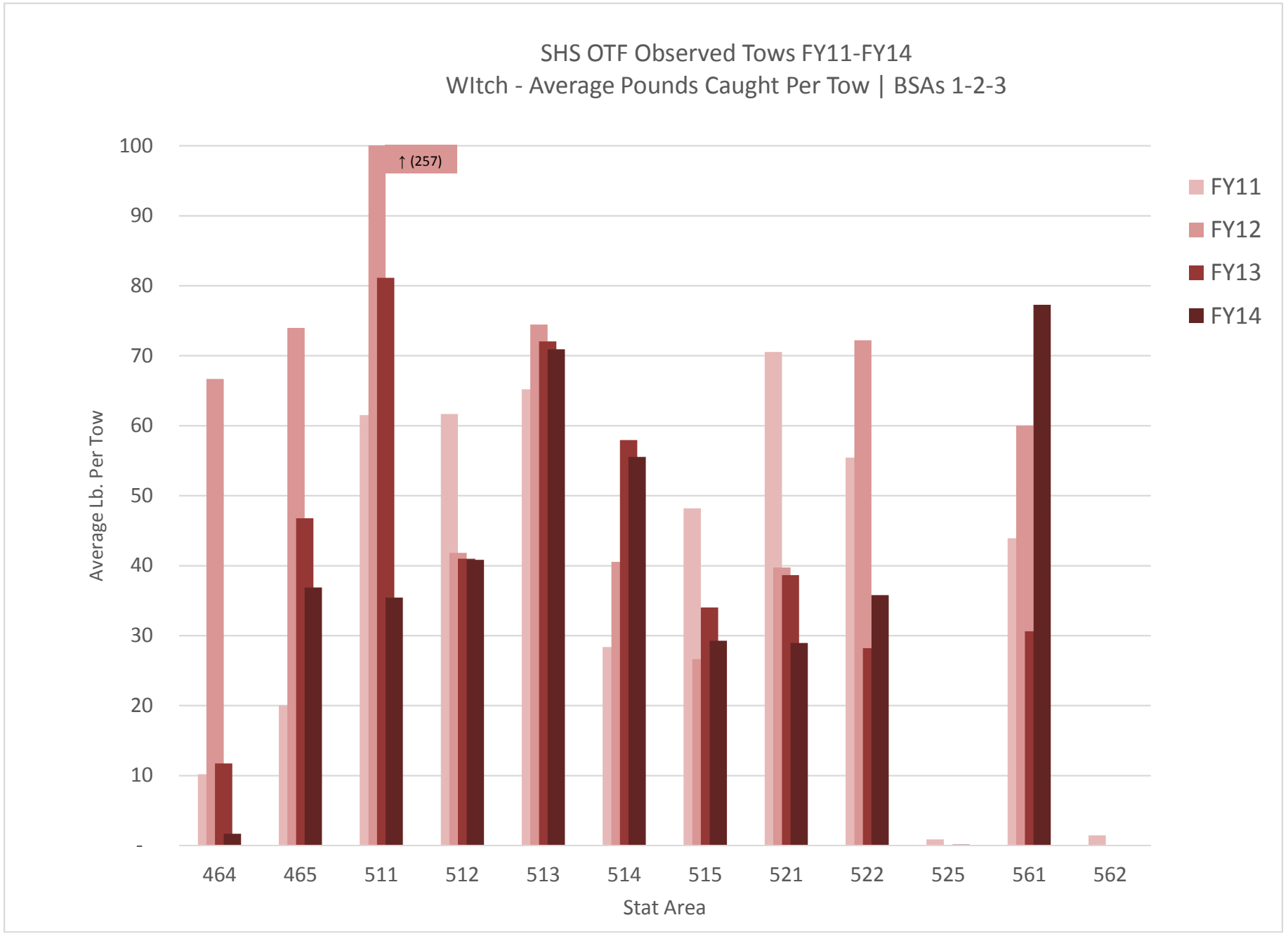
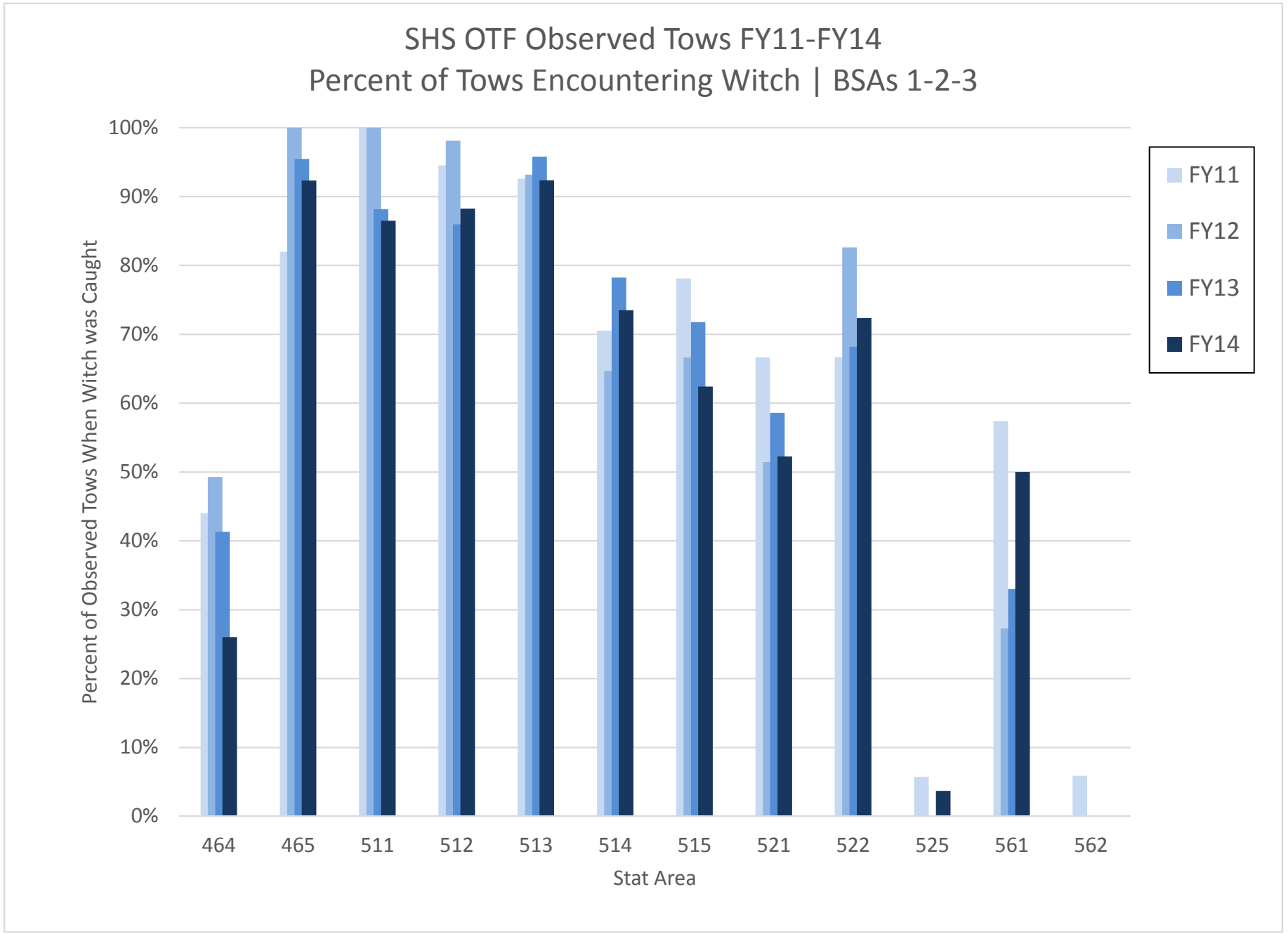

SHS OTF Observed Tows FY11-FY14
WItch - Average Pounds Caught Per Tow | BSAs 1-2-3
Average Lb. Per Tow
100
90
80
70
60
50
40
30
20
10
-
↑ (257)
FY11
FY12
FY13
FY14
464
465
511
512
513
514
515
521
522
525
561
562
Stat Area


SHS OTF Observed Tows FY11-FY14
Percent of Tows Encountering Witch | BSAs 1-2-3
Percent of Observed Tows When Witch was Caught
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
464
465
511
512
513
514
515
521
522
525
561
562
Stat Area
FY11
FY12
FY13
FY14

Witch Flounder Utilization in the Sustainable Harvest Sectors

Allocation & Use

Witch flounder is a high-demand stock. Under five years of sector management, the fleet has caught most of its annual allocation, exceeding 100% in FY2013, when a lawsuit filed by environmental firm Conservation Law Foundation forced the NMFS to retroactively reduce the fleet's ACE late in the fishing year (Table 1).

Table 1: Sectors' Witch Utilization Rates

FY	SECTOR ALLOCATION	CATCH	PCT CAUGHT
2010	852	725.3	84%
2011	1236	997.1	82%
2012	1448	983.3	69%
2013	610	642.3	107%
2014	610	515.4	86%
2015 (est)	610	530	87%
2016 (SSC)	*277 (approx)*		

Witch is harvested not only for its own value, but as an important bycatch component for trawlers targeting monkfish in the Northern Fishery Management Area. When targeting monkfish (which at times can add 20% to the value of a groundfish trip), witch bycatch is largely unavoidable. Of the Sustainable Harvest Sector's (SHS) 350 trawl trips which landed 1,000 pounds or more of monktails in FY14, 99% landed some amount of witch as well (Table 2).

Table 2: Witch Bycatch in the SHS Trawl Directed Monk Fishery, FY14

Trip Median Catch – Monktail:	2,130 pounds
Trip Median Catch – Witch:	600 pounds
Witch Leverage Ratio:	3.5 : 1

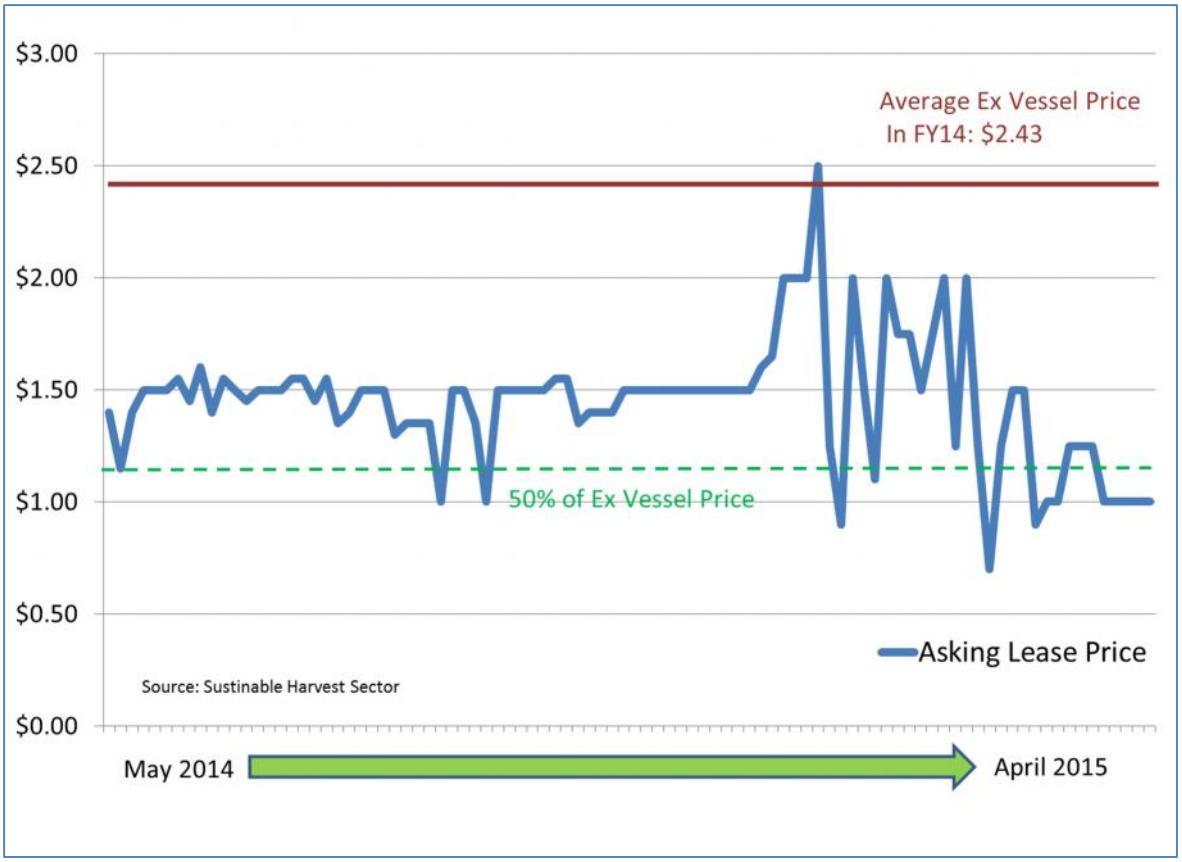
Witch is also of increasing importance to the inshore fleet, whose opportunities to harvest other stocks have diminished under sector management. Our <50 ft vessels are very reliant on plaice, conducting 120 trips last year which caught at least 100 pounds of plaice. Just one of those trips had no witch catch (Table 3).

Table 3: Witch Bycatch in the SHS <50 ft Plaice Fishery, FY14

Trip Median Catch – Plaice:	1,430 pounds
Trip Median Catch – Witch:	450 pounds
Witch Leverage Ratio:	3.2 : 1

Lease demand for ACE is high. Lease prices for witch are among the top five of the seventeen tradeable stocks[1], a function of both the ex-vessel value of the fish and its high utilization. The NMFS estimates witch ACE prices range from 25%-50% of the ex-vessel price[1] from 2010-2013; our recent experience suggests that ratio has increased (Figure 1).

Figure 1: Witch ACE Lease Price Offers in the SHS, FY14



In summary, witch allocation is in high demand, nearly fully utilized, and sought for both its value as a standalone stock, and to leverage the harvest of several million dollars of other stocks annually.

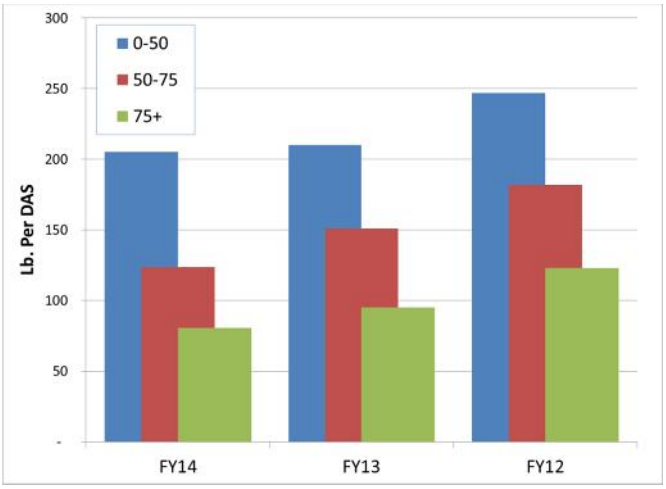
[1] Source: 2013 Final Report on the Performance of the Northeast Multispecies (Groundfish) Fishery, http://www.nefsc.noaa.gov/publications/crd/crd1502/.

SHS Landings

In FY14, 88% of our sector's total trawl trips landed some amount of witch. There were about 1,000 trips; nearly all fished in Broad Stock Areas 1, 2 and 3.

Our small boats are more reliant on the witch resource than larger boats, with the smallest vessel class generally catching twice as much as the largest class, per day fished (Figure 2).

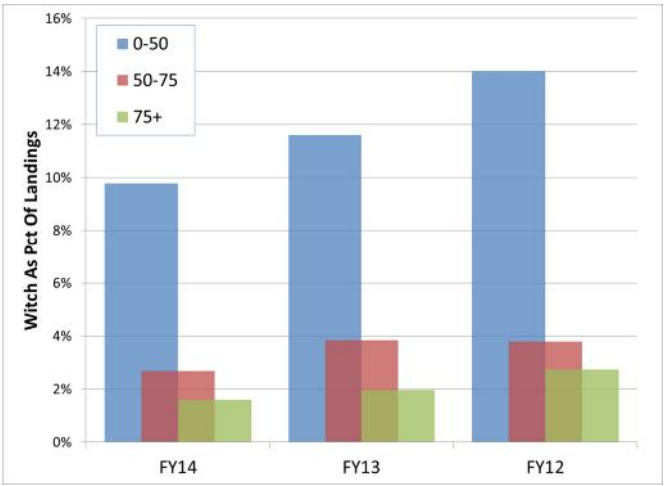
Figure 2: SHS Vessel Witch Catch Per DAS, By Vessel Length



Witch also comprises a greater percent of landings of the smallest vessels, which is logical: they are unable to pursue in commercial quantities several stocks available to their larger brethren (e.g. redfish; the eastern Georges stocks) (Figure 3).

Figure 3: SHS Vessel Witch Landings As Pct of Total Landings, By Vessel Length

[Includes non-groundfish stocks caught on groundfish trips]



As allocations are cut, the small boat fleet is running out of opportunity stocks. The FY14 variability of groundfish landings by vessel size in our sector illustrates the issue. Two of our <50 ft. fleet's top three landed stock ACEs (GOM cod and witch) are or will be set at near-moratorium levels (Figure 4).

Figure 4: SHS <50 ft Trawl Vessel Diversity of Landings, FY14

[Groundfish only]

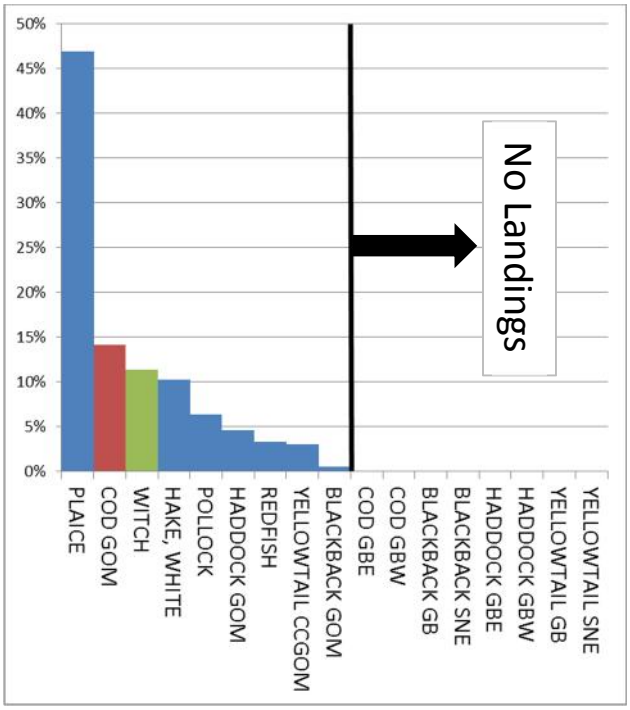


Figure 4 shows FY14's catch composition, which included GOM cod catch under a quota which was four times higher than this year's. This fleet's reliance on plaice and witch has likely increased in FY15.

Distribution

The SHS encounters witch throughout the Gulf of Maine and on Georges Bank, both in and offshore. Over the last four years, observers have monitored 3,400-5,400 of our vessels' tows annually, with similar encounter rates (Table 4).

Table 4: Sustainable Harvest Sector | Observed Trawl Tows | FY10-FY14
Percent Of Tows Where Some Witch Was Encountered

BSA	Stat Area	FY11	FY12	FY13	FY14		Avg Annual Tows
1	464	44%	49%	41%	26%		54
1	465	82%	100%	95%	92%		43
1	511	100%	100%	88%	86%		26
1	512	94%	98%	86%	88%		153
1	513	93%	93%	96%	92%		552
1	514	71%	65%	78%	73%		599
1	515	78%	67%	72%	62%		1,116
2	521	67%	51%	59%	52%		865
3	522	67%	83%	68%	72%		508
3	525	6%	0%	0%	4%		30
3	561	57%	27%	33%	50%		80
3	562	6%	0%	0%	0%		9

As a 'unit' stock, witch is harvested in all four broad stock areas. In Figure 5 below, the statistical areas shaded in grey represent a reasonable facsimile of where most of the catch occurs. The total of those grey areas encompasses 73,000 square miles of fishing grounds (less the 8,300 square miles of the five permanently closed areas) (Figure 5, next page).

In FY15, the commercial fleet is allocated 610 MT (1,345,000 pounds) of witch flounder. This is the equivalent of 18 pounds of allocation per square mile, higher only than Georges Bank yellowtail at 16 pounds per square mile (even Gulf of Maine cod fares better, at 23 pounds per square mile of fishing ground) (Table 5, next page).

Figure 5: Groundfish Catch Stock Attribution

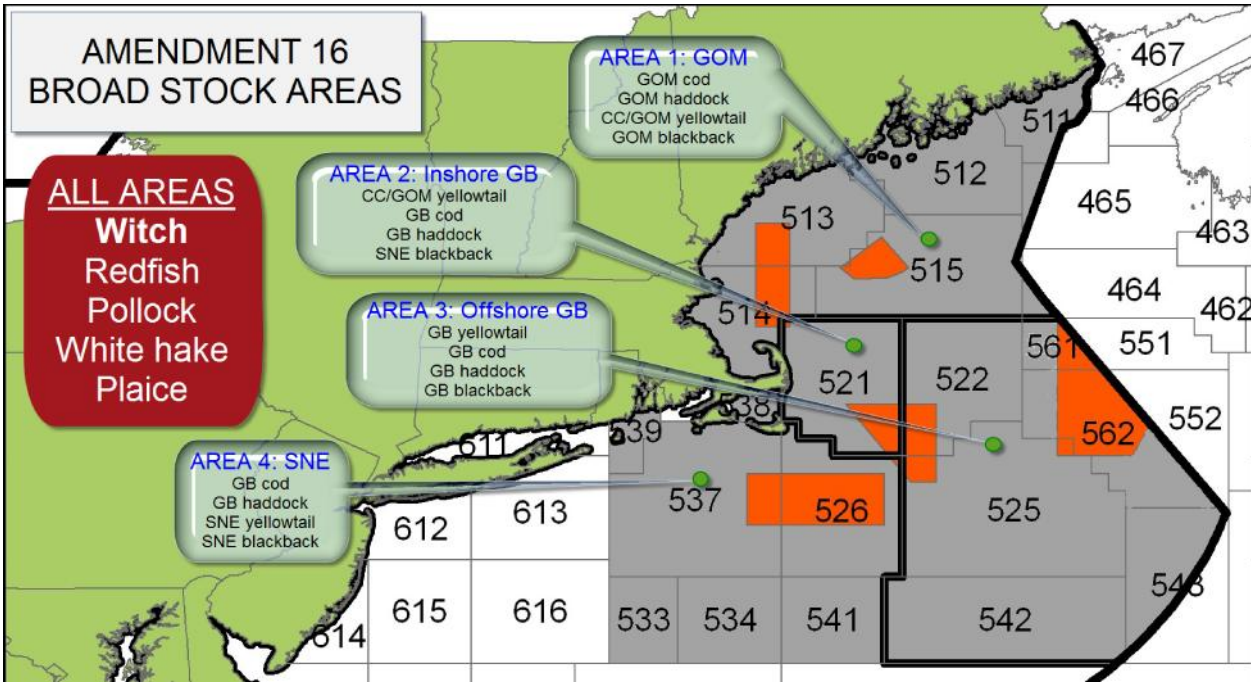
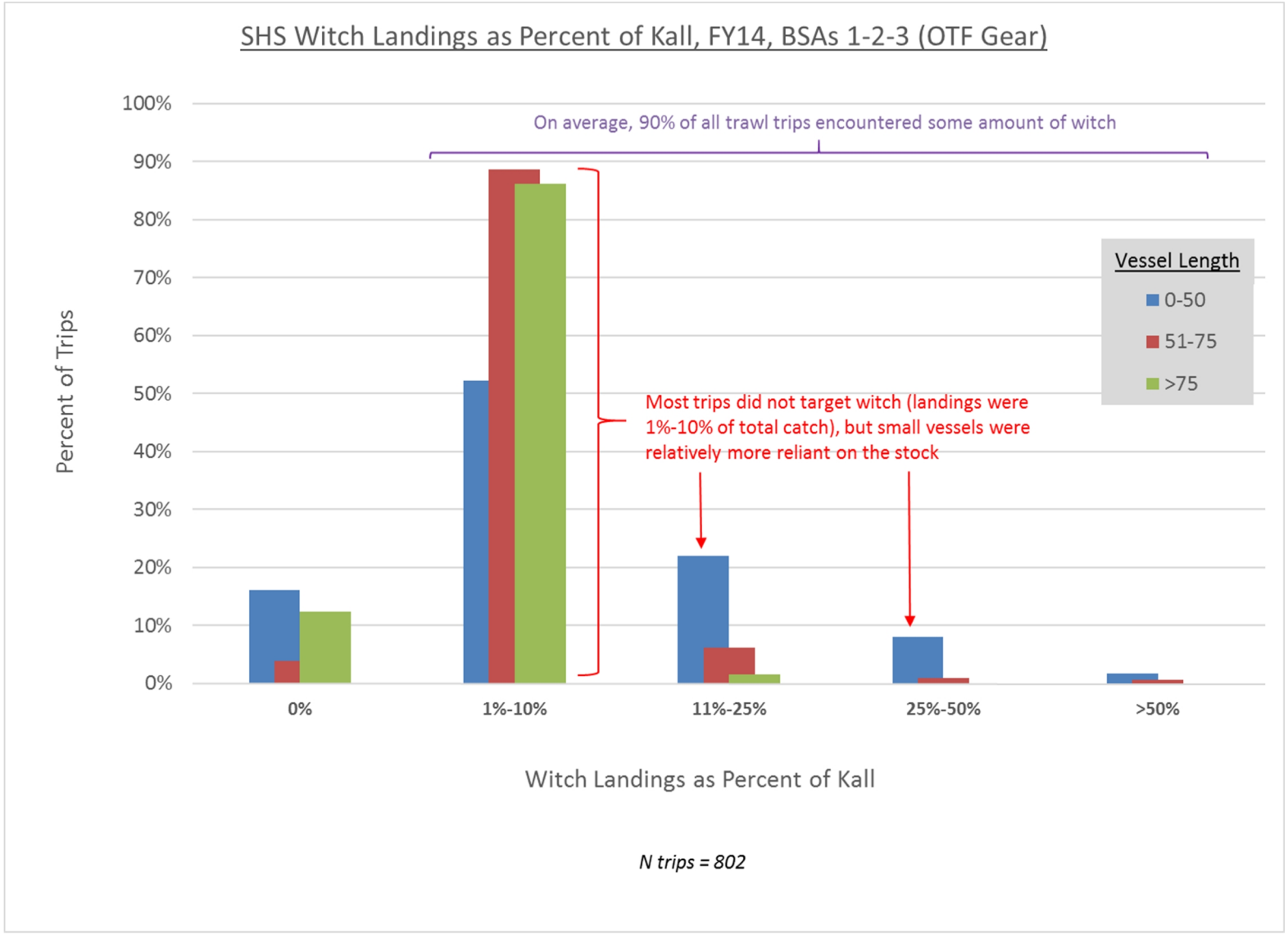


Table 5: FY15 Allocation Availability Per Square Mile of Fishing Grounds

Stock	Available Harvest Area in Square Miles	FY15 Commercial Allocation - MT	FY15 Commercial Allocation - Lb	Allocation Available Per Square Mile
HADDOCK GB	53,100	21,759	47,978,595	**903**
POLLOCK	73,000	13,720	30,252,600	**414**
REDFISH	73,000	11,034	24,329,970	**333**
BLACKBACK GB	27,100	1,891	4,169,655	**154**
HAKE, WHITE	73,000	4,343	9,576,315	**131**
BLACKBACK SNE	26,100	1,306	2,879,730	**110**
HADDOCK GOM	19,900	958	2,112,390	**106**
COD GB	53,100	1,787	3,940,335	**74**
YELLOWTAIL SNE	21,500	557	1,228,185	**57**
BLACKBACK GOM	19,900	392	864,360	**43**
PLAICE	73,000	1,408	3,104,640	**43**
YELLOWTAIL CCGOM	24,500	458	1,009,890	**41**
COD GOM	19,900	207	456,435	**23**
WITCH	73,000	610	1,345,050	**18**
YELLOWTAIL GB	27,100	195	429,975	**16**

An allocation of witch flounder of 277 MT to sectors next year is the equivalent of about 8 pounds of ACE per square mile.

[END]



Witch Landings Per Trip in Pounds		
Length	Median	Mean
0-51	235	318
51-75	410	664
>75	341	524

APPROXIMATING USE OF WITCH FLOUNDER IN THE SUSTAINABLE HARVEST SECTOR FOR <=50 FOOT TRAWL VESSELS, FY2014

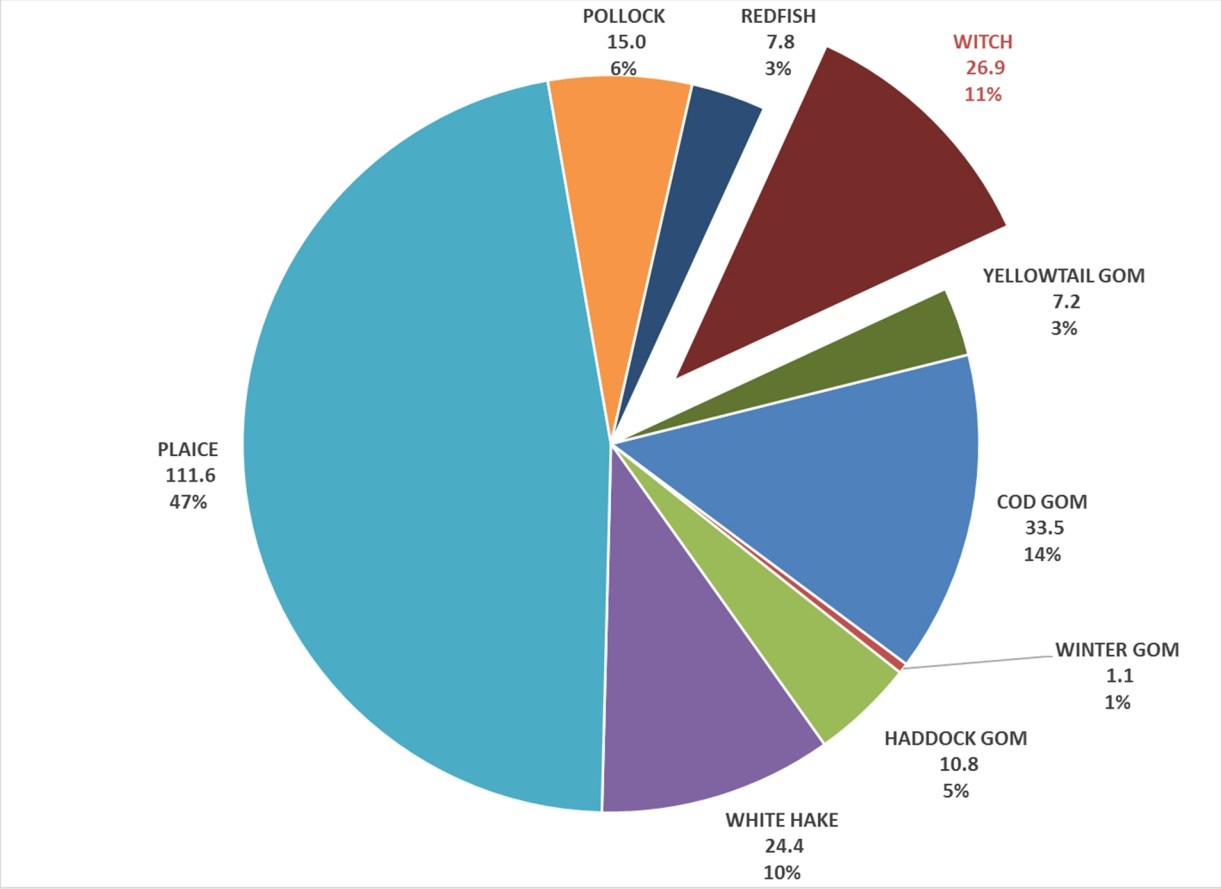
Landings & Value

Earlier we provided the PDT examples of the importance of witch flounder in leveraging harvests of other stocks.[1] Some PDT analysis suggests various changes to FY2016 witch ACLs will have little economic impact (little beyond the singular value of the flounder itself), because the bulk of economic losses will result from a lowered GB cod allocation, i.e. the ACL for the cod stock will limit fishing effort before the ACL of witch flounder.

However, some vessels do not fish in the GB stock area at all, particularly the <=50 foot trawl class in this sector. Thus GB cod allocation is not at all restrictive for them, and reductions in witch flounder ACE will translate to losses beyond the singular value of witch landings.[2]

In FY2014, the SHS's <=50 foot landings composition from trips in the Gulf of Maine (BSA1) was:

Figure 1: FY2014 SHS Groundfish Landings from BSA1, <= 50 ft. Trawl (Tons)



[1] Witch Flounder Utilization in the Sustainable Harvest Sectors, Dec 2015

[2] Voluntary area/gear restrictions implemented by the sector in FY2015 have proven successful at avoiding GOM cod, therefore we don't expect that stock's ACL to limit catch before the witch ACL does next year.

APPROXIMATING USE OF WITCH FLOUNDER IN THE SUSTAINABLE HARVEST SECTOR FOR <=50 FOOT TRAWL VESSELS, FY2014

Recasting this landing data, for every one ton of witch flounder, this fleet also landed:

Table 1: FY2014 SHS Groundfish Landings from BSA1, <= 50 ft. Trawl, Catch Per Ton of Witch (Tons)

Stock	Tons	Pct
COD GOM	1.25	14%
HADDOCK GOM	0.40	5%
PLAICE	4.15	47%
POLLOCK	0.56	6%
REDFISH	0.29	3%
WHITE HAKE	0.91	10%
WINTER GOM	0.04	<1%
WITCH	*1.00*	*11%*
YELLOWTAIL GOM	0.27	3%
SUM	**8.87**	**100%**

As a rough guide we use calendar year 2014's average annual groundfish prices to estimate the value of each stock in this landings portfolio. Prices below for are for fish landed in the state of Maine, which is where the majority of this fish was in fact landed[3]. Witch flounder averaged $2.58 per pound ($5,699 per ton). Thus for each ton of witch landed, this fleet also landed:

Table 2: FY2014 SHS Groundfish Value from BSA1, <= 50 ft. Trawl, Catch Per Ton of Witch ($$)

Stock	Tons Landed	Avg Price/Lb.	Convert to Avg Price/Ton	Extend
COD GOM	1.25	$2.19	$4,825	$6,026
HADDOCK GOM	0.40	$1.37	$3,010	$1,205
PLAICE	4.15	$1.79	$3,949	$16,405
POLLOCK	0.56	$1.24	$2,737	$1,528
REDFISH	0.29	$0.62	$1,369	$397
WHITE HAKE	0.91	$1.51	$3,336	$3,026
WINTER GOM	0.04	$1.96	$4,322	$173
WITCH	*1.00*	*$2.58*	*$5,699*	*$5,699*
YELLOWTAIL GOM	0.27	$1.03	$2,276	$608
SUM	**8.87**			**$35,068**

In summary, in FY2014 for each (roughly) $5,699 of witch flounder landings, this fleet leveraged an additional $29,369 ($35,068 - $5,699) in other stocks. Witch flounder accounted for about 10 percent of landed weight, and 15% of total trip value.

[3] http://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/annual-landings/index; time does not permit for better evaluation. Winter and yellowtail flounder prices not shown for Maine so Massachusetts prices were used instead.

APPROXIMATING USE OF WITCH FLOUNDER IN THE SUSTAINABLE HARVEST SECTOR FOR <=50 FOOT TRAWL VESSELS, FY2014

Extrapolation of Witch ACL Reductions

FY2014's sector sub-ACL for witch was 610 tons, and the PDT recently advanced possible FY2016 ACLs of about 460, 380, and 320 tons. These represent percentage reductions of about 31%, 41%, and 50% respectively.

In FY2014, this fleet landed 26.9 tons of witch flounder (see Figure 1). Each ton of witch landings generated $35,068 in total revenue from all groundfish stocks (see Table 2). Changing no other variables, we can calculate a simple corresponding reduction in total landed value at the various witch sub-ACLs.

Table 2: FY2014 SHS Groundfish Value from BSA1, <= 50 ft. Trawl, $$ Losses at Various ACLs

SubACL	Pct Reduction	Witch Landings (t)	Total Revenue	Loss
610	n/a	26.9	$943,331.37	n/a
418	31%	18.4	$646,414	($296,917)
361	41%	15.9	$558,267	($385,065)
304	50%	13.4	$470,119	($473,212)

This simple discussion does not account for avoidance measures this fleet may take to reduce financial losses. The loss figures in Figure 2 are likely overstated. However, Figure 2 also does not include the value of monkfish – an important catch component in the Gulf of Maine trawl fishery. This fleet landed about 190,000 pounds of monkfish (live weight) in FY2014, likely worth at least $175,000.

In summary, because this fleet is not restricted by GB cod allocation, its losses from reduced witch allocation must, all other things being equal, be significantly higher than the singular stock value that the PDT quota utilization model suggested.