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Economic Impacts of the Potential Harbor Porpoise Consequence Closure

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Introduction

The coastal Gulf of Maine consequence closure will close significant portion of the ocean to gillnet fishing during the months of October and November. The areas targeted to be closed include: the entire Mid-Coast, Massachusetts Bay, and Stellwagen Bank management areas. Due to the close proximity of these areas to shore, the vessels that will be impacted the most by this closure are the smaller, in shore day boats that derive much of their annual income from fishing in these areas during this time of the year.

In addition, since most sectors are organized in large part by the type of gear predominantly employed, this closure will also result in significant economic loss to certain sectors and to the fishing communities that support them. The sectors and geographic regions that will be most impacted by this closure are XI and XII Northeast Fishery Sectors (NEFS 11 and 12) located in New Hampshire, III Northeast Fishery Sector (NEFS 3) located in Gloucester, and X Northeast Fishery Sector (NEFS 10) located in and around Boston and the South Shore Massachusetts.

This analysis will show that the total economic loss associated with these closures to the entire region is approximately ten million dollars. This includes the direct loss in revenue to the individual fishing vessels, the indirect loss in revenue to the shore side supporting businesses, and the induced economic loss to the surrounding regions. In addition, the direct loss in revenue to each sector is shown to be 25% direct loss in total revenue to the New Hampshire Sector, a 28% direct loss in total revenue to the Gloucester Sector, and a 16% direct loss in total revenue to the South Shore Sector from loss in landings.

Because this closure is set to be an annual occurrence, these losses will be permanent for both sectors and fishermen. This loss cannot be perpetually accounted for; especially given all of the additional regulatory costs set to incur next year and into the future. The immediate result will be an exponential increase in the rate of fleet consolidation away from the smaller day boat fixed gear fishermen and away from the smaller traditional fishing communities and towns. As evidence of this, the results show a total loss of employment to the entire region as a result of this closure to be close to 100 full and part time jobs –either as fishermen or as workers in fishing related businesses.

Data and Methods

Data about aggregate landings in the months of October and November by the fishermen affected from each of the Gulf of Maine management regions was provided by Sector Managers of the affected Sectors as well as by the Northeast Sector Services Network (NESSN).

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Specifically, this data came from Sector Manager’s reconciled year end reports and via download of dealer data on SIMM (Sector Information Management Module). Data on dockside prices for species caught during this time frame (October and November) was attained via the Cape Ann Seafood Exchange in Gloucester. The prices paid per species caught are differentiated specific to gill net fishermen, so they are the most accurate and representative estimates of revenue from gill net landings available.

Each sector provided information about the total landings during the months of October and November from all sector vessels that would be affected by the closure. These landings were differentiated by species and market grade, but the total revenue loss was ultimately calculated by summing species catch by market grade and then multiplying each species total landed weight by the average market price (averaged across all market grades). The direct loss in revenue calculated for each sector as a result of no fishing in October and November was then shown as a percentage of total revenue for the Sector, and was subsequently used in an economic impact analysis to show multiplier effects specific to each region’s economy.

Results

TABLE 1. Direct Loss of Revenue to New Hampshire Vessels

SPECIES	Average Landings Oct/Nov FY 2010-2012	Average Prices Oct/Nov FY 2011	Revenue Loss as a Result of Consequence Closure
GOM Cod	210863	\$2.11	\$444,920.93
Monkfish	4902	\$4.33	\$21,225.66
Cusk	153	\$1.14	\$174.42
Dab	246	\$1.50	\$369.00
Gom Winter	1426	\$1.92	\$2,737.92
Gray Sole	466	\$3.64	\$1,696.24
GOM Yellow Tail	166	\$1.19	\$197.54
GOM Haddock	2396	\$2.36	\$5,654.56
White Hake	37151	\$1.27	\$47,181.77
Halibut	107	\$8.90	\$952.30
Pollock	540321	\$0.83	\$450,087.39
Redfish	1162	\$0.86	\$999.32
Skates	102	\$0.66	\$67.32
TOTAL REVENUE LOSS			\$976,264.37
TOTAL REVENUE NEFS 11 AND 12 (AV. 2010-2012) (ALL VESSELS GILLNET AND TRAWL)			\$3,850,236

Table 1 shows the list of species caught during October and November by the NH affected vessels. The landings shown are the average of landings over the last two years during the months of October and November. These average landings were then multiplied by the prices specific to gill net fishermen during the months of October and November; and the revenue

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loss for each species was then summed to arrive at a total revenue loss for the entire sector as a result of the potential consequence closure.

As the results show, total revenue loss for NH vessels as a result of the consequence closure is estimated at \$976,264—which is generated by nine NH vessels, and represents a significant amount of their yearly income from fishing. In total, the revenue loss from the consequence closure is approximately 25% of the total yearly revenue for the sector.

Table 2. Direct Loss of Revenue to Boston Region Vessels

Species	Landings Oct/Nov (Average 2010- 2012)	Average Prices (all mkt grades) Oct/Nov FY 2011	Average Revenue Loss as a Result of Consequence Closure
GOM Cod	19130	\$2.11	\$40,364.30
Monkfish tails	30577	\$4.33	\$132,398.41
Cusk	833	\$1.14	\$949.62
Dab	6	\$1.50	\$9.00
Gom Winter	1503	\$1.92	\$2,885.76
Gray Sole	28	\$3.64	\$101.92
Gom Yellow Tail	97	\$1.19	\$115.43
Gom Haddock	4633	\$2.36	\$10,933.88
White Hake	12826	\$1.27	\$16,289.02
Halibut	53	\$8.90	\$471.70
Pollock	57045	\$0.83	\$47,518.49
Redfish	2351	\$0.86	\$2,021.86
Skates	91163	\$0.66	\$60,167.58
Bluefish	1650	\$0.86	\$1,419.00
Hake Silver	137	\$1.06	\$145.22
TOTAL REVENUE LOSS (Average 2010-2012)			\$315,791.19
TOTAL REVENUE NEFS 10 (Approx Av. 2010-2012) (ALL VESSELS)			\$1,934,861

Table 2 shows the direct loss in revenue to the Boston region vessels as a result of the potential consequence closure in October and November. Landings were averaged over the last two years, and the loss in species revenue was summed to arrive at the total revenue loss to seven Boston region vessels of \$315,791. This represents 16% of the total yearly revenue for NEFS 10.

Table 3. Direct Loss of Revenue to Gloucester Vessels

Species	Landings Oct/Nov FY 2011	Average Prices (all mkt grades) Oct/Nov FY 2011	Revenue Loss as a Result of Consequence Closure
GOM Cod	478448	\$2.11	\$1,009,525.28
Monkfish tails	18207	\$4.33	\$78,836.31
Cusk	203	\$1.14	\$231.42
Dab	251	\$1.50	\$376.50
Gom Winter	8813	\$1.92	\$16,920.96
Gray Sole	659	\$3.64	\$2,398.76
Yellow Tail	770	\$1.19	\$916.30
Gom Haddock	6348	\$2.36	\$14,981.28
White Hake	22257	\$1.27	\$28,266.39
Halibut	29	\$8.90	\$258.10
Pollock	207940	\$0.83	\$173,214.02
Redfish	451	\$0.86	\$387.86
Skates	29494	\$0.66	\$19,466.04
Bluefish	17699	\$0.86	\$15,221.14
Hake Silver	5834	\$1.06	\$6,184.04
TOTAL REVENUE LOSS			\$1,367,184.40
TOTAL REVENUE NEFS 3 (ALL VESSELS)			\$4,799,736

Table 3 shows the total revenue loss from twenty Gloucester vessels that would be affected by the consequence closure in October and November to be \$1,367,184. This represents approximately 28% of the total yearly revenue for the Gloucester gill net sector (NEFS 3).

The loss in direct revenue to all three sectors combined is estimated at \$2,659,239. In total, this revenue loss is the result of lost fishing opportunities for 35 vessels across the three affected sectors. Another way to look at this direct impact is to consider that this total represents an average revenue loss to each vessel of approximately \$76,000—annually. This is a tremendous fine to these small day boats; and because October and November are considered the money-making months for most of these vessels, the revenue generated from these two months equates to a large portion of their yearly income from fishing.

It is important to note that these lost landings cannot be replaced by fishing in different areas, different times of the year, or by increasing fishing effort in the remaining open months. The size of the consequence closure prevents the small day boats from steaming to fishing grounds outside of the closure; the seasonal movement of fish and the bad weather in the winter

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months prevents fishermen from switching times of the year to capture these fish; and in times of the year that remain open, fishermen are already maximizing their fishing effort to take advantage of the flexibility afforded to them under sector management. Employing more effort than what they currently employ will result in diminishing marginal returns to the vessel.

In addition to the impact that this closure will have on the small day boat fishing fleet, it will have an equally detrimental impact to the traditional fishing communities that support the vessels and depend on the landings from these boats for the viability of their businesses. Not only will these supporting businesses also be impacted, but the local consumer will have dramatically less access to locally caught fresh seafood. The following analysis shows how this consequence closure, if implemented in the months of October and November, would further impact the communities and fishing related businesses in these communities.

Economic Impact Analysis

The National Environmental Policy Act (NEPA), Executive Order 12866, and National Standard 8 of the Sustainable Fisheries Act require federal regulators to consider the impacts on businesses that are directly and indirectly affected by proposed management actions. One way to examine direct and indirect affects is to use input-output models of the economy to track how a change in revenue to one business trickles through the rest of the economy.

Researchers at the National Marine Fisheries Service (NMFS) have developed a multiregional, fishery specific input-output model based on IMPLAN Pro structural equations. The NMFS model is known as the Northeast Regional Input-Output Model (NERIOM) (Steinback and Thunberg 2006). This model is important because it shows how the impacts of fishery management actions in the northeast affect both the vessel from a direct economic loss, but also the local economies that depend on the fishing activity of the vessel.

The NMFS model is constructed at the regional level, but it has been designed so that the multiplier effects can be determined for 12 specific sub-regions within the Northeast. Among these sub-regions are the New Hampshire seacoast region, the Gloucester (Massachusetts) region, and the Boston Region. These three regions encompass almost all of the ex-vessel landings by vessels directly affected by this consequence closure.

Steinback and Thunberg (2006) present multiplier effects for the 12 sub-regions in the northeast from a hypothetical reduction in ex-vessel revenues. They show economic impact multipliers for the most important commercial fishing related sectors of the economy. These multipliers were used in this analysis to show how a reduction in ex-vessel landings impacts both fishermen and their respective regional economies.

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Two different types of economic impact multipliers are generally shown: sales multiplier and employment multipliers. The sales multiplier shows how a direct loss in revenue to a fishing vessel indirectly impacts the fishing related businesses. Employment multipliers first show the direct employment loss to fishermen as a result of a direct revenue loss to the vessel, and then show the indirect loss of employment to workers who work in fishing related businesses. Table 4 shows how a loss in revenue to the New Hampshire vessels impacts the entire NH Seacoast local economy.

TABLE 4. Sales Impacts of Loss in NH Ground Fish Revenue

NH Commercial Ground Fishing Loss (Direct Economic Loss to NH Vessels from Consequence Closure)	-\$976,264
Agriculture	-\$2,519
Mining	-\$2
Transportation, Communication, and Public Utilities	-\$29,684
Water Transportation	-\$2,218
Warehousing and Storage	-\$3,958
Construction	-\$5,947
Manufacturing	-\$34,205
Seafood Processing	\$1,381,888
Ice	-\$1,876
Boat Building	-\$379
Paperboard Containers	-\$414
Trade	-\$38,771
Seafood Dealers	-\$507,913
Fish Exchange/Auctions	\$0
Wholesale Trade	-\$61,263
Finance, Insurance and Real Estate	-\$37,801
Services	-\$120,592
Government	-\$23,891
TOTAL (Direct and Indirect) Economic Loss to NH Local Economy	(\$3,229,578)

It can be seen that a one dollar loss in ground fish revenue results in a 3.3 dollar multiplier effect to the entire Seacoast region. A loss in fishing revenue to ground fish vessels significantly impacts the fishing related businesses that operate in these areas above and beyond the direct impact to local fishermen.

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Table 5 first shows the direct loss in employment to New Hampshire fishermen (captain and crew) from a direct revenue loss of \$976,264 to New Hampshire vessels, and then shows how this employment loss multiplies through the local economy¹.

TABLE 5. Employment Impacts from Loss in NH Ground Fish Revenue

NH Commercial Ground Fishing Loss	-16
(Direct Employment Loss to NH Vessels from Consequence Closure)	
Agriculture	0
Mining	0
Transportation, Communication, and Public Utilities	0
Water Transportation	0
Warehousing and Storage	0
Construction	0
Manufacturing	0
Seafood Processing	-8
Ice	0
Boat Building	0
Paperboard Containers	0
Trade	0
Seafood Dealers	-2
Fish Exchange/Auctions	0
Wholesale Trade	0
Finance, Insurance and Real Estate	0
Services	-2
Government	0
TOTAL (Direct and Indirect) Employment Loss to NH Local Economy	-28

The results of Table 5 show that a direct loss of employment to New Hampshire commercial fishermen results in a 1.75 employment multiplier to the regional economy. Given the nature and skills required for fishing related jobs, fishermen are not easily retrained to take jobs in other sectors of the economy. Therefore, the duration of employment loss to commercial fishermen is often greater than when losses occur in other sectors of the economy.

¹ The ratio of direct employment loss to direct loss in revenue is derived from estimates presented in Steinback and Thunberg (2006).

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Because the economies of different geographic regions in the northeast are more or less dependent on commercial fishing, differences in the magnitude of multiplier effects are likely. Therefore, it is necessary to show separate models for each of the three impacted regions. Table 6 shows the sales multiplier to the Boston region. This includes vessels that tie up in Scituate and other places on the South Shore.

TABLE 6. Sales Impacts to Boston Region from Loss in Ground Fish Revenue

Boston Region Commercial Ground Fishing Loss		\$315,791
(Direct Employment Loss to Boston Region Vessels from Consequence Closure)		
Agriculture		-\$1,047
Mining		-\$377
Transportation, Communication, and Public Utilities		-\$56,566
	Water Transportation	-\$13,066
	Warehousing and Storage	-\$3,831
Construction		-\$9,862
Manufacturing		-\$32,945
	Seafood Processing	-\$629,707
	Ice	-\$3,968
	Boat Building	-\$820
	Paperboard Containers	-\$707
Trade		-\$38,369
	Seafood Dealers	-\$114,718
	Fish Exchange/Auctions	-\$5,366
	Wholesale Trade	-\$100,379
Finance, Insurance and Real Estate		-\$105,604
Services		-\$241,989
Government		-\$39,152
		-
TOTAL (Direct and Indirect) Employment Loss to Local Economy		\$1,082,682

The sales multiplier effect for the Boston Region is shown to be 3.41. Again, this means that for every one dollar in ex-vessel landings lost, an additional three dollars and forty one cents in lost to the local economy.

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Because the Boston area is so densely populated with different types of businesses offering multiple employment opportunities, including fishing related businesses, the multiplier effects to the regional economy are shown to be very high for employment due to the large number of businesses that would be affected. Table 7 shows the employment multiplier effect.

TABLE 7. Employment Impacts to Boston Region from Loss in Ground Fish Revenue

Boston Region Commercial Ground Fishing Loss	-5
(Direct Employment Loss to Boston Region Vessels from Consequence Closure)	
Agriculture	0
Mining	0
Transportation, Communication, and Public Utilities	-1
Water Transportation	0
Warehousing and Storage	0
Construction	0
Manufacturing	0
Seafood Processing	-2
Ice	0
Boat Building	0
Paperboard Containers	0
Trade	-1
Seafood Dealers	-1
Fish Exchange/Auctions	0
Wholesale Trade	-1
Finance, Insurance and Real Estate	1
Services	-2
Government	0
TOTAL (Direct and Indirect) Employment Loss to Local Economy	-14

The employment multiplier to the Boston region is 2.8. Relative to the other regions, this multiplier is high. The direct loss of five jobs to commercial fishermen fishing in the Boston and south shore regions, results in an additional nine jobs lost to employees in other fishing related businesses from an initial loss of \$315,791 dollars in revenue to ground fish vessels.

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The following table, Table 8, shows the sales multiplier from a direct loss in ground fish revenue to the Gloucester (North Shore Region).

TABLE 8. Sales Impacts to Gloucester Region from Loss in Ground Fish Revenue

Gloucester Commercial Ground Fishing Loss		-\$1,367,184
(Direct Economic Loss to Gloucester Vessels from Consequence Closure)		
Agriculture		-\$1,805
Mining		-\$353
Transportation, Communication, and Public Utilities		-\$27,368
	Water Transportation	-\$1,184
	Warehousing and Storage	-\$1,952
Construction		-\$6,196
Manufacturing		-\$43,028
	Seafood Processing	-\$4,056,267
	Ice	-\$883
	Boat Building	-\$175
	Paperboard Containers	-\$1,348
Trade		-\$34,860
	Seafood Dealers	-\$104,190
	Fish Exchange/Auctions	-\$97,319
	Wholesale Trade	-\$56,703
Finance, Insurance and Real Estate		-\$31,125
Services		-\$133,303
Government		-\$30,715
		-
TOTAL (Direct and Indirect) Economic Loss to Local Economy		(\$5,995,959)

Table 8 shows that a direct loss of 1.3 million dollars to the Gloucester gill net fleet results in an approximate 6 million dollar loss to the local economy. This represents a 4.39 sales multiplier effect. This high multiplier shows that the Gloucester local economy is heavily dependent on revenue from ground fish landings.

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Table 9 shows the direct loss in employment to Gloucester fishermen (captain and crew) from a direct revenue loss of \$1,367,184 to Gloucester vessels, and then shows how this employment loss multiplies through the local economy.

TABLE 9. Employment Impacts from Loss in Gloucester Ground Fish Revenue

Gloucester Commercial Ground Fishing Loss	-22
(Direct Employment Loss to Gloucester Vessels from Consequence Closure)	
Agriculture	0
Mining	0
Transportation, Communication, and Public Utilities	0
Water Transportation	0
Warehousing and Storage	0
Construction	0
Manufacturing	0
Seafood Processing	-19
Ice	0
Boat Building	0
Paperboard Containers	0
Trade	0
Seafood Dealers	-3
Fish Exchange/Auctions	0
Wholesale Trade	0
Finance, Insurance and Real Estate	0
Services	3
Government	0
TOTAL (Direct and Indirect) Employment Loss to Local Economy	-47

Table 9 shows an employment multiplier to the Gloucester (north shore) region of 2.13. The total direct and indirect loss of employment to the entire region is approximately 47 jobs. Given the status of low employment opportunities in the commercial fishing industry to start with, this is a significant loss to an already struggling industry and fishing region.

The main point of this analysis is to show that the consequence to the consequence closure is not just a tremendous direct loss in revenue to smaller, day boat fishermen attempting to make a living fishing inshore Gulf of Maine waters--but also to the historic and culturally significant fishing communities that support and celebrate their livelihoods.

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