

SOCIAL IMPACTS**CHAPTER 7**

As a complement to the economic analysis, the social impact assessment (SIA) examines the social and cultural consequences of the Atlantic Large Whale Take Reduction Plan (ALWTRP) measures under consideration. The discussion below is organized according to the following topics:

- Section 7.1 discusses the requirements that necessitate an SIA;
- Section 7.2 describes the general methodology used to assess social impacts for the ALWTRP alternatives;
- Section 7.3 provides a detailed socioeconomic characterization of the communities most affected by the ALWTRP measures;
- Section 7.4 examines the potential socioeconomic impacts of the alternatives, highlighting the most heavily affected classes of commercial fishing vessels;
- Section 7.5 identifies other social impacts of the alternatives, including effects on fishermen's quality of life and the benefits of marine mammal protection for the general public; and
- Section 7.6 provides a summary of the social impacts, including a detailed comparison of the regulatory alternatives.

7.1 BACKGROUND

NEPA is the primary legal authority necessitating development of an SIA for Federal management actions, including those of the ALWTRP under the authority of the MMPA. According to Section 40 CFR 1508.14, “[if] economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all these effects on the human environment.” In addition, Executive Order 12898 requires that Federal agencies achieve environmental justice by addressing “disproportionately high and adverse human health and environmental effects on minority and low income populations.”

7.2 METHODOLOGY

NOAA guidance recommends that the SIA take the form of a social factor analysis organized around a matrix of indicators comparing each regulatory alternative (NOAA, 2001). The guidance suggests that the matrix consist of a set of indicators that address five categories of social factors, including:

- The size and demographic characteristics of the fishery-related work force residing in the area;
- The attitudes, beliefs, and values of fishermen, fishery-related workers, and other stakeholders;
- The social structure and organization of the affected community, including effects on the ability of jurisdictions to provide support and services to families and communities;
- Life-style, health, and safety impacts, as well as non-consumptive and recreational uses of marine resources; and
- The historical dependence on and participation in the fishery, reflected in structural changes in fishing practices, income distribution, and rights.

The guidance further recommends that changes in the chosen social variables be considered relative to baseline conditions in these variables, allowing an assessment of the impact of the policy measure in question.

This EIS implements an SIA approach consistent with this guidance. The analysis involves three basic steps:

- The analysis uses county-level data on affected fishing vessels to identify the communities at greatest risk of experiencing adverse social impacts stemming from promulgation of commercial fishing regulations under the ALWTRP.
- Second, the analysis uses county-level socioeconomic data to characterize key features of the at-risk communities, examining economic, demographic, and social features that may influence the impact of the regulations on the region.
- Finally, based on the results of the economic impact assessment, the analysis characterizes the changes in fishing practices and fishing activity that could potentially occur under each of the regulatory alternatives. This includes a review of typical vessel compliance costs as well as consideration of the associated socioeconomic impacts, focusing on employment levels in the harvest, dealer, and processing sectors.

To supplement this analysis, the SIA also considers various other social impacts – both negative and positive – that may result from the ALWTRP modifications. Due to time and resource constraints, the analysis is primarily built on readily available data from NMFS’ dealer, processor, and vessel trip report (VTR) databases, as well as demographic and socioeconomic data from the U.S. Census. Existing socioeconomic studies of Atlantic-coast ports provide additional information on community and lifestyle factors in affected regions.

7.3 AT-RISK COMMUNITIES

7.3.1 Identification of At-Risk Communities

To identify the communities at greatest risk of experiencing adverse social impacts as a result of modifications to the ALWTRP, this analysis is focused at the county level. National Standard 8 of the Magnuson-Stevens Act requires that NMFS consider impacts on fishing communities, but does not define “community” spatially. Clearly, fishing communities extend beyond the boundaries of a particular port or city. Fish can be landed in one town and processed in a neighboring town. Likewise, a fisherman can land catch in one town, live in a neighboring town, and register his vessel in yet another location. While a county’s political boundaries do not limit this network of social interactions and economic resource flows, the use of counties as an analytic focus offers several advantages. First, the geographic range of the county is a useful spatial mid-point between individual towns/ports and large regions; this is especially important given that the ALWTRP regulations apply to such an extensive geographic range (essentially the entire east coast of the U.S.). In addition, many of the data used to characterize communities are most readily available at the county level.

To identify regions most likely to realize socioeconomic impacts of potential concern, the analysis focuses on counties with large numbers of vessels that would be subject to the requirements of the regulatory alternatives under consideration. Specifically, the analysis first estimates the number of active vessels in each county that would need to comply with ALWTRP requirements.¹ The estimated number of fishing vessels per county is largely based on the same data and methods discussed for the economic impact analysis, with two key exceptions. First, the total number of lobster vessels per county is based on trap tag data rather than VTR data.² The trap tag data provide more complete location and vessel size information than VTR data. Second, available data on OTP and gillnet vessels that hold only state permits do not always

¹ As discussed further below, most of the communities at greatest risk of experiencing adverse social impacts are located in the Northeast. The requirements that would be imposed on vessels from this region under Alternatives 2, 3, 4, and 6 are essentially identical, while the requirements that would be imposed under Alternative 5 would affect only a small number of vessels. For purposes of this analysis, therefore, the presentation initially focuses on Alternative 2 and the number of vessels that would be affected under that alternative. The summary at the end of the chapter provides a comparison of the regulatory alternatives.

² Under Amendment 3 of the American Lobster FMP, lobstermen operating under state or Federal permits are required to tag all lobster traps. Tags for all traps must be purchased annually. NMFS and state marine resource agencies maintain data on the number of trap tags purchased for each federally permitted vessel and state licensed individual. Active lobster vessels are defined as any that purchased more than 100 trap tags in 2002. The trap tag data indicate each vessel owner’s county of residence.

identify the owner's home county or the county of the vessel's home port. These data were obtained from state agencies for vessels from Massachusetts and North Carolina, states with significant concentrations of OTP and gillnet vessels. For the remaining states, vessels that hold only state permits were distributed to counties based on the geographic distribution of federally-permitted vessels.

The analysis defines at-risk counties as those which:

1. Have over 100 active vessels that must comply with ALWTRP requirements; and
2. Report annual landings of greater than two million pounds by vessels using ALWTRP regulated gear.

These criteria ensure that the at-risk counties include those where a large number of potentially affected vessels are based and where landings from these vessels play an important role in the local economy.

Based on these criteria, Exhibit 7-1 lists the at-risk counties. The list is heavily weighted toward the Northeast, particularly those areas where lobstering is prevalent.

Exhibit 7-1		
KEY COMMUNITIES AFFECTED BY ALWTRP MODIFICATIONS		
At-Risk County¹	State	Major Ports²
Washington	ME	Beals Island and Jonesport, Cutler, Eastport, Lubec
Hancock	ME	Stonington/Deer Isle
Knox	ME	Rockland, Vinalhaven
Lincoln	ME	South Bristol, Boothbay Harbor
Cumberland	ME	Portland, Harpswell
York	ME	Kennebunkport/Cape Porpoise
Rockingham	NH	Hampton/Seabrook, Portsmouth, Isles of Shoals
Essex	MA	Gloucester, Rockport, Marblehead
Plymouth	MA	Plymouth, Scituate
Barnstable	MA	Sandwich, Hyannis, Chatham, Provincetown
Bristol	MA	New Bedford, Fairhaven, Westport
Washington	RI	Point Judith/Galilee
Newport	RI	Jamestown, Newport, Tiverton, Sakonnet Point
Suffolk	NY	Hampton Bays, Montauk, Greenport
Ocean	NJ	Point Pleasant, Long Beach/Barnegat Light
Notes:		
¹ For this analysis, at-risk counties are defined as those with over 100 active vessels that must comply with ALWTRP requirements and which report annual landings of greater than two million pounds by vessels using gear potentially subject to regulation under the ALWTRP. This list is heavily weighted toward the Northeast, particularly several coastal counties in Maine where lobstering is prevalent.		
² Major ports based on Hall-Arber et al. (2001) and McCay and Cieri (2000).		

7.3.2 Socioeconomic Characterization of At-Risk Communities

Having identified at-risk counties, the socioeconomic characterization further describes the likelihood of adverse socioeconomic impacts as a result of costs imposed by ALWTRP requirements. The overall objective is to examine the significance of the fishing industry in key counties and consider baseline factors that may affect communities' ability to absorb the economic costs imposed by the regulations. Appendix 7-A describes the parameters in the SIA county data base as well as the source of the data or methods used to derive key parameters.

Exhibit 7-2 presents socioeconomic data for each at-risk county. Key findings include the following:

- The potential for adverse socioeconomic impacts seems to be greatest in Maine communities where lobstering is a prominent component of the regional economy. The importance of lobstering is reflected in the fact that landings with gear subject to ALWTRP requirements make up a large portion (more than 50 percent) of overall commercial fishing landings in these counties. Although the dealer and processing sectors are small to medium in size, they are frequently part of small communities and play an important role in regional economies in the state.
- Of all Maine counties, Hancock and Knox appear to have the greatest potential to experience adverse impacts from the ALWTRP, based on the counties' demographic and economic characteristics. These counties serve as the home port to a large number of lobster trap/pot vessels, report significant lobster landings (by both weight and value), and – particularly in the case of Hancock County – are home to significant dealer and processor sectors. At the same time, they are rural and have limited economic diversification.
- Washington County (Maine) also has characteristics that may make it more vulnerable to adverse socioeconomic impacts. As shown, in combination with a large lobster fishing sector, the county has a higher unemployment and poverty rate and a lower median income than any of the other counties. Like Hancock and Knox Counties, Washington County is rural and relatively dependent upon commercial fishing.
- Several counties report significant harvests with gear subject to ALWTRP requirements, but this activity does not constitute the majority of their commercial fishing activity. Specifically, less than 50 percent of ex-vessel revenues in Bristol (MA), Barnstable (MA), Washington (RI), Newport (RI), Suffolk (NY), and Ocean (NJ) Counties are accounted for by landings with gear subject to ALWTRP requirements.

Exhibit 7-2

SOCIOECONOMIC PROFILE OF AT-RISK COUNTIES

	Characteristic/Parameter	Hancock, ME	Cumberland, ME	Knox, ME	Washington, ME	Lincoln, ME
Ports	Key ports in county	Stonington/Deer Isle	Portland, Harpswell	Rockland, Vinalhaven	Beals Island and Jonesport, Cutler, Eastport, Lubec	South Bristol, Boothbay Harbor
Harvest Sector	Key species landed	Lobster	Lobster, gillnet multispecies	Lobster	Lobster	Lobster
	Total harvest by ALWTRP vessels (pounds)	19,042,846	11,729,014	22,192,938	7,990,820	7,727,215
	Total value of harvest for ALWTRP vessels (\$)	\$56,461,241	\$31,742,365	\$62,749,931	\$26,084,050	\$17,886,149
	ALWTRP harvest value as percent of county harvest value	88%	55%	88%	61%	69%
	Total ALWTRP vessels in county	639	484	620	468	391
	Total estimated employment on ALWTRP vessels in county	1,226	985	1,320	817	700
Dealer Sector	Number of dealers handling ALWTRP-vessel catch	19	19	12	8	14
	Estimated employment at dealers handling ALWTRP-vessel catch	99	219	87	39	86
Processing Sector	Total number of processing facilities	8	11	4	5	5
	Number of facilities processing ALWTRP species	3	10	1	2	5
	Employment at facilities processing ALWTRP species	239	90	18	26	51
	Total quantity of seafood processed at processors in county (pounds)	8,607,308	2,630,847	10,303,404	484,855	1,707,026
	ALWTRP species as percent of all processed quantity	57%	36%	5%	16%	72%
	Quantity of ALWTRP species processed (pounds)	4,862,204	942,046	501,549	78,709	1,232,241
Demography	Population	52,336	265,612	39,618	33,941	33,616
	Unemployment rate	4.4%	2.8%	3.0%	8.8%	3.0%
	Median household income	\$35,811	\$44,048	\$36,774	\$25,869	\$38,686
	Families below poverty level	7.0%	5.2%	6.4%	14.2%	6.6%
	Fishing dependency	High	Medium	High	High	Medium
	Gentrification level	Low	High	High	Low	NA

Exhibit 7-2

SOCIOECONOMIC PROFILE OF AT-RISK COUNTIES

	Characteristic/Parameter	York, ME	Rockingham, NH	Essex, MA	Barnstable, MA	Bristol, MA
Ports	Key ports in county	Kennebunkport/ Cape Porpoise	Hampton/Seabrook, Portsmouth, Isles of Shoals	Gloucester, Rockport, Marblehead	Sandwich, Hyannis, Chatham, Provincetown	New Bedford, Fairhaven, Westport
Harvest Sector	Key species landed	Lobster	Lobster	Lobster, gillnet multispecies	Lobster, gillnet multispecies	Lobster, gillnet multispecies, red crab
	Total harvest by ALWTRP vessels (pounds)	3,588,794	6,090,041	14,761,882	10,818,089	8,500,306
	Total value of harvest for ALWTRP vessels (\$)	\$ 12,082,208	\$12,449,428	\$28,066,851	\$ 15,648,204	\$ 12,870,907
	ALWTRP harvest value as percent of county harvest value	92%	75%	52%	42%	7%
	Total ALWTRP vessels in county	232	135	428	188	115
	Total estimated employment on ALWTRP vessels in county	445	316	897	427	288
Dealer Sector	Number of dealers handling ALWTRP-vessel catch	11	6	15	9	17
	Estimated employment at dealers handling ALWTRP-vessel catch	54	41	124	74	278
Processing Sector	Total number of processing facilities	4	5	15	7	13
	Number of facilities processing ALWTRP species	4	1	10	5	11
	Employment at facilities processing ALWTRP species	56	26	592	86	499
	Total quantity of seafood processed at processors in county (pounds)	196,631	34,631,353	130,080,843	1,089,378	47,573,445
	ALWTRP species as percent of all processed quantity	52%	15%	24%	54%	27%
	Quantity of ALWTRP species processed (pounds)	102,904	5,091,039	31,570,165	590,590	12,934,397
Demo- graphy	Population	186,742	277,359	723,419	222,230	534,678
	Unemployment rate	4.6%	5.9%	6.2%	4.7%	6.2%
	Median household income	\$43,630	\$58,150	\$51,576	\$45,933	\$43,496
	Families below poverty level	5.9%	3.1%	6.6%	4.6%	7.8%
	Fishing dependency	Medium	Low	Medium	High	Medium
	Gentrification level	High	High	Medium-High	Medium	Medium

Exhibit 7-2

SOCIOECONOMIC PROFILE OF AT-RISK COUNTIES

	Characteristic/Parameter	Plymouth, MA	Washington, RI	Newport, RI	Suffolk, NY	Ocean, NJ
Ports	Key ports in county	Plymouth, Scituate	Point Judith/Galilee	Jamestown, Newport, Tiverton, Sakonnet Point	Hampton Bays, Montauk, Greenport	Point Pleasant, Long Beach/ Barnegat Light
Harvest Sector	Key species landed	Lobster	Lobster, monkfish	Lobster	Lobster, monkfish	Monkfish
	Total harvest by ALWTRP vessels (pounds)	4,579,603	5,181,588	4,734,896	2,631,708	7,820,327
	Total value of harvest for ALWTRP vessels (\$)	\$ 11,981,237	\$11,433,190	\$ 6,497,359	\$ 2,701,857	\$ 7,853,552
	ALWTRP harvest value as percent of county harvest value	84%	29%	44%	7%	22%
	Total ALWTRP vessels in county	265	195	136	111	223
	Total estimated employment on ALWTRP vessels in county	564	428	329	224	508
Dealer Sector	Number of dealers handling ALWTRP-vessel catch	6	20	9	11	9
	Estimated employment at dealers handling ALWTRP-vessel catch	33	185	116	48	90
Processing Sector	Total number of processing facilities	0	7	1	1	1
	Number of facilities processing ALWTRP species	0	6	1	1	0
	Employment at facilities processing ALWTRP species	0	128	13	3	0
	Total quantity of seafood processed at processors in county (pounds)	0	7,692,439	11,237	53,845	808,430
	ALWTRP species as percent of all processed quantity	NA	13%	100%	100%	NA
	Quantity of ALWTRP species processed (pounds)	0	992,363	11,237	53,845	0
Demography	Population	472,822	123,546	85,433	1,419,369	510,916
	Unemployment rate	4.9%	3.6%	4.2%	4.4%	5.4%
	Median household income	\$55,615	\$53,103	\$50,448	\$65,288	\$46,443
	Families below poverty level	4.9%	4.2%	5.4%	3.9%	4.8%
	Fishing dependency	Low	Medium	Medium	N.A.	N.A.
	Gentrification level	High	High	High	N.A.	N.A.

- The processing sector is prominent in counties that include urban ports, such as Cumberland (ME) and Essex and Bristol (MA). Relative to other at-risk counties, processors in Essex County handle the largest quantity of catch affected by the ALWTRP requirements (i.e., the largest quantity of key species associated with ALWTRP regulations).
- A study of New England's fishing communities (Hall-Arber et al., 2001) rated eleven coastal regions in terms of fishing dependence. A high dependency rating indicates areas where fishing accounts for a relatively large portion of employment and where employment alternatives for fishermen are few. Several of the at-risk counties are in regions assigned high dependency ratings, including Hancock, Knox, Washington (ME), and Barnstable.³
- Hall-Arber et al. (2001) also rated individual ports' level of gentrification. Gentrification creates a variety of pressures on the fishing industry and fishing communities, including increases in local real estate prices and loss of fishing infrastructure to tourism and other types of shorefront development. Gentrification is widespread in New England, but is especially pronounced in communities such as Rockland (Knox County), Portland (Cumberland County), Kennebunkport (York County), Portsmouth (Rockingham County), Plymouth (Plymouth County), and the coastal areas of Rhode Island.

7.4 SOCIOECONOMIC IMPACTS OF ALTERNATIVES

While the preceding discussion identified and characterized communities where the potential for adverse socioeconomic impacts is greatest, this section looks more closely at specific segments of the harvest sector and the potential impact of the compliance costs faced by individual vessels. The discussion focuses on whether the costs will cause changes in fishing effort that may subsequently cause socioeconomic effects such as changes in landings and changes in regional employment.

7.4.1 Comparison of Vessel Compliance Costs to Ex-Vessel Revenues

To further examine the potential for socioeconomic impacts from the revised ALWTRP requirements, this analysis considers the economic burden placed on different classes of vessels. Placing vessel compliance costs in the context of typical ex-vessel revenues helps determine

³ Fishing dependency is characterized based on the multiple-attribute index developed by Hall-Arber, et al. (2001). Note that counties examined here may be characterized as highly fishing dependent despite the fact that only small portions of their overall population are employed in fishing.

whether the costs will be significant enough to cause behavioral changes (e.g., vessel retirement) on the part of vessel operators.

7.4.1.1 Vessel Distribution

The cost/revenue comparison is organized around each major vessel classification and the sizes of vessels operating in those classifications. The analysis begins with the location-based vessel classifications used in the economic impact analysis (e.g., offshore, northern nearshore, etc.). These groups are further subdivided into vessel size classes. For example, the northern nearshore lobster fishery is divided into four classes of vessels: Class I (vessels less than 28 feet in length), Class II (29 to 40 foot vessels), Class III (41 to 50 foot vessels), and Class IV (vessels greater than 50 feet in length). The analysis compares average annual compliance costs for each lobster vessel segment to the average annual revenues for vessels in that segment. The cost/revenue comparison for other trap/pot and gillnet vessels is organized in the same fashion.⁴

7.4.1.2 Vessel Revenue

Estimates of average annual revenue for each fishery segment are derived from ex-vessel revenue information obtained from NMFS' 2002 dealer data base. First, ex-vessel revenue is calculated for each unique ALWTRP vessel the dealer data identify.⁵ The analysis then uses individual vessel revenue to derive average annual revenue per fishery segment. To do so, the hull ID from the landings databases is matched with the hull ID in the permit database to identify the length of each vessel and its home port. Then, annual average revenue for each vessel segment is calculated, based on the fishery (lobster, OTP, gillnet), general location (northern, Mid-Atlantic, or southeast), and size class. For instance, the analysis identifies the average annual revenue earned by a Class II lobster vessel operating in the Northeast.

7.4.1.3 Vessel Compliance Costs

To allow comparison to average vessel revenues, the analysis incorporates the vessel compliance cost estimates developed for the economic impact assessment. Average compliance costs are estimated for each fishery segment under each regulatory alternative, one of which

⁴ The VTR database provides size class data for federally permitted vessels. For vessels that hold only state permits, the analysis incorporates size data from Maine, Massachusetts, and North Carolina. To develop a distribution of vessels by size for other states, the analysis applies data on lobster vessels from Maine, OTP vessels from Massachusetts, and gillnet vessels from Massachusetts and North Carolina. Using state data is preferable to using VTR data since federally permitted vessels tend to be larger than those holding only state permits.

⁵ Seafood dealers that limit purchase and sales to lobster are not required to report landings to the Dealer Database. As a result, the analysis would not include information for lobster trap/pot vessels that sell their catch to such "lobster-only" dealers or possess their own dealer permit and sell only lobster. The direction and magnitude of the bias associated with this uncertainty, however, is not known.

NMFS may identify in the FEIS. For example, the analysis identifies annual compliance costs for a northern nearshore lobster vessel under each alternative. The discussion of the economic impact assessment explains the method for deriving these costs.

7.4.1.4 Comparison of Cost and Revenue

To identify potentially hard-hit sectors of the commercial fishing industry, the analysis compares vessel compliance costs to average vessel revenues. Exhibits 7-3 through 7-5 present the results. There is no clearly defined threshold at which annual costs represent a large enough percent of annual revenues that a vessel operator would cease fishing. For purposes of analysis, however, the exhibits highlight two impact categories:

- **Heavily-Affected Vessels:** Vessel segments for which estimated compliance costs exceed 15 percent of average annual revenues.
- **At-Risk Vessels:** Vessel segments for which estimated compliance costs are between 5 and 15 percent of average annual revenues.

The tables focus on regulatory Alternative 2, since it is the limiting alternative, i.e., it affects the greatest number of vessels and imposes the greatest costs relative to the other alternatives.

The analysis identifies 10 vessel segments that can be considered heavily affected, i.e., for which compliance costs may exceed 15 percent of annual revenues. All of these segments are composed of smaller (Class I or Class II) vessels, which typically have a smaller revenue base with which to absorb such costs.⁶ Six of the segments represent lobster vessels, indicating that the smallest vessels in this fishery may have difficulty complying with new ALWTRP requirements. The discussion below analyzes the heavily affected fishing segments in greater detail.

⁶ As explained in Chapter 6, the analysis of vessel compliance costs is based upon 103 model vessels: 28 representing lobster trap/pot vessels, 55 representing other trap/pot vessels, and 20 representing gillnet vessels. Each of these models is designed to be representative of a group of vessels that is likely to face similar compliance costs (i.e., vessels that face similar regulatory requirements and use similar configurations of gear). This is not to say that all vessels represented by a particular model would in practice face identical compliance costs; clearly, variation in operating practices, vessel size, and the scale of operations within a particular vessel category will lead to variation in compliance costs. The scope of the analysis and lack of the necessary data, however, prohibit analysis of compliance costs at a higher level of specificity.

The limitations of the cost analysis are potentially problematic in comparing estimated compliance costs to revenue data that are available at a higher degree of detail. In some instances, for example, data on vessel revenues are available by vessel size class within a particular group (e.g., Northern Nearshore lobster vessels), while estimates of compliance costs are available only for the group as a whole. As a result, the comparison of annual compliance costs to annual revenues may suggest a more severe impact on small vessels, which tend to have a lower revenue base, than would actually be the case. This potential bias should be recognized in interpreting the findings of this analysis.

Exhibit 7-3

COMPARISON OF VESSEL COMPLIANCE COSTS AND REVENUES: LOBSTER

Location	Vessel Size Class	Number of Vessels Affected ¹	Lower Bound Annual Compliance Costs ²	Upper Bound Annual Compliance Costs ²	Average Annual Revenue	Lower Bound Cost as a Percent of Revenue	Upper Bound Cost as a Percent of Revenue
Heavily Affected Vessels							
Offshore	I	8	\$ 10,969	\$ 10,969	\$ 19,746	55.55%	55.55%
LMA 6	I	2	\$ 4,354	\$ 4,354	\$ 8,456	51.49%	51.49%
Offshore	II	52	\$ (6,823)	\$ 10,969	\$ 31,212	-21.86%	35.15%
Southern Nearshore	I	4	\$ 2,608	\$ 2,608	\$ 8,456	30.85%	30.85%
Northern State Waters	I	245	\$ 44	\$ 4,131	\$ 19,746	0.22%	20.92%
LMA 6	II	4	\$ 4,354	\$ 4,354	\$ 26,366	16.52%	16.52%
At-Risk Vessels							
LMA 6	III	5	\$ 4,354	\$ 4,354	\$ 29,439	14.79%	14.79%
Northern State Waters	II	1,996	\$ 44	\$ 4,131	\$ 31,212	0.14%	13.24%
Northern Nearshore	I	39	\$ (1,549)	\$ 2,608	\$ 19,746	-7.84%	13.21%
Offshore	III	43	\$ 10,969	\$ 10,969	\$ 99,580	11.02%	11.02%
Southern Nearshore	II	37	\$ 2,608	\$ 2,608	\$ 26,366	9.89%	9.89%
Southern Nearshore	III	57	\$ 2,608	\$ 2,608	\$ 29,439	8.86%	8.86%
Northern Nearshore	II	419	\$ (1,549)	\$ 2,608	\$ 31,212	-4.96%	8.36%
Other Vessels							
Northern State Waters	III	513	\$ 44	\$ 4,131	\$ 99,580	0.04%	4.15%
Northern Nearshore	III	186	\$ (1,549)	\$ 2,608	\$ 99,580	-1.56%	2.62%
Offshore	IV	65	\$ (6,823)	\$ 10,969	\$ 449,129	-1.52%	2.44%
Southern Nearshore	IV	4	\$ 2,608	\$ 2,608	\$ 251,544	1.04%	1.04%
Northern Nearshore	IV	9	\$ 2,608	\$ 2,608	\$ 449,129	0.58%	0.58%
Notes:							
1. Number of affected vessels based on methods discussed in economic impact analysis.							
2. Range reflects different compliance costs for subgroups of vessels in each category.							

Exhibit 7-4

COMPARISON OF VESSEL COMPLIANCE COSTS AND REVENUES: OTHER TRAP/POT

Location	OTP Group	Vessel Size Class	Number of Vessels Affected ¹	Lower Bound Annual Compliance Costs ²	Upper Bound Annual Compliance Costs ²	Average Annual Revenue	Lower Bound Cost as a Percent of Revenue	Upper Bound Cost as a Percent of Revenue
Heavily Affected Vessels								
Mid-Atlantic	Black Sea Bass Pot	I	7	\$ 265	\$ 4,510	\$ 22,688	2.91%	41.01%
Mid-Atlantic	Black Sea Bass Pot	II	18	\$ 3,734	\$ 4,510	\$ 22,688	16.46%	19.88%
Mid-Atlantic	Other	I	2	\$ 1,603	\$ 1,603	\$ 9,106	17.60%	17.60%
Northern	Hagfish Pot	II	1	\$ 6,367	\$ 6,367	\$ 37,203	17.11%	17.11%
At-Risk Vessels								
Mid-Atlantic	Black Sea Bass Pot	III	18	\$ 265	\$ 4,510	\$ 43,978	0.60%	10.25%
Northern	Hagfish Pot	III	1	\$ 6,367	\$ 6,367	\$ 67,054	9.49%	9.49%
Mid-Atlantic	Other	II	1	\$ 1,603	\$ 1,945	\$ 22,688	7.07%	8.57%
Mid-Atlantic	Conch/Whelk Pot	I	2	\$ 774	\$ 774	\$ 9,106	8.50%	8.50%
Northern	Red Crab Pot	IV	3	\$ 152	\$ 24,973	\$ 393,095	0.04%	6.35%
Other Vessels								
Mid-Atlantic	Other	III	2	\$ 426	\$ 1,945	\$ 43,978	0.97%	4.42%
Northern	Conch/Whelk Pot	II	10	\$ 748	\$ 979	\$ 37,203	2.01%	3.53%
Mid-Atlantic	Conch/Whelk Pot	II	16	\$ 728	\$ 774	\$ 22,688	3.21%	3.41%
Northern	Black Sea Bass Pot	I	12	\$ 276	\$ 353	\$ 18,992	1.46%	3.18%
Mid-Atlantic	Scup Pot	I	1	\$ 285	\$ 285	\$ 9,106	3.13%	3.13%
Northern	Shrimp Pot	I	47	\$ 533	\$ 590	\$ 18,992	2.81%	3.11%
Northern	Hagfish Pot	IV	4	\$ 4,188	\$ 8,119	\$ 393,095	1.07%	2.07%
Northern	Other	II	2	\$ 437	\$ 567	\$ 37,203	1.17%	2.05%
Northern	Conch/Whelk Pot	III	5	\$ 748	\$ 902	\$ 67,054	1.12%	1.82%
Mid-Atlantic	Conch/Whelk Pot	III	25	\$ 774	\$ 774	\$ 43,978	1.76%	1.76%
Northern	Shrimp Pot	II	94	\$ 533	\$ 627	\$ 37,203	1.43%	1.69%
Southern	Black Sea Bass Pot	II	27	\$ 280	\$ 280	\$ 18,691	1.50%	1.50%
Northern	Scup Pot	II	15	\$ 287	\$ 369	\$ 37,203	0.77%	1.34%
Northern	Black Sea Bass Pot	II	30	\$ 276	\$ 353	\$ 37,203	0.74%	1.28%
Southern	Black Sea Bass Pot	I	5	\$ 280	\$ 280	\$ 24,117	1.16%	1.16%
Northern	Other	III	6	\$ 437	\$ 567	\$ 67,054	0.65%	1.06%
Mid-Atlantic	Black Sea Bass Pot	IV	2	\$ 3,734	\$ 3,734	\$ 366,767	1.02%	1.02%
Northern	Shrimp Pot	III	5	\$ 590	\$ 590	\$ 67,054	0.88%	0.88%

Exhibit 7-4

COMPARISON OF VESSEL COMPLIANCE COSTS AND REVENUES: OTHER TRAP/POT

Location	OTP Group	Vessel Size Class	Number of Vessels Affected ¹	Lower Bound Annual Compliance Costs ²	Upper Bound Annual Compliance Costs ²	Average Annual Revenue	Lower Bound Cost as a Percent of Revenue	Upper Bound Cost as a Percent of Revenue
Mid-Atlantic	Scup Pot	III	2	\$ 300	\$ 367	\$ 43,978	0.68%	0.83%
Northern	Black Sea Bass Pot	III	17	\$ 139	\$ 353	\$ 67,054	0.21%	0.66%
Northern	Scup Pot	III	5	\$ 348	\$ 348	\$ 67,054	0.52%	0.52%
Mid-Atlantic	Other	IV	2	\$ 1,603	\$ 1,603	\$ 366,767	0.44%	0.44%
Southern	Black Sea Bass Pot	III	17	\$ 280	\$ 280	\$ 96,657	0.29%	0.29%
Mid-Atlantic	Conch/Whelk Pot	IV	2	\$ 774	\$ 774	\$ 366,767	0.21%	0.21%
Northern	Other	IV	4	\$ 437	\$ 567	\$ 393,095	0.11%	0.14%
Northern	Scup Pot	IV	3	\$ 287	\$ 348	\$ 393,095	0.07%	0.09%
Northern	Black Sea Bass Pot	IV	3	\$ 289	\$ 328	\$ 393,095	0.08%	0.08%

Notes:

1. Number of affected vessels based on methods discussed in economic impact analysis. Segments with zero vessels affected are shown for illustration only.
2. Range reflects different compliance costs for subgroups of vessels in each category.

Exhibit 7-5

COMPARISON OF VESSEL COMPLIANCE COSTS AND REVENUES: GILLNET

Location	Vessel Size Class	Number of Vessels Affected ¹	Lower Bound Annual Compliance Costs ²	Upper Bound Annual Compliance Costs ²	Average Annual Revenue	Lower Bound Cost as a Percent of Revenue	Upper Bound Cost as a Percent of Revenue
Heavily Affected Vessels (None)							
At-Risk Vessels							
Mid-Atlantic	I	22	\$ 633	\$ 980	\$ 6,731	9.40%	14.57%
Northeast	I	8	\$ 1,120	\$ 1,120	\$ 19,359	5.79%	5.79%
Other Vessels							
Mid-Atlantic	II	353	\$ 9	\$ 980	\$ 59,595	0.02%	1.65%
Northeast	II	131	\$ 28	\$ 1,120	\$ 76,618	0.04%	1.46%
Mid-Atlantic	III	285	\$ 9	\$ 980	\$ 111,618	0.01%	0.88%
Northeast	III	166	\$ 28	\$ 1,120	\$ 167,904	0.02%	0.67%
Northeast	IV	31	\$ 28	\$ 1,120	\$ 304,546	0.01%	0.37%
Mid-Atlantic	IV	35	\$ 633	\$ 980	\$ 377,776	0.17%	0.26%
Southeast	III	1	\$ 185	\$ 185	\$ 81,810	0.23%	0.23%
Southeast	II	5	\$ 185	\$ 185	\$ 82,723	0.22%	0.22%
Southeast	IV	1	\$ 185	\$ 185	\$ 119,073	0.16%	0.16%
Notes:							
1. Number of affected vessels based on methods discussed in economic impact analysis.							
2. Range reflects different compliance costs for subgroups of vessels in each category.							

Numerous other vessels (approximately 2,600) fall in the at-risk vessel category. As shown, most of these are smaller vessels in the various fisheries. The at-risk vessels are dominated by Class II lobster vessels; of these, the most affected subsets are vessels in Maine, which are estimated to have greater gear loss costs. A variety of other vessels fall in the at-risk range, including northern nearshore lobster vessels, several categories of other trap/pot vessels (e.g., black sea bass, hagfish, red crab), and Class I gillnet vessels in the Northeast and Mid-Atlantic.

7.4.2 Landings and Employment Impacts

The regulatory alternatives under consideration likely have limited implications for landings and employment in the harvest, dealer, and processing sectors. Building on the cost/revenue comparison introduced above, this section estimates the landings reduction and employment impacts associated with a potential reduction in fishing effort.

To characterize potential employment impacts, the analysis first assumes that vessels in heavily affected segments of the ALWTRP fisheries (i.e., those segments for which annual compliance costs are greater than 15 percent of annual revenues) will discontinue their operations (a conservative, upper-bound assumption). Next, the analysis incorporates estimates of average crew size for each fishery and vessel size class. These estimates are multiplied by the number of vessels in each segment to estimate employment impacts in the harvest sector. Then, the analysis uses data from the NMFS landings database to determine the average landings per vessel in each heavily affected vessel segment. Multiplying average landings by the number of vessels yields the estimated annual reduction in landings. Finally, the analysis examines the SIA county data base to determine how the heavily affected vessels are distributed geographically, identifying the most heavily affected counties.

Exhibit 7-6 summarizes the results of the analysis. From the standpoint of potential employment and landings effects, the most significant potential impacts are those associated with Class I lobster vessels fishing in northern state waters and Class II lobster vessels fishing in offshore waters. Overall, the potential landings reduction associated with all heavily affected segments of the lobster fishery totals about 1.8 million pounds; this represents approximately two percent of total annual lobster landings.

Other heavily affected vessel segments account for relatively little direct employment in commercial fishing. Only in the case of the southeast black sea bass fishery does it appear that the ALWTRP regulations may have a significant impact. Available data suggest that landings from Class II black sea bass vessels represent a large component (possibly one-third) of total landings in the southern black seabass trap/pot fishery.⁷ While this vessel segment accounts for a

⁷ As highlighted in the caveats below, estimates of landings and revenue for black sea bass vessels are based on a very small sample of vessels; therefore, the conclusions for this fishery are highly uncertain.

relatively small number of vessels and crew, its elimination could have significant implications for black sea bass markets.⁸

Exhibit 7-6					
CHARACTERISTICS OF HEAVILY AFFECTED VESSEL SEGMENTS					
Specific Fishery Segment	Size Class	Compliance Costs as a Percent of Revenue	Affected Vessels*	Total Employ- ment	General Location
Lobster, LMA 6	I	51%	2	3	CT
Lobster, LMA 6	II	17%	4	7	CT
Lobster, Northern State Waters	I	20%	122	189	ME
Lobster, Offshore	I	56%	8	13	Primarily MA, RI, NJ
Lobster, Offshore	II	35%	50	104	Primarily MA, RI, NJ
Lobster, Southern Nearshore	I	31%	4	5	Primarily NY
OTP, Black Sea Bass Pot	I	20-41%	7	13	Primarily NC
OTP, Black Sea Bass Pot	II	16-20%	18	37	Primarily NC
OTP, Hagfish Pot	II	17%	1	3	Northeast
OTP, Other	I	18%	2	4	
TOTAL**			219	379	
Notes:					
* Vessels reported reflect number of heavily affected vessels in segment. For “Lobster, Northern State Waters” and “Lobster, Offshore, Class II”, the heavily affected vessels are restricted to the geographic sub-segment (i.e., the subset of the segment’s vessels fishing in a particular geographic area) for which costs exceed 15 percent of revenues; therefore, the number of vessels is less than that shown in Exhibit 7-3 (which reports the total number of vessels in each segment).					
** Totals may not sum due to rounding.					

It is noteworthy that the highly affected fishery segments identified here do not appear to be concentrated in a single geographic area. For example, Class I lobster vessels are based in ports all along the Maine coast, as well as in New Hampshire and Massachusetts. Data suggest that offshore lobster vessels operate out of ports from Maine to New Jersey, with some concentration in Massachusetts. Likewise, Class I gillnetting vessels are distributed along the New Jersey and North Carolina coasts. While data on the geographic distribution of the OTP vessels are less specific, the affected segments of the black sea bass fishery are scattered throughout the Mid-Atlantic and southeast, with some concentration in North Carolina.

This geographic distribution has important implications for other social impacts of the ALWTRP. The analysis developed here does not suggest that major displacement of fishermen would occur, and to the extent that jobs are lost, they are not highly concentrated in one geographic area. Likewise, effects on dealers and processors are not likely to be significant because: (1) any reductions in catch would be spread across various dealer and processor establishments; and (2) the affected catch is a small component of total catch and would likely be

⁸ Available landings data do not allow an assessment of the role that trap/pot landings play in the overall landings of black sea bass in the southeast. However, Northeast data suggest that trap/pot landings account for over 40 percent of all landings.

made up by remaining vessels, leaving overall catch unaffected in the long run. Hence, while small groups of fishermen in heavily affected segments (e.g., North Carolina black sea bass) may be unable to stay in operation, the potential for large-scale socioeconomic impacts as a result of the ALWTRP modifications is limited.

Numerous additional vessels fall in the at-risk category, i.e., annual compliance costs represent between five and 15 percent of annual revenues. Class II lobster vessels in Maine account for the majority of these vessels. It is difficult to gauge how these vessel operators may respond to the ALWTRP modifications under consideration. However, to the extent that these vessels are driven out of business, social and economic impacts could be significant. Maine Class II lobster vessels account for over one-quarter of annual lobster landings. Changes in effort from this segment of the fishery could influence lobster markets, as well as employment at dealers and processors.

As noted, the analysis discussed here focuses on impacts under Alternative 2. Alternatives 3 (Preferred), 4, and 6 (Preferred) would affect similar numbers of vessels and therefore generate similar social impacts. Alternative 5, the modified SAM, would likely involve minor social impacts. The summary discussion at the end of this chapter provides a more detailed comparison of the alternatives.

7.4.3 Caveats

The cost and revenue comparison is subject to a variety of uncertainties that should be considered when interpreting the results:

- The analysis comparing vessel cost and revenue provides a rough indicator of the burden associated with compliance costs. A more rigorous approach would involve development of cost models for individual vessel categories with calculation of baseline and post-regulatory profit margins. Although this approach is preferable, the number and variety of vessels affected by the ALWTRP requirements makes such an analysis infeasible.
- For some vessel segments, estimates of annual revenue and/or landings are based on limited data. In particular, most small lobster vessels are not federally permitted and therefore are not required to report their catch to NMFS; furthermore, they often sell to dealers who do not report their purchases to NMFS.⁹ Revenue estimates for these vessels are based on a small sample that may not be representative. Specifically, it is possible that the analysis systematically underestimates lobster vessel revenue, and therefore overstates the impacts of the compliance costs. For instance, a previous study of lobster vessels fishing in the SAM zone estimated annual per-vessel revenues of roughly \$120,000 for a Class II

⁹ Dealers handling only lobster are not required to report to NMFS.

vessel (NMFS, 2001). In comparison, the revenue estimate used for northern Class II vessels in this analysis is only about \$31,000. Likewise, revenue and landings estimates for other trap/pot vessels (e.g., black sea bass vessels) are based on small samples, although the direction of the potential bias is unclear.

- Ex-vessel revenue information is available only for states from Maine to Virginia. Therefore, Virginia data are used to characterize revenue for all vessels in the southeast, including North Carolina, where a significant concentration of gillnet vessels exists. To the extent that Virginia gillnet vessels are not generally representative of gillnet vessels in the southeast, the cost-revenue comparison for gillnet vessels may be inaccurate.
- As noted, the size distribution for vessels that do not hold Federal permits is based on limited data available from key states (Maine, Massachusetts, and North Carolina). To the extent that the actual size distribution of vessels differs from the assumed distribution, the analysis may overstate or understate the scale of impacts.

The assumptions made in defining heavily affected vessels and the likely response of fishermen are also subject to significant uncertainty. Key caveats include the following:

- The analysis of impacts is based on annualized compliance cost estimates. Depending upon the timing of key regulatory requirements and other factors, the actual stream of annual costs that fishermen face will vary, i.e., costs will be small in some years and large in others. To the extent that it is difficult to borrow money to finance purchases in high-cost years, larger numbers of vessel operators may be at risk of ceasing operation than the analysis suggests.
- The assumption that vessels facing high compliance costs will leave the industry is extremely conservative. Fishermen may have a number of strategies available to reduce or eliminate the costs of complying with the ALWTRP requirements, e.g., fishing in exempted waters. Fishermen's ability to pursue these strategies may be constrained by limited entry requirements that specify fishing location; practical considerations (e.g., distance, lack of familiarity with new fishing grounds); and tacit territorial agreements among members of the fishing fleet. Nonetheless, it is unlikely that the costs imposed by the ALWTRP modifications examined here would alone be responsible for driving fishermen out of the industry. A broader examination of pressures facing the lobster, other trap/pot, and gillnet sectors is presented in the cumulative effects analysis later in this report.

- Likewise, assumptions regarding reduced landings are highly conservative. While some vessels may cease operation, remaining vessels may increase effort to make up the lost catch, moderating the potential impact of ALWTRP requirements on dealers, processors, retailers, and consumers.
- Some vessels fish for multiple ALWTRP species and would therefore need to convert multiple sets of gear in order to comply. In the cost-revenue comparison, these vessels are treated as separate entities, i.e., combined compliance costs are not taken into account. As such, the analysis may understate the impacts for these vessels. However, these fishermen frequently harvest the second species for supplementary income, and therefore may simply cease fishing for the secondary species, but not leave fishing entirely. This option may reduce the individual fisherman's income but not create a direct compliance cost.
- The employment figures included in the discussion of potential socioeconomic impacts are rough estimates. They are derived by multiplying the number of heavily affected vessels by average per-vessel employment for each fishery and size class. Nonetheless, these estimates are likely superior to economic census figures since: (1) the census often undercounts individuals employed in fishing or other resource harvesting professions; and (2) the census figures cannot be associated with specific fisheries.

7.5 OTHER POTENTIAL SOCIAL IMPACTS

The discussion above focuses on socioeconomic impacts in fishing and related industries. The ALWTRP modifications under consideration may have other social impacts, influencing the quality of life enjoyed by fishermen, their families, and other groups.

7.5.1 Potential Negative Social Impacts

For fishermen and their families, the following social impacts may be associated with modifications to the ALWTRP requirements:

- Competition for fishing grounds may increase as a result of geographic stipulations in the ALWTRP. Most notably, in an attempt to avoid gear modifications and other requirements, fishermen may relocate their effort to exempted waters. This may cause congestion in some areas and increase the frequency of gear conflicts. The stress associated with such conflicts may erode relationships among fishermen and exacerbate tensions over fixed resources such as fishing grounds.

- As noted in the economic analysis, gear changes introduced under the ALWTRP may increase the incidence of gear loss. While tests and experience suggest that gear loss associated with weak link requirements will be minor, more significant issues may arise when non-floating line becomes caught on rocks and other bottom structure. Apart from the direct cost of gear loss, social impacts may be realized. For instance, fishermen may spend increased time hauling gear and grappling for gear. To the extent that hours at sea increase, this could reduce the quality of life for fishermen and their families.
- Gear changes implemented under the ALWTRP also may pose safety issues for fishermen. Some industry experts have suggested that hauling gear with neutrally buoyant or sinking groundline may pose a danger when fishermen attempt to free fouled line from bottom structure. Sources also suggest that the non-floating line may have more of a tendency to kink and may consequently present a greater risk of tangling and/or injuring fishermen.
- New trap/pot fisheries folded into the ALWTRP may be affected by requirements for one buoy line when fishing four or fewer traps. With two buoy lines, fishermen can choose which end to haul based on currents and weather conditions; therefore, pulling gear with only one buoy line could pose a safety risk. In addition, the use of one buoy line may increase gear conflicts and gear loss.
- The dynamic area management (DAM) program requires vessels to remove gear in proximity to right whale sightings. The quick response time could force fishermen out to sea during unsafe conditions in order to comply with this requirement. Lobster and gillnet vessels already comply with the DAM program, but Alternatives 2 through 4 require previously unregulated other trap/pot vessels to comply until 2008, when the program ceases for all vessels.
- The comparison of annual costs and revenue strongly suggests that smaller vessels may find it more difficult than larger vessels to absorb compliance costs and continue fishing. The burden placed on small vessels may have important implications for the structure and character of the overall fishing industry. To the extent that smaller vessels have difficulty competing, trends toward consolidation, larger harvest operations, and increased corporate ownership may be fortified. Fishermen who value the independence of their profession and the freedom to operate a small family business may be harmed by these trends.

While such impacts are possible, it is difficult to predict their extent or determine whether the regulatory alternatives differ with respect to the potential for such effects.

7.5.2 Potential Positive Social Impacts

In some cases, the regulatory alternatives introduce ALWTRP changes that may present safety and quality-of-life benefits for fishermen. Most notably, all of the alternatives call for removal of DAM requirements. Industry advocates have asserted that DAM provisions can be burdensome, requiring unanticipated gear removals that disrupt fishermen's schedules and that may cause safety issues in times of bad weather. Likewise, the regulatory alternatives call for elimination of current rules that limit trawls of five or fewer traps to one buoy line, lowering the cutoff to four or fewer traps. The addition of a buoy line may help avoid gear conflicts and reduce gear loss, grappling, and associated safety issues.

The general public may also realize social benefits as a result of improved whale protection associated with the ALWTRP. The welfare of individuals who view and photograph whales from private recreational vessels or from commercial whale watch vessels will be enhanced to the extent that the ALWTRP successfully protects and helps restore whale populations.¹⁰ A number of economic studies have noted that enjoyment of the whale watching experience is positively correlated with the number of whales sighted. For instance, a study at the Stellwagen Bank National Marine Sanctuary asked respondents to cite the most attractive features of a whalewatch; the top responses included the number of whales seen as well as the number of species seen (Day, 1985). Likewise, Loomis and Larson (1994) determined that whale watch riders viewing gray whales were willing to pay more for the experience when populations were increased.

While, it is not feasible to quantify the increase in whale sightings or the associated economic welfare benefits associated with the ALWTRP, it is possible to characterize the overall size and popularity of commercial whale watching operations on the east coast. While complete data on the industry are lacking, a study by Hoyt (2000) attempted to compile data for operations worldwide. Roughly half of all commercial whale watching worldwide occurs in the U.S., and much of this activity is centered in New England.¹¹ As shown in Exhibit 7-7, the Hoyt study identified 36 whale watching businesses in New England, with most operating multiple vessels. Hoyt estimated that over one million individuals take whale watching tours in the region, yielding over \$30 million in revenue each year. Because these figures only apply to permitted and registered operations, the full scale and economic impact of whale watching activity is likely greater. Overall, given the level of activity in the industry, the economic welfare benefits associated with enhanced whale watching could be significant.

¹⁰ The Regulatory Impact Review included in this EIS provides a more detailed discussion of economic welfare concepts.

¹¹ Although whale watching operations exist in the mid- and South Atlantic states, the degree of activity is smaller and cannot be reliably distinguished from tours to view other species such as dolphins.

Exhibit 7-7				
NEW ENGLAND WHALE WATCHING INDUSTRY				
State	Number of Operations	Number of Vessels	Annual Ridership	Annual Revenue (millions \$)
Massachusetts	17	30-35	1,000,000	\$24.0
New Hampshire	4	6-10	80,000	\$1.9
Maine	14	18-24	137,500	\$4.4
Rhode Island	1	1	12,500	\$0.3
TOTAL	36	55-70	1,230,000	\$30.6
Source: Hoyt, 2000.				

Finally, it is noteworthy that increased whale populations may benefit the operators of whale watch vessels. Larger whale populations may increase demand for whale watch services, increasing patronage and/or the price that customers are willing to pay. In either case, whale watch operations may become more profitable.

A second economic benefit category associated with whale protection is non-use benefits.¹² Economic research has demonstrated that society places economic value on (relatively) unique environmental assets, whether or not those assets are ever directly exploited. For example, society places real (and potentially measurable) economic value on simply knowing that large whale populations are flourishing in their natural environment (often referred to as “existence value”) and will be preserved for the enjoyment of future generations. Using survey research methods, economists have developed several studies of non-use values associated with protection of whales or other marine mammals. Exhibit 7-8 summarizes these studies. In each, researchers surveyed individuals on their willingness to pay (WTP) for programs that would maintain or increase marine mammal populations. While none of these studies focuses specifically on the North Atlantic populations of right, humpback, fin, or minke whales, they do demonstrate that individuals derive economic value from the protection of marine mammals.

¹² Portions of this discussion of non-use benefits are based on NMFS, *Steller Sea Lion Protection Measures, Final Supplemental Environmental Impact Statement*, November 2001.

Exhibit 7-8		
STUDIES OF NON-USE VALUE ASSOCIATED WITH MARINE MAMMALS		
Author	Title	Findings
Giraud et al. (2002)	Economic Benefit of the Protection of the Steller Sea Lion	Estimated willingness to pay (WTP) for an expanded Steller sea lion protection program. The average WTP for the entire nation amounted to roughly \$61 per person.
Hageman (1985)	Valuing Marine Mammal Populations: Benefit Valuations in a Multi-Species Ecosystem	Per-household WTP for Gray and Blue Whales, Bottlenose Dolphins, California Sea Otters, and Northern Elephant Seals estimated to be \$23.95, \$17.73, \$20.75, \$18.29 per year respectively (1984 dollars).
Loomis and Larson (1994)	Total Economic Values of Increasing Gray Whale Populations: Results From a Contingent Valuation Survey of Visitors and Households	Mean WTP of U.S. households for an increase in gray whale populations estimated to be \$16.18 for a 50 percent increase and \$18.14 for a 100 percent increase.
Day (1985), cited in Rumage (1990)	The Economic Value of Whalewatching at Stellwagen Bank. The Resources and Uses of Stellwagen Bank	Non-use value of the presence of whales in the Massachusetts Bays system estimated to be \$24 million.
Samples et al. (1986)	Information Disclosure and Endangered Species Valuation	Estimated individual WTP for protection of humpback whales to be \$39.62 per year.
Samples and Hoyller (1989)	Contingent Valuation of Wildlife Resources in the Presence of Substitutes and Complements	Respondents' average WTP (lump sum payment) to protect humpback whales in Hawaii ranged from \$125 to \$142 (1986 dollars).

7.6 SUMMARY AND COMPARISON OF ALTERNATIVES

The analysis of at-risk counties shows that some regions of the east coast have high concentrations of vessels that must comply with ALWTRP requirements. New England lobster operations represent the most significant affected fishery with respect to a number of socioeconomic indicators, including numbers of vessels, total employment, and quantity of landings. Because lobstering is a prominent component of local economies in Maine and other New England states, the potential for social impacts within these communities is significant.

A comparison of annual vessel compliance costs to vessel revenue suggests that a limited subset of vessel operators are likely to face costs significant enough to drive them out of business. Although uncertainties exist in the analysis, the most heavily affected vessels seem to be few in number (relative to the full set of ALWTRP vessels) and small in size. Therefore, they employ a relatively small number of fishermen (about two percent of those on all ALWTRP vessels) and account for a relatively small share of landings. Heavily affected vessels are defined as those for which annual compliance costs exceed 15 percent of annual revenue; this criterion is highly conservative, and in reality many fishermen would likely adjust to the modified ALWTRP regulations (e.g., fish in exempted waters) rather than leave fishing. These adjustments, combined with the fact that small decreases in landings would likely be made up by other vessels, suggests that impacts on dealers and processors would be minor.

Exhibit 7-9 compares the socioeconomic implications of the regulatory alternatives. The implications of Alternatives 2, 3 (Preferred), 4, and 6 (Preferred) vary little because most of the vessels the analysis identifies as heavily affected are based in the Northeast, where the provisions of Alternatives 2, 3 (Preferred), 4, and 6 (Preferred) do not vary. Thus, for most of the social impacts evaluated, Alternatives 2, 3 (Preferred), 4, and 6 (Preferred) are largely identical. Specifically, Alternatives 2, 3 (Preferred), 4, and 6 (Preferred) have similar implications with respect to the following dimensions:

- The number of vessels considered heavily affected is essentially identical under Alternatives 2, 3 (Preferred), 4, and 6 (Preferred) as is the number of fishermen employed on these vessels.
- The impacts on dealers and processors are expected to be minor for all these alternatives.
- The negative social implications for the alternatives are expected to be the same, including potential competition for fishing grounds, safety and time implications of gear loss, and potential industry consolidation.
- The vessel-level impacts of the alternatives do not vary regionally (i.e., all the alternatives primarily impact the Northeast region), nor do the alternatives differentially affect rural versus urban areas.

However, the alternatives may differ with respect to the public welfare associated with increased whale protection. As noted in the biological impacts discussion, Alternative 2 requires the most geographically widespread changes, and may therefore provide marginally greater whale conservation benefits relative to the seasonal requirements in Alternatives 3, 4, and 6. The degree to which this is true is not readily discernible from the biological impacts analysis. Nonetheless, greater whale protection would result in greater use benefits (e.g., whale watching) as well as greater non-use benefits (e.g., existence value).

In contrast to the other alternatives, analysis of Alternative 5 (the modified SAM) shows very few vessels would face compliance costs that qualify them as heavily affected. Consistent with the more limited geographic scope of the requirements, Alternative 5 would also be less protective of whales and therefore yield fewer use and non-use benefits for the general public.

It is important to consider the socioeconomic burden of the ALWTRP in the context of the larger set of regulations faced by ALWTRP fisheries and the overall fishing industry. To the extent that certain communities already may be struggling with existing regulations, the ALWTRP modifications may add to the burden and have a significant marginal impact. The cumulative effects analysis presented later in this DEIS considers these issues.

Exhibit 7-9

SUMMARY OF SOCIOECONOMIC IMPACTS BY ALTERNATIVE

Parameter	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Preferred)	Alternative 4	Alternative 5	Alternative 6 (Preferred)
Number of Heavily Affected Vessels	0	219	219	219	2	219
Total Employment on Heavily Affected Vessels	0	379	379	379	3	379
Impacts on Dealers	None	- Minor	- Minor	- Minor	- Minor	- Minor
Impacts on Processors	None	- Minor	- Minor	- Minor	- Minor	- Minor
Other Potential Negative Social Impacts	None	- Competition for fishing grounds in exempted waters - Safety and time implications of gear loss - Burden greatest on small vessels; potential industry consolidation	- Competition for fishing grounds in exempted waters - Safety and time implications of gear loss - Burden greatest on small vessels; potential industry consolidation	- Competition for fishing grounds in exempted waters - Safety and time implications of gear loss - Burden greatest on small vessels; potential industry consolidation	- Minor	- Competition for fishing grounds in exempted waters - Safety and time implications of gear loss - Burden greatest on small vessels; potential industry consolidation
Positive Social Impacts	None	- Removal of DAM program may increase safety of and lessen burden on fishermen - Public welfare benefits of increased whale protection (greatest benefit relative to other alternatives)	- Removal of DAM program may increase safety of and lessen burden on fishermen - Public welfare benefits of increased whale protection (slightly lesser benefit relative to Alternative 2)	- Removal of DAM program may increase safety of and lessen burden on fishermen - Public welfare benefits of increased whale protection (slightly lesser benefit relative to Alternative 2).	- Removal of DAM program may increase safety of and lessen burden on fishermen - Public welfare benefits of increased whale protection (significantly lesser benefit relative to Alternative 2).	- Removal of DAM program may increase safety of and lessen burden on fishermen - Public welfare benefits of increased whale protection (slightly lesser benefit relative to Alternative 2).

7.7 REFERENCES

- Giraud, Kelly, Branka Turkin, John Loomis, and Joseph Cooper, "Economic Benefit of the Protection Program for the Steller Sea Lion," *Marine Policy* 26:6, pgs. 452-458, 2002.
- Hageman, R., *Valuing Marine Mammal Populations: Benefit Valuations in a Multi-Species Ecosystem*, Administrative Report LJ-85-22, Southwest Fisheries Center, National Marine Fisheries Service, La Jolla, CA, 1985.
- Hall-Arber, Madeleine, Chris Dyer, John Poggie, James McNally, and Renee Gagne, *New England's Fishing Communities*, A report to the MIT Sea Grant College Program, Grant # NA87FF0547, Cambridge, MA, 426 pp, 2001.
- Hoyt, Erich, *Whale Watching 2000: Worldwide Tourism Numbers, Expenditures, and Expanding Socioeconomic Benefits*, 2000.
- Loomis, J. and Larson, D., "Total Economic Values of Increasing Gray Whale Populations: Results from a contingent valuation survey of visitors and households," *Marine Resource Economics*, Vol. 9, pp. 275-286, 1994.
- McCay, Bonnie and Marie Cieri, *Fishing Ports of the Mid-Atlantic*, April 2000.
- NMFS, *Final Environmental Assessment of the Interim Final Rule Amending the Atlantic Large Whale Take Reduction Plan, Seasonal Area Management*, December 2001.
- NOAA, *Guidance for Social Impact Assessment*, Appendix 2(g), revised March 19, 2001, (obtained online at http://www.st.nmfs.gov/st1/econ/cia/sia_appendix2g.pdf)
- Rumage, W. T., "The economic value of whalewatching at Stellwagen Bank," in *The Resources and Uses of Stellwagen Bank. Part II, Proceedings of the Stellwagen Bank Conference*, April 26-27, 1990, University of Massachusetts at Boston. Boston, 1990.
- Samples, Karl C., John A. Dixon, and Marcia M. Gowen, "Information Disclosure and Endangered Species Valuation," *Land Economics*, 62:3. pgs. 306-312, 1986.
- Samples, K. and Hollyer, J., "Contingent Valuation of Wildlife Resources in the Presence of Substitutes and Complements," in R. Johnson and G. Johnson (eds.), *Economic Valuation of Natural Resources: Issues, Theory and Application*, Westview Press, Boulder, CO, 1989.

Appendix 7-A

**DESCRIPTION OF COUNTY
SOCIOECONOMIC CHARACTERIZATION DATABASE**

Exhibit 7A-1		
DATABASE FOR COUNTY SOCIOECONOMIC CHARACTERIZATION		
Sector	Database Parameter	Description/Source
Harvest Sector	Total Landings	Total pounds of commercial fish and shellfish species landed in the county, based on NMFS dealer data.
	Total Value of Landings	Total ex-vessel value of commercial species landed in the county. Based on NMFS dealer data. Data available for Northeast only.
	ALWTRP Landings	Total quantity of fish landed in the county by vessels affected by the ALWTRP regulations (based on gear information specified in NMFS dealer data).
	ALWTRP Landings Value	Ex-vessel value of fish landed in the county by vessels affected by the ALWTRP regulations (based on NMFS dealer data). Data available for Northeast only.
	ALWTRP Landings as Percent of Total	Quantity of ALWTRP landings as a percent of all landings in the county.
	ALWTRP Value as Percent of Total	Ex-vessel value of ALWTRP landings as a percent of the value of all landings in the county. Data available for Northeast only.
	Number of Vessels	<ul style="list-style-type: none"> - Lobster: Number of lobstering vessels registered in the county, based on trap tag data. State-permitted-only vessels removed based on percent of state waters that lie in ALWTRP-exempted waters. All state-permitted-only vessels distributed to size class based on distribution of state-only vessels in Maine. - Other Trap/Pot and Gillnet: Based on VTR data indicating vessel home port. State-permitted-only vessels distributed to counties based on the geographic distribution of Federal vessels in each state (except in Massachusetts and North Carolina, where vessel-specific data are available). Vessels distributed to size classes based on data for Massachusetts vessels (OTP) and Massachusetts and North Carolina vessels (gillnet).
Estimated Harvest Sector Employment	Number of individuals working on ALWTRP vessels is based on the number of vessels registered in the county and the average number of crew associated with major vessel types. Crew data for federally permitted vessels are drawn from NMFS permit databases; crew data for state-only vessels are based on estimates from Maine (lobster), North Carolina (gillnet), and Massachusetts (OTP and gillnet).	

Exhibit 7A-1

DATABASE FOR COUNTY SOCIOECONOMIC CHARACTERIZATION

Sector	Database Parameter	Description/Source
Dealer Sector	Overall Number of Dealers	Number of seafood dealers purchasing catch landed in the county; derived from NMFS dealer data. Includes only federally permitted dealers.
	Number of Dealers Handling ALWTRP Catch	Number of dealers purchasing catch landed with ALWTRP regulated gear; derived from the NMFS dealer data. Includes only federally permitted dealers.
	Dealer Employment	Employment at dealers handling ALWTRP catch, based on the average number of employees per dealer establishment and the number of dealers in the county. The average employment figure is derived from data in the Census Bureau's County Business Patterns database (based on data for the "fish and seafood wholesale" industry).
Processing Sector	Total Number of Processing Facilities	Number of seafood processing facilities in the county, based on NMFS 2001 processor data.
	Employment at All Processing Facilities	Total number of individuals employed at processing facilities in the county, based on NMFS 2001 processor data. The figures reflect the average number of individuals employed at processors during the year, based on monthly employment data.
	Overall Quantity Processed	Total quantity of fish processed at processing facilities in the county, based on NMFS 2001 processor data.
	Value of Overall Quantity Processed	Value of fish processed at facilities in the county, based on NMFS 2001 processor data.
	Number of Processors Handling ALWTRP Species	Number of processor facilities that handled species affected by ALWTRP requirements, based on NMFS 2001 processor data.
	Employment at Processors Handling ALWTRP Species	Total number of individuals employed at processing facilities handling ALWTRP species. The figures reflect the average number of individuals employed at processors during the year, based on monthly employment data (2001).
	Total Quantity Processed at ALWTRP Processors	Total quantity of fish (ALWTRP and non-ALWTRP species) processed at facilities that handle ALWTRP catch, based on NMFS 2001 processor data.
	Quantity of ALWTRP Species Processed	Quantity of ALWTRP species processed, based on species codes in the NMFS 2001 processor data.
ALWTRP Species Processed as a Percent of Total Processed	Total quantity of ALWTRP-related fish processed, taken as a percent of total quantity of fish processed in the county.	

Exhibit 7A-1**DATABASE FOR COUNTY SOCIOECONOMIC CHARACTERIZATION**

Sector	Database Parameter	Description/Source
	Value of ALWTRP Species Processed	Estimated value of ALWTRP species processed at processing facilities in the county, based on NMFS 2001 processor data.
Demographic	Population, Median Household Income, and Families Below Poverty Line	U.S. Census Bureau, Census 2000 Demographic Profiles.
	Unemployment Rate	U.S. Bureau of Labor Statistics, 2002 Local Area Unemployment Statistics.
	Fishing Dependency	Rating of alternative occupation potential as estimated in Table 2 of Hall-Arber et al., 2001.
	Gentrification Level	Rating of the degree of gentrification for key ports, as estimated in Table 8 of Hall-Arber et al., 2001.
Note: All data 2002, unless otherwise indicated.		