

TABLE X-8.—TOTAL ANNUAL IMPINGEMENT LOSSES FOR ALL OCEAN FACILITIES IN THE NORTH ATLANTIC REGION EXPRESSED AS AGE 1 EQUIVALENTS, FOREGONE FISHERY YIELD, AND PRODUCTION FOREGONE—Continued

Species	Age 1 equivalents (#s)	Total yield (lbs)	Production foregone (lbs)
Rainbow smelt .....	25,005	190	4,854
Red hake .....	7,054	1,287	2,434
Rock gunnel .....	1,883	0	38
Sculpin species .....	1,704	0	415
Scup .....	764	154	500
Searobin .....	234	17	78
Striped bass .....	581	815	1,679
Striped killifish .....	458	0	12
Tautog .....	370	429	1,003
Threespine stickleback .....	880	0	0
White perch .....	310	0	12
Windowpane .....	2,063	181	299
Winter flounder .....	6,981	2,224	5,375
Total .....	184,004	20,406	48,312

Table X-9 displays this information for entrainment. In these tables, “total yield” includes direct losses of harvested species as well as the yield of harvested species that is lost due to losses of forage species. As discussed in

detail in Chapter A5 of Part A of the section 316(b) Phase II Case Study Document, EPA used a simple model of trophic structure and trophic transfer efficiency to estimate the yield of harvested species that is lost because of

the loss of forage to impingement and entrainment. The conversion of forage to yield contributes only a very small fraction to total yield.

TABLE X-9.—TOTAL ANNUAL ENTRAINMENT LOSSES FOR ALL OCEAN FACILITIES IN THE NORTH ATLANTIC REGION EXPRESSED AS AGE 1 EQUIVALENTS, FOREGONE FISHERY YIELD, AND PRODUCTION FOREGONE

Species	Age 1 equivalents (#s)	Total yield (lbs)	Production foregone (lbs)
Alewife .....	0	0	1,119
American plaice .....	1,388	952	859
American sand lance .....	4,513,770	0	267,006
Atlantic cod .....	4,468	2,887	4,827
Atlantic herring .....	34,143	5,837	20,037
Atlantic mackerel .....	7,716	1,441	13,253
Atlantic menhaden .....	8,124	3,729	14,845
Atlantic silverside .....	5,087	3	600
Bluefish .....	5	62	13
Butterfish .....	27	81	10
Cunner .....	1,177,927	5,584	92,933
Fourbeard rockling .....	576,339	0	69,754
Grubby .....	252,098	0	70,899
Lumpfish .....	6,094	0	36,035
Northern pipefish .....	782	0	33
Pollock .....	499	1,050	6,617
Radiated shanny .....	1,789,347	0	20,033
Rainbow smelt .....	1,330,867	9,997	386,647
Red hake .....	2,539	1,005	3,379
Rock gunnel .....	8,080,717	0	214,957
Sculpin species .....	764,165	0	214,910
Searobin .....	3,925	527	1,563
Tautog .....	882	2,417	2,537
Windowpane .....	27,575	3,788	5,418
Winter flounder .....	287,616	92,710	227,283
Total .....	18,876,100	132,070	1,675,567

#### 4. Recreational Fishing Valuation

As noted above, anglers will get greater satisfaction, and thus greater economic value, from sites where the catch rate is higher, all else being equal.

Recreational fishery losses due to impingement and entrainment may reduce recreational catch rates and thus negatively impact angler welfare. To estimate welfare losses to recreational anglers in the North Atlantic region

from impingement and entrainment at cooling water intake structures in North Atlantic, the Agency used a model developed by R. Hicks *et al.* (NMFS, August 1999). For details see “The Economic Value of New England and