

are 55 facilities in the Great Lakes Region. The remaining 372 facilities

were included in the Interior region of the U.S.

TABLE X-1.—DEFINITION OF COASTAL REGIONS

Region	Geographic area	Number of estuarine facilities	Number of ocean facilities	Total number of facilities
North Atlantic .....	Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut.	19	2	21
Mid Atlantic .....	New York, New Jersey, Delaware, Maryland and Virginia ....	43	1	44
South Atlantic .....	North Carolina, South Carolina, Georgia, East Florida .....	13	1	14
Gulf of Mexico .....	West Florida, Alabama, Missouri, Louisiana, Texas .....	20	3	23
Northern California .....	All Counties North of Point Conception .....	6	2	8
Southern California .....	All Counties South of Point Conception .....	2	9	11
Total Number of Estuarine and Ocean Facilities <sup>a</sup> .	.....	103	18	121

<sup>a</sup> In addition, there are 3 ocean facilities in Hawaii that are not included in the NMFS-defined regions.

The analysis of direct use benefits for each region proceeds in three steps: (1) Estimating regional impingement and entrainment losses; (2) estimating benefits to recreational anglers from improved fishing opportunities due to reduced impingement and entrainment based on a region-specific valuation function; and (3) estimating benefits from improved commercial fishery yield. The following sections discuss each of these steps in detail.

### 3. Estimating Regional Impingement and Entrainment Losses

#### a. Species Groups

For the case studies presented at proposal, EPA conducted species-specific analyses of impingement and entrainment on a facility-specific basis. For the new regional studies, EPA is evaluating species groups comprised of species with similar life histories. Groups are based on family groups or groups used by NMFS for landings data. For example, bay goby, blackeye goby, yellowfin goby, and other gobies are grouped together as “gobies.” For the regional studies, EPA evaluated impingement and entrainment rates for such species groups and developed a regional total impingement and entrainment estimate by summing results for each group. An exception was made for species of exceptionally high commercial or recreational value (e.g., striped bass). Such species were evaluated as single species.

Aggregation of species into groups of similar species facilitated parameterization of the fisheries models used by EPA to evaluate facility impingement and entrainment monitoring data. As noted by many commenters and by EPA in the section 316(b) Phase II Case Study Document, life history data are very limited for

many of the species that are impinged and entrained. As a result, there are many data gaps for individual species. To overcome this limitation, in its new studies EPA used the available life history data for closely related species to construct a single representative life history for a given species group. For previously completed case studies, EPA used the species-specific life history information that was previously developed and then aggregated impingement and entrainment results for the species within a given group to obtain a group estimate. The document, “Regional Methodology Used in the section 316(b) Phase II Notice of Data Availability,” summarizes the regional methodology. The documents, “Appendix 1: Life History Parameter Values Used to Evaluate I and E in the North Atlantic Region,” and “Appendix 2: Life History Parameter Values Used to Evaluate I and E in the Northern California Region,” provide tables of all of the life history data and data sources used by EPA for the two regional analyses presented in this NODA.

EPA believes that the species group approach is appropriate for the national rulemaking given the many data limitations associated with our lack of knowledge of specific fish life histories, particularly the growth and mortality rates of early life stages. At the individual permit level, more detailed information should be available based on the data collected to support a permit application (see, for example, the proposed permit application requirements at § 122.21 (r) and § 125.95).

#### b. Impingement and Entrainment Methods

EPA evaluated facility impingement and entrainment monitoring data for all

individual fish species with losses over one percent of the facility total. EPA converted annual impingement and entrainment losses for each species group into (1) age 1 equivalents, (2) fishery yield, and (3) biomass production foregone using standard fishery modeling techniques (Ricker, 1975; Hilborn and Walters, 1992; Quinn and Deriso, 1999). Details of these methods are provided in Chapter A5 of Part A of the section 316(b) Phase II Case Study Document, except for the corrections given in the preceding section “Case Study Corrections and Clarifications” and the changes noted below. Section A5-4 of Chapter A5 discusses data uncertainties. For all analyses, EPA assumed 100% entrainment mortality based on the analysis of entrainment survival studies presented in Chapter A7 of Part A of the section 316(b) Phase II Case Study Document

#### (1) Yield Equation

As several commenters pointed out, the equation for yield presented in Chapter A5 of the section 316(b) Phase II Case Study Document, contains a typographical error. The correct equation is:

$$Y_k = \Delta_j \Delta^a L_{jk} S_{ja} W_a (F_a / Z_a) (1 - e^{-Z_a})$$

where:

$Y_k$  = foregone yield (pounds) due to impingement and entrainment losses in year  $k$   
 $L_{jk}$  = losses of individual fish of stage  $j$  in the year  $k$   
 $S_{ja}$  = cumulative survival fraction from stage  $j$  to age  $a$   
 $W_a$  = average weight (pounds) of fish at age  $a$   
 $F_a$  = instantaneous annual fishing mortality rate for fish of age  $a$