

database files, and (c) it is applicable to rivers, estuaries, and lakes.

If site-specific models are used, EPA will not be able to model each regulated MPP facility receiving water or watershed separately due to various factors, including data requirements and time constraints. One potential scenario is to develop a limited number of "generic" watersheds that are representative of the topography and hydrology of the areas in which MPP facilities are located. Load reduction scenarios for each of the facilities with detailed information would then be evaluated for water quality

improvements using the "generic" watershed which best represents the geography and flow conditions of the discharging facility. Another option being considered is to model a small sample of the watershed or reach areas containing MPP facilities and extrapolate results to a broader number of areas (see Section VII.B.2 of this NODA).

In determining which of these candidate models to pursue, EPA will weigh resource requirements for each model, the availability of data required to run each model, and the contribution of the endpoints simulated by each

model toward best representing the range of environmental impacts and benefits of regulation. If EPA uses one or more of these models for the final rule, EPA will use the revised final loadings estimates along with information on facility location within watersheds. A comparison of the advantages and disadvantages of all three models is provided in Table VII.A.2-1. EPA solicits comment on the applicability of the AQUATOX, QUAL2E and BASINS models to model the environmental benefits of the MPP regulation.

TABLE VII.A.2-1.—SUMMARY OF THE FEATURES OF AQUATOX, QUAL2E, AND BASINS

AQUATOX	QUAL2E	BASINS
Conventional and nutrient loadings assessed	Conventional and nutrient loadings assessed	Conventional (including DO, BOD, TSS, FC) and nutrient loadings assessed
Eciststen effects (effects on fish and other aquatic life) estimated	Requires specific data about reach and pollutant parameters	Includes background levels for DO ₃ , NH ₃ , and BOD
Requires specific data about reach and pollutant parameters	Does not model TSS; Only models rivers, no estuaries or lakes	Reach and pollutant data easily available from BASINS databases
Does not model BOD, FC; Multiple model runs required to model effect of pollutants downstream from reach	Peer reviewed/available to public	Models rivers, estuaries, and lakes
Peer reviewed/available to public		Peer reviewed/available to public

B. Recreational Benefits: What Changes and Information Are Being Considered?

The benefits analysis for the proposed rule used two methods to estimate a household's willingness to pay for improvements in water quality: (1) A water quality ladder; and (2) a continuous water quality index. Both methods are based on results from a stated-preference survey conducted by Mitchell and Carson (1993).² Previous applications of the Mitchell and Carson survey had focused on the household willingness to pay for "stepped" improvements in water quality from current levels to boatable, fishable, and swimmable conditions nationwide. Each step on the ladder, *i.e.* use level, was defined by a set of water quality indicators such that a water body must meet minimal criteria for every indicator to be classified into the next higher use class. Thus, the stepped willingness to pay could only indicate a benefit from an action that resulted in all water quality indicators satisfying the next higher use category. The ladder approach failed to attribute any benefits

to improvements in water quality that were insufficient to actually achieve a discrete improvement in use. Conversely, a relatively small change in water-quality could receive a relatively large valuation if it happened to push water-quality over the threshold between steps. A "continuous" method was suggested by Mitchell and Carson (1993) as a means to attribute benefits to marginal water quality improvement whether or not it happened to be of sufficient improvement to result in reclassification to a higher use class. The benefits analysis of the proposed MPP regulation presented both methods in order to contrast their results.

The "continuous" method of monetizing water quality benefits from WQI changes used in the analysis of the proposed rule was further revised in the benefit assessment of the final effluent limitation guidelines for CAFO. This revision included the application of a benefit transfer function from the Mitchell and Carson survey. Mitchell and Carson expressed the results of their survey in several forms. In one format, Mitchell and Carson assigned a single value to each change in use class, *e.g.*, households were willing to pay \$184 (1999 dollars; updated household income) to raise all of the nation's waters from boatable to fishable

conditions. The continuous benefit analysis of the MPP proposed rule divided this value by the number of WQI points in the step so that each unit change was assigned a portion of the value for achieving the whole step. For example, assume the threshold WQI for boatable waters was 79 and the threshold for the next higher step, fishable waters, was 94.4. Dividing \$184 by 15.4 WQI points in the boatable range allocates \$11.91 to each WQI point gained. Thus, household willingness to pay for a three point improvement in WQI in this range would be \$35.73 (=3×11.91). Mitchell and Carson also expressed their results as an equation relating the change in the water quality index and household income to the household's willingness to pay for improved water quality. For the final rule, EPA is considering using this function to value benefits based on the changes in the WQI. The continuous equation approach may be superior to the ladder approach in that it addresses concerns that benefits from marginal changes in the water quality are missed using the discrete ladder. And the Mitchell-Carson benefit function approach may be superior to the WQI approach used at proposal in that it is less sensitive to the baseline use of the waterbody. In contrast, the WQI

² Carson, Richard T. and Robert C. Mitchell. 1993. The Value of Clean Water: The Public's Willingness to Pay for Boatable, Fishable, and Swimmable Quality Water. Water Resources Research 29(7):2445-2454.