

fishing, boating and wildlife observation that may be enhanced when risks to aquatic life are reduced and where perceivable water quality efforts associated with MP&M pollutants, such as turbidity, are reduced. Among these ecological benefits, EPA was able to estimate dollar values for improved recreational opportunities and for non-user benefits.

EPA expects the MP&M rule to improve aquatic species habitats by reducing concentrations of toxic contaminants such as aluminum, cadmium, copper, lead, mercury, silver, and zinc in water. These improvements may enhance the quality and value of water-based recreation, such as fishing, swimming, wildlife viewing, camping, waterfowl hunting, and boating. The benefits from improved water-based

recreation would be seen as increases in the increased value participants derive from a day of recreation and the increased number of days that consumers of water-based recreation choose to visit the cleaner waterways. This analysis measures the economic benefit to society from water quality improvements based on the increased monetary value of recreational opportunities resulting from those improvements.

EPA assessed recreational benefits of reduced occurrence of pollutant concentrations exceeding aquatic life and human health AWQC values. EPA estimates that baseline in-stream concentrations of 9 pollutants (*i.e.*, aluminum, cadmium, copper, lead, manganese, mercury, nickel, silver, and zinc) will exceed the acute and chronic

criterion for aquatic life in 353 reaches nationwide. The final rule eliminates concentrations in excess of aquatic life-based AWQCs on nine of these reaches. Section IX.4 of this preamble presents EPA's analysis of the effect of MP&M discharges on occurrence of pollutant concentrations in affected waterways in excess of human health-based AWQCs.

The analysis of recreational benefits combined the findings from the aquatic life benefits analysis and the human health AWQC exceedance analysis described previously. These analyses found that 394 stream reaches exceed chronic or acute aquatic life AWQC and/or human health AWQC values at the baseline discharge levels (*see* Table IX-3). EPA expects the final rule will eliminate exceedances on nine of these discharge reaches.

TABLE IX-3.—ESTIMATED MP&M DISCHARGE REACHES WITH MP&M POLLUTANT CONCENTRATIONS IN EXCESS OF AWQC LIMITS FOR PROTECTION OF HUMAN HEALTH OR AQUATIC SPECIES

Regulatory status	Number of reaches with MP&M pollutant concentrations exceeding AWQC limits					Number of benefitting reaches	
	Aquatic life		Human health		Total	All AWQC exceedances eliminated	AWQC exceedances reduced
			H ₂ O and organisms	Organisms only			
Chronic	Acute						
Selected Option: Traditional Extrapolation							
Baseline	353	18	78	21	394	N/A	N/A
Post-Compliance	344	9	78	21	386	9	0
Selected Option: Post-Stratification Extrapolation							
Baseline	350	15	112	21	426	N/A	N/A
Post-Compliance	344	9	112	21	420	6	0

Removing water quality impairments would increase services provided by water resources to recreational users. EPA expects potential recreational users to benefit from improved recreational opportunities, including an increased number of available choices of recreational sites. For example, some of the streams that were not usable for recreation under the baseline discharge conditions may be newly included in the site choice set for recreational users from nearby counties. Streams that have been used for recreation under the baseline conditions can become more attractive for users making recreational trips more enjoyable. Individuals may also take trips more frequently if they enjoy their recreational activities more.

EPA attached a monetary value to these reduced exceedances based on increased values for three water-based recreation activities—fishing, boating, and wildlife viewing—and for non-user values. Because most benefitting reaches are close to densely populated areas,

potential recreational users may also benefit from lower travel costs to the recreational sites in the vicinity of their home towns that were not previously suitable to water-based recreation. EPA applied a benefits transfer approach to estimate the total WTP, including both use and non-use values, for improvements in surface water quality. This approach builds upon a review and analysis of the surface water valuation literature.

EPA first estimated the baseline value of each recreational activity (*i.e.*, fishing, boating, and wildlife viewing) corresponding to the benefitting reach by multiplying the estimated annual person-days per reach by the estimated per-day values of water-based recreation. The baseline per-day values of water-based recreation are based on studies by Walsh *et al.* (1992) and Bergstrom and Cordell (1991) (*see* DCN 20444 and DCN 20427, section 8.5.2.4). The studies provide values per recreation day for a wide range of water-

based activities, including fishing, boating, wildlife viewing, waterfowl hunting, camping, and picnicking. The mean values per recreational fishing, boating, and wildlife viewing day used in this analysis are \$42.12, \$48.30 and \$26.28 (2001\$) respectively. Applying facility weights and assuming over all benefitting reaches provides a total baseline value for a given recreational activity for MP&M reaches expected to benefit from the elimination of pollutant concentrations in excess of AWQC limits.

EPA then applied the percentage change in the recreational value of water resources implied by surface water valuation studies to estimate changes in values for all MP&M reaches in which the regulation eliminates AWQC exceedances by one or more MP&M pollutants. The Agency selected eight of the most comparable studies and calculated the changes in recreation values from water quality improvements (as percentage of the baseline) implied