

under alternative C are 48% less than alternative D in 2012. The threshold volumes required to meet water quality standards at Lake Mohave under alternative C are 61% less than

alternative D in 2012 because of the combination of fewer boats on the water in alternative C and the ban on two-stroke carbureted engines after 2012. Complete results of the water quality

analysis are found in the water quality section of the Environmental Consequences section of the Final EIS and in appendix H of the Final EIS.

IMPACTS OF ALL WATERCRAFT ON SURFACE WATER QUALITY—THRESHOLD VOLUME OF WATER NEEDED TO MEET WATER QUALITY STANDARDS

[In acre-feet]

Alt/Year	Ecological benchmark					Arizona standards for fish consumption	Human health criteria	
	Benzo (a)pyrene (fuel and exhaust)	Naphthalene	1-methyl Naphthalene	Benzene	MTBE	Benzo (a)pyrene (fuel and exhaust)	Benzo (a)pyrene (fuel and exhaust)	Benzene
Lake Mead								
(assuming minimum pool elev. 1,150 feet, volume above thermocline 2,085,000 acre-feet)								
C-2004	4,047	1,602	4,554	1,836	58	28,331	12,878	198,900
D-2004	4,593	1,818	5,167	2,083	66	32,149	14,613	225,702
C-2012	1,754	694	1,973	795	25	12,275	5,580	86,179
D-2012	3,371	1,334	3,793	1,529	48	23,597	10,726	165,662
Lake Mohave								
(assuming minimum pool elev. 634 feet, volume above thermocline 687,800 acre-feet)								
C-2004	3,352	1,326	3,771	1,520	48	23,461	10,664	164,706
D-2004	3,925	1,553	4,416	1,780	56	27,473	12,488	192,874
C-2012	1,035	410	1,165	470	15	7,247	3,294	50,877
D-2012	2,652	1,049	2,983	1,203	38	18,561	8,437	130,307

18. One commenter stated, EPA has confirmed that studies show most unburned gasoline and gasoline additives emitted from two-stroke marine engines evaporate from water within the first hour and 15 minutes after they are released. More specifically, at 86 degrees Fahrenheit 84% of the unburned gasoline/additive mix released into the water evaporated within 75 minutes.

NPS Response: We generally agree with this comment. The commenter includes a quantitative discussion of the volatility of many of the components found in gasoline and gasoline additives emitted from carbureted two-stroke engines. As stated in the Final Environmental Impact Statement, many organic pollutants that are initially dissolved in the water volatilize to the atmosphere, especially if they have high vapor pressures, are lighter than water, and mixing occurs at the air/water interface (Final EIS, Methodology section, under Water Resources, Assumptions for Evaluating Impacts from Marine Engines, Including Personal Watercraft). Therefore, NPS analyses accounts for evaporative rates in its methodology and believes it has accurately portrayed potential effects to water quality.

19. There were a number of commenters concerned that the changeover to four-stroke and two-stroke direct injection PWC engines to meet the requirements of the EPA 2006 and CARB 2008 emission standards is occurring much more rapidly than EPA and National Park Service has estimated. Amounts of unburned fuel released at Lake Mead and Lake Mohave will accordingly continue to decline rapidly, achieving a reduction of approximately 90% from the 1998 baseline levels by 2012.

NPS Response: In the water quality analysis presented in the Final EIS, the assumption was made that clean technology engines (any engine not using carbureted two-stroke technology) would be 90% cleaner than the carbureted two-stroke engines. Under alternative C, conversion to all clean technology engines would be completed by 2012, while alternative D uses the rate of conversion of the engines from carbureted two-stroke to clean engines consistent with the EPA rule, "Final Rule for New Gasoline Spark-Ignition Marine Engines" (US EPA, 1996). The NPS used the EPA data where it was assumed that 21.6% of the carbureted two-stroke engines in use in 1998 would be replaced by 2004 and that 58.4% would be replaced by 2012. One of the

commenter's (Personal Watercraft Industry Association) assertion is principally based on confidential, proprietary PWC sales and forecast data prepared by PWC manufacturers. This proprietary data was not supplied with the comment, and therefore has not been available to the NPS.

The commenter states that the data indicates that the conversion of PWC models to cleaner engines is occurring more rapidly than anticipated in the 1996 EPA analysis of the effects of the conversion rule. While the National Park Service has no reason to doubt that PWC conversions and sales may be proceeding at a greater rate than forecast by EPA, there is no survey or similar data available at this time that indicates that the engine mix at Lake Mead is proceeding at a faster or slower rate than the EPA forecast. Therefore, use of the EPA rates is considered appropriate in disclosing potential impacts to water quality.

20. One commenter stated the National Park Service committed to investigate the extent of oil and gas spills at refueling operations in the Lake Mead NRA, and to mitigate the impacts from these activities. This will further reduce the amount of unburned fuel released into the waters of the Lake Mead NRA from PWC use. Expected