

ESTIMATED HYDROCARBON AND NITROGEN OXIDES EMISSIONS FOR ALTERNATIVES C AND D
[Tons per year]

	Alternative C ¹				Alternative D ²				Difference ³	
	2004		2012		2004		2012		2012	
Percent of carbureted two-stroke engines replaced	21.6%		100%		21.6%		58.4%			
Pollutant	All watercraft	PWC	All watercraft	PWC	All watercraft	PWC	All watercraft	PWC	All watercraft	PWC
Hydrocarbons (HC)	904	689	360	199	918	701	659	467	299	268
Nitrogen oxides (NO _x)	159	16	186	40	161	16	174	28	- 12	- 12
HC+NO _x	1063	705	546	239	1079	717	833	495	287	256

¹ Alternative C (modified preferred alternative): After 2012, all boats on the lakes would be compliant with the EPA 2006 emission standards.

² Alternative D (baseline alternative): By 2012, 58.4% of carbureted two-stroke engines on the lakes would be compliant with the EPA 2006 emission standards. Using EPA's assumptions, by 2025, 75% of engines on the lakes would be compliant with the EPA emission standards.

³ Difference between alternative C and alternative D in 2012. Negative values indicate an increase in NO_x emissions.

Note that in 2004 the conversion of carbureted two-stroke engines to cleaner engines is assumed to be the same for both alternatives C and D, but the emissions for alternative D would be higher than for alternative C. This would occur because alternative D would allow more watercraft to be in operation, compared to alternative C. The important result shown in the above table is that in 2012, alternative C would result in 287 fewer tons per year of HC+NO_x than alternative D. Alternative C proposed elimination of these annual emissions through the life of the plan (2003 through 2023) would be a significant contribution to the efforts to reduce ozone concentrations in the region. This is because even though the cleaner four-stroke and two-stroke direct injected engines will emit more NO_x due to a higher ratio of fuel actually being burned, they emit less hydrocarbons which reduces the likelihood of ozone formation.

Emission levels shown in the table above are not directly comparable with the emission levels submitted by the commenter because the National Park Service—Air Quality Division calculates emissions on an annual basis, and the commenter's calculations are for an average boating day during the boating season. Some assumptions made for National Park Service calculations are more conservative than those used for commenter's calculations. The National Park Service assumed that the conversions from carbureted two-stroke engines to cleaner engines would occur at the rate forecast by the Environmental Protection Agency. As shown in the table above for tons per year of estimated hydrocarbon and nitrogen oxides emissions for alternatives C and D, 21.6% conversion is assumed from 1998 levels by 2004, and 58.4% conversion by 2012. The commenter

assumes a faster conversion. The commenter assumes that emissions would be reduced because a significant portion of PWC would be cleaner than EPA requirements due to compliance with the more restrictive California requirements. However, our goals for the reduction of emissions can not be achieved without the proposed 2012 restrictions.

24. One commenter expressed concern that PWC emissions are declining faster than forecast by the EPA. The existing fleet of PWC has achieved a 25% reduction in the pre-1999 baseline of HC+NO_x emissions, and will achieve over an 80% reduction by 2012.

NPS Response: The comment is principally based on two assumptions made by the commenter. The first is based on confidential, proprietary PWC sales and forecast data prepared by PWC manufacturers. No supporting data was supplied with the comment. 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 indicating the engine conversion at Lake Mead is proceeding at a faster or slower rate than the EPA forecast. Therefore, use of the EPA rates is considered appropriate—and use of an accelerated rate may be considered speculative without additional supporting data.

The second assumption by the commenter is that 75% of the PWC at Lake Mead will have engines that comply with the California (CARB) conversion rule for all years, which requires that marine engine emission

reductions targeted by the EPA for 2006 be achieved in California by 2001. The California rule then requires further emission reductions by 2004 and 2008 (title 13, California Code of Regulations, sections 2440–2448). The commenter assumes that 50% of the PWC users at Lake Mead will be from California and all will have CARB-compliant watercraft, and that, because of manufacturing and sales efficiencies outside of California, an additional 25% of the Lake Mead PWC users will have CARB-compliant watercraft. The National Park Service concurs that many watercraft users at Lake Mead have California-registered PWC, and that they will meet the California Air Resources Board standards.

There is no data relative to PWC at Lake Mead to confirm the 75% figure assumed by the commenter. The National Park Service emissions calculations are conservative only in the sense that it does not specifically account for watercraft that have already or will be converted to meet California Air Resources Board standards. This is not considered “overly” conservative because 50% of the park visitors originate from California, and a certain percentage of these visitors will have PWC that are compliant with the EPA 2006 rule. There is currently no data to support or refute this 75% estimate. Under the preferred alternative, the engines would be 100% compliance after 2012.

25. One commenter stated that PWC emissions of HC+NO_x at Lake Mead during the boating season were 3.9 tons per day prior to 1999, and are estimated at 2.9 tons per day for 2002 and 0.7 tons per day in 2012. Clark County, Nevada emissions are estimated at 450 tons per day. Therefore, PWC emissions at Lake Mead pose no public health risks.

NPS Response: The NPS-estimated emissions are a small fraction of Clark