

shore locations, the 0.5m depth was a representative depth when taking this into consideration.

Lastly, most studies and long-term monitoring efforts conducted elsewhere were designed with sampling stations at 3m and/or 0.5 depths, thus allowing the Lake Powell results to be compared to results in these other water bodies.

39. One commenter stated that the numbers used to predict loading on the lake for future years assume a zero growth condition. A zero growth assumption is not realistic for the boating industry or Glen Canyon National Recreation Area. Glen Canyon National Recreation Area has plans to continue to develop projects that support the boating industry.

NPS Response: New estimates for changes in boat uses at Glen Canyon have been generated for the Final Environmental Impact Statement based on trends for National Park Service units with PWC usage throughout the United States. Over the last 10 years Glen Canyon NRA has experienced a decrease in boating use at about -2.6%. In order to give a variety of growth scenarios for the future, the effects of three differing growth scenarios are now described in the analysis: (1) Annual increase in use of 2% per year, (2) no change (flat rate), and (3) annual decrease in use of 2% per year. For a complete explanation of the change in use, see the "Visitor Use and Experience" section in the "Affected Environment" chapter in the Final Environmental Impact Statement.

40. One commenter stated that there was no conclusion as to how much of the water pollution could be attributed to PWC.

NPS Response: The conclusion on PWC hydrocarbon contribution relative to all watercraft is presented in the "Environmental Consequences" chapter of the Draft and Final Environmental Impact Statements. Using the methodology developed by the National Park Service Division of Environmental Quality (Bransom) and assumptions of the relative polluting capabilities of PWCs and other motorized vessels, PWC were estimated to contribute 50% of all hydrocarbon pollution to the lake.

41. One commenter performed calculations to determine the PWC contribution to lake pollution. Assuming PWC engines have four times the emission displacement into the water of other boats, a total contribution of 21% was obtained versus the NPS assumption of 50%.

NPS Response: Commenter's assumptions about engine sizes do not reflect the boating distribution data gathered for Lake Mead which was used

as an estimate of use by engine type on Lake Powell. The "Methodology and Assumptions" section in the "Environmental Consequences" chapter of the Draft and Final Environmental Impact Statements explains the boat distribution and clearly shows the greatest percent of boat hours are generated by "stern-drive" or inboard/outboard engines. These engines are often comparable in size to automobile engines, not one-quarter the size of the typical PWC engine. Because the commenter did not consider the distribution of engine types in the recreation area, we believe that their conclusion that PWC contribute only 21% of the pollution into the lake is incorrect. Furthermore, the methodology used in the EIS analysis differed from the commenter's calculation in that the EIS methodology considered the pollution contribution to the lake by engine type (carbureted, two-stroke direct-injected, and four-stroke). The assumptions in the EIS methodology are that four-stroke and clean technology two-stroke engines deliver to the water 10% of the hydrocarbons of carbureted two-stroke engines.

42. One commenter suggested calculating two-stroke engine pollution contribution using fuel and engine oil purchases made at the lake's marinas.

NPS Response: Many boaters buy fuel and oil at locations other than the marina, and using the marina sales would not capture the total amount of petroleum products used on the lake by two-stroke or other engine types.

Comments Related to Air Quality

43. Commenters stated that the National Park Service did not consider 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 emissions at Glen Canyon will accordingly continue to decline rapidly, achieving a reduction of approximately 90% by 2012.

NPS Response: All alternatives use 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" (EPA 1996). The National Park Service 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. The commenter's opinion 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, was not available to the National Park Service.

The commenter states that the data indicates that the conversion of two-stroke carbureted PWC models to cleaner direct-injection 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 the EPA, there is no survey or similar data available at this time that indicates that the engine mix at Glen Canyon 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 on air quality. Under the modified preferred alternative B, PWC used in the recreation area after 2012 would be 100% compliant with the EPA 2006 emissions standards for the manufacturing of gasoline marine engines versus 58.4 percent estimated by EPA in 1996. The concessionaire is currently replacing any discontinued PWC with a new model that meets or exceeds the EPA 2006 standards. It is estimated that the concessionaire fleet would consist of PWCs meeting the EPA 2006 standards within the next three years.

PWCs rented outside the recreation area for use in the recreation area will also have to meet the EPA emission standards after 2012. Entrance to the recreation area will require all PWC to have EPA 2006 emission certification prior to entering the park.

44. One commenter expressed concern that PWC emissions are declining faster than forecasted by the EPA. The existing fleet of PWC has achieved a 25% reduction compared to hydrocarbon plus nitrogen oxides (HC + NO_x) emission levels before the EPA regulation became effective, and will achieve reductions greater than 80% by 2012.

NPS Response: The comment is principally based on two assumptions made by the commenter. The first is based on confidential, proprietary information regarding 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 seen that local rentals