

protected. Water quality shall not be lowered to a level that does not comply with applicable water quality standards" (Arizona Administrative Code R18-11-107; see the "Water Quality" section, "Affected Environment" chapter). The National Park Service water quality sampling performed at Lake Powell did not show that any Arizona water quality criteria were exceeded. As shown in Table 9 in the "Affected Environment" chapter, Arizona standards are not as stringent as those for Utah, with the exception of naphthalene and these standards are not violated. There would be no violation of Arizona water quality standards set for the designated uses of Lake Powell under any of the alternatives analyzed in this assessment. The EIS text has been edited in the "Water Quality" section of the "Environmental Consequences" chapter to clearly state this finding.

The modified preferred alternative B in the Final Environmental Impact Statement includes mitigation measures to further protect water quality in the recreation area. The modified preferred alternative will provide an important step toward substantially reducing petroleum-related pollution by requiring all PWC used in the recreation area after 2012 to be 100% compliant with the EPA 2006 emissions standards for the manufacturing of gasoline marine engines.

35. One commenter stated that cumulative effects of the build up of oil and gasoline in the lake over time were ignored. The estimated emission into the lake assumed that on a daily basis, 100% of hydrocarbon emissions volatilized daily. The emissions from PWC contain oil, and oil does not volatilize completely.

*NPS Response:* The commenter has misinterpreted the DEIS. NPS never stated that 100% of the hydrocarbon emissions volatilized daily. Although most polycyclic aromatic hydrocarbon components are volatile, some of these hydro pollutants do accumulate in the water column. The text has been changed and is included in the Final Environmental Impact Statement to provide more information on volatility and on the evaporation and half-life rates applicable to the waters of Lake Powell. Detailed discussions on this issue can be found in the Final Environmental Impact.

36. One commenter stated that the analysis lacks a description of a detailed long-term monitoring plan to ensure evaluation of impacts on the aquatic system.

*NPS Response:* Modified alternatives A and B addressed in the Final

Environmental Impact Statement include implementation of a water quality monitoring project. The project will be directed at developing a detailed long-term monitoring plan by the Technical Advisory Committee, formed in 1996 to protect Lake Powell's water quality. The plan will ensure that water quality complies with State regulations and criteria and is consistent with requirements of the Clean Water Act. The monitoring project will benefit from the findings of two recently completed studies on the chemical content of lake waters and sediment in the Colorado River inflow area and three side canyons. An additional study on the dynamics of sediment re-suspension in the Colorado River inflow is currently underway. Funding is also being sought for additional studies in the San Juan and Escalante River inflow areas. The monitoring project will include hydrocarbon content of sediments and PAH content of lake waters. Benthic population studies may be included, if deemed necessary by the Technical Advisory Committee. The results of the monitoring project will be used to guide management decisions for any impacts on the aquatic system on Lake Powell.

37. One commenter requested that the water quality section of the Final Environmental Impact Statement should clearly state whether activities regulated by the National Park Service are violating, or have the potential to violate, State-adopted, EPA-approved water quality standards under the Federal Clean Water Act.

*NPS Response:* We agree with the comment and the FEIS was revised to show that there are no violations or potential violations of State or Federal standards. The Utah Department of Environmental Quality, Water Quality Division, was contacted for clarification of the State's assessment of Lake Powell water quality. The division reported that the State has no concerns with regard to the 1.7 µg/L and 3.43 µg/L benzene concentration obtained near Bullfrog Marina during water quality testing. The drinking water intake near Hite Marina is approximately 0.25 mile upstream of the marina, and it is unlikely that gasoline components from the marina would migrate in this direction. Hite is also a smaller marina than Bullfrog, with much less boat traffic and fueling activities. Because of current water levels, Hite Marina is not currently operating. Water levels will need to increase significantly in Lake Powell before Hite Marina can return to full operation. In addition, the intake floats at approximately 12 feet below the water surface. Benzene is lighter than water, highly volatile, and has a half-life

of approximately five hours. There are no water quality concerns by the State of Arizona since no drinking water is extracted from Lake Powell in Arizona.

The Final Environmental Impact Statement proposes a water quality monitoring program for modified alternatives A and B. This plan is outlined in responses to "General Comments" above.

The "Water Quality" section in the "Affected Environment" chapter has been changed in the Final Environmental Impact Statement to include new information on the drinking water intakes and on the jurisdiction over the two sites.

38. One commenter stated that the assessment of water quality is based on water column samples taken at 0.5 and 3 meter depths. Given that most constituents from watercraft exhaust or refueling spills will float on the water's surface, it would seem logical to collect water samples at the water's surface rather than 0.5 meters below to determine compliance with standards.

*NPS Response:* The objective of the sampling effort was to collect representative data that would be most useful for comparison to Clean Water Act water-quality criteria and standards, especially those promulgated for the protection of drinking water supplies and aquatic life. To meet these objectives, sample locations that represented mixed and homogeneous conditions after considering watercraft propeller and wake affects and naturally occurring wave action would yield data representative for these purposes. To determine appropriate sampling depths that would meet these criteria, the most recent body of literature on water pollution caused by motorized watercraft was reviewed and researchers in the field were sought and interviewed.

Through that review and those interviews the NPS determined that there is evidence that, for motorized vessel-expelled PAHs, completely mixed conditions occur at 3m depth. PAH concentrations that are found in completely mixed conditions are more representative of bioavailable concentrations for aquatic life and therefore more comparable to water quality criteria.

Additionally, concentrations of BTEX in particular were assumed to be much more variable at the surface than 0.5m below it and, therefore, concentrations at the water surface would be less representative. The assumption here was that due to vessel and wave action, mixing would be greater just below the surface rather than right at it. Previous research found that, at least at near-