

apply to the personal watercraft powered by them. There is general agreement that two-stroke engines (including personal watercraft) discharge a gas-oil mixture into the water. Fuel used in PWC engines contains many hydrocarbons, including benzene, toluene, ethylbenzene, and xylene (collectively referred to as BTEX). Polycyclic aromatic hydrocarbons (PAHs) also are released from boat engines, including those in personal watercraft. These compounds are not found appreciably in the unburned fuel mixture, but rather are products of combustion. Discharges of all these compounds—BTEX and PAHs—have potential adverse effects on water quality.

Under the proposed regulation, PWC would be allowed within Amistad National Recreation Area with some locational restrictions. Numbers of personal watercraft using the reservoir and adjoining waters during a high-use day would likely increase from an average of 32 per day in 2002 to 37 per day in 2012, an average increase of 1.5% per year. Based on current observations it is assumed that 14 personal watercraft would operate in the Amistad Reservoir and Rio Grande upstream of the reservoir in 2002, increasing to 16 by 2012; and 18 personal watercraft would operate in Devils River and San Pedro Canyon, increasing to 21 by 2012.

Continuing PWC use under this regulation, as it was before November 7, 2002, was evaluated in the EA and the analysis determined that PWC use would have negligible adverse effects on water quality because of improved emissions controls from EPA in place by 2012. (For an explanation of terms such as “negligible” and “adverse” in regard to water quality, *see* page 91 of the Environmental Assessment.) The EA analysis found that all pollutant loads would be well below ecotoxicological benchmarks and human health criteria. Cumulative impacts from PWC and motorized boat use would also be negligible through improved emission controls. This proposed rule was also reviewed as required by NPS Management Policies to determine if park resources would be impaired. Based upon the findings in the EA, the NPS has concluded that PWC use would not result in an impairment of the water quality resource.

Air Quality

PWC emit various compounds that pollute the air. In the two-stroke engines commonly used in personal watercraft, the lubricating oil is used once and is expelled as part of the exhaust; and the combustion process results in emissions

of air pollutants such as volatile organic compounds (VOC), nitrogen oxides (NO_x), particulate matter (PM), and carbon monoxide (CO). Personal watercraft also emit fuel components such as benzene that are known to cause adverse health effects. Even though PWC engine exhaust is usually routed below the waterline, a portion of the exhaust gases go into the air. These air pollutants may adversely impact park visitor and employee health, as well as sensitive park resources.

For example, in the presence of sunlight VOC and NO_x emissions combine to form ozone. Ozone causes respiratory problems in humans, including cough, airway irritation, and chest pain during inhalations. Ozone is also toxic to sensitive species of vegetation. It causes visible foliar injury, decreases plant growth, and increases plant susceptibility to insects and disease. Carbon monoxide can affect humans as well. It interferes with the oxygen carrying capacity of blood, resulting in lack of oxygen to tissues. NO_x and PM emissions associated with PWC use can also degrade visibility. NO_x can also contribute to acid deposition effects on plants, water, and soil. However, because emission estimates show that NO_x from personal watercraft are minimal (less than 5 tons per year), acid deposition effects attributable to personal watercraft use are expected to be minimal.

Under the proposed rule, PWC use would be allowed to operate under the same conditions as were in effect before November 7, 2002. PWC users could operate wherever motorized vessels are authorized. The number of personal watercraft using Amistad is predicted to increase annually by approximately 1.5%, based on current trends at the unit. Baseline data for the 2001/2002 season at Amistad indicate annual use at approximately 640 personal watercraft, with each machine assumed to operate on the water for an average of four hours per day. The predominantly two-stroke engine technology would be replaced gradually over time in accordance with the Environmental Protection Agency's (EPA) requirements for engine manufacturers so that by 2012 most personal watercraft will be the cleaner burning four-stroke type.

Allowing PWC use at Amistad National Recreation Area at the previous levels would result in negligible adverse impacts for all pollutants. (For an explanation of terms such as “negligible” and “adverse” in regard to air quality *see* page 100 of the Environmental Assessment.) Cumulative emission levels would be

negligible for PM₁₀, HC, VOC, and NO_x. Cumulative CO emissions would be at a moderate adverse level for both the short and long term. Over the long term NO_x emissions would increase slightly, with a negligible adverse effect. This alternative would not alter existing air quality conditions, with future reductions anticipated in PM₁₀, HC, and VOC emissions due to improved emission controls. Therefore, the proposed rule would not result in an impairment of air quality.

Soundscapes

The primary soundscape issue relative to PWC use is that other visitors may perceive the sound made by personal watercraft as an intrusion or nuisance, thereby disrupting their experiences. This disruption is generally short term because personal watercraft travel along the shore to outlying areas. However, as PWC use increases and concentrates at beach areas, related noise becomes more of an issue, particularly during certain times of the day. Additionally, visitor sensitivity to PWC noise varies from backcountry users (more sensitive) to swimmers at popular beaches (less sensitive). Amistad's backcountry visitors consist of boaters who camp at undesignated campsites along the shoreline.

The biggest difference between noise from PWC and that from motorboats is that PWC repeatedly leave the water, which magnifies noise in two ways. Without the muffling effect of water, the engine noise is typically 15 dBA louder than it would be while operating continually underwater and the smacking of the craft against the water surface results in a loud “whoop” noise or series of them. With the rapid maneuvering and frequent speed changes, the impeller has no constant “throughput” and no consistent load on the engine. Consequently, the engine speed rises and falls, resulting in a variable pitch. This constantly changing noise is often perceived as more disturbing than the constant noise from motorboats.

PWC users tend to operate close to shore, to operate in confined areas, and to travel in groups, making noise more noticeable to other recreationists. Motorboats traveling back and forth in one area at open throttle or spinning around in small inlets also generate complaints about noise levels; however, most motorboats tend to operate away from shore and to navigate in a straight line, thus being less noticeable to other recreationists.

Under the proposed rule, noise from personal watercraft would continue to