



## **Vermont Legislative Research Shop**

### **Snowmobile Impact on the Natural Environment**

#### **Emissions**

Recreational two-stroke vehicles including snowmobiles, all terrain vehicles (ATV's), mini-bikes, and other specialty vehicles, are significantly more polluting than four stroke engines due to their poor combustion. The typical snowmobile produces significantly more Carbon monoxide (CO) and unburned hydrocarbons (UHC) than a modern automobile (National Park Service).

Figures submitted to the California Air Resources

issued. New standards have been adopted for emissions of oxides of nitrogen (NO<sub>x</sub>

productivity, and can impair immune function. Furthermore, Dorance *et al.*, (1973), Moen (1976) have suggested that additional human caused stress on wildlife in the winter is undesirable since it may increase energy use and stress resulting in increased mortality, decreased productivity, and changes to behavioral adaptations.

### **Alternatives**

Snowmobiles could be altered by switching to a small four-stroke engine with conventional pollution control equipment, running a two-stroke engine slightly lean with catalytic after-treatment, or using two stroke engines with fuel injection would also aid the environment. A study prepared for the National Park Service and the Montana Department of Environmental Quality by Lela and White (2002) concluded

- Commercially-available 4-stroke snowmobiles are significantly cleaner than 2-stroke sleds. Compared to previously tested 2-strokes, these 4-stroke sleds emit 98-95 percent less HC, 85 percent less CO, and 90-96 percent less PM.
- Four-stroke snowmobile NO<sub>x</sub>, however, is considerably higher than from a 2-stroke, being increased by a factor of seven to twelve.
- The commercially-available 4-stroke snowmobiles emit roughly 90 percent less toxic hydrocarbons, such as 1,3-butadiene, benzene, formaldehyde, and acetaldehyde, than 2-stroke sleds.
- Four-stroke snowmobiles achieve approximately 40 percent better fuel economy than 2-stroke sleds.
- Use of a catalyst can further reduce snowmobile emissions. The University of Idaho CSC 2002 sled, that incorporates a 4-stroke, closed-loop controlled engine with catalyst, generated the lowest emissions of all sleds tested. Compared to the 4-stroke Arctic Cat sled, the Idaho sled emitted 64 percent less HC, 29 percent less CO, 99 percent less NO<sub>x</sub>, and 36 percent less PM (Lela and White 2002).

A proposed way to eliminate environmental and wildlife effects from snowmobiles is President Clinton's ban on snowmobiles in Yellowstone and Grand Teton National Parks that was suppose to take full effect in 2003-2004. The Bush Administration has issued alternatives to the Clinton proposal, which could also apply to other parks and wildlife areas around the country as other options to control the volume of snowmobile activity and limit their negative effects. These alternatives include applying new emissions and noise-reducing technology on all snowmobiles, limiting their access to only major snow roads instead of all of them, and reduce the number of snowmobiles at popular entrances to parks while increasing the number at others; making it easier to regulate the population flow in particular areas (Seelye 2002).

### **Federal action concerning snowmobiles since 2002**

Yellowstone National Park has been at the center of snowmobile controversies since the 1990's when President Clinton and the National Park service declared and outright ban on snowmobile use. This ban has been the center of numerous lawsuits by interest groups and attempts to reverse the total ban has gone through several different court decisions.

Since 2004 there has been a temporary solution adopted that might become new law on snowmobile use in the park. The park has been allowing 720 snowmobiles in the park per day

February 20th, 2002.

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United States Environmental Protection Agency. 2002. Office of Transportation and Air Quality EPA420-F-02-037: 1-5. "Regulatory Announcement: Emissions Standards for New Nonroad Engines." <http://www.epa.gov/OMS/regs/nonroad/2002/f02037.pdf>

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Disclaimer: This report has been compiled by undergraduate students at the University of Vermont under the supervision of Professor Anthony Gierzynski. The material contained in the report does not reflect the official policy of the University of Vermont.