

Manure Causing White Haze



For years, residents in rural regions of British Columbia's Lower Fraser River Valley were puzzled by the appearance of a thick band of white haze in the sky overhead on calm, sunny days. It wasn't until recently that Environment Canada scientists in Vancouver identified it as a rural version of urban smog associated with intensive agricultural production and, specifically, emissions from poultry and other livestock manures.

The haze, which occurs a couple of hundred metres above the ground, can hang around for days--trapped by a cap of warm air that seals off the valley like a lid and obscures the view of the surrounding mountains. Although its health effects are not yet fully known, the direct relationship between fine particles, respiratory disease and mortality has fueled growing concern

over this unusual phenomenon.

Manure has been a major concern in the Fraser Valley for some time because of its connection with rising nitrogen levels in local water supplies. To assess the scale of the problem, researchers with the Fraser River Action Plan carried out a series of studies on agricultural nutrient management using census data to determine the quantity of manure and to estimate the amount of nitrogen produced by dairy, swine and poultry farms in the area. After balancing this total with what was going into plants and soil, they discovered that a large quantity was evaporating into the air as ammonia.

Using specialized samplers, the scientists found high concentrations of ammonium sulphate and ammonium nitrate in the air at ground level--evidence that the ammonia was likely combining with nitrogen and sulphur oxides from industrial pollutants and vehicle emissions. When the moisture in these compounds evaporates, the fine particulates that remain are visible as a milky haze. Some of these particles fall to the earth or are washed out in rain, so they can re-enter the cycle again and again.

Although the scientists have not yet sent an aircraft through the haze to confirm their theory, they have tested it using a computer model to track air parcels moving away from Vancouver and through the Fraser Valley. As they pass over Abbotsford, an area of intense poultry farming, these parcels of air have been shown to pick up high levels of ammonia. While white haze has not yet been reported elsewhere in Canada, it is also a common phenomenon in farming regions of Colorado.



Ammonia from manure volatilizes into the atmosphere and reacts with particles of urban smog to create white haze.

Environment Canada is working with agricultural producers and other stakeholders to find solutions to this and water contamination problems, including transporting manure out of the area to nitrogen poor regions, changing poultry diets to reduce the nitrogen content of manure, or using it as an additive to commercial fertilizer. In the meantime,

scientific data on white haze are being used to develop airshed management plans and encourage stricter controls on nitrogen and sulphur oxide emissions in this rapidly growing region of the country.