

SURFACE WATERS MOST LIKELY IMPACTED BY
HORMONES FROM LAND-APPLIED CAFO WASTES IN MISSOURI

Jessica R.G. Scott

Dr. Michael Urban, Thesis Advisor

ABSTRACT

The land application of livestock wastes is a significant potential contributor of environmental hormone contamination. Hormones from land-applied wastes have been detected in field runoff and in downstream surface waters. Contamination risks are especially significant when, "...manure is applied to areas where the majority of stream water derive from drainage water..." (Kjaer et al., 2007). "In areas where manure application is intensive, estrogens have been found in surface waters in concentrations known to affect the endocrine system of fish and amphibians... how the estrogens reach the surface waters is unclear..." (Laegsdmand et al., 2009). Environmental estrogen exposure is linked to reproductive maladies and altered sex characteristics in wildlife and to reproductive disorders and a variety of cancers in humans.

Previous study findings indicate that it is very difficult to predict fine scale transformation or degradation rates of hormones across complex agricultural landscapes. This study identifies important fine scale chemical processes and broad scale transport mechanisms and uses a simple model of runoff from CAFO land application fields in Missouri to identify surface waters most likely to be impacted by the hormones those wastes contain. A recent study finds that increased density of animal feeding operations correlate to increased hormonal activity in watershed stream reaches. In Missouri, increased hormonal activity may also be found in areas where CAFO facilities, their animals and wastes are concentrated.