



THE WILDLIFE SOCIETY

South Dakota Chapter

20515 Shamrock Ave.

Pierre, SD 57501

(605) 224-8861

July 27, 2010

Mr. Dick Kelly, Minnehaha County Commissioner
Minnehaha County Commission Office
Administration Building, First Floor
415 North Dakota Avenue
Sioux Falls, SD 57104

Dear Commissioner Kelly:

The South Dakota Chapter of The Wildlife Society (SDTWS) is a professional society of natural resource managers, researchers and biologists dedicated to the sound stewardship of wildlife resources and the environment upon which wildlife and humans depend. The SDTWS would like to take this opportunity to thank you for taking on the important task of reviewing the Minnehaha County drainage ordinance. We believe a well balanced and technically accurate drainage ordinance is extremely important for assuring that wildlife populations, water quality, downstream property rights and human health are not adversely impacted by drainage projects. We also believe that such an ordinance must be crafted to meet the mutual needs of agriculture producers, the environment and the downstream public.

We have reviewed the proposed amendments to the county drainage ordinance (MC 27-01-03) and respectfully recommend that the full amendment be adopted as written with the following four changes:

1. Section 1---That Section 1.08 be amended to lengthen the required notification distance from 1 mile to 1.5 miles for projects with tile diameter ranging from 6"-9"; and to lengthen the required notification distance from 1.5 miles to 2 miles for projects with tile diameter ranging from 10"-11".
2. Section 5---That Section 2.03 include an additional provision that states—*“Applicants for tile drainage projects shall provide detailed information on any best management practices (e.g. filter strips, created wetlands, controlled drainage gates) that the applicant will be installing at the tile outlet to reduce the amount of nitrate and total annual flow discharged directly from the tile outlet. Applicants are encouraged to*

include best management practices in their tile drainage plans and to monitor nitrate levels on at least twice a year.”

3. Section 5---That Section 2.03 include an additional provision that states---“*Applicants shall include a copy of the National Wetlands Inventory (NWI) map of the area associated with the drainage project and clearly identify any NWI wetlands that would be impacted if the proposed drainage project is approved.*”
4. Section 7---That Section 2.06 include an additional provision that states---“*Proposed drainage projects (or portions thereof) that would drain or otherwise adversely impact wetland(s) denoted on NWI maps shall not be approved, unless specifically recommended by the Board as a result of unique or extenuating circumstances.*”

We believe these four recommendations will protect water quality, wildlife habitat and the rights of downstream landowners, and at the same time, provide a reasonable method to approve new drainage projects that are fully vetted and supported by local landowners. Our position is in part based on the growing number of downstream landowners who believe they have had their property rights negatively impacted by new drainage. In addition, the recent rapid expansion of drainage tile and associated landscape changes witnessed in recent years has the potential to contribute directly to, or be associated with, a wide variety of environmental concerns as described below.

Potential Negative Impacts of Drainage Tile

•Nitrate-based pollution discharged from tile into receiving waters:

Peer-reviewed literature based on thousands of statistically structured water samples illustrates that nitrate levels in tile discharge often exceeds the federal safe drinking water standard of 10 parts per million (ppm). Note-The ppm standard is often represented as “milligrams per liter” and the two terms are used synonymously in water quality literature. In their exhaustive review of dozens of drainage studies, Gilliam et al. 1999 noted in Agronomy publication #38 that- “*Nitrate concentrations in water draining from many subsurface drainage systems are sufficiently high to cause concern for drinking water supplies.*” Likewise, Kaspar et al. with the USDA Agricultural Research Service noted in their 2003 publication that—“*In areas of the United States with drained cropland, nitrate-contaminated water from drainage tiles in agricultural fields is a primary source of nitrogen contamination of surface waters.*”

More recent data further affirms the concern with high levels of nitrate in tile discharge. In their literature review published in Environment Science and Technology, Blann et al. (2009) reviewed numerous reports of high nitrates and noted that—“*Artificial subsurface drainage is the major pathway for nitrate loss from subsurface drained agricultural lands.*” For example, Patni et al. (1996 Transactions of the American Society of Agricultural Engineers) analyzed water samples over a 40 month period from drain tile and documented nitrate levels exceeding 10 ppm “*in more than 90% of the 1,010 tile effluent samples analyzed.*” Additional studies such as David et al.(1997) in the Journal of Environmental Quality have documented nitrate levels in tile water that exceed the federal safe drinking water standard by 200%-400%. In the most general terms, the Environmental Protection Agency notes that –“*Concentrations of nitrate in tile drains are usually quite high (10-40 mg/l).*” Likewise, William Crumpton with Iowa State University

noted in a published interview in 2008 that nitrate concentrations in tile drainage “*are commonly more than double the drinking water standard.*” The growing concern with tile water quality has generated a large degree of interest in best management practices that are designed to reduce the adverse impacts of nitrate in tile discharge. For example, the Minnesota Department of Agriculture and the University of Minnesota Extension Service are actively working with landowners to promote nitrate reducing best management practices such as filter strips, controlled drainage gates and woodchip bioreactors. We believe the implementation of such best management practices holds significant promise in meeting the needs of both agriculture and the environment, and as such, they are included as one of our primary recommendations for amending the Minnehaha county drainage ordinance.

•Correlation between nitrate levels and cancer:

As concerns over nitrate levels continue to mount, medical researchers are beginning to investigate the relationship between nitrate levels and cancer. In a 2001 study published in the Journal of Epidemiology it was reported by Weyer et al. that in a sample of 21,997 Iowa women the occurrence of bladder cancer was associated with nitrate levels as low as 2.46 ppm in drinking water. The authors also documented an association between nitrate levels and elevated incidence of ovarian cancer. Weyer subsequently noted that—“*The U.S. Environmental Protection Agency drinking water standard is 10 mg per liter nitrate-nitrogen. Our study suggests that nitrate much less than that than could be a serious health concern.*” More recent data further affirms the health concern with high levels of nitrate. In a 2007 study published in the Journal of Epidemiology, Ward et al. reported that five or more of years using public water supplies with nitrate levels exceeding 5 ppm was associated with an increased risk of thyroid cancer. Likewise, Weyer et al. in a 2008 study published in the Journal of Epidemiology re-affirmed an association between moderate nitrate levels (>2.23 ppm) and bladder cancer.

•Increased water costs for municipalities, rural water systems and private well owners:

In response to high nitrate levels, some municipalities, rural water systems and private well owners are having to install expensive nitrate removal systems to safeguard human health. In recent years, four municipalities and one rural water system in Minnesota have needed to install nitrate removal systems. In a summary of these new systems, the Minnesota Department of Agriculture noted that –“*Up front costs for these removal systems are expensive, especially for smaller communities.*” The report noted that the initial construction costs of nitrate removal systems can range from \$350 to \$1000 per resident. For example, the Lincoln-Pipestone rural water system in southwestern Minnesota incurred a cost of \$1.7 million to install a nitrate removal system. Concerns with high nitrate levels in drinking water supplies are also prevalent in Iowa. Evidence indicates that average nitrate levels in the Raccoon River, a primary drinking water source for Des Moines, has doubled from 1975 to 2002. A 2002 article in the Des Moines Register described the high costs the city was incurring to remove nitrates from the public water supply, and reported that water quality officials “*put much of the blame on the increasing number of agricultural drainage tiles used in Iowa.*”

•Reduction in existing waterway filters and associated wildlife habitat:

One technique used to prepare an area for the eventual installation of drainage tile is to apply extremely high rates of herbicide to kill existing vegetation and then systematically target the area for intense tillage until all vegetation, especially wetland and riparian plants, are completely eliminated. Such techniques run counter to many best management practices and facilitate

erosion by eliminating valuable buffering vegetation and wildlife habitat. For example, Gilliam et al. (1999) summarized previous research and noted in Agronomy Publication #38 that—*“There is no question that utilizing drainage to convert native vegetation growing on wet soils to agricultural crops will increase losses of sediment, nutrients, and pesticides.”* Along with direct removal of wildlife habitat, drain tile may also adversely impact wildlife populations via high rates of nitrate exposure. Blann et al. in a 2009 issue of Environmental Science and Technology reviewed a range of nitrate toxicity studies and noted that—*“Adverse effects were reported for a range of freshwater invertebrates, fishes, and amphibians at long-term exposures to nitrate concentrations at 10 mg/l.”*

•New pathways for phosphorous pollution to enter surface waters:

A growing body of evidence suggests that under certain situations, drainage tile can contribute to significant new pathways for phosphorous discharge into downstream waters. This is particularly problematic when the baseline condition was a functioning stand of filtering vegetation that was systematically destroyed with a combination of high rates of herbicide application, intense tillage and finally, the installation of drain tile. Blann et al. in a 2009 issue of Environmental Science and Technology reported that—*“However, significant P export in either dissolved or particulate form occurs via subsurface drainage under conditions associated with leaching or elevated sediment/runoff delivery to subsurface drains..... and can be as important or more important than surface transport in areas dominated by subsurface drainage.”* The authors go on to cite eight different peer-reviewed papers that support this conclusion.

•Increased total annual flows into downstream receiving waters:

While drainage tile may reduce surface runoff and peak flows under certain cropland conditions, there is a growing body of evidence *“that total water output”* or *“total water yield”* from a field or small watershed is increased with drainage tile. This is especially true when tile is used to drain a pothole or remove buffer vegetation. This conclusion was forwarded in two separate comprehensive literature reviews of agricultural drainage conducted in 2009 and 2005. Furthermore, Blann et al., in the 2009 review went on to qualify that any surface runoff benefits attributed to drainage tile need to be qualified---*“The overall ecosystem benefits arising from reductions in surface runoff with subsurface drainage are, however, uncertain, given the corresponding increase in nitrate loads associated with rapid subsurface flow.”* Other researchers have associated increased flow rates in rivers with the widespread installation of tile. In their 2009 literature review, Blann et al., summarized some of the most recent research on the Minnesota river from Magners and others and noted that—*“Analysis of USGS stream gauge station data revealed that annual peak flows for the 1 to 2 year recurrence intervals have increased by 20% to 206% over the past 25 years, a period corresponding with renewed installation of subsurface drainage.”*

•Impact upon downstream land use and property rights:

As drainage (particularly via tile) expands, a growing number of landowners have had their property adversely impacted by excess water. These impacts are often very stressful for the downstream landowners and support the existing research that in many cases tile drainage does generate excess and unwanted water. Included below are excerpts from recent testimonials of concerned landowners from other counties who have been recipients of drainage water.

“In September 1999 my husband passed away. In November 1999 my neighbors did tiling....Now the pasture area is so wet you can’t drive in it so I have to walk to control the weeds. I am a senior citizen so no easy task.”

“My wish is to explain to people what has transpired in this county in the last few years. It has gone from a wonderful place to live to a place where neighbors can’t stand one another and have little respect for the rights of others..... I have never had the right to say no as my land has always been more than ½ mile downstream of the proposed projects. There are now gullies and wash outs all over the place. The river is now polluted and the banks continue to erode.”

“Before the tile was installed, the flow was intermittent and would dry up after a rain, but now it is ever-flowing even in the winter.....Even if the law says you can legally drain water on your neighbor for their own personal gain, does that make it morally right?”

Summary:

It has been suggested that gaining wetland approval from the USDA-Natural Resource Conservation Service (NRCS) will assure there is little environmental damage from new drainage projects. The information summarized above illustrates this is often not the case. The NRCS wetland compliance program, as good as it is, still only has authority to administer resource conservation for a relatively narrow sub-set of environmental issues and for a very specific wetland definition. There are a wide variety of other important wetland resources, wildlife habitats, water quality factors and property rights issues that NRCS does not have the statutory authority to address. As such, it is critically important that a county drainage ordinance has the ability to help safeguard the health, safety, and rights of local citizens, particularly those downstream of proposed drainage projects. Once again, we applaud you for taking on this important topic. Minnehaha County is uniquely positioned to demonstrate how a county-level drainage ordinance can balance the needs of production agriculture, the environment and downstream property rights. For example, drainage tile can provide a variety of agronomic benefits to crop production with minimal environmental impacts if: (1) the tile will not drain wetlands (both NRCS and NWI), and, (2) the tile is installed in association with best management practices such as control gates and buffer strips that assure nitrate levels and total water yields from the tile outlet are moderated. Please feel free to contact the SDTWS if we can be of any further assistance as you continue to move forward with this vital effort.

Sincerely,



Chad Switzer, President
South Dakota Chapter of the Wildlife Society

cc: Minnehaha County Drainage Ordinance Task Force
Commissioner, Jeff Barth
Commissioner, Anne Hajek
Commissioner, John Pekas
Commissioner, Carol Twedt