

# Firesteel Creek News

VOLUME 1 ISSUE 1

MAY 1999

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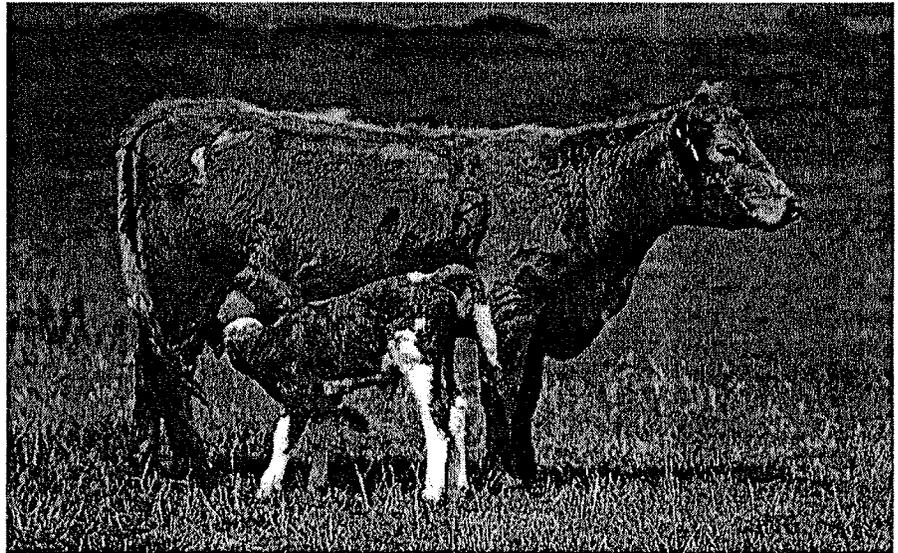
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## Rotational Grazing Systems Rock!

By: Terry Heilman, District Conservationist, Jerauld County

Today's youth have an expression to indicate that they like or strongly agree with something - "it rocks!" We want you to know that the EQIP program can help you develop a grazing system or pasture rotation system that works or "rocks" for you.

Beginning in 1998, an EQIP priority area was established within the drainage area for Firesteel Creek in Jerauld, Aurora, and Davison counties. Seventy-five percent cost-share is now available for conservation practices to help develop rotational grazing systems like wells, pipelines, tanks, dams and dugouts, as well as cross fencing.

What makes this real is that both the land operator and the government have something to gain. The land operator can increase the productivity and the efficient use of grasses from thirty to fifty percent with a well-designed rotational grazing system and good management compared to season-long, continuous grazing. In addition, many grazing systems can be designed to offer better quality grazing later in the season, maintaining breeding stock in better condition and improving the growth rate of calves. The government benefits primarily from the improved grass cover in most pastures, thereby decreasing runoff and erosion, as well as utilizing a greater amount of the livestock waste for forage production rather than running into Firesteel Creek.

If you are interested in developing a grazing system or pasture rotation system anywhere within the Firesteel Creek drainage area in Jerauld, Aurora or Davison counties, call the local county NRCS office to set up an appointment. We can and will help you! Don't put it off any longer - you aren't losing anything by looking into it right now, but you might be losing this opportunity if this program is not funded again next year or the year after. Government cost-share programs are now designed to complete a specific task and then move on to a new task or objective in another location or another watershed.

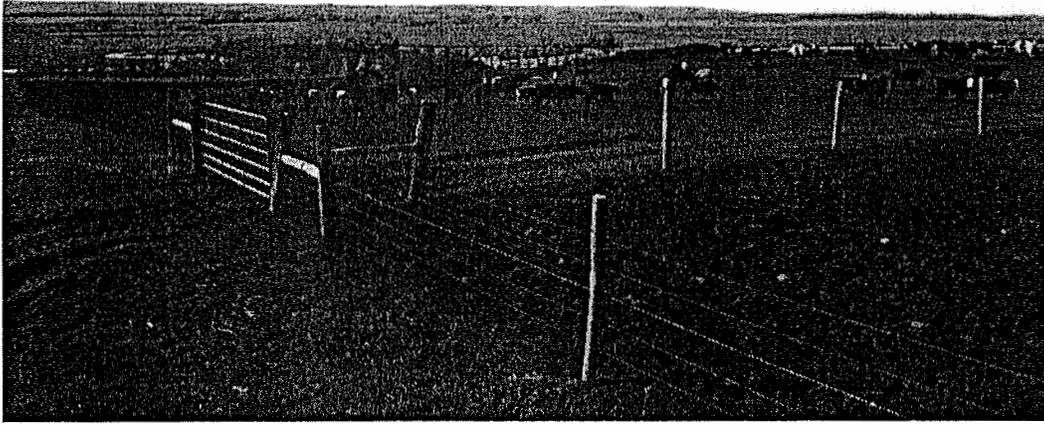
## ASSISTANCE AVAILABLE!

By: Steve Vlieger, District Conservationist, Davison County

Assistance is available to apply conservation practices to cropland. The assistance can be Technical and/or financial assistance. But the key to obtaining financial assistance rests upon the development of a conservation plan on the cropland where you wish to apply the conservation practices. A conservation plan need not be a complex document. All that is required is a listing of the conservation practices to be applied and the date the practice will be applied. The planning process is a dynamic and ongoing process.

The development of conservation plan requires and inventory of resources, assessment of the problem(s) and concern(s), development of alternatives, selection of the alternative you prefer, development and implementation of the conservation plan. The process though lengthy in description is relatively simple. All the steps in planning do not need to be completed simultaneously. The best conservation plans are developed over a period of time. It is important that process not be rushed. After the plan is developed you can then begin the implementation process. Again the implementation should be at a pace which suits your needs and abilities.

Various conservation practices can be applied to cropland to treat the resource problem. For example, if you have a wind erosion problem you can alternate the problem by planting field windbreaks, using no-till planting, vegetative barriers or a combination of these practices. Often times one conservation practice will solve two or more problems; for example, no-till planting can prevent wind and water erosion as well as conserving moisture. If you do not begin planning you will continue to have a resource problem which will affect your profitability and bottom line.



A typical example of a feedlot on Firesteel Creek. Channel is right below lots with trees in front of creek. The producer will be moving his feed lots off of the channel using 319 funding.

### Cost-Share Money Available for Ag Waste Systems

David Kringen, Project Coordinator  
Firesteel Creek/Lake Mitchell Restoration Project

As many of you have noticed, a great deal of emphasis has been put on non-point source pollution these days. Non-point source pollution (runoff associated with agricultural, urban and other diffuse sources which does not have a specific point of entry into a water body) managed to escape the notice and regulations that were imposed on point sources during the 1970's and 80's. But because of this lack of attention, it is now the principal cause of water quality impairment. Well, times have certainly changed and as we learn more about water quality and that which affects it, guidelines and standards are being adopted by federal, state, and local governments to address these non-point source concerns.

To help contend against non-point source pollution, Congress added Section 319 to the Clean Water Act in 1987. Since then, EPA offices have funded innumerable water quality projects in conjunction with state and local agencies as public concern over water quality issues has increased.

Currently, the Davison Conservation District, in association with the Jerauld and Aurora Conservation Districts, is sponsoring a 319 project in the Firesteel Creek watershed. This is an 8-year project to reduce the phosphorus loading to Firesteel Creek and Lake Mitchell by 50%. It is this phosphate enrichment that has caused the excessive algae growth in Lake Mitchell, which in turn has been linked to the terrible taste and odor problems that city and rural residents have experienced. The reduction of phosphorus will be accomplished through the implementation of animal waste management systems, grazing systems, buffer strip establishment, information and education

programs, as well as other conservation practices.

The major emphasis of the project will be placed on the installation of animal waste systems. A majority of the nutrients entering Firesteel Creek can be interrupted by capturing runoff water from feedlots into storage basins and will decrease the concentration of phosphorus loading into Lake Mitchell.

Cost-share for the construction of these waste systems is currently at 80%. This will include all the dirt work required for the construction of the system along with the other miscellaneous items that are essential to the operation of it such as fencing around the waste basin, drain tubes, trash screens, etc. For feedlots where relocation off the creek is necessary, items such as water tanks, aprons, shelterbelts, etc. that can not be moved from the original lot will also be cost-shared at an 80% level. The producer's share will include both in-kind match for the labor they put in as well as some out-of-pocket cost.

I want to remind everyone that installing an animal waste system is purely a voluntary effort on your part. But as non-point source pollution begins to attract more attention, a time may come when this might not be the case and it may become mandatory to address your feedlot runoff. At this point, I would encourage you to give some serious thought about installing an animal waste system while 319 cost-share money is available. Please remember though that this money will not last forever and only a limited amount is available. Precedence will be given to those producers that were deemed a high priority during the watershed study that was completed in 1996 and installation of these animal waste systems will be directed toward them. Other cost-shareable practices such as grassed waterways, grazing systems, etc. are available to any landowner within the Firesteel Creek watershed.

Aurora County Conservation District  
PO Box 277  
Plankinton, SD 57368

# Lake cleanup needs cooperation

By DAVID KRINGEN

Greetings from the shores of Lake Mitchell.

As all of you are aware, Lake Mitchell offers area residents a great opportunity for outdoor recreation with activities such as boating, fishing and swimming. Mitchell is fortunate to have such a resource so close to downtown.

What is more important, though, is the fact that Lake Mitchell is the drinking water supply for the City of Mitchell as well as the Davison Rural Water System. This simple statement was painfully apparent this past spring as all of us attempted to cope with the water's taste and smell. Besides the taste and odor problems, the lake continuously experiences excessive algae blooms, as well.

Because of the decline in Lake Mitchell water quality, a thorough assessment of the watershed was conducted from 1993 to 1996. Lakes do not exist in isolation but are intimately linked to the watershed surrounding them. The activities that occur within the watershed are often reflected in its water. The purpose of this study was to find causes of the decline and to present alternatives to correct the problems.

The Davison Conservation District is currently sponsoring an

## IN OTHER WORDS



KRINGEN

David Kringen is the project coordinator for the Lake Mitchell/Firesteel Creek Restoration Project.

In Other Words features opinions from local and other contributors who have areas of special interest or expertise. Material shouldn't exceed 600 words and can be sent, along with a photo, to: Editor, *The Daily Republic*, 120 S. Lawler, Mitchell, S.D., 57301. *The Daily Republic* cannot guarantee all submitted material will be used.

implementation project that aims to reduce in-lake soluble phosphorus in Lake Mitchell by 50 percent by the year 2015. It is excessive phosphorus in lakes which leads to algae blooms and have been linked to taste and odor problems in some cases. The goal of the project is to restore water quality in Lake Mitchell to a level that supports its priority use as a domestic water supply, as well as recreation.

One of the more prominent conservation activities being applied throughout the watershed to obtain this goal is the installation of animal waste management systems. These facilities are designed to eliminate runoff from feedlots. Contaminated water and runoff within the feedlot is diverted to a holding pond while

outside clean water and snowmelt is turned away.

Other activities include the promotion of improved grazing management systems that can improve cattle productivity while decreasing runoff and erosion. The use of alternative sources to water livestock, such as pasture pumps and dugouts, are also being encouraged.

Other examples of practices being promoted include conservation tillage, grassed waterways, buffer strips and safe land application of manure through nutrient management planning.

As any farmer might tell you, the agricultural community already faces too many rules and regulations but it is also true that they have been exempted from many of

the environmental regulations that pertain to other businesses and industries. But by no means is the rural community the only one contributing to the decline of Lake Mitchell. The City of Mitchell recently rerouted a storm sewer that was previously dumping large amounts of pollutants directly into the lake. Urban runoff is an often-overlooked contributor to water quality problems but nonetheless just as important. Urban areas on a per acre basis can deliver as much or more pollutants as rural areas do.

Lake residents also need to be involved by keeping track of the amount of phosphorus being applied to lawns via fertilizer and to apply only what the lawn really needs. It is very possible you are over-fertilizing every year. Applying the proper amount of fertilizer will lessen the risk of phosphorus runoff from lawns after heavy rains. A soil test is a great tool to determine the correct amount.

As you can see, everyone within the watershed bears a portion of the responsibility. But with effort and commitment from the parties involved now, present and future residents will be able to enjoy and use the lake as it was intended.

Be part of the solution, not the problem.

# Firesteel Creek News

VOLUME 1 ISSUE 2

NOVEMBER 1999

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Construction of the new Olinger ag waste management system in Jerauld County is nearing completion. Curt's lot was the first priority feedlot in the watershed to be constructed and funded under the Firesteel Creek Restoration Project. Curt hopes to have cattle in his new lot by late November.

## CROSS FENCING PASTURELAND

Tom Clemens, D.C., Aurora County

### WHY PRODUCERS CROSS FENCE PASTURELAND

Some reasons for animal control are:

1. Keep your animals in where they belong
2. Separate the different types of cattle
3. Gives grass a chance to rest after grazing
4. Fence areas like tree, rivers or streams, roads, or other highly erodible areas from livestock.

One type of fence to use is called a power fence or electric fence. The electric fence controls the animals by a sharp, short, but safe shock. The fence can be used on most types of animals.

Some of the benefits of a power fence:

1. Low cost
2. Easy construction
3. Easy to maintain
4. Easy to move or adjust for grazing
5. Uses a solar-powered energizer for electricity for locations away from home.

This next spring, the Aurora County Conservation District and the Firesteel Creek Watershed Project will try to have a hands-on demonstration on the construction and proper use of power fences along with the benefits of rotational grazing. More information will be coming at a later date.

<It takes about 4,000 to 6,000 pounds of crop residue per year to maintain the content of organic matter in a soil.>

## ASSISTANCE AVAILABLE!

Steve Vlieger, D.C., Davison County

Water quality is important for livestock whether they are in the pasture or feedlot. The better the quality of the water, the better the gain on the animals. Animals confined to feedlots generally have access to fresh water in tanks or automatic water fountains. Providing fresh water to grazing livestock can be another matter.

There are basically two options for pasture situations: well or pond. If wells and/or pipelines are utilized, you will generally have fresh water for your livestock. If you use ponds either dugouts or impoundment dams, the quantity of water may be adequate but the quality may be lacking especially if cattle walk into the pond to drink.

To improve water quality in ponds, a pasture pump can be used. Pasture pumps function similarly to the old well pumps which were common many years ago. Instead of manpower, cattle pump the water for themselves. Pasture pumps can be used to pump water from creeks, streams and ponds. Use of a pasture pump will improve water quality because livestock are not standing in the water to obtain a drink.

If you are interested in learning more about pasture pumps, contact the NRCS office. We have a pump to view and are also able to provide funds to obtain a pasture pump.

<A single spade full of rich garden soil contains more species of organisms than can be found above ground in the entire Amazon rain forest.>



Area farmer Wayne Edinger discusses the different aspects of manure management with Senator Tom Daschle at DakotaFest '99.

#### MANAGING MANURE AND WASTEWATER

David Kringen, Project Coordinator  
Firesteel Creek/Lake Mitchell Restoration Project

If you were at DakotaFest this summer, chances are you either walked by or walked through the NRCS exhibit on Manure Management. The conservation landscape in miniature included a running stream, buffers, and fields along with stations highlighting the nutrient management process. These stations included determining the quantity and nutrient value of manure, soil fertility needs, the development of a nutrient management plan, and land application of the resource.

The exhibit was well received with over 2,200 people visiting the display. It was also featured on KELO-TV, Today's Ag, the Mitchell Daily Republic, KSOO Radio, and WNAX Radio. Obviously people took notice of not only the display but the message as well.

We are all aware of the benefits manure can provide as a soil amendment. Manure can contain considerable amounts of nitrogen (N), phosphorus (P), and potassium (K) along with other micronutrients. It also contains significant amounts of organic matter, which will improve soil structure and tilth, increase water infiltration and water holding capacity, and reduce the erosion potential of the soil. Basically, it's really good stuff for your crop and soil. However, as with most things, if it's not managed properly, it can become a liability.

Manure generally contains more phosphorus than what is required for the crop if the application rate is based on nitrogen needs. This means continuous application of manure to the same field year after year will result in a phosphorus build-up in your soil over time. At high levels, this can pose pollution problems downstream during runoff events. In order to prevent this, your options can include rotating different fields for ma-

nure application, applying manure at rates based on P removal of the crop, and installing buffer strips along water courses to filter runoff. Advancements in feed ration technology may also help reduce the amount of N and P in manure.

A nutrient management plan is a tool that will assist you in making sound decisions concerning manure application. The plan is based on soil testing, manure testing, soil types, and crop requirements. It is important to know what your crop needs are as well as the nutrient value of your soil and manure through regular testing in order to make proper management decisions.

Technical assistance is available at your NRCS office or conservation district for nutrient management planning.

One way to improve the handling and storage of your manure while decreasing the potential for it to enter Firesteel Creek is with a management system facility or structure. Evaporation ponds will contain runoff from feedlots while keeping the "clean water clean" by the use of diversion dikes. Cost-share money is available for the construction of these systems through the Firesteel Creek Restoration Project.

Proper collection, handling, storing, and utilization of manure will greatly reduce the impact it has on Firesteel Creek and will go a long ways into the restoration of Lake Mitchell as a quality drinking water supply. The application of manure to a field should not be based on how close it is to the barn but by the nutrient needs of the crop and the N/P content of the soil and manure.

< Modern farming practices that minimize soil disturbance (plowing) and return plant residues to the soil, such as no-till farming and crop rotations, are slowly rebuilding the Nation's stock of soil organic matter. >

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Chuck Blomberg/Republic

Curt Olinger, rural Wessington Springs, moved his 1,000 head of cattle to this new feedlot last week. The new feedlot is part of the Lake Mitchell/Firesteel Creek Restoration Project, which helps farmers design better animal waste management systems. Olinger's feedlot was the first and only lot completed of the 37 feedlots expected to be worked on over a period of eight years.

## First of 37 feedlots improved

By **CHUCK BLOMBERG**  
Republic Staff Writer

**WESSINGTON SPRINGS** — Runoff from Curt Olinger's 1,000-head cattle operation southeast of here will no longer flow into Firesteel Creek.

The operation recently became the first of 37 feedlots to be improved through the Lake Mitchell/Firesteel Creek Restoration Project, which will improve other sites over a period of eight years.

"He just moved his cattle into the new area last week," said David Krigen, project coordinator.

Officials toured the site Wednesday to see the beginning of the overall multi-million dollar restoration project that's expected to improve the quality of Mitchell's drinking source — Lake Mitchell — over a period of time.

Olinger's 1,000-head cattle operation was one of 37 sites pointed out by the study as most likely contributing to waste runoff in about

350,000 acres of the creek's watershed.

The project moved Olinger's feedlot nearly a half-mile east of Firesteel Creek to a 19-acre area that was formerly an alfalfa field. New fences were erected, cement feed bunks set in place, and a new drainage system was buried in order to guide runoff into a newly dug sediment basin and an evaporation pond.

The sediment basin will have to be cleaned once a year, according to project engineers.

Olinger said the project was a good deal for him.

"I wanted to get off the creek anyway," he said. "I think it's a good deal. It's a chance for farmers to cost share."

There is a total of \$2.7 million in federal, state and local funds available over the next eight years to complete the Firesteel cleanup projects, including Mitchell's promise of \$20,000 a year, Krigen said.

See **FEEDLOTS**, Page 9

## FEEDLOTS: Looking into operations

Continued from Page 1

That money also can go toward shore stabilization, he said.

The landowners are responsible for about 25 percent of each project's cost.

That percentage includes the money contributed to the project and the time and materials invested by the landowner.

Most projects will cost anywhere from \$75,000 to \$95,000.

"This is about as big as our projects will get," Krigen said of Olinger's lot.

Olinger said that his overall project cost about \$110,000.

Krigen said officials currently are not interested in cost-sharing with any operations larger than 1,000 units.

"We're looking to help the smaller producer," Krigen said. "The larger operations can handle it themselves."

Three more projects are expected to begin in the spring, but Krigen said he wouldn't release

the names of those people until the projects are completed.

Mitchell City Councilman Don Verhey, who took the tour Wednesday, said that the city made a good investment when it decided to help in the Firesteel cleanup project.

"I thought it was fantastic," Verhey said of the new feedlot. "Even though we're going to go with Missouri River water, it's a good project. We can't have algae blooms stinking up the place."

Mitchell voters decided in April to allow the city to bond up to \$16 million to build a pipeline in order to pump in Missouri River water through the B-Y Water District.

While the estimated \$20-plus million project will supply up to 2 million gallons of river water to the city a day, Mitchell residents will still have to drink some lake water two to four months out of the year during peak water uses in the summer.

The restoration project eventually will improve the water quality in Lake Mitchell and the rest of Firesteel Creek, but it will be a gradual process, Krigen said.

"It's not the actual (manure) that causes the problem in the creek. It's the nutrients," Krigen said.

The nutrients help foster algae and other aquatic plant growth that leads to Lake Mitchell's occasional bad smell.

It also increases the phosphorous levels in the lake, Krigen said.

Project officials have a goal to reduce phosphorous, which leads to algae blooms, by 50 percent within 15 years.

"You're not going to see immediate results. But gradually, over the years, less and less nutrients will go into the creek and it will happen," Krigen said.

"It's an important project for the city of Mitchell."

# FIRESTEEL CREEK NEWS

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March 2000

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## MESSAGE FROM THE COORDINATOR

Hello again from the shores of Firesteel Creek and Lake Mitchell. As I sit and write this at the end of February, I am pleased to see we are finally receiving some much-needed moisture with hopes of more on the way. This has been a very strange winter this year and it remains to be seen what kind of run-off event we will have this spring.

I would like to take this opportunity to welcome all the lake residents (everyone on Harmon Drive) to our mailing list. You folks will now be receiving the same quarterly newsletter as the producers in the watershed do. This is an attempt to keep everyone informed on the progress of the watershed project along with information on different conservation activities that are available to the producer. I hope everyone takes a few minutes to look over our newsletter as quite a bit of work goes into putting it together and getting it out.

Now that the Firesteel Creek/Lake Mitchell project is underway, I would like to try to re-energize the Lake Association. Your past donations have and will continue to work towards projects that aid in the restoration of the lake. For example, past donations and grants have sustained Dr. Robert Tatina's water quality monitoring program for a number of years now. Baseline data such as his is important so we can measure improvements in water quality later down the road plus it also shows a commitment to the restoration of the lake by the local community. His continuous monitoring is the only one in the state that I am aware of that is funded through a private non-profit organization such as the one that is in place here in Mitchell.

Along with those of us who drink Lake Mitchell water, lake residents have a large stake in the restoration project and stand to gain the most from it. I ask that all lake residents and anyone else interested support the restoration effort by once again joining the Firesteel Creek/Lake Mitchell Improvement Association. I hope to work more closely with the association over the course of the project to reach our goal of improved water quality in Firesteel Creek and Lake Mitchell.

Even with cost-share money available, improvements such as ag waste management systems can still be an expensive cost of production for the watershed producer. They are the ones spending the money and don't necessarily see the benefits local residents do, as they may not utilize the lake for drinking water or recreation. Private contributions to help with the expense of these or other projects would go a long way in showing the producer that there is a real commitment to the project and that we support their voluntary efforts towards cleaning up the lake. By working with the lake association board, sound decisions can be made on how best to apply these funds in the future. Please take a few moments and fill out the application below and join the Firesteel Creek/Lake Mitchell Improvement Association. Any donations over and above the membership dues would also be very welcome and appreciated.

-----  
Membership Drive 2000  
Firesteel Creek/Lake Mitchell Improvement Association, Inc.  
600 South Burr  
Mitchell, SD 57301

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_

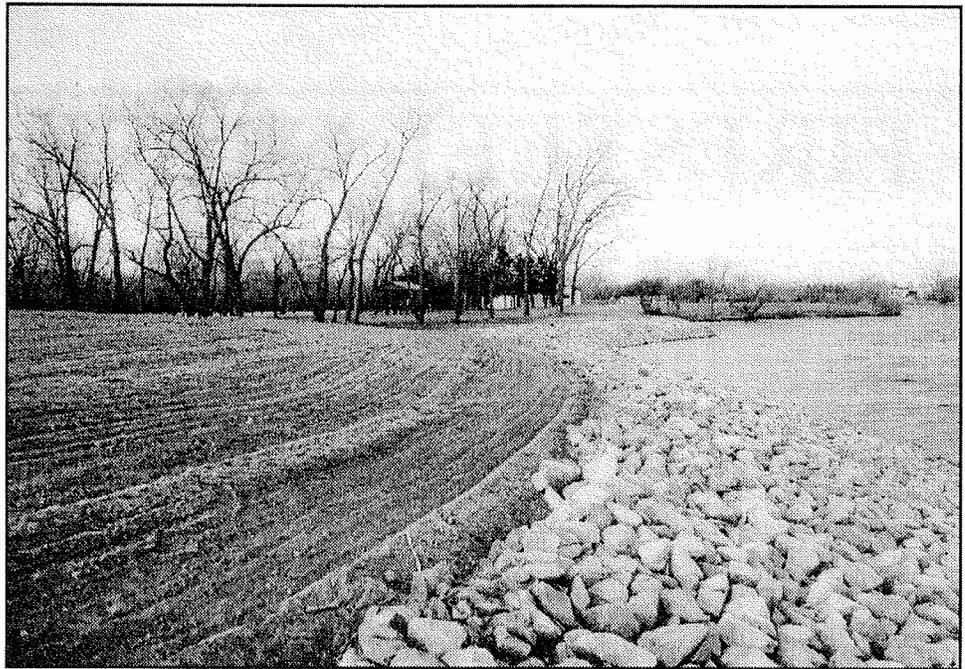
Zip Code: \_\_\_\_\_

Home Phone: \_\_\_\_\_

Date Joined: \_\_\_\_\_

_____ Individual Membership	\$20.00 Donation
_____ Family Membership (Mr. & Mrs.)	\$30.00 Donation
_____ Business Membership	\$50.00 Donation

**At right:** An example of shoreline stabilization near the Sportsman's Club on the south side of Lake Mitchell. Four hundred fifty (450) feet of shoreline was shaped and riprapped during November and December to stop the bank erosion that was occurring. The project was funded through the City of Mitchell and Firesteel Creek/Lake Mitchell Restoration Project.



### Mitchell's Hunt for Good Water

Tim McGannon, P.E.  
 Director of Public Works  
 City of Mitchell

As far back as the turn of the Century, Mitchell and the surrounding areas have been trying to solve the water dilemma. Really, though, there are only two problems with water in this part of the plains, Quality and Quantity.

Since the turn of the Century, several strides have been taken to solve these issues. The construction of Lake Mitchell Dam in 1928 stands today as one of the great accomplishments to bring an adequate supply of water to the area. This impoundment has served us well, even taking in to consideration the drought cycles such as the mid '70's which nearly dried up the lake. The quantity issue was addressed again in 1976 when a pipeline to Lake Mitchell was built from the James River.

Today, the Quality issue is being fought on two fronts. Mitchell is in the process of a project which will bring treated Missouri water from Lewis and Clark Lake south of Lesterville. This project will likely only bring a portion of the water needed by the community. The other project is the Firesteel Watershed project spearheaded by the Aurora, Jerauld and Davison County Conservation Districts along with the help of local, area farmers and ranchers.

This project, its sponsors and the farmers and ranchers involved will be remembered in the same breath as both the building of Lake Mitchell Dam and the B-Y Missouri River project. All are equally important to solving the Quality and Quantity problems of water on the prairie.

To those of you who have signed up to be part of this project, and those of you thinking about it, Thank YOU. When our grandchildren talk about the improvements made to the water supply, they will be talking about you.

### Don't let excess snowmelt or rainwater run through your lots!

Terry Heilman  
 District Conservationist  
 Jerauld County

One of the most difficult working conditions on the farm or ranch has to be the mess that excess water makes in calving yards or feedlots in the spring. Walking (or should I say sliding and stumbling) to the barn or the next lot can be a major job sometimes. Some of you know exactly what I mean – you know something needs to be done about that mess – other than moving the lots and the barn. That's where we come in.

Contact us right away if you think you have runoff water coming through your lots that could be diverted with a ditch or dike located on the uphill side or sides of your lots. When you contact us, we will check out your situation as soon as possible to get some preliminary measurements and then contact our engineering staff to line up some surveying and design work.

There is 75% cost-share available during the next year or two to complete these kinds of diversions in order to reduce animal waste runoff into Firesteel Creek, but you don't have to live next to the Creek in order to get this assistance. You are eligible if you live anywhere in the Firesteel Creek drainage area.

Contact your local Natural Resources Conservation Service (NRCS) office to get started cleaning up the mess in your lots now. Don't wait until next year or the year after that. Technical help and money are available now.

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Located just minutes north of downtown Mitchell, SD, Lake Mitchell offers area residents opportunities for boating, fishing, and swimming as well as other recreational activities. Created in 1928, Lake Mitchell is a man-made reservoir located on Firesteel Creek and was originally created to serve as the city's drinking water supply.

Over the past 20 years however, city officials, lake property owners, and recreational users have expressed concerns about declining water quality. The primary concerns have been the taste and odor problems residents continually experience in their drinking water along with excessive algae blooms.

Starting in 1993, the City of Mitchell, Davison, Aurora, and Jerauld Conservation Districts, the Lake Mitchell Development committee, and private citizens initiated a comprehensive water quality assessment within the Firesteel Creek watershed in partnership with the South Dakota Department of Environment and Natural Resources. The purpose of this study was to find causes for the water quality decline and to present alternatives to correct the problems.

Completed in 1996, the water quality assessment identified animal feeding operations and intense summer long grazing operations as the most likely sources for the high nutrient loading into Lake Mitchell. Although the impact of summer grazing was hard to quantify, animal feeding operations were estimated to contribute 51% of the soluble phosphorus load occurring within the watershed (37 critical and 79 secondary animal feeding operations).

The Davison Conservation District is currently sponsoring an implementation project to reduce the nutrient loading into Firesteel Creek and Lake Mitchell. The goal of the project is to reduce phosphorus delivery to Lake Mitchell to reduce in-lake soluble phosphorus by 50% by 2015. The core of the project includes the installation of animal waste management systems and improved grazing management. Secondary goals include reducing wind and water erosion from cropland and improving wildlife habitat. Funding for this project comes primarily from EPA 319 monies, the Environmental Quality Incentive Program (EQIP), the City of Mitchell, state grants, and local producers.

In November of 1999, city and county officials toured the first completely installed animal waste management system funded through the Firesteel Creek/Lake Mitchell Restoration Project. Work on three more systems is scheduled to begin in 2000.

## LETTERS TO THE EDITOR

THE DAILY REPUBLIC ■ WEDNESDAY, JUNE 14, 2000 ■

### Watershed project is local triumph

#### To the Editor:

Everyone across the nation will soon be talking over the dinner table about the Firesteel/Lake Mitchell Watershed Project.

Well, maybe not everyone, but the project is receiving some national attention for a few things we have been involved with.

Several months ago, I was interviewed by the New England Interstate Water Pollution Control Commission. A publication soon to be published will highlight our project and a couple of others in the United States that will describe the different approaches and challenges that watershed management takes across the country.

Not long ago, the Environmental Protection Agency awarded the Firesteel/Lake Mitchell Watershed

Project, along with other local agencies and staff, an Environmental Achievement Award for our involvement with the NRCS educational outreach exhibit on manure management at DakotaFest '99. This is an honorary award presented for work by individuals and groups external to the EPA workforce. The restoration project will again be involved with the exhibit at DakotaFest 2000, so come on out, have a look, and say "Hi."

The National Association of Resource Conservation & Development Councils has also recently invited a representative to give a presentation about our project at the National Conference in Ogden, Utah, in June. We were asked to attend because of the importance the project has within the community. Although we had to decline the invitation, it was an honor to be asked.

The week of May 15 found me at the Rocky Mountain Watershed Coordinator's Roundtable for EPA Region 8 held near Bozeman, Mont. States attending the meeting included South Dakota, North Dakota, Wyoming, Montana, Colorado, and Utah. Although it was very interesting and educational to learn about the different watershed programs, I came back feeling pretty good about our local effort. Projects in South Dakota seem to be much more established and secure than ones in the western states, which rely more on grass roots volunteer staffing, little or no local gov-

ernment involvement, and no money to speak of.

This lack of money in states such as Colorado is probably due to the number of projects competing for it. Where South Dakota may have 15 projects competing for EPA money, Colorado may have 45 and with less to distribute throughout the state than South Dakota might.

This summer promises to be a busy one for the restoration project. With luck, construction on five new Animal Nutrient Management Facilities will begin on farms throughout the watershed. The construction of these ANMF will directly contribute to the reduction of phosphorus into Firesteel Creek.

But even with the help of cost-share money, these manure management systems can still be a financial burden on a producer's pocketbook (even more so during today's economic climate in the agricultural community). I ask that you continue to support our local ag producers who are voluntarily applying these conservation practices toward the restoration effort. Without their participation, the restoration of Firesteel Creek and Lake Mitchell would quickly grind to a halt and all of this wonderful recognition we are getting will be for nothing.

**David Kringen**  
Project Coordinator  
Firesteel/Lake Mitchell  
Watershed Project

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# FIRESTEEL CREEK NEWS

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Volume 2, Issue 2

June 2000

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## **Livestock General Permits – Do they provide me any protection?**

**By: Nettie Myers – Secretary of SD Dept. of Environment & Natural Resources**

This is often the first question asked when a producer is told about the state livestock permitting system. The answer is YES, not only does obtaining a permit provide protection from lawsuits, there are other benefits as well. Let me explain.

First, a little background on the permits. In 1997 and 1998, the state Department of Environment and Natural Resources (DENR) developed and issued two general permits that establish the environment requirements that must be met by regulated animal feeding operations. One of these permits applies only to swine feeding operations, and the second applies to all other types of confined livestock.

You notice that I say “regulated” operations. By regulated, I mean the feedlot confines a certain number of livestock throughout the year, or the feeding operation is causing pollution. Generally, if an operation has more than 1,000 animal units, the operation is regulated. An animal unit is a government term used to compare the size of one feeding operation to another. For example, 1,000 animal units is equivalent to 1,000 feeder cattle, 2,500 finishing hogs, and 700 dairy cattle. Smaller operations can also be regulated if they are causing pollution or if a local government requires a state permit.

While smaller operations may not be regulated, the owners of these operations are encouraged to obtain a permit. This often leads the producer to ask the important question – What protection do I get from a permit? Many producers see applying for a permit only as a bureaucratic step that puts them on some government list. So they say, no way am I going to apply for a permit and put a target on my chest.

However, there are advantages to the producer for applying for coverage under the state general permits. The first advantage is protection from being sued. The second is the peace-of-mind of being in compliance with regulatory requirements. The third advantage is making it easier to expand or sell the feeding operation in the future.

### **Legal Protection**

First, I will discuss the legal protection that the producer gains. Legal protection is gained under both federal and state laws. There is a section in the federal Clean Water Act that provides a “shield” to those who obtain permits under the authority of the Clean Water Act (the state general permits are issued under this authority). This is often referred to as a “permit shield.” Essentially, Congress has said if you are in compliance with your permit, you are protected from being sued by the government or from any citizen on issues related to the Clean Water Act.

It is important to note, however, that the protection provided by the permit shield only relates to items addressed in your permit. For example, if my feedlot is permitted and I am in compliance with the conditions of the permit, but I have a fertilizer spill that pollutes a nearby stream, the permit shield does not protect me from being sued for the damages caused by the spill. Since it is unrelated to the permit, the permit shield does not protect me in this case.

The permit shield is supported by federal policy written and adopted by the U.S. Environmental Protection Agency (EPA). It is also supported by federal court case law. One example is a decision issued by the Federal Court of Appeals for the Second Circuit (*Atlantic States Legal Foundation v. Eastman Kodak Co.*, 12 F.3d 353 (2d Cir. 1993), cert. Denied, 513 U.S. 811 (1994)). In this case, Atlantic States Legal Foundation, a not-for-profit environmental group based in Syracuse, New York, filed a citizen’s lawsuit against Eastman Kodak Company for alleged violations of the Clean Water Act. Kodak argued the case should be dismissed because it had complied with the Clean Water Act requirements. The Appeals Court affirmed the District Court in dismissing the case based on the fact that Kodak had fully complied with all requirements in its permit, and thus ruling that Atlantic States’ lawsuit had no merit.

While it would be frightening for a producer to have to go through the legal process described in this case, the point is that the protection provided to people who have permits and are in compliance with those permits was upheld in this court decision.

There is also protection under state law. The 1991 Legislature passed what is commonly called the “right to farm” act. The purpose of that act is to protect agricultural operations from harassing nuisance lawsuits. One provision states that a protected agricultural operation may reasonably expand without losing its protected status if it is in compliance with all county, municipal, state, and federal environmental laws or regulations. So what is the easiest way to prove you are in compliance with environmental laws? Show them your certificate of compliance you get after you have gone through the state permitting process!

This provision of the right to farm act has been reviewed by the South Dakota Supreme Court. The Supreme Court recently noted that compliance with county, municipal, state, and federal environmental codes, laws, or regulations would protect an agricultural operation from nuisance lawsuits over a proposed expansion (*Welsh vs. Centerville Twp.*, 1999 SD 73, 595 N.W. 2d 622 (s. Ct.1999) 1999 S.D. Lexis 94).

So you see, by being a permitted animal feeding operation, you can use the state permit and even the state employees who helped you through the permitting process as evidence to protect you from others who may be complaining about your feeding operation or your plans for expansion.

### **Peace-of-Mind**

The second advantage – peace-of-mind – is a little harder to describe. In talking with people in the livestock industry in South Dakota, producers have a fear of environmental regulations. Will someone file a complaint on me? How much is a system going to cost? Will I be put out of business? Will I be fined? These are just a few of the questions facing people in this business.

Should a producer decide to go through the regulatory process to obtain a permit, at least the producer can rest assured that his or her feedlot is in compliance – and the producer finally has an answer to most of these questions. To document compliance, the state issues the producer a final certificate of compliance at the end of the permitting process. As long as the producer operates the feeding operation consistent with the permit requirements, the producer is protected. While someone may still file a complaint on a permitted feedlot, it will be a simple matter of having the state inspector verify compliance and the matter will be dropped. It is the goal of each state inspector to have producers succeed in their business and, therefore, they try to assist producers accomplish that goal.

### Ability to Expand

The third and final advantage is that permitting an operation makes it easier to expand or sell an operation. When a producer goes through the permitting process, the state has documentation of the manure management system constructed at the feeding operation and has verified that the system meets all requirements. For example, say a producer went to the department and got a permit to construct a new 700-head cattle feedlot. A few years later, the producer decides to expand to 2,000-head. Because the state has already approved the existing portion of the operation, the new permit application only has to address the expansion. If the manure management system was originally designed with potential expansion in mind, the permitting to expand to 2,000 head is very simple.

On the other hand, consider a producer who constructed a 700-head cattle feedlot and did not get a state permit. That producer later decides to expand to 2,000-head (which puts the operation in the regulated category). In this case, the state does not have any information on the existing system. The producer ends up having to provide documentation proving that the existing system meets applicable state requirements. Many times, that documentation may not be available. There have been many cases where this has happened. In each of these cases, the state and the producer have been able to work things out and get the operation permitted. However, that process can be stressful and frustrating.

A permit may also likely be viewed as an asset if the producer wishes to sell the operation. The state frequently gets inquiries from potential buyers about certain operations and whether they are permitted. If an operation is not permitted, the buyer always seems reluctant about the purchase. These days, everyone wants to avoid a potential environmental liability – especially the financial institutions. Having a permit in place could increase the value of the lot as well as the salability.

### Summary

So, does a livestock general permit provide a producer protection? I think the answer is definitely yes. And, it provides other advantages such a peace-of-mind, ease of expanding the business in the future, and potentially increasing the value of the feeding operation. However, each producer is going to have their own priorities when running their business. Hopefully, the information presented here will help you find your own answer to this important question.

### **New enhancements make continuous CRP more attractive**

A few new incentives have been added to the continuous CRP program for producers to enroll environmentally sensitive areas on their farm. The continuous signup offers landowners a non-competitive means of enrolling a relatively small acreage into the CRP program. Offers are automatically accepted if all eligibility requirements are met. The continuous CRP program is best suited for conservation practices such as riparian buffers (streamside plantings of trees, shrubs, and grasses), grass filter strips, grassed waterways, field windbreaks, or contour grass strips.

New to the program this year includes a Signup Incentive Payment (SIP). This is a one-time payment of \$10 for each eligible acre enrolled for each full year of the CRP contract. This means \$100 per eligible acre for a 10-year contract and \$150 for a 15-year contract. For example, if you enrolled 10 acres of eligible land for 10 years, you would receive a one-time payment of \$1000 (\$10 x 10 acres x 10 years) or \$1500 (\$10 x 10 acres x 15 years) if you enrolled the same amount of land in a 15-year contract.

Another new item also includes the Practice Incentive Payment (PIP) that effectively provides 90 percent Federal cost-share for the total eligible costs of practice installation under continuous CRP. In other words, it provides another 40% of the costs of installing a practice above and beyond the 50% cost-share you normally receive. This is a one-time payment only and not available if reestablishment needs to occur.

Marginal pastureland is also being accepted using new rental rates that better reflect the market rental value. In order to qualify though, pasture must be immediately adjacent and parallel to a perennial stream, a seasonal stream or a permanent waterbody, such as a lake or pond that provides at least a seasonal flow of surface water off the farm. Trees must be planted in order for marginal pastureland to be accepted.

Contact your local District Conservationist for more information. See the Editors section at the top of this newsletter for the name and number of the DC in your area.

**Thanks to all that donated to the Firesteel/Lake Mitchell Improvement Association and the Firesteel/Lake Mitchell Watershed Project!! And come see our new sign at Kibbee Park on the north side of the lake!**

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# Feedlot changes curb water pollution

## Creek feeding Lake Mitchell focus of plan

By STEVE YOUNG  
Argus Leader

WESSINGTON SPRINGS - The earth-moving equipment pushing dirt across Jeff Burg's farm east of here is spawning more than dust clouds these warm September days.

It's pushing the promise of cleaner water, too.

All the way down to Mitchell.

Up and down the Firesteel Creek watershed, covering 351,000 acres in Jerauld, Aurora and Davison counties, farmers such as Burg are beginning to make changes on their land to curb the pollutants running into nearby creeks and waterways.

A number of producers are working in concert with state and federal officials to slow the flow of phosphorus off their feedlots.

With financial aid ranging up to 80 percent of the cost, they are building new waste-management systems on their farms - called Animal Nutrient Management Facilities - to capture phosphorus-laden runoff and keep it from polluting nearby Firesteel Creek.

Others have adopted environmentally friendly agricultural practices, such as reduced or no-till farming and rotational grazing.

And ongoing discussions continue between farmers and environmental officials about the planting of trees to stabilize creek banks, about putting in grass strips along the creek to filter out nutrients and about putting dikes around shelterbelts to capture snow and other runoff.

"I view it as an opportunity to get up to where we need to be as far as being environmentally friendly," says Burg, 32, who farms with his brother, Corey, and his uncle, Quinten. They raise about 1,000 head of cattle.

"I'm willing to do my part to promote water quality as best as I can," Jeff Burg says.

Water / See 6A



Photos by Ken Klotzbach / Argus Leader

Jeff Burg inspects Firesteel Creek, which runs in the spring behind his cattle operation near Wessington Springs. Burg is among farmers managing animal waste in ways that avoid polluting the creek, which runs into Lake Mitchell.

## Wall Lake a cleanup success story

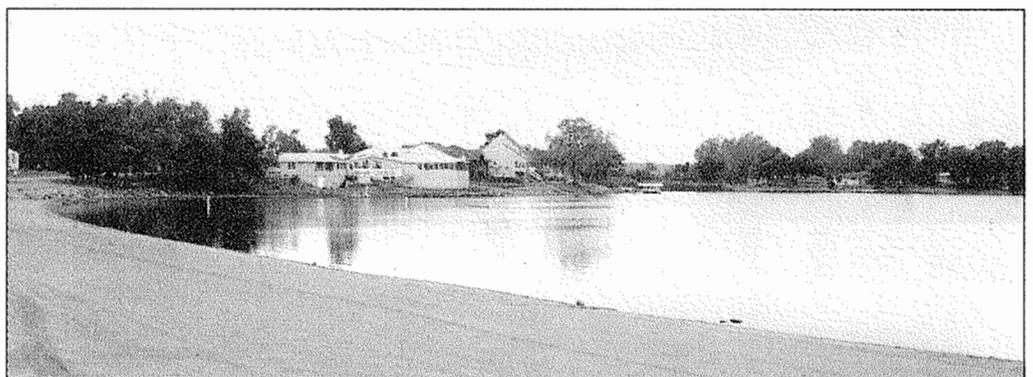
By STEVE YOUNG  
Argus Leader

In the dog days of summer, when the beach fills with sun worshippers and the water ripples from boats and swimmers, Russ Fleming doesn't have to think too far back to remember how life once was at Wall Lake.

In the 32 years he's lived there, Fleming can remember when the water stretching east out his front door used to be a solid carpet of green algae on a routine basis.

He can remember when water levels were so low in places, pickups could roll across the surface atop silt, soil and other debris left there by the tributaries that feed the lake.

And he certainly can remember when it was a whole lot worse.



Lloyd B. Cunningham / Argus Leader

Since its cleanup, Wall Lake has become a popular spot for water recreation and lakeshore homes. Work included dredging the lake from 8 feet deep to 20 to 35 feet deep.

But as the nation continues to struggle with water pollution and the enforcement of federal clean-water laws, Wall Lake now symbolizes what volunteer and cooperative efforts can do in trying to be responsible about the environment.

That's because 11 years ago, a diverse union of federal, state and local groups lined up behind Minnehaha County to restore the popular recreation spot 12 miles west of Sioux Falls.

In a little more than five years beginning in the

autumn of 1989, they secured more than \$2.2 million to:

■ Dredge more than 1.5 million cubic yards of silt and muck out of the lake, dropping its average depth from 8 feet at the start to 20 feet at

Wall Lake / See 7A

# Water

Continued from 1A

"And I always think it's better to be proactive than reactive."

It is especially critical now that the Environmental Protection Agency is turning its scrutiny from direct-source pollution – such as industrial plants dumping raw sewage into rivers – to nonpoint sources of contamination.

That nonpoint pollution includes waterways being tainted by runoff from dirty, oily city streets, from construction sites and from farms, yards and golf courses laden with fertilizers and pesticides.

"EPA rules are getting tougher," Burg says. "I can see them cracking down someday on runoff."

For now, however, efforts such as the Firesteel Creek Restoration Project are largely voluntary. Even then, they are critical to the well-being of those living along the watershed.

## Mitchell drinking water

Firesteel in particular has a major impact on Lake Mitchell, which sits at the north end of Mitchell and is a significant source of drinking water for that Davison County community.

In recent years, city officials, lake-property owners and recreational users complained about the lake's declining water quality. The water tasted bad. It smelled. And the algae in the lake seemed excessive.

"It's gotten worse over time," says John Iverson, a resident of the lake for 20 years. "Even though most of the algae is not toxic, the kids don't want to go swimming in it. The clothes and bathing suits come out all inundated with algae. It's hard to live next to that."

The phosphates and nitrates that are the focus of the effort are common nutrients contained in livestock manure, fertilizer and irrigation runoff. In surplus amounts, those nutrients can lead to excessive plant growth in lakes and streams, foul taste in water and dead fish.

High nitrate levels in drinking-



Ken Klotzbach / Argus Leader

David Clausen checks the final grading of a retention pond being constructed for Jeff Burg near Wessington Springs.

water supplies can be a health threat, too, particularly to babies.

In 1993, a Firesteel Creek/Lake Mitchell study was undertaken to study the effects of watershed inputs on the lake's water quality. It found:

- The silt and sediment flowing into Lake Mitchell appeared to be low, reducing the depth of the lake at only about one foot for every 61 years.

- But the nutrient pollution was high. The study estimated that 197 tons of nitrogen and 67.1 tons of phosphorus were coming into the lake annually. The probable source? Animal-feeding operations within the watershed.

- Of 241 feedlots evaluated in the watershed, 37 were identified as being priorities for dealing with nutrient runoff.

"Our computer models estimated that if we could take care of those 37 feedlots by putting waste systems in, we could take care of 37 percent of the phosphorus coming into the creek," says Dave Kringen, coordinator of the Firesteel restoration project.

So that's what Kringen and his office have been doing, talking to producers about waste-management systems and farming practices that can benefit the watershed.

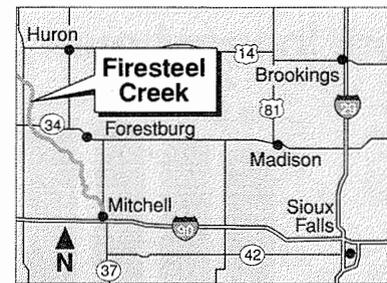
Last year, Burg's neighbor to the

south, Curt Olinger, put in the first waste-management system. Now Kringen is working with four or five more farmers, including Burg, to build systems on their land.

## \$200,000 feedlot relocation

Last winter, a Natural Resources Conservation Service engineer designed a system for the Burgs that included digging out an evaporation pond, creating a dividing berm with a tube through it for the runoff to pass, and adding fencing and feed bunks for the cattle.

The total cost of relocating his feedlot to the east and north – and farther away from Firesteel Creek – will run about \$200,000. Though the government is participating at an 80



Argus Leader graphic

percent-to-20 percent split, the Burgs' cost will be higher than 20 percent because they are upgrading their fencing and putting in more square feet of concrete to set the feeding bunks on.

Now when it rains, the runoff from the feedlot will go into the holding pond, where it will be disposed of through evaporation instead of making its way into Firesteel Creek.

Kringen says the cooperation of producers in the watershed has been fantastic. But again, he stresses, participation is entirely voluntary.

"By no means do I have the power to mandate," says Kringen, an employee of the Davison Conservation District who is paid out of EPA grant dollars.

"There is nothing that says either install a system or get rid of your livestock," he says. "It is the producer's decision whether he wants to install a system or not, though obviously, we will try to encourage him as much as possible."

It could be that some will decide not to take advantage of the financial assistance to put in the systems. Burg has a neighbor who is pushing

50. He's thinking of retirement down the road and isn't sure he wants to make the investment.

Producers like that might just decide instead to get out of cattle altogether, Burg says.

For now, however, many of the younger producers Kringen is working with seem to be embracing the idea of restoring the watershed. This winter, engineers will be drawing up plans for three or four more waste-management systems, he says.

The goal is to make improvements and build enough new systems to reduce the phosphorous delivery to Lake Mitchell by as much as 50 percent by 2015.

If that means producers will need some help in getting water to pastures so cattle don't have to drink out of the creek, his office has assistance for that, Kringen says.

If they need a well dug, or a water

pipeline put in, there are funds for that as well, he adds.

"The goal is to bring the lake into a euphoric state, to where it's on the edge of what you would call normal," says Iverson, who not only lives at Lake Mitchell but is president of the Firesteel Improvement Association.

"Our goal is to bring the phosphate and nitrate readings up acceptable levels so we don't have as large an algae problem."

The city, the state and the federal government all are willing to pitch in to make it happen, he says.

It appears for now that the producers are, too.

"We can't keep loading these phosphates and nitrates into the lakes," Iverson says. "We're going to kill our lakes. We just can't do that."

Reach reporter Steve Young at 331-2306 or syoung@argusleader.com

# FIRESTEEL CREEK NEWS

Volume 2, Issue 3

September 2000

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## Lake Residents – Do you know what you’re applying to your lawn? by Dave Kringen

Most everyone wants to have a lush, weed-free, green lawn to enjoy. Whether you work on it yourself or hire a lawn-care professional, a lot of time and/or money can be spent on it. Fertilizing is obviously an important part of having a nice lawn. Fertilizing helps keep your lawn green and minimizes competition from weeds. But it is also very possible that you may be putting on more fertilizer than what you really need.

Just as the farmer soil tests his fields to find out what next year’s nutrient needs are, so should a homeowner with his or her lawn. This is probably the most important aspect of a lawn fertilization program and rarely (if ever) does it get done. In many cases, phosphorus is not even needed. In a study done in the Twin City metro area, an analysis of homeowner soil tests from 1991 through 1994 showed that 74 to 85% of lawns in the area had very high levels of phosphorus, making phosphorus fertilization unnecessary. Another study done by Cenex/Land O’ Lakes in Wisconsin showed that 86% of the lawns they looked at tested very high for phosphates. Why apply it if you don’t need it? By taking a soil sample, you will have available to you the necessary information needed to make proper lawn management decisions.

The Davison County Extension Office can provide you with the necessary information, sample bags, and submission forms for you to take a soil sample. It is recommended that you soil test your lawn for available nutrients every 3-5 years. Samples are sent to the SDSU Soil Testing Laboratory in Brookings and results are returned to you within 5-10

Phosphorus (P) soil test level		Amount of phosphate (P <sub>2</sub> O <sub>5</sub> ) to apply lb. P <sub>2</sub> O <sub>5</sub> /1000 sq. ft.
-----ppm----- Bray-P1	Olsen -P	
0-10	0-7	1.0
11-25	8-18	0.5
over 25	over 18	0.0

days. The SDSU lab currently charges \$13.00 for a regular-series test which includes nitrate-nitrogen, organic matter, phosphorus, potassium, pH, soluble salts, and texture class. The table at left contains phosphorus fertilizer recommendations for an established lawn. The SDSU lab uses the Olsen-P test for phosphorus. If your soil test shows a concentration of P greater than 18 ppm, don’t fertilize with phosphorus. It is not needed by your lawn and will most likely end up in the lake with the next rainstorm

(especially since granular fertilizer is not incorporated into the soil). There is a local fertilizer dealer located here in Mitchell that offers a phosphate-free brand of fertilizer for lawn care and can be ordered at your request. It is also cheaper per pound than other fertilizer brands containing phosphorus.

Fortunately, lake residents (or anyone for that matter) do not have to choose between having a nice lawn and protecting water quality. With a simple soil test, you can do both. I realize that the majority of the phosphorus comes from other sources within the watershed but it is also true that it is everyone’s responsibility to do their part, not just the cattle producer. Do your part by soil testing your lawn. If you have a professional taking care of your lawn, ask them some questions. Do they soil sample? What is their fertility program? How many pounds of nitrogen, phosphorus, and potassium do they apply over the course of the year? Maybe you don’t really need as much as they apply and can save yourself a buck or two while doing the lake some good.



At left: Photo of our new watershed project sign which was placed in Kibbee Park (north of the spillway) at the end of June. The 4 x 8 foot sign was purchased through Firesteel/Lake Mitchell Improvement Association funds. Current participants in the project are listed on the bottom half of the sign.

**At right:** Dirtwork is complete on the new animal nutrient management facility located on the Burg family farm east of Wessington Springs. Sediment and evaporation ponds are in the foreground with mounds being finished in the back. Fencing, water supply, gravel, etc. will now be some of the next items to address. This system is one of four currently under construction this fall.



### Conservation Planning by Steve Vlieger

Harvest season is fast approaching. As you harvest corn and soybeans and move cattle from pasture to cornstalks, you have an excellent opportunity to assess the condition of your cropland and pastures. If you see areas that need attention, the winter months are a great time to develop plans to make the needed improvements.

A conservation plan is an excellent tool to help you implement the improvements in a logical and orderly manner. For example, you do not install a cross fence in a pasture without making provisions to provide water to the extra pastures. The same is true if you decide to construct a terrace or diversion. You must have a grass waterway to serve as an outlet. Once the conservation plan has been developed, you can then begin looking for funding to help implement it.

Depending on the practice, there may be several cost-share programs available or you may use a combination of programs. For example, field windbreaks and farmstead shelterbelts can be funded through CRP or EQIP while ag waste systems can be funded using EQIP, 319, state, and city funds. Personnel from your local NRCS and/or conservation district are available to help you work through the funding puzzle and select the best program or programs for your situation.

Don't hesitate in developing a conservation plan for your farm because the cost-share dollars have been used up before the end of the fiscal year the past several years. Contact your respective NRCS office for assistance.

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# FIRESTEEL CREEK NEWS

Volume 2, Issue 4

December 2000

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## Reducing Wind Erosion with Field Windbreaks by Dave Kringen

You've all heard the old saying "Only 2 things in life are for sure... death and taxes". But if you live on the prairie, you can add another... wind. We've got plenty of it. And we've all seen the topsoil and dust flying around from cropland, gravel pits, construction sites, etc. when it gets nasty out. One way to help keep that soil in your field instead of in the ditch is by planting a field windbreak. Windbreaks are plantings of single or multiple rows of trees or shrubs used to help reduce wind erosion, provide wildlife habitat, protect growing plants, manage snow, and improve irrigation efficiency. For comprehensive protection of a field, windbreaks are placed in a series across the area (typically spaced at intervals of 5 to 20 times the height of each windbreak), with individual windbreaks running parallel to one another, but perpendicular to prevailing winds (see figure at bottom of page).

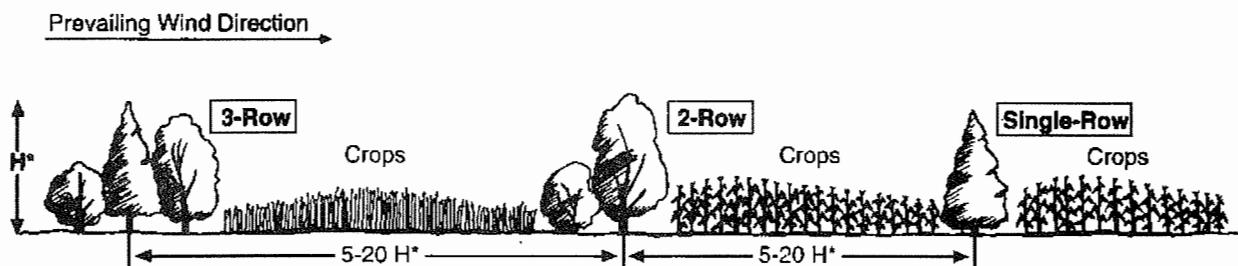
Agronomically speaking, field windbreaks offer several advantages. Studies have shown a net increase in crop yields from fields protected by narrow pattern windbreaks. In one study, yields increased an average of 10% in all crops when



plantings were spaced 10 to 15 tree heights apart. Windbreaks can contribute to winter wheat success by capturing and distributing snow evenly across a field providing critical early spring soil moisture. In the northern plains states, winter wheat fields protected by windbreaks have demonstrated 15 - 20% increases in yields as a result of increased moisture due to snow capture and protection from winter desiccation. Many of the birds that live in windbreaks will consume pest insects in the windbreak and the adjacent crop field. It has been estimated that birds consume about 260 pounds of insects per half-mile of windbreak each year. These natural biological controls could actually help reduce crop losses and provide some economic significance. Field windbreaks

also help contain the fine soil particles where most of the humus and nutrients exist by reducing wind velocities and preventing soil fertility loss. Needless to say, your pheasant hunting will more than likely improve too with food and cover in the same place.

Cost-share is available for windbreak establishment for producers in the Firesteel Creek watershed through either continuous CRP or EPA319. Continuous CRP offers 90% cost-share on trees and installation (including fabric if you want it) and a yearly payment on the acres you took out of production. A 10 or 15 year contract is available. EPA319 money will cost-share trees and installation (including fabric if you want it) at a 60% rate. It's not quite as good as deal as continuous CRP but is a bit easier to work with. Contact your local NRCS District Conservationist or myself if you are interested in putting a plan together or have any questions.

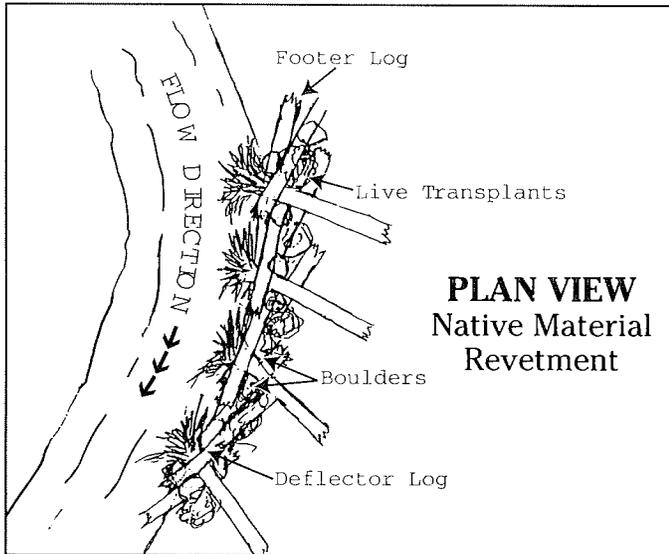


$H^*$  = Expected height of trees in tallest row. Field windbreaks designed to distribute snow evenly across a field should be tall and porous as where windbreaks designed to capture snow and control drifting should contain high-density, multiple rows.

## Streambank Stabilization the Natural Way by Dave Kringen

Traditionally, most streambank stabilization projects have involved placing lots of riprap, concrete, or other man-made materials along a stream or shoreline. While these products do a good job of protecting the bank from erosion, they generally are very expensive, provide little or no wildlife habitat, and do little aesthetically. There has been a move in the last several years however to use bioengineering. Bioengineering is a method that uses materials such as live vegetation, root wads, rocks, and biodegradable fabric. It is a much cheaper way to stabilize your eroding bank and offers other advantages "hard" engineering doesn't such as wildlife and fish habitat.

Streambanks are usually reshaped with a 3:1 sideslope. Oftentimes, rock vanes or deflector logs are used to redirect the water away from the bank and dissipate some of the stream flow energy. Root wads (tree root systems with approximately 20 - 30 feet of tree left) are driven perpendicularly into the bank at the channel bottom elevation to help stabilize the bank, prevent under cutting by the water, and provide roughness. Deflector logs and footer logs are placed above and below the root wads to interlock the structure and hold it in place. Willow stakes, grass, and other vegetation are used with erosion control blankets to stabilize the bank.



Willow stakes, grass, and other vegetation are used with erosion control blankets to stabilize the bank.

The Minnehaha Conservation District completed a bioengineered shoreline stabilization demonstration project along the Big Sioux River a couple of years ago and estimated it cost approximately \$25/ft to install. Compare that to \$50 - \$150 that it would cost using traditional riprap methods and it starts to look like a pretty good deal.

The Firesteel watershed project has 60% cost-share available for those interested in exploring this

stabilization option. If you have an area along Firesteel Creek or one of its tributaries that needs some attention, contact your local NRCS/conservation district office where personnel can help develop a plan that's right for you.

# *Happy Holidays from Firesteel Creek News!!*

Many thanks go out to Vern Niles (Aurora), Mike Johnson (Aurora), Ron & Curt Olinger (Jerauld), and Jeff Burg (Jerauld) for starting and/or completing the installation of their animal nutrient management facilities along Firesteel Creek this year. Although residents who gain the most from this project certainly appreciate your efforts, I doubt they realize the amount of time and labor the five of you have put into installing these systems. On behalf of those residents, thank you for participating in the restoration project!!

- Dave

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# FIRESTEEL CREEK NEWS

Volume 3, Issue 1

March 2001

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## NOTE FROM THE COORDINATOR by Dave Kringen

As I look out my window at the mountains of snow as I write this, I suspect I will be very busy with water quality sampling this spring. The sampling equipment got pretty rusty sitting in the corner last year due to the drought. Along with a much needed flush, a little less phosphorus and nitrogen will be making its way into Lake Mitchell this year too thanks to the 5 animal nutrient management facilities that are either completed or nearly complete. These systems are designed to contain all the runoff from their lots up to a 25-year, 24-hour storm event (around 4½ inches in this area). Eight other producers have recently requested NRCS assistance for engineering design work with two of those scheduled for construction in 2001.

As most of you are aware, the Firesteel Creek Watershed Project is not the quick fix for Lake Mitchell's immediate problems. What we do in the watershed now is an investment for the future. As we continue to install best management practices throughout the watershed, less and less sediment and nutrients will enter Firesteel Creek until at some point we see some significant differences. As a result, the frequency and duration of the algae blooms that regularly occur will eventually decline.

As for the near future, Mitchell's city council is currently considering approval of an in-lake management proposal that should provide some relief from our annual summer-long algae blooms through the application of alum (aluminum sulfate). Alum is used in lakes to control algae by reducing the available phosphorus needed for the plants to grow. Conditions look favorable for work to begin this spring with an alum treatment as early as this fall or next at the latest. Although some may be thinking this is going to be the cure to all our ills, I want to caution you on your expectations. This is a mud-bottom reservoir located in a very large and productive agricultural watershed, the lake will never be perfectly pristine as some might hope. But I am optimistic that if the alum is applied, we will see some significant improvement in the condition of the lake and considerably less algae.

It is also that time of year for the Firesteel/Lake Mitchell Improvement Association's Annual Membership Drive. Last year's drive raised \$440. With that money, we were able to put up the watershed sign in Kibbee Park and buy promotional refrigerator magnets. Thank you to all who contributed! As work has continued to move forward in the watershed, a need has arisen to utilize Geographic Information System (GIS) technology. GIS analysis is a way to visualize geographic patterns and relationships by combining many different layers of information. A few examples of what we will be able to do with this technology include creating watershed-wide soil and fertility maps, planning and implementing best management practices, assessing landuse patterns, and possibly entering into the precision farming arena. Involvement with the in-lake management is also likely. GIS will also greatly enhance our ability to secure additional funding that will be needed in the future by quantifying resource conditions and measuring the accomplishments of the restoration effort. The bottom line is that GIS means better information for a more informed public and a more successful project.

Through a generous donation by the Wal-Mart Corporation (see photo on back), realization of this project is nearly complete. Their donation will go towards the purchase of a new computer, computer desk, and software needed to apply this GIS technology. Software is expensive however, so in order to purchase all the necessary components, I need to rely on your generosity. Please take a moment and fill out the form below. I feel this is a worthy project and your contribution can help make it happen!

-----  
Send your contributions to:

Membership Drive 2001  
Firesteel/Lake Mitchell Improvement Assoc., Inc.  
600 South Burr  
Mitchell, SD 57301

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

_____ Individual Membership	\$20.00 Donation
_____ Family Membership	\$30.00 Donation
_____ Business Membership	\$50.00 Donation

**A NUTRIENT MANAGEMENT PLAN FOR LIVESTOCK PRODUCERS**  
by Merle Kost, Resource Conservationist, NRCS

Ideally, a nutrient management plan is a strategy to make the best use of plant nutrients while protecting the quality of our surface and groundwater resources. If you have a livestock feeding operation, it is a plan to help you evaluate and balance the use of animal manure, commercial fertilizer, and other nutrient sources such as legumes. Livestock producers are especially encouraged to develop a nutrient management plan to maximize the value of on-farm manure nutrients.



A potential environmental problem associated with animal manure is application at rates that exceed crop needs. These excessive nutrient applications waste much of the manure's fertilizer value. Applying too much manure at the wrong time or improperly handling it in other ways releases nutrients into the air or into surface and groundwater supplies. Therefore, instead of nourishing crops, nutrients become pollutants. Excess nitrogen can leach through soil, causing groundwater contamination. Another common misuse of manure is repeated applications on the same field, resulting in excessive buildup of phosphorus in the soil. A loss of phosphorus through runoff from such fields can stimulate algae growth, resulting in a negative affect on water quality of nearby streams and lakes.

Following are some suggestions on how you may improve manure nutrient use efficiency, and at the same time reduce potential water quality problems:

- Use current soil test results to determine nitrogen, phosphorus, and potassium levels in the soil and amounts needed to meet realistic crop yield goals.
- Test the manure for total nitrogen, phosphorus and potassium, including inorganic nitrogen, to determine amounts of each available to meet crop needs.
- Calibrate manure application equipment to effectively calculate the nutrients applied to a given field and thus avoid over-application.
- Rotate fields receiving manure to avoid nutrient buildup (i.e. phosphorus).
- Incorporate manure for maximum nutrient efficiency (i.e. reduces nutrient losses due to runoff & volatilization).
- On fields receiving manure, use commercial fertilizer only when manure nutrients do not meet crop yield goals.
- Designate setback or "buffer" areas along sensitive areas in fields where manure will not be applied to reduce risks of nutrient losses and disease bearing pathogens through runoff and erosion (i.e. along wells, natural or manmade ditches, streams, lakes).
- Avoid surface application of manure on sloping land, and in the winter on frozen or snow-covered fields.
- Avoid applying manure on wet soils to minimize compaction and runoff.

For further information or assistance in developing a nutrient management plan, contact your local NRCS and conservation district.



**At left:** The Firesteel Creek Watershed Project received a \$4,000 grant award from the Wal-Mart Corporation during the March 14th Grand Opening ceremony in Mitchell. This money will go towards the purchase of a new computer and GIS software. Many thanks go out to Marty Muller-Driggers and her associates for their hard work in securing these funds from the national office!  
– Dave

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# Lake may be 1st in S.D. to use alum in algae fight

By **CHUCK BLOMBERG**  
The Daily Republic

Treating a lake with alum to reduce algae levels is so uncommon in South Dakota that one official on Wednesday said it's possible Lake Mitchell would be the first in the state if council members decide to proceed with an alum project in the near future.

"Usually it's not done because of financial concerns. It's not a cheap thing to do. It takes a lot of money," said Eugene Steuven, environmental program scientist for the Department of Environment and Natural Resources' Division of Water Resources Management.

"In my opinion, we would like to see it done. ... I like the idea of a trickle system."

State and local officials met with Dick Osgood, of Ecosystems Strategies, of Shorewood, Minn., on Thursday to discuss his upcoming study on treating the lake with alum, also known as aluminum sulfate.

Mitchell City Council members on Monday approved spending \$40,000 for the study, which is expected to be completed at the end of this year.

Alum basically starves algae by reducing phosphate levels in the lake, Osgood said. And since algae is what sometimes makes the lake less desirable for recreational purposes, reducing algae is exactly what some residents want for Lake Mitchell.

The project would do no harm to wildlife or fish, Osgood said.

"There are days that you can walk on it," said Bob Sebert, a member of the city lake development committee.

Osgood said he will take a good look at Lake Mitchell sometime today, and that the first phase of the study will begin in upcoming weeks.

The first phase will take about

See **ALUM**, Page 19

## **ALUM:** Application options discussed

Continued from Page 1

30 days and requires a local volunteer to take weekly samples of the lake at locations that have not yet been selected. In the second phase, Osgood said there would be actual field studies and an in-depth look at the phosphate levels in Lake Mitchell.

In the third phase, Osgood said his company would complete designs and recommendations.

"We should wrap it all up by the end of the year," he said.

Osgood said that there are three application options that will need to be considered, including:

■ a bulk, one-time treatment to the lake that would generally last

about 10 years;

■ building a pump station and trickling smaller amounts into the lake through hoses;

■ and placing the pump station on Firesteel Creek and treating the water coming into the lake.

Osgood said he would have to determine how much phosphates are being deposited from runoff and how much is generated from within the lake itself.

Managing phosphates is a lot like balancing a checkbook in that the study will have to look at how much phosphates are entering the lake, how much is leaving and how much is being generat-

ed because of existing phosphates, he said.

"You have to figure compound interest," he said.

Osgood was reluctant to give a cost estimate at this point, because, he said, every lake is different. However, he said many projects cost \$100,000 to \$200,000.

Steuven figured that an absolute maximum cost would be nearly \$470,000, based on a 670-acre lake being treated at \$700 per acre.

"That's the high end," he said.

Osgood and Steuven both agreed that a project probably would not cost near that much.

THE DAILY REPUBLIC ■ THURSDAY, MAY 10, 2001

# FIRESTEEL CREEK NEWS

Volume 3, Issue 2

June 2001

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## Lake Residents Look At Fertilizer Alternatives by Dave Kringen

"I'll certainly do what I can if it will help clean up the lake," one resident recently said to me as we stood in his backyard overlooking Lake Mitchell. That sentiment was enforced over and over recently by lake residents participating in a unique program carried out this spring in conjunction with the Firesteel Creek watershed project.

Earlier this spring, I sent a letter to all Lake Mitchell residents offering a free lawn soil test in order to determine nutrient levels. I was especially interested in looking at phosphorus (P) concentrations in the soil and the possibility of lakeside lawns being a source of P to the lake. A typical lawn fertilizer contains 3 major elements - nitrogen, phosphorus, and potassium. While these elements are needed in various amounts, most lawns are seldom deficient in phosphorus or potassium and require only nitrogen applications. Phosphorus concentrations will build up in the soil if applied to lawns on a yearly basis and runoff from snowmelt and rainfall events can transport these elevated concentrations to the lake and contribute to the algae problem. Our soil test determined nitrogen, phosphorus, and potassium concentrations along with pH and soluble salts. I anticipated getting about 25 responses to my letter; but received 49 instead! Obviously, lake residents are interested in getting more directly involved with the restoration effort!

Samples were distributed fairly evenly around the lake (25 taken from North Harmon, 19 from South Harmon, and 5 from West Harmon). Table 1 shows the result averages for each parameter. Phosphorus concentrations averaged 22 ppm

**Table 1. Soil test results from Harmon Drive lawns (49 samples)**

Parameter	Average
Nitrogen (lb/ac)	13
Phosphorus (ppm)	22
Potassium (ppm)	298
Soluble salts (mmho)	0.25
pH	7.8

(parts per million) and ranged widely from a low of 8 ppm to a high of 72 ppm. Of the 49 samples taken, 31 of them (63%) had P concentrations at or above what the SDSU Fertilizer Recommendation Guide considers "very high" and 44 (90%) were at or above what is considered "high" (see Table 2). Ideally, a P level in the "medium" category (8-11 ppm) is most desirable both for your lawn and your lake. Concentrations above that is not only unneeded but undesirable as the potential for P loss in runoff increases as soil P accumulates.

Potassium concentrations averaged 298 ppm and ranged from 180 ppm to 425 ppm. Of the 49 samples taken, 49 (100%) were over what SDSU considers "very high" (161+ ppm). Although potassium never receives much lip service when people talk about eutrophication (the degree of nutrient enrichment in a waterbody), it is still interesting none the less. There's certainly no shortage of this nutrient in the soils around Lake Mitchell.

Nitrogen on the other hand was quite low averaging just 13 lbs/acre. This comes as no surprise though with the record snow we had last winter and the rain we had this spring. Most of the nitrogen was probably leached out of the profile plus most of the samples were taken before any nitrogen was applied this spring. Also, nitrogen tends to be taken up by the plant rather quickly after fertilizing and may not necessarily show up in a soil test.

**Table 2. Soil test calibration levels used in SD (SDSU Fertilizer Recommendation Guide, EC 750, Jan 2001)**

Nutrient	Categories				
	Very Low	Low	Medium	High	Very High
Nitrogen (lb/ac)	0-25	26-50	51-75	76-100	101+
Phosphorus (ppm)	0-3	4-7	8-11	12-15	16+
Potassium (ppm)	0-40	41-80	81-120	121-160	161+

Overall, our results have reinforced what other studies in the Midwest have shown...that you only really need to apply nitrogen on a regular basis in order to maintain a healthy lawn. Of those residents I have had a chance to talk to about their results, most have been very receptive to the idea of using a phosphate-free fertilizer on their lawn, which is available here in Mitchell. I would urge all Lake Mitchell residents to look into this fertilizer option. This is one potential source of phosphorus to the lake that we could easily correct. If you have questions about test results or are interested in looking into using a phosphate-free fertilizer, contact me at the number listed above.

Many thanks go out to Rick Kriese for volunteering his time to help with the soil sampling.



**At left:** Bernie Schmucker and Dave Kringen go over Bernie's lawn soil sampling test results. The Schmuckers were one of the 49 Lake Mitchell homeowners to take part in this program. Thanks to all who participated!!

**Farmable Wetlands Pilot Program  
by Steve Vlieger**

South Dakota has been selected as one of six states to implement the Farmable Wetlands Pilot (FWP) Program. The program's purpose is to restore wetlands to reduce downstream flooding, improve surface and groundwater quality, and recharge groundwater supplies.

To be eligible for FWP, the land must have been planted to an agricultural commodity 3 of the previous 10 years. The wetland cannot exceed 5 acres in size. An upland buffer must be included with the wetland. The buffer cannot exceed 3 times the size of the wetland or an average width of 150 feet around the wetland. The wetland hydrology must be restored and the upland buffer must be seeded to grass. The FWP contracts are between 10 - 15 years based on the operator's preferences.

In return for enrolling land in FWP you will receive an annual rental payment. The payment is based on the rental rate + 20% of the rental rate + maintenance payment. In addition to the annual payment, you will receive a one time payment of \$100 - \$150/acre based on the contract length. Establishing permanent cover and restoring hydrology is eligible for 90% cost share assistance in addition to your annual payment.

Acreage is capped at 100,000 acres in South Dakota and sign-up will continue until the acreage cap is reached. If you are interested in signing up for the FWP Program or desire additional information, contact your NRCS or FSA office.

**New Wetland Management Option:  
Pilot Program under the Conservation Reserve Program (CRP)**

receive financial incentives

enhance wildlife habitat

improve soil & water quality

adjacent buffer

wetland

before

**Photo shows small wetland areas and adjacent buffers eligible for the program.**

**USDA**  
Natural Resources Conservation Service  
Farm Service Agency

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# FIRESTEEL CREEK NEWS

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Volume 3, Issue 3

September 2001

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## Lake Mitchell Water Quality Improvement Program

Dick Osgood  
ECOSYSTEM STRATEGIES  
Shorewood, MN

The City of Mitchell has commenced a comprehensive watershed cleanup program with the goal of controlling algae blooms in Lake Mitchell. The watershed cleanup addresses the root of Lake Mitchell's algae problems by reducing nutrients that enter the lake and feed algae. Due to the large size of the watershed, an immense effort of cleanup activities is required for many years. The City is to be commended for starting this large task.

The algae problems in Lake Mitchell are extreme – in fact, the lake is classified as hyper-eutrophic, meaning it is so enriched with nutrients that very large improvements will be necessary before any visible changes occur. Therefore, the algae problems can be expected to persist for a long time.

The City of Mitchell has retained us<sup>1</sup> to design a treatment system that will accelerate the improvement in lake water quality even before results of the watershed cleanup are noticeable. In other words, this work is designed to compliment the watershed cleanup.

### Why Do Both Projects?

Lake Mitchell's algae problems are the result of excessive nutrient inputs entering the lake through Firesteel Creek. Thus, the ultimate solution must involve cleaning up the watershed. While this is a valuable approach in the long run, it will take a long time and a lot of effort. As a result, noticeable water quality improvements cannot be expected for one or more decades.

To give more immediate relief and accelerate water quality improvements, the City of Mitchell has retained us to design an alum treatment system for Lake Mitchell. This system can be implemented and operated in the short-term, until improvements due to the watershed cleanup are effective.

### What is Alum and How Does it Work?

'Alum' is also known by its chemical name, aluminum sulfate. When added to lake water, alum inactivates nutrients needed by the algae and removes the algae, thereby clarifying the lake water. The alum settles to the lake bottom and does not harm aquatic life. In fact, alum is now added to the City's drinking water as a clarifying agent.

### What Are We Doing?

We are studying Lake Mitchell and evaluating its management needs by 1) reviewing previous studies on Lake Mitchell, 2) collecting water quality data this summer, 3) running mathematical models and 4) getting input from the City's Lake Development Committee. With this information, we can design a system to apply alum to the lake that will accomplish the goal of controlling nuisance algae blooms.

There are three possible ways to apply liquid alum to the lake: 1) a single, bulk application over the lake surface, 2) continuous dosing into the Firesteel Creek inflow, or 3) continuous or seasonal application into the lake water directly. The preferred system may involve one or more of these methods.

### What Happens Next?

We anticipate having draft recommendations available by the end of 2001. The City will then consider these recommendations and decide whether to support the treatment system or not. We are happy to answer questions or provide additional information to anyone who is interested. Please contact Dick Osgood at (952) 470-4449 or at [DickOsgood@aol.com](mailto:DickOsgood@aol.com).

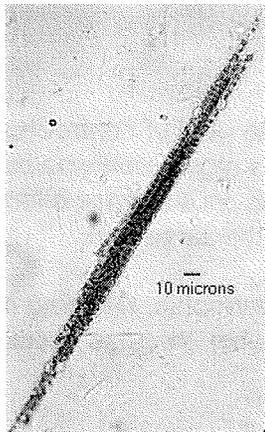
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<sup>1</sup> Dick Osgood of ECOSYSTEM STRATEGIES and Dr. Gertrud Nurnberg of FRESHWATER RESEARCH have been retained by the City of Mitchell to design an alum treatment system for Lake Mitchell to reduce algae problems until watershed improvements are in place.

**Impress your friends...know your algae species**  
**by**  
**Dave Kringen**

Anyone that has been on the lake this year knows that we have experienced another summer-long algae bloom. But what everyone may not realize is that there are different types of algae that are predominate at different times of the year. Now most of you are probably thinking "algae is algae and I don't care what kind it is, I just want to get rid of it" but it has been interesting to watch the succession of species over the course of the summer.

\*If you were out on the lake around the 4th of July, you may have wondered who was dumping all of those grass clippings in the water. This was in fact our first serious blue-green algae bloom of the year and was dominated by the genus *Aphanizomenon*. This species forms individual strands of cells that lie in free-floating parallel bundles to each other which end up resembling grass clippings. These plants contain gas vacuoles which allow it to move up and down within the water column or form surface scums.



The other predominant species of algae seen this year was *Microcystis*. The marble-like cells of this genus will form colonies enclosed in mucilage and will give the appearance of a thick pea soup during bloom conditions. Blooms of this algae will float to the surface under calm conditions and become concentrated by winds or currents in shallow areas near shore. *Microcystis* can be considered dangerous because it contains a toxin called microcystin that is harmful to the aquatic food chain; including fish, waterfowl, and other wildlife or pets that may drink the water. *Microcystis* blooms are commonly found in Lake Mitchell in late August or early September.

**At top:**  
*Aphanizomenon* at  
400x magnification.

Both species can also create taste and odor problems in drinking water supplies. Chemical compounds that are linked to foul odors and tastes can be released by the algae themselves or by the bacteria that decompose them.

It is also interesting to note that blooms of one of these types of algae occur to the exclusion of the other. A lake can be densely overgrown with either *Microcystis* or *Aphanizomenon*, but not the two together. Unfortunately, we usually end up seeing both over the course of the summer.



**At left:** Local farmer and cutup "Wild Wayne" (aka Wayne Edinger) receives a volunteer leadership award from the Firesteel/Lake Mitchell Water Quality Project during DakotaFest 2001. "Wayne has never hesitated to donate his time for different events related to the watershed project and we just wanted to show him how much we appreciate all that he's done and the support he has shown. It's been a lot of fun to work with him," said Dave Kringen, project coordinator.

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# FIRESTEEL CREEK NEWS

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Volume 3, Issue 4

December 2001

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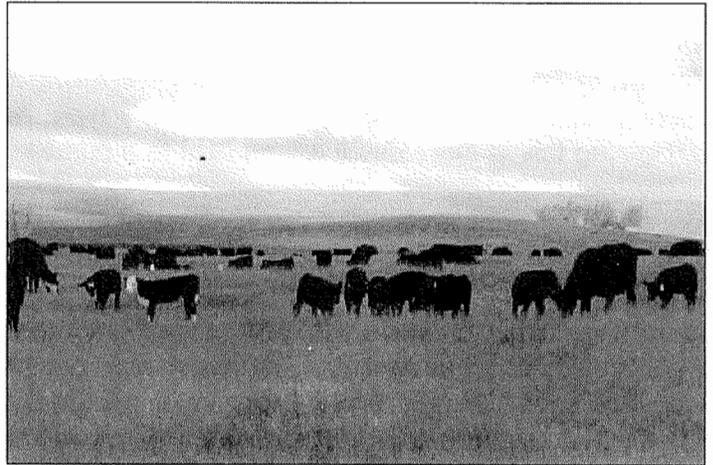
## Farmers and Ranchers Use Grazing Systems to Produce More Profit, Cleaner Water, and Better Wildlife Habitat

**John Deppe**

**RC&D Coordinator, Lower James RC&D**

Fifty-three percent of South Dakota's land area is grassland. Livestock and/or wildlife are produced by over 90% of South Dakota's farmers and ranchers using this grassland as the feed/forage base for production.

The Firesteel Creek Watershed has 163,422 acres of grassland (native range) and 61,327 acres of pastureland. Pastureland is often brome grass or a mixture of brome and native grass. Similar to South Dakota, Firesteel Creek is 55% grasslands with a higher percentage of grasslands in northern Aurora County and the Jerauld County areas of the watershed. Most of the land bordering or near Firesteel Creek is grassland. These grasslands are a buffer for the creek with the potential to remove sediment and nutrients from runoff water preventing water pollution to the creek and Lake Mitchell.



The 1997 Census of Agriculture, based on the county level data (not Firesteel Creek Watershed data) for Davison, Aurora, and Jerauld County's reports farm income of 80.3 million dollars for livestock and 50.9 million dollars for crops. Sixty-two percent of the farm/ranch income is coming from the harvest of grassland forage by livestock.

The grasslands of Firesteel Creek are critical both to farm income and due to their extent, location (buffering) and their ability to soak-up rainfall or snowmelt thus reducing erosion from runoff are also critical to the clean water goals of farms, ranches, and communities in the watershed. South Dakota farmers and ranchers are continuously developing and using a variety of livestock grazing methods with a goal of increasing business profit while simultaneously improving natural resource assets such as clean water and wildlife habitat.

The grazing systems showing the greatest success at meeting producer profit and stewardship goals are rotational grazing systems. These systems range in intensity from grazing livestock for 90 days per pasture instead of season long continuous grazing to grazing periods of 1-3 days accompanied by smaller pastures created with highly mobile electric fences and above ground water pipelines.

In 2001, three ranchers are demonstrated grazing systems on their ranches, with the support of technical assistance and funding from private groups and local, state and federal agencies. In 2002, three additional ranches will participate in on-ranch demonstrations. These systems are being monitored to determine the impact of the grazing systems to include profit, forage production, changes in forage types, livestock condition, gains, conception rates, forage used, waterfowl and song bird numbers, soil changes, etc. To learn more about the work of these three ranchers go to the web site <http://www.sdconservation.org> and click on grassland where you will find a management/demonstration link.

The Grassland Coalition, a non-profit organization of farmers, ranchers, and private and public organizations has taken the leadership to secure support in South Dakota for grassland managers. In August of 2001, the Grassland Coalition secured funding to hire two part-time specialists in grassland management to support farmers and ranchers who are interested in planning and using an improved or more intensive grazing system. These specialists are available to visit with producers about their grazing goals, support the design of a grazing system, and help producers during use of the new system through visit to the pastures during the grazing season.

Farmers and ranchers in Firesteel Creek Watershed can discuss grassland management with the range specialists now available or with NRCS range specialists by contacting Dave Kringen, Firesteel Creek Project Coordinator or the Conservation District/NRCS office in your county.



## Project Receives I & E Grant

Dave Kringen

The Firesteel Creek Watershed Project was recently awarded an NRCS Environmental Quality Incentive Program Information and Education (EQIP I & E) grant. This grant was developed to generate information on a number of topics related to the Firesteel Creek implementation project and then be made available to all watershed producers, project partners, and urban residents. It is hoped that the information derived from this grant will help accelerate future implementation of Best Management Practices (BMPs) in order to achieve the overall water quality goal of a 50% reduction in nutrient loadings to Firesteel Creek/Lake Mitchell. Planned projects to be carried out through the I & E grant include:

- Nutrient management in continuously manured fields
- Lakeside resident lawn nutrient management
- Feedlot options for producers with smaller herds
- Technical assistance and follow-up for producers implementing planned grazing systems

Of particular interest to myself will be comparing the differences in soil test data from continuously manured fields with data from non-manured fields while taking into account factors such as past commercial fertilizer and manure applications, past soil test data, soil type, landscape position, crop needs and uptake, etc. A letter explaining this in more detail will be sent to a number of producers who I hope will participate later this winter.

We have currently contracted the services of Diana Tong to provide some much needed technical assistance and follow-up for several producers in the watershed who are currently implementing or are interested in implementing a planned grazing system. Diana is an employee of the Hand County Conservation District and is experienced with developing grazing systems that not only fit the needs of the producer, but helps to achieve water quality goals as well. The technical assistance that Diana is currently providing and which the Grassland Coalition soon will (see article other side) should present a good marriage with the financial assistance the Firesteel Creek project provides in order to implement practices related to grazing management.

Once all the data and information is compiled, I plan to put out a project summary pamphlet that will detail the items listed above along with a summary of all watershed activity to date.



**At left:** Dwight Scott and Eldon Asbenson are seen here reinstalling fence at the Dale Fraser farm after dirt work for the new animal nutrient management facility was recently completed in mid-november. The Fraser system is the sixth facility to be installed since the start of the watershed project and the third in Aurora County.

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# FIRESTEEL CREEK NEWS

Volume 4, Issue 1

March 2002

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## PROJECT TO PROTECT HABITAT

Landowners interested in grassland seedings, rotational grazing systems, small ponds, and wetland restoration can benefit from a Threatened Habitats project sponsored by the North Central Resource Conservation and Development (RC&D) Association. North Central RC&D and the United States Fish and Wildlife Service will partner with several organizations in a 6-year effort to establish, protect, restore and enhance wetlands and associated grasslands in a 21-county area throughout central South Dakota.



Joby Timm, North Central RC&D Coordinator, referenced that this project is one of many RC&D projects across South Dakota striving to enhance and protect the valued landscape character of the Missouri River watershed. "We all live in a watershed," Timm said. "We need to implement conservation practices that will protect the landscape long-term."

Paul Coughlin, wetlands biologist for the South Dakota Department of Game, Fish and Parks, noted that changes in technology and farm use have transformed

the Missouri Coteau region in central South Dakota from an expansive native prairie-wetland system used for livestock ranching to a landscape dominated by tillage agriculture. "Over 160,000 acres of native prairie have been converted to cropland in this area since 1987," Coughlin said.

Coughlin said a system of habitat conservation programs and easements will be used in this project to benefit both ranchers and prairie wildlife. The project will have 3,000 cropland acres restored to grassland, nearly 600 acres of wetlands will be established and another 120 acres restored, and 14,000 grassland acres will be enhanced using improved grazing systems. The project area includes a nearly contiguous tract of some 2,700 square miles of habitat. "The project area is ecologically important for meeting all or part of the life-cycle needs of over 50 bird species," Coughlin said. "Most notably, it provides critical breeding habitat for upland nesting ducks and songbirds." Specifics of the program include:

### Grassland Seedings

Practice Description: Seeding cropland back to tame or native grass.  
Cost-share: 100% of the grass seed cost up to \$80/acre.  
Producer Input: All seedbed preparation, seeding and weed control.  
Other Notes: No haying prior to July 15<sup>th</sup>.

### Rotational Grazing

Practice Description: Cross fencing grazing land.  
Cost-share: 100% of the fence material up to \$20/acre.  
Producer Input: All fence installation and maintenance.  
Other Notes: Grazing plan will be jointly designed by the landowner and USDA or USFWS.

### Ponds

Practice Description: Small ponds created with earthen dam grades.  
Cost-share: 75% of the "dirtwork" cost.  
Producer Input: 25% of the "dirtwork" and seeding and fencing the dam grade.  
Other Notes: Does not include stand alone dugouts. However, dam/dugout combinations and small dam repairs are eligible. Wildlife partners will provide all the necessary seed and fence for protecting the dam grades.

### Wetland Restorations

Practice Description: Filling drainage ditches to restore drained potholes.  
Cost-share: 100% of the "dirtwork".  
Producer Input: Seeding down the dirtwork.

**General Notes:** All projects will be completed via a 20 year cost-share agreement with the USFWS. Payments will be made to producers and/or contractors upon completion of a specific project. For more information, or for a site review of a potential project, contact your local Conservation District office, the local USFWS office, or the local RC&D office.





**At left:** Firesteel Creek project coordinator Dave Kringen was recently a guest on KORN's Forum to talk about and give an update on the Firesteel Creek watershed project. J.P. Skelly is seen here interviewing Kringen.

### Nutrient Management Plan Review

Dean Colling  
Civil Engineering Technician  
Agricultural Nutrient Management Team

With spring just around the corner, I would like to remind producers with ag waste systems to review their nutrient plans to see if they are up to date. If your plan is quite old or if animal units or land area have changed dramatically, then it would be a good idea to contact someone from the Ag Nutrient Management Team to have it updated or revised. I also strongly encourage people fertilizing their fields or lawns to have it tested to see if it needs any additional nitrogen or phosphorus and how much instead of just guessing, which could lead to water pollution and wasted money.

More important than the preliminary plan is the actual application plan using current manure and soil tests to determine rates. Manure contains a lot of phosphorus and can provide great benefits to your crop and your pocket book if applied to the fields that will utilize it the most, which are usually the soils which test the lowest in available phosphorus. The only way to do this is by using current soil and manure tests and applying the manure at the correct rates using application worksheets. Our team can provide you with application worksheets if you don't have any and assist you with filling them out and how to go about getting samples. One of the worst things someone with an ag waste system can do is to apply the manure in a manner where it just ends up in the water anyway because of overloading or runoff.

Managing nutrients isn't only for people with ag waste systems or livestock, it is everyone's responsibility in the watershed to prevent excess nutrients from getting into lakes and streams whether it be from manure, fertilizer, crop ground, lawns, or from soil erosion. So lets do our part for managing nutrients on crop ground and lawns by getting the needed tests and information. Please feel free to contact your watershed coordinator or the Ag Nutrient Management Team in Mitchell or check out [www.sdconservation.org](http://www.sdconservation.org) on the web for information on nutrient management.

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# FIRESTEEL CREEK NEWS

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June 2000

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## FINE TUNING MANURE APPLICATIONS

Merle Kost

Resource Conservationist, NRCS

Manure spreader calibrating is a new service being offered to livestock operators in the Firesteel Creek Watershed Project area. This service is possible thanks to special water quality funds appropriated last fall to purchase portable weigh scales for on-farm use to weigh and calibrate spreaders. The scales were delivered in April.

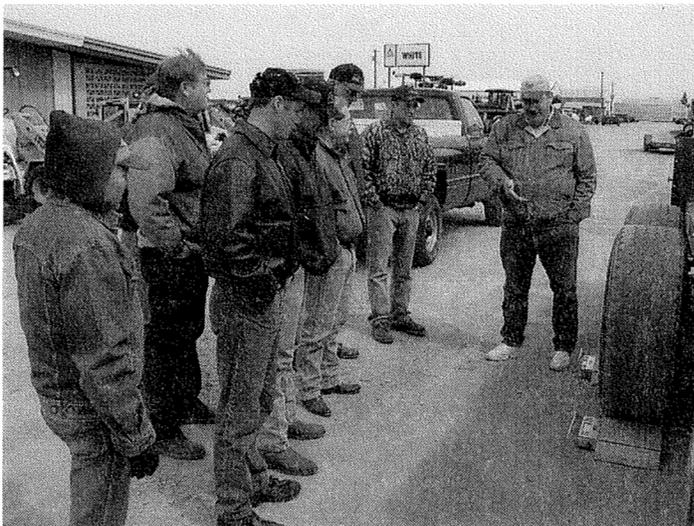
Because the scales are portable, they can be brought on-site to a livestock feeding operation when manure hauling occurs. The calibration procedure would include weighing a spreader when it is empty and several loads when full of manure to determine an average weight. Then next step would be to determine the area over which a load is spread and calculate the application rate. "Knowing the weight of a load of manure will enable an operator to calculate how many tons per acre are actually being applied", says Dave Kringen, Project Coordinator. "Not having a weight, you are guessing at how much is going to the field and likely end up under or over-applying nutrients."

Calibration of manure spreaders, like calibration of any fertilizer spreader first requires an accounting of the nutrients available and what the crop needs to meet yield goals. An effective land application plan should include:

- A lab analysis of the forms and amounts of nutrients in the livestock manure;
- A soil test to know the nutrient level in the soil before manure is spread;
- Method of manure application. Incorporation and direct injection, for instance, reduces nutrient losses from runoff and volatilization;
- Setting realistic yield goals to determine nutrient needs;
- Crediting nutrient contributions from other sources such as prior year legumes;
- Calculating the manure application rate by dividing the amount of manure in the spreader by the area it is spread on.

Calibrating a manure spreader is part of a process, but a very essential one to know how much manure, including nutrients, are being applied over a given area. It is a simple easy management tool that can help livestock producers use nutrients from manure more efficiently while at the same time protecting the environment.

The spreader calibration service is free and available to all livestock producers in the Firesteel Watershed Project area. Interested operators are encouraged to sign up by calling Dave Kringen at 996-1564 Ext. 131 or stopping by his office located at the USDA Service Center, 1820 North Kimball Street in Mitchell. The calibration services are planned to be available during the months of April through October.



**At left:** Representatives from NRCS, SDACD, and several water quality projects in the area recently met in Watertown to learn how to correctly operate the new portable weigh scales. The Upper Big Sioux Water Quality Project purchased two sets of scales with one set to be based out of Mitchell. These scales are available to all local producers interested in calibrating their manure spreaders.

## ALTERNATIVE SOLUTIONS FOR OPEN FEEDLOTS

David Kringen  
Project Coordinator  
Firesteel/Lake Mitchell Watershed Project

Like it or not, manure has, is, and will continue to be an issue for South Dakota livestock producers. There is no doubt that the production of manure in less than desirable locations poses risks to surface waters when not properly managed. While "no discharge" is the rule for CAFOs\*, alternative solutions do exist for those smaller operations (< 500 animal units) concerned with reducing feedlot runoff while minimizing capital expense. Below are two alternative management practices that smaller livestock operations can use in combination with each other to achieve the "functional equivalency" that complete containment provides CAFOs.

### Settling Basins

The first and most important component of a pollution abatement design for any feedlot is solids removal. It has been shown that the majority of solids (the large particles) coming off a beef feedlot will settle within the first 10 minutes, with small particles requiring a much longer period of time. In one study conducted in Iowa in the early 1990's, settling below a beef feedlot removed an average of 64% of the solids from the raw runoff. It removed 84% of the total nitrogen, 80% of the phosphorus, and 34% of the potassium. Other studies have shown similar results. Eighty percent of the phosphorus just by digging a ditch below your lot! A properly designed and managed settling basin should remove about 30% of the N and P from the runoff from open swine lots and approximately 80% of each from open beef lots.

### Vegetative Filter Strips

Vegetative filter strips (VFS) are defined as a band of permanent vegetation situated downslope of an animal production facility that provides erosion protection and contaminant reduction. The vegetation is used to treat feedlot runoff through filtration, adsorption, settling and infiltration. Strips enhance the filtration of suspended sediment and improve adsorption of soluble nutrients onto soil and plant surfaces. Overland flow systems, as opposed to channelized-flow systems, are the recommended type of VFS as it allows uniform loading of runoff at a relatively shallow depth. This uniform depth across the width of the VFS results in a slower velocity and more efficient removal of sediment and nutrients. NRCS minimum length standards for VFS require at least 60 feet for slopes of less than 2 percent, 90 feet for slopes of 2 to 4 percent, and 120 feet for slopes 5 to 6 percent. It is recommended that settling precede vegetative filter strips to reduce solids buildup which can cover the plants and effectively "kill" the VFS. Maintenance may be needed periodically in order to prevent soil erosion and minimize the formation of gullies. Harvesting of the vegetation should be done occasionally to remove nutrient accumulation and maintain plant vigor. Traffic should be kept to a minimum to prevent soil compaction or otherwise damage the filter strip in some way.

Producers operating smaller herds can use these two practices in concert with each other to provide an effective means of reducing feedlot runoff to nearby streams at minimal cost. Cost-share is available for those interested in implementing a feedlot management system similar to the one above. Contact your local NRCS District Conservationist or Conservation District for more information.

\*Concentrated Animal Feeding Operation (CAFO) is defined as an animal feeding operation that feeds or maintains more than 1,000 animal units (AU). A feeding operation with less than 1,000 AU can also be defined as a CAFO if there is a likelihood of discharge into waters of the state.

Note: Portions of this article were paraphrased from an Iowa State University paper entitled ALTERNATIVE TREATMENTS TO MINIMIZE WATER POLLUTION FROM OPEN ANIMAL FEEDLOTS.

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# Cleanup continues along Firesteel

Project completed at seven feedlots along area creek

By **CHUCK BLOMBERG**  
The Daily Republic

**STORLA** — Chuck Faulhaber has no regrets about making an investment to move his 700-head cattle operation off of Firesteel Creek.

After all, it helps the environment and he gets to cost-share the expense with the government to build an operation exactly how he wants it.

"It's better for the environment, I'm sure," Faulhaber said. "It's mostly for the cost-share money, I guess. ... It was something I've been thinking about for the last five or six years."

The cleanup project on Firesteel was initiated in the late 1990s following a study that identified 37 feedlots located in positions where nutrients would run into Firesteel Creek. Those nutri-

See **FIRESTEEL**, Page 11



Chuck Blomberg/Republic

**CHUCK FAULHABER**, OF rural Storla, is in the process of using a government program to build a better feedlot system in order to keep nutrients from draining into Firesteel Creek. He is the eighth farmer to take part in the program.

## FIRESTEEL: Feedlots to be moved or redone

Continued from Page 1

ents are believed to be part of the reason Lake Mitchell suffers from high phosphate levels that cause the intense algae blooms.

The lake serves as both a drinking source and a recreation area for Mitchell. The blooms cause taste and odor problems in the water.

Most of the large feedlots along the Firesteel Creek watershed will be moved or redesigned to prevent drainage into the creek within the next two to three years, according to project coordinator Dave Kringen.

"All of the big ones should be taken care of by then," he said, adding that it will not be necessary to move all of the sites listed in the study. "One was a pen with six pigs in it."

The project on the creek is designed to reduce the phosphate loads in Lake Mitchell by 50 percent by 2015. The lake has an average phosphorous content in the summer of about 318 parts per billion, which Kringen said is extremely high.

"(Reducing phosphates) by 50 percent is an optimistic goal," said Kringen, adding that he believes that goal can be achieved.

Farmers and ranchers have the incentive to proceed with the project because of the cleanup program, which offers an 80 percent grant to farmers.

Kringen said it costs the average operation between \$75,000 and \$125,000 total to move off of the creek. That means that a farmer's share of that cost would be between \$15,000 and \$25,000.

That expense is why it might take some farmers longer to finish a project.

"In a lot of cases, it's really up to them and their banker," Kringen said.

For example, Faulhaber was able to produce enough funding to build the evaporation pond this year. However, he plans to wait

until next year to proceed with moving cattle.

The total Firesteel Creek cleanup project is expected to cost about \$2.7 million, including funds from federal, state and about \$20,000 a year from the City of Mitchell.

Kringen said that, so far, seven feedlot projects have been completed along Firesteel Creek, while Faulhaber's is still under construction.

Another six feedlots are in the planning stages, he said.

As part of the project budget, the EPA has approved more than \$850,000 in funds through 2007. The project would need another appropriation at that time.

Farmers who have taken advantage of the program say it has worked well for them.

Dwight Scott, another Aurora County farmer, was the first to proceed with a project. Scott finished moving one of his sites off of Firesteel before the Firesteel Creek project was completed as a concept.

"It works pretty good," he said. "We did the first one in 1995. There was some funding back then, but not as much."

Curt Olinger, of rural Wessington Springs, was the first to complete a project under the program as it is known today.

"I guess it's not my place to say if (other farmers) should or shouldn't participate in the program. All I can say is that it has worked well for me," he said.

Kringen declined to release a list of the sites being asked to relocate. However, Kringen said that no one so far has given him a firm no on moving an operation off of the creek.

"If they're not interested this year, they might do it later," he

said.

Kringen also said that some of the feedlot owners are becoming old and do not have anyone to pass the farm on to after they die. In a situation like that, he said it might not be necessary to proceed with a project.

In addition to feedlots, Kringen said he is working on some shore stabilization projects and providing lakeside homeowners with information on fertilizer use.

Kringen said that many homeowners near the lake use phosphorous to fertilize their lawns even though the soil around the lake is exceptionally high in phosphates.

"It takes everybody, not just the farmers," he said. "They don't need phosphorous for fertilizer."

For now, the project is proceeding slowly but surely, as expected by City of Mitchell officials. The Firesteel Creek cleanup project is in the works for the long-term health of the creek and Lake Mitchell.

Another solution, which would work in the short term, is still being debated by Council members. That option is to treat Lake Mitchell on an annual basis with aluminum sulfate, or alum. That would cost the city about \$542,000 in the first three years to reduce phosphate levels to 90 parts per billion. After the three-year period, it would cost about \$100,000 a year.

Council members are still awaiting word on a \$450,000 grant to proceed with the alum treatment.

Kringen said it will take a great deal of resources to reduce the phosphates and algae levels in the lake.

"The lake has a lot of P in it," he said of the phosphates.

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# FIRESTEEL CREEK NEWS

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## South Dakota Group Tours Alum-treated Minnesota Lakes

**Dave Kringen**

**Firesteel/Lake Mitchell Watershed Project**

A fact-finding group of South Dakotans representing local and state government recently spent a few days in Minnesota touring a number of aluminum sulfate (aka alum) treated lakes. The purpose of the trip was to talk with consultants, lake associations and other groups who have used alum as a management tool and increase our overall knowledge and comfort level with it. We also wanted to see firsthand the water quality improvements (if any) that the applications provided and be aware of any health risks that alum could potentially pose.

Representatives from the City of Mitchell, the SD Department of Environment and Natural Resources, the Lake Oliver Water Quality Project, and myself met with three different groups concerning lakes where alum has been applied as recently as this past spring to as long as 8 years ago. Our first stop took us to an environmental consulting company in Maple Plain, MN to discuss alum-treated lakes that they have been involved with. Their results from single-dose applications showed that alum treatments were effective by significantly reducing in-lake phosphorus levels and doubling the clarity of the water for a period of 5 - 7 years. The firm also repeated to us several times that their experience with alum showed it to be safe and effective. Although Lake Mitchell's proposed yearly applications would differ from the traditional single-dose application normally used, the firm felt that the continuation of the watershed project in combination with annual alum treatments would be the best course to follow in order to see improvements in Lake Mitchell.

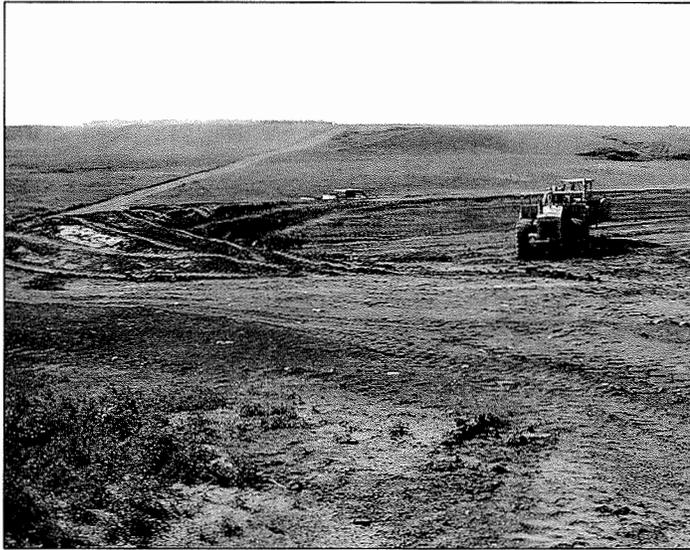
Our next stop led us to the Minneapolis Chain of Lakes; a collection of very heavily-used, hydrologically-linked suburban lakes located in the heart of Minneapolis. We met with the chief limnologist for the Minneapolis Parks and Recreation Department and toured two lakes, one that was treated recently and another treated a number of years ago. Like the consulting firm, the limnologist reiterated that alum treatments were safe and effective and that he was very satisfied with the results, both aesthetically and from a water quality perspective.

Our last stop before heading back to South Dakota took us to Sauk Centre, MN to visit with the Sauk River Watershed District manager. We looked at two lakes that were treated this past spring. They were very pleased with the results and recommended it as a management tool.

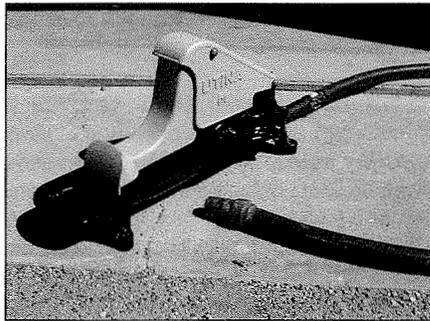
After speaking with these groups, I believe alum to be an effective lake management tool. I believe that the proposed annual applications as opposed to the traditional single-dose rate is the correct approach for Lake Mitchell. Because of the enormous size of our watershed, it could be a long time before we see some real significant reductions in phosphorus. Alum applications are necessary if we are to see any improvements in the near term.

**At right:** Members of the South Dakota contingent that recently toured a number of alum-treated Minnesota lakes in late August.





**“Dirt and diesel” work continues in Firesteel.** Construction of animal nutrient management facilities continued this summer with the completion of one system and the start of another. **At left:** Dirtwork on the Vern Niles farm (Aurora Co.) wrapped up in July with the construction of two evaporation ponds that were needed for existing feedlots. A total of three ponds were needed at this site with the first built in the Fall of 2000 and the remaining two built this summer. **Below:** Construction of a sediment basin and evaporation pond began at the Chuck Faulhaber farm in Aurora County in late July. His is the eighth system to be installed in the watershed, seven since the watershed project’s inception in 1998 with one other installed prior to that. Thanks guys for your participation!!



**Wanted:** Cattle producers wanting to try something new. I have 4 of these nose pumps available for a few of you to try out in your pasture. For more information, contact Dave Kringen at 605-996-1564 Ext. 131. Try one for a year and tell me what you think.



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# FIRESTEEL CREEK NEWS

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December 2002

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## Management Options for Manure Phosphorus

**Merle Kost**  
Resource Conservationist, NRCS

When manure is applied according to crop nitrogen needs, phosphorus will generally be applied at rates exceeding crop removal and/or maximum crop yield needs. This situation occurs because the manure nitrogen-to-phosphate (N:P) ratio is usually lower than the crop removal ratio. Unlike commercial fertilizer, manure does not come custom blended to match the exact nutrient needs of a crop. When manure is applied to meet the crop needs for one nutrient (i.e. nitrogen), a fixed amount of all the other nutrients is applied as well. These other nutrients may or may not be needed at the rates applied. Manure contains various levels of the three major plant nutrients – nitrogen, phosphorus and potassium (N, P and K) as well as many essential micronutrients such as calcium, sulfur and zinc to name a few.

Excess phosphorus is good if the manure is applied to fields having a low soil test phosphorus. It raises the fertility of the soil and generally increases yields. However, applying more phosphorus to soils that already test high or very high is not justified, is of no value to the crop, and increases the risk of surface water contamination from field runoff and erosion.

A phosphorus buildup will occur faster where the N:P ratio between crop and manure increases simply by how the manure is stored, handled and applied. For example, nitrogen volatilization losses from open lots and surface applied manure contributes to the ratio gap. Phosphorus losses are negligible, but nitrogen losses can be significant. If manure, in this instance, is applied at a higher rate to meet crop nitrogen needs, phosphorus often will be applied at several times crop needs.

Selection of fields for manure application generally should be based on the highest nutrient needs. In many cases, the fields closest to the livestock facility usually have a history of receiving the most manure. Often these fields end up having certain high residual nutrient levels, especially phosphorus.

**Some options to consider when dealing with a high phosphorus level situation are:**

1. **Transport manure to more remote fields on the farm if those fields have very low to medium soil phosphorus test levels.** This will not only make more effective use of manure nutrients but also reduce overall commercial fertilizer costs. It can help offset the additional manure hauling costs.
2. **Obtain manure application lease agreements from adjoining landowners that have tillable land low in phosphorus.** Nutrient testing and development of a nutrient management plan would be keys to maintaining a mutual benefit for both parties. Land that is close to the livestock facility will also lower the cost of manure handling.
3. **Rent or purchase additional land to increase the landbase available for manure application.** This approach may be preferred by livestock operators who are expanding their operation and want control of the timing and scheduling of crops to facilitate the application of manure.
4. **Rotate fields.** This option works best for operations with a large landbase. A plan is developed whereby a single application of phosphorus applied as manure is made at a rate equal to the recommended phosphorus application for the entire crop rotation or multiple years in the crop sequence. When such applications are made however, the application rate should not exceed the recommended nitrogen application rate for the planned crop. Manure would not be applied again for the duration of the remaining rotation.

5. **Increase crop uptake of nutrients.** The crop uptake of phosphorus can be increased in a field by including crops in the rotation that removes more phosphorus during the growing season (i.e. alfalfa, corn silage). This mining effect will proportionally increase the amount of phosphorus that may be added to a given field over time.
6. **Reduce the amount of manure nutrients produced.** New technology is allowing some operators to choose reducing the nitrogen and phosphorus content of manure by changing or decreasing the nutrient content in the livestock diet. The result is a decrease in the amount of land required for manure application.

Management of phosphorus to prevent excess buildup in the soil is fundamental to a sustainable livestock operation. The result is to ensure maximum utilization of manure nutrients while minimizing a water pollution hazard on the farm.

The factors that limit the amount of manure that should be applied to a given field are the existing fertility level of the soil, nutrient content of the manure, crop nutrient needs and field site limitations (i.e. slope, depth to an aquifer) that can affect the risk of runoff and leaching hazards. Recommended nutrient application rates for crops in South Dakota can be found in the South Dakota State University (SDSU) "Fertilizer Recommendations Guide" (EC750 dated June 2002).



A number of livestock producers took advantage of the portable weigh scales to calibrate manure spreaders this past fall. At left, Dave Kringen is seen taking a manure sample for nutrient analysis. An analysis along with spreader calibration will give a producer a good estimate of the amount of nutrients available for crop growth through the application of manure.

**Note:** The next SD Cooperative Extension Service one-day manure and environmental training session for livestock producers is scheduled for Tuesday, January 14<sup>th</sup>, at the Crossroads Motel, 100 Fourth St. SW in Huron, SD. Registration begins at 8:30 a.m. and costs \$25 per person. Registration includes lunch, coffee breaks, and a training manual. **This training is required for livestock producers obtaining a SD DENR Livestock Permit** but all producers are welcome. Topics to be covered include water and odor pollution processes, how to obtain a livestock permit, regulations for livestock operations, amount of manure and nutrients produced by livestock, determining land application rates for manure, preparing a manure management plan, potential health problems associated with handling manure, and altering animal diets to maintain livestock performance while reducing odors and manure nutrients. For more information, contact your local Extension or NRCS office.

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# FIRESTEEL CREEK NEWS

Volume 5, Issue 1

March 2003

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## Nutrient Management EQIP Education Assistance

The South Dakota Association of Conservation Districts (SDACD) is currently sponsoring a grant to encourage producers in eastern South Dakota to soil and manure test. Financial assistance provided by this grant will allow the 45 counties in eastern South Dakota to work with approximately 6 producers per county on soil and manure sampling and testing. Priority in a county will be given to producers in a 319 project watershed (i.e. Firesteel Creek watershed) or to producers with a completed ag waste system developed by the ag waste team. NRCS or conservation district personnel will assist the producer with the soil and/or manure sampling techniques and then develop a nutrient budget for a field based on the sample(s) analysis and projected crop yield goal.



Each soil test includes nitrate-nitrogen (0" – 6" and 6" – 24"), phosphorus, potassium, pH, soluble salts, texture class, organic matter, and fertilizer recommendations. Manure analysis determines total nitrogen, inorganic nitrogen, total phosphorus, and total potassium. Up to three (3) soil tests will be paid for per producer through the grant. These can be either in the same field or in different fields where manure is to be applied.



The project will be evaluated on (1) number of producers assisted and samples gathered and tested and (2) producer survey about the project. To find out more or to enroll for a free manure and/or soil test this spring, contact your local conservation district or the watershed project at 605-996-1564 Ext. 131.

**BOAT MOTOR WANTED:** The Davison Conservation District has recently acquired a 12-foot aluminum boat to use for water quality sampling in Lake Mitchell. It has been a number of years since this boat has seen water and I am currently bringing both the boat and the trailer back from the dead! Unfortunately though, I do not have a motor to go with it. If anyone has between a 5 – 15 horsepower outboard they would be interested in donating or selling to the watershed project, PLEASE contact me at 605-996-1564 Ext. 131. Thank you, Dave Kringen, Project Coordinator.



### Hey Lake Mitchell homeowners!

Have you purchased a phosphate-free fertilizer to use on your lawn this year? If you remember our lawn soil sampling project in 2001, 90% of the samples taken had excessive levels of available phosphorus (P) in the soil. This can be a concern because there is a direct relationship between soil test P and phosphorus in runoff. As soil test P increases, so does the concentration of phosphorus in the runoff. And it's the phosphorus that grows the algae when it's transported to the lake. Please do your part by using a zero-phosphate fertilizer for your lawn and remember to soil sample every 3 to 5 years. If you use a professional lawn service, become familiar with their lawn care program. Please keep in mind it takes the efforts of both watershed AND lakeside residents to clean up a lake!

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# Alum won't harm fish at Lake Mitchell, say project organizers

By **CHUCK BLOMBERG**  
The Daily Republic

As the time nears for the first aluminum sulfate treatment at Lake Mitchell, project organizers are trying to quell rumors that the process will hurt fishing.

"This has been done in hundreds and hundreds of lakes," said David Kringen, project coordinator for the Firesteel Creek/Lake Mitchell Watershed Project. "There have been no instances (of harm to fish) as far as I know."

The City of Mitchell plans to proceed with applying aluminum sulfate, also known as alum, to Lake Mitchell in an attempt to reduce algae problems. The project, expected to begin during the week of June 9, will cost in the area of \$180,000 in the first year. About 60 percent of that cost will

be covered by a federal grant.

Kringen is in the process of distributing a "fact sheet" about the alum application process. The fliers so far have been left at Cabela's, Jack's Sinclair and The Depot.

Kringen said there have been concerns circulating about alum harming either the fish, or the food source for fish.

The flier explains the alum process, why it's needed and states that alum will not harm fish and wildlife.

"Alum will not hurt fish or their food. The algae in the lake will be less abundant and the kind of algae may actually change to a form more edible by invertebrates and zooplankton, which form the base of the food chain," the flier states.

City officials say the alum process is needed because the

algae blooms foul the city's drinking water and cause odor problems. A federal grant will help pay for adding alum to the lake for the next three years, plus help monitor the lake for two years following the last application.

Alum is a non-toxic chemical, the same substance used in making pickles.

It is added to lake water to remove phosphates, Kringen said.

Once in the water, alum turns into aluminum hydroxide — the same ingredient in over-the-counter antacids, he said.

The alum will form a white substance in the lake that neutralizes phosphates, which feed the algae.

Kringen said project consultant Dick Osgood will be in town in about two weeks to help finalize the process and application amounts.

# Lake treatment experts prepare for alum project

By **CHUCK BLOMBERG**  
The Daily Republic

After taking a drive around Lake Mitchell Wednesday morning, lake treatment experts said there should be no problems with applying aluminum sulfate to the water.

The \$150,000 project is expected to begin the week of June 9.

"The staging locations are ideally located, there's good access ... there shouldn't be any problems," said Tom Eberhardt, president of TeeMark Corporation and its Sweetwater Technology Division. "There will be no danger to boaters or swimmers or fish."

Sweetwater Technology, of Aitkin, Minn., was awarded a bid on the project of about \$1 per gallon of aluminum sulfate. Dick Osgood, the Minnesota scientist hired to study applying alum to the lake, expects that roughly 150,000 gallons will be applied to the lake this year, meaning the application project will cost about \$150,000.

Past figures have shown that the overall project will cost between \$500,000 and \$542,000 for alum treatment over a three-year period. That cost includes monitoring and consulting fees.

The project, designed to reduce algae levels by trapping phosphates on the bottom of the lake, will be paid for mostly by a federal grant for the next three years. The City of Mitchell will pay 40 percent of the project.

City officials approved the project in hopes of improving water quality in the lake, which is a drinking source for Mitchell.

See **ALUM**, Page 11

## ALUM: Barge will spray chemical in water

Continued from Page 1

Eberhardt said his company has done 30 or 40 alum applications to lakes.

The alum, which is commonly used in making pickles, will be applied by a barge with a boom that will spray the chemical into the water.

City Public Works Director Tim McGannon said the barge will enter the lake from the boat ramps on Indian Village Road on the west end of the lake.

During the application, Eberhardt said a truck would deliver alum every hour.

Eberhardt said that once the alum hits the water, people will see a white "snowy substance," or flocculent, form and sink to the bottom of the lake.

Aluminum sulfate changes chemically to aluminum hydroxide, the active ingredient in some antacids, as it hits the water.

The chemical will then latch onto phosphates in the water and trap the substance on the bottom of the lake.

Osgood, who will be doing tests on Lake Mitchell today with project coordinator Dave Kringen, of

Mitchell, said that at first the lake will likely become extremely clear.

"It will take care of the algae immediately. The alum will take the algae down to the lake bottom and make the water very clear right away," Osgood said. "It won't stay that way. But it will come back to a level that's an improvement."

The city has federal grant funds in place to proceed with the Lake Mitchell alum application for three years. Funds are in place to monitor the lake for five years.

## Unloading alum into Lake Mitchell



Chuck Blomberg/Republic

Terry Paulson, left, and Mike Maxwell, both of Sweetwater Technology, of Aitkin, Minn., began the process of applying aluminum sulfate to Lake Mitchell on Monday. The two-man crew will continue the application throughout the week. Maxwell applies the alum using the barge pictured here, while Paulson stays on the shore to coordinate trucks and help load the barge with alum.

## Chemical used to reduce algae

### Project will last throughout week

By CHUCK BLOMBERG  
The Daily Republic

A two-man crew on Monday began unloading alum — the same chemical used to make pickles — into Lake Mitchell in an effort to reduce algae blooms.

The project, which experts say will not harm fish or wildlife, will last throughout the week.

"It's safe. There will be no restrictions on watering lawns ... or swimming," said Dick Osgood, of the Osgood Group, consultant for the project. "People should use common sense when boating (near the barge.)"

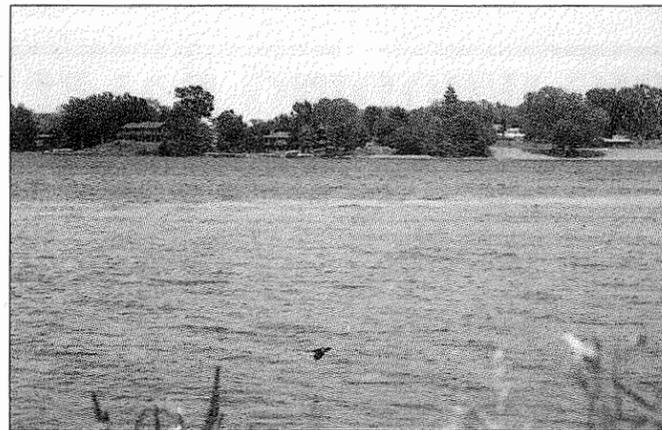
About six barge-loads of alum

were applied to the lake Monday, or roughly 12,900 gallons. A crew with Sweetwater Technology, of Aitkin, Minn., began the application process at about 1:30 p.m. The barge will run from 7 a.m. to 4 p.m. the remainder of the week, applying a total of 150,000 gallons.

About eight truckloads, each carrying 4,300 gallons of alum, will be delivered to the lake daily. The trucks are coming from Wisconsin Rapids, Wis., which is about 465 miles away.

Last year, city officials approved moving forward with treating Lake Mitchell with aluminum sulfate, or alum. The project has been estimated to cost as high as \$542,000, including application costs, monitor-

See ALUM, Page 17



Chuck Blomberg/Republic

AS ALUM, A clear chemical, is applied to the lake, a whitish-green substance is formed, as shown here. The white substance will sink to the bottom of the lake, giving the lake a clear appearance, according to experts.

## ALUM: Treatment in lake

Continued from Page 1

ing and consulting fees, over the course of three years.

Application will cost about \$150,000 this year. The Davison Conservation District received a federal grant that will cover about 60 percent of the project, plus two additional years of monitoring.

On Monday, a barge from Sweetwater Technology was launched from the public boat ramp on Indian Village Road. The boat uses a boom system and hoses to unload alum directly into the lake.

In two trips, the barge unloaded a truckload of alum in roughly an hour on the southeast portion of the lake.

City Public Works Director Tim McGannon said the city approved the project in order to complement the Firesteel Creek cleanup project. The Firesteel Creek project helps farmers move their feedlots off of the creek's watershed. That is expected to reduce the nutrients that run into Lake Mitchell over time.

"We probably won't see results (from the creek project) for 20 years," McGannon said, adding

that alum application will have a more immediate effect. "It should help us have better-tasting water."

Algae blooms in the lake have been blamed for the taste and odor problems in the city's drinking water. McGannon said the lake has been relatively clear so far this year, but the algae is beginning to flourish — turning the lake green.

"You can only see about a foot down. There's clumps of algae floating," McGannon said.

The algae also can make the lake unpleasant for recreation.

Alum reduces algae by binding to phosphates, which is the food source for algae.

On Monday, the clear chemical turned a whitish-green color as it entered the lake behind the barge. Osgood said that as the white substance sinks, the lake will become extremely clear.

That clarity will not last, but Osgood said the algae problem should be at a reduced level after the treatment.

"It should be something between very clear and how it is now," he said.

# Alum treatment reduces phosphate levels in lake

By **CHUCK BLOMBERG**  
The Daily Republic

Test results released Thursday showed that this month's aluminum sulfate treatment accomplished the goal of reducing phosphate levels in Lake Mitchell.

However, Project Coordinator David Kringen said it will likely take a few weeks to see a reduction in algae levels.

"The treatment occurred at a time when the algae had already begun to bloom," said Kringen, explaining why there were still heavy algae blooms on the north portion of the lake.

Kringen said those algae blooms should dissipate and there should be less-intense

blooms throughout the summer.

Lake Mitchell was treated with aluminum sulfate earlier this month as part of a larger lake and watershed management effort being undertaken by the Davison Conservation District. A total of 150,000 gallons of aluminum sulfate, also known as alum, was applied to Lake Mitchell at a cost of about \$150,000.

Kringen said the goal of the project is to reduce algae levels by reducing phosphorous level to 90 parts per billion. A 1999 study showed the phosphorous levels to be at 250 parts per billion. Phosphorous is a major food source for algae.

"We reached our target (of 90

parts per billion)," Kringen said.

Kringen said officials will continue to monitor the water quality of the lake throughout the summer.

The information from the analysis will be used to "fine-tune" next year's alum application, Kringen said.

The City of Mitchell has agreed to help fund the alum application project for three years. A federal grant will help pay for 60 percent of the project, plus two additional years of monitoring.

The project has been estimated to cost as much as \$542,000 over a three-year period, including application costs, monitoring and consulting fees.

# Lake may require more aggressive treatment

## Algae blooms still a nuisance at Lake Mitchell

By **CHUCK BLOMBERG**  
The Daily Republic

Officials overseeing the treatment of Lake Mitchell said Friday that a more aggressive aluminum sulfate treatment could be used next year in an attempt to reduce algae blooms.

"We'll see how this year plays out (first)," said David Kringen, project coordinator for the Lake Mitchell and Firesteel Creek watershed cleanup project. "On

the north side of the lake it isn't real good."

Last month, a barge applied 150,000 gallons of aluminum sulfate, also known as alum, to Lake Mitchell in order to reduce phosphorous levels from roughly 250 parts per billion to 90 parts per billion. It is believed that the reduction of phosphorous in the lake will cut off the food source for the algae.

Kringen said the project was a success in decreasing the phosphorous level of the lake, and the project reached its goal of 90 parts per billion for phosphorous levels.

However, Kringen said the lake still has a great deal of algae

blooms. Algae blooms in the past have been blamed for hindering recreation in the lake and causing taste and odor problems in the city's drinking water.

"Whether algae blooms will last throughout the summer remains to be seen," Kringen said.

However, officials are considering the possibility of reducing the phosphorous levels of the lake even lower than 90 parts per billion, Kringen said.

"At the conclusion of the summer, we will be evaluating the water quality data and recommending adjustments to next year's alum treatment," he said.

Kringen said the long-term

remedy to Lake Mitchell's algae problems will require a substantial cleanup of the tributary watershed.

The alum application cost about \$150,000 this year. The Davison County Conservation District received a federal grant that will cover about 60 percent of the project. The grant will cover expenses for three years, plus two additional years of monitoring.

Even though algae blooms are thick in parts of the lake this year, City Public Works Director Tim McGannon said the city has not received many complaints.

# Blanket of algae



Chuck Blomberg/Republic

The algae in Lake Mitchell is thick this year in shallow areas such as Kippes Bay, pictured here. As a result, officials may have to make adjustments to next year's aluminum sulfate treatment.

## Alum results called disappointing

Adjustments may be made in treatment process next year

By **CHUCK BLOMBERG**  
The Daily Republic

Algae at Lake Mitchell has been so thick in some places that some residents wonder if they could now walk on the water, raising questions about

the success of this year's alum treatment.

While project officials agree that the use of aluminum sulfate, or alum, was not as successful as they had hoped, they say results should be more favorable as adjustments are made in the future.

"I really feel that we need to be more aggressive and get in (the alum) earlier to prevent

blooms," said Councilwoman Joyce Jones. "I think people are fairly patient knowing this is a three-year project. We didn't expect miracles the first year."

In June, a two-man crew used a barge to apply 150,000 gallons of alum to Lake Mitchell. The chemical, which is commonly used to make pickles, bonds with phosphates, cutting off the food source for algae.

Council members voted to move forward with the project in hopes of reducing odor problems at the lake and improving conditions for recreation. The project has been estimated to cost as high as \$542,000 over a three-year period. This year's application cost about \$150,000, or about \$1 for every gallon of alum. To help pay for the project,

See **ALGAE**, Page 11

## ALGAE

Continued from Page 1

ect, the Davison Conservation District received a federal grant that will cover 60 percent of the costs.

In the first year, the city did not see major benefits from the alum application, according to project officials.

The algae appeared to clear on the south side of the lake early this summer, but officials do not yet know if that was due to the alum treatment or the wind pushing the algae to a different area of the lake.

"Quite honestly, I was a little disappointed with the results," said Project Coordinator David Kringen. "We're going to look at different alternatives (for application)."

Jones, who lives near the lake, said the algae has been thick at times throughout the summer, but that a windy day earlier this week helped clear a portion of the lake.

"It seems like it moves," she said.

Project Consultant Dick Osgood, of the Osgood Group, said the application worked initially, bringing phosphate levels in the lake down to his goal of 90 parts per billion.

However, the benefit did not last for long.

Osgood said that soon after the application, phosphate levels skyrocketed back up to about 700 parts per billion, which was high enough for algae to flourish.

"It didn't solve problems for this year," Osgood said. "What seems clear at this time is that the internal cycling of phosphorous that feeds the algae was not slowed down by the treatment. The numbers are pretty clear as to why — it was under dosed for that purpose."

Internal cycling refers to the

phosphorous that leaks out of the lake mud, or lake bottom, as the water warms in the summer, Osgood said.

"This year that happened," he said.

Osgood said the current game plan has been to reduce the phosphate levels over the three-year period using small doses. But if quicker results are desired from the treatment, Osgood said more alum will have to be applied to the lake to handle the phosphates that come from the lake bottom.

Osgood said he is currently working on a report that he will present to Council members in upcoming weeks. The report will include options for improving future treatments, he said.

"I think we will tweak the game plan for next year. I don't know what my recommendations will be yet, but there may be two or three alternative ways to modify that," he said.

Osgood also said this year's alum treatment received little help from Mother Nature. The lake has been low throughout the year and there was little flow into the lake, he said.

"This is also a strange year in terms of flow into the lake. There was none, practically speaking. ... We predicted in prior years that the quality of the lake would be poorer (with little flow)," he said.

On Wednesday, the lake was 42 inches below the level of the spillway.

The low water level in the lake will cause higher concentrations of phosphates and algae, Osgood said.

Kringen said the project will require some patience.

"I had hoped for a little better conditions out there. But you can't get it fixed in one year when it took 80 years to get there," he said.

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# FIRESTEEL CREEK NEWS

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Volume 5, Issue 2

December 2003

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## **Certificate of Compliance and the SD General Permit for Concentrated Animal Feeding Operations: What are they and what do they offer**

by  
Dave Kringen  
Project Coordinator

The majority of the Firesteel Creek watershed lies in Aurora, Davison, and Jerauld counties. If you are a livestock producer in any one of these counties and make the decision to install an animal waste management system, there are certain requirements called "performance standards" in the county zoning ordinances that are expected of you. The first of these standards reads as follows:

"Animal Feeding Operations shall submit animal waste management system plans and specifications for review and approval prior to construction, and a Notice of Completion for a Certificate of Compliance, after construction, to the South Dakota Department of Environment and Natural Resources (DENR)".

This means that an engineering design and construction plan must be submitted to DENR to verify that all state standards are met. Upon DENR approval, a Notice of Completion is submitted by the engineer after construction is completed certifying that the manure handling/storage system was built in accordance to the design plans and specifications. A Certificate of Compliance is then sent to the producer which states that the owner/operator is in compliance with South Dakota pollution control regulations and will remain in compliance as long as the operation does not significantly change.

County zoning ordinances also require a nutrient management plan be developed to ensure the safe utilization of the manure produced. The plan deals specifically with managing the source, amount, placement, and timing of the application of manure nutrients to the land. The plan acts as a guide for the proper management of manure that, when implemented, will help protect surface and groundwater.

The producer now has two options available to him. He can be satisfied with the Certificate of Compliance or take it a step further and apply for a SD General Permit. The general permit process includes all that is required in the zoning ordinances plus a one-day environmental training program, manure and soil nutrient testing, land application record keeping, and inspections of the facility by a DENR official (around once every 3 years). Although this may mean more work on the producers part, it also offers more protection.

A certain amount of risk is associated with just holding a Certificate of Compliance as it does not provide the producer with any legal protection. A permitted facility however, gains the producer protection under both state and federal law. A permitted facility assures the livestock operator that as long as the facility is being operated under permit requirements, it is in compliance with environmental law and is under no threat of being fined or shut down. It may actually increase the value of your feeding operation while promoting good relations with neighbors and local government.

## Holistic Management...Life is a Whole Experience

Everyone is invited to attend the Holistic Management...Life is a Whole Experience Workshop, a 1 and ½ day workshop, coming to Mitchell during the last two weeks of February 2004 (dates to be finalized by January 1). This is a how-to workshop that begins the process of establishing your roadmap to personal and professional success. The foundation of the workshop will be the Holistic Management model as developed by Alan Savory. The presenter will be Wayne Berry. Wayne is an Associate Professor at Williston State College where he teaches economics and farm management. He has a master's degree in agriculture economics, is a retired Major in the U.S. Army Reserve, and a lifelong rancher and intensive grazer in Montana. Wayne was certified by the Center for Holistic Management in Albuquerque, NM as a holistic management educator, and he is a Certified Nx Level Entrepreneurial Trainer/Facilitator. Funding for the workshop is being provided by the South Dakota Grasslands Coalition to allow no registration fees for participants. For more information contact the Lower James RC&D, Mitchell, 996-1031.

**Coordinator's Personal Note:** As some of you may have noticed this past summer, I have a 12-foot aluminum boat that I use for water quality sampling on Lake Mitchell. This is an old rivet boat built back in the mid-1950's that unfortunately has a bad tendency to leak. In lieu of replacing the rivets, I am open to suggestions on how to slow the flood. By the end of the summer, I think I was bailing more than I was sampling! Maybe a bilge pump and motorcycle battery is my best and cheapest option but am curious about other alternatives. If any of you have had some success with this type of thing, I'd appreciate any and all advice. My number is 996-1564 Ext. 131. Thanks! Dave Kringen

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# City takes wait-and-see approach on alum treatment's effectiveness

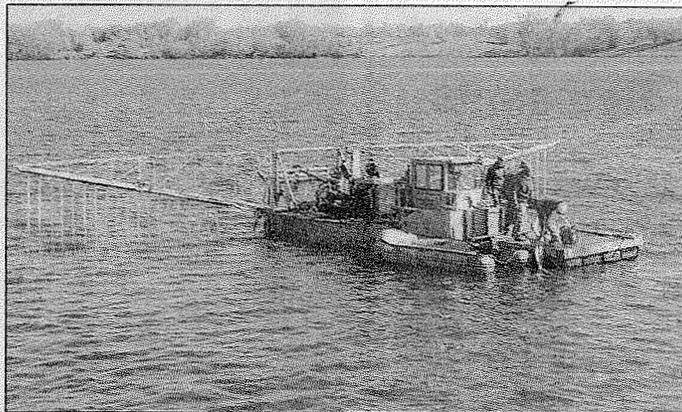
By HAROLD CAMPBELL  
The Daily Republic

Mitchell officials say the jury is still out on the effectiveness of the city's three-year algae treatment program on Lake Mitchell.

A 25-foot-long barge operated by Sweetwater Technology Corp., of Aitkin, Minn., has been depositing alum, or aluminum sulfate, into the lake this week as part of the effort to decrease phosphorous, a prime food source for algae.

"I'm going to wait until the third year is over before making any judgment," said Tim McGannon, city public works director.

See ALUM, Page 11



Harold Campbell/Republic

WORKERS FOR SWEETWATER Technology Corp., of Aitkin, Minn., load alum, or aluminum sulfate, onto a barge in Lake Mitchell as part of the city's three-year effort to clean algae from the lake.

## ALUM: Treatment started Monday, set to end today

Continued from Page 1

"Even if we see some improvement this year, I'm still going to wait until the entire project is done to gauge its effectiveness."

Alum is a nontoxic material commonly used to clear drinking water. In lakes, alum is used to control algae, not by killing the algae, but by reducing the amount of phosphorous in the water.

After last year's treatment, algae was still reported to be thick on the lake last summer.

Dick Osgood, of Osgood Consulting, project consultant, said last year's treatment was in June when algae was already forming.

This year's treatment began Monday and is expected to end today in an effort to get ahead of the algae growth cycle.

"We had to pick the best window of opportunity," Osgood said.

The 25-foot barge uses two 30-foot arms to pump up to 25,000 gallons of alum at once.

Sweetwater plans to apply 120,000 gallons this year.

The alum is pumped into the barge through a hose leading from one of seven tank trucks.

The alum controls algae by cutting down the amount of phosphorous in the water.

Distribution of alum is controlled by a computer process continually monitoring water depth and boat speed and automatically adjusting the valves to deliver a precise amount into the water.

The barge can treat a 60-foot wide path traveling up to 7 mph.

The operator is guided by a computerized satellite navigational system across the lake in parallel paths. This is designed to guarantee accurate coverage of the entire lake surface.

Tom Eberhardt, Sweetwater president, said treatments would vary by depth more from last year to try to more fully cover the

entire depth of the water.

City Council members voted last year to move forward with the project in hopes of reducing odor problems at the lake and improving conditions for recreation. The project has been estimated to cost about \$542,000 over a three-year period.

To help pay for the project, the Davison Conservation District received a federal grant to cover 60 percent of the costs.

Osgood said the goal was to bring phosphorous levels in the lake to 90 parts per billion. However, that level last year skyrocketed to as high as 700 parts per billion.

Much of that, he said, was due to low lake levels.

Phosphorous enters the water either externally, from runoff or groundwater, or internally, from sediments on the bottom of the lake.

With the recent dry conditions,

the sediments at the bottom of the lake have been the problem, Osgood said.

Council member Joyce Jones said it probably would not be until July before any effects of this year's treatment could be seen.

"I hope we can seal that (algae) bloom," she said. "Toward the end of the year, it gets stagnant and can cause an odor. I hope the alum can help."

McGannon said he thought residents should be patient.

"Once the three years are up, I think we can start seeing results," he said.

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# FIRESTEEL CREEK NEWS

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## Buffers, buffers, buffers

by

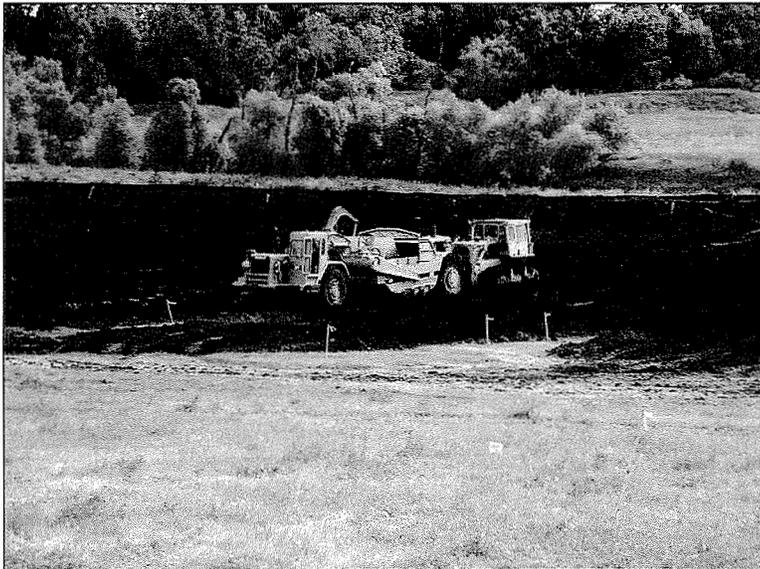
Dave Kringen

Project Coordinator

A recent addition to the Continuous CRP program is now available for range and pasturelands adjacent to Firesteel Creek that could go a long ways toward realizing the watershed project's ultimate objective of a 50% reduction in phosphorus delivery to Lake Mitchell by 2015. These practices are called the **Marginal Pastureland Wildlife Habitat Buffer (CP29)** and the **Marginal Pastureland Wetland Buffer (CP30)** programs. The purpose of these practices are to remove nutrients, sediment, organic matter, and other pollutants from surface runoff by excluding livestock from direct access to a stream and providing an alternative water supply. Installing one of these practices will enhance water quality, reduce nutrient and pollutant levels, and improve wildlife habitat. A few of the practice highlights and criteria of CP29 and CP30 include:

- Places the land in a 10 to 15 year contract with competitive annual rental rates
- Minimum width of the buffer is 20 feet with a maximum average width of 120 feet
- Alternative watering facilities and permanent fencing to exclude livestock away from the buffer is cost-shared at 50% with another 40% practice incentive payment (PIP) on eligible installation costs
- Cost-shareable items for alternative watering facilities may include pasture taps to rural water, pipeline, tanks and tank set-up, dugouts, wells, etc., depending on your needs
- A maintenance rate is included in the annual rental payment for any upkeep on your fence that needs to occur

I like this program because it allows streambanks time to heal from the overgrazing that can frequently occur in these riparian areas. Firesteel Creek will run cleaner by significantly reducing both streambank erosion and overland sediment delivery. It also provides the producer a better source of water than anything Firesteel Creek can offer. Cleaner water means better performance from your cattle and that equates to more dollars in your pocket. Please contact your local NRCS office for details.



Dirtwork was recently completed on a new animal waste management system (AWMS) at the Dina "Pudge" Shefner farm in Aurora County. Pudge is currently in the process of moving fence and rerouting water from a portion of his lot that needed to be abandoned to a new area in order for the system to function properly. Trees along Firesteel Creek can be seen in the background. Thanks Pudge for your participation in the watershed project!

**ATTENTION FEEDLOT PRODUCERS.** Manure spreader calibration services will again be offered this year starting in mid-to-late August. Portable weigh scales will be brought on-site to your livestock feeding operation when you are ready to haul manure.

The procedure includes weighing your spreader empty and several loads when full to determine an average weight. The next step is to determine the area over which a typical load is spread and calculate an application rate. Knowing the average weight of a load and area spread will enable the operator to calculate how many tons per acre of manure are being applied. Along with spreader calibration, a soil test and a manure sample taken for nutrient analysis will give a producer a good estimate of the amount of nutrients available for crop growth.

The spreader calibration service is completely free and available to all livestock producers. Interested operators are encouraged to sign up by contacting the Firesteel Creek Watershed Project at 605-996-1564 Ext. 5.

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# Lake Mitchell algae not as much of a problem this year, officials say

By HAROLD CAMPBELL  
The Daily Republic

The amount of algae on Lake Mitchell appears to be down from the past several years, local officials said Wednesday.

"We're better off than we were last year," said David Kringen, project coordinator for the Lake Mitchell Watershed Project with the Davison Conservation District.

"I don't think the concentration is there as much as in previous years."

Kringen said he last inspected the lake on July 20. At that time, he said, both algae and phosphorous counts were down from the same time in past years.

"I thought the middle and south side looked decent, but the north side looked a little green," he said.

"I have pictures from a year ago where it looks like a blanket of green."

In addition to official phosphorous and algae counts, he said he also gauges the lake's condition by its appearance on July 4, which he called the busiest time of the year on the lake.

"I noticed the lake on the Fourth of July this year looked a lot better than last year," he said.

However, he said whether the improvement is a result of the second year of the city's three-year alum treatment program at the lake is still uncertain.

In addition to the alum treatment, he said Lake Mitchell also has benefited from increased rainfall this summer which has infused fresh water into the lake and helped keep down algae and

See ALGAE, Page 11

# ALGAE: Not as much in lake

Continued from Page 1

phosphorous levels.

In May, a 25-foot-long barge, operated by Sweetwater Technology Corp. of Aitken, Minn., deposited alum, or aluminum sulfate, into the lake each day for a week as part of the effort to decrease phosphorous, a prime food source for algae.

City Council members voted last year to move forward with the project in hopes of reducing odor problems at the lake and improving conditions for recreation. The project has been estimated to cost about \$542,000 over a three-year period.

To help pay for the project, the Davison Conservation District received a federal grant to cover 60 percent of the costs.

Tim McGannon, city public works director, said while he thought the lake's appearance was better this summer, he was going to wait before making a judgment on the treatment program.

"I'm going to wait until the third year is over before making any judgment," said Tim McGannon, city public works director.

"Even though there seems to be some improvement this year, I'm still going to wait until the entire project is done to gauge its effectiveness."

Alum is a nontoxic material commonly used to clear drinking water. In lakes, alum is used to control algae, not by killing the algae, but by reducing the amount of phosphorous in the water.

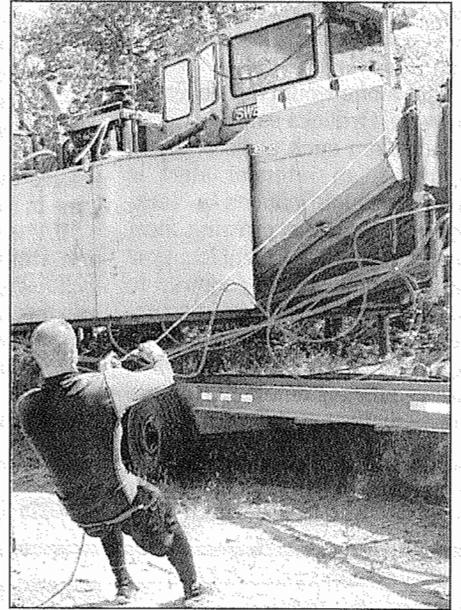
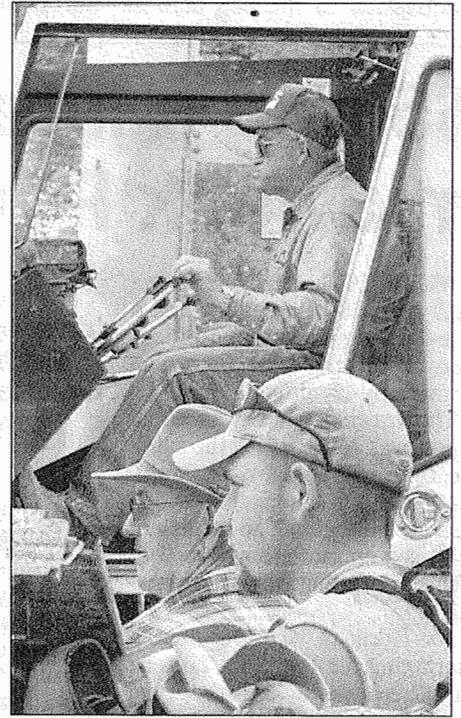
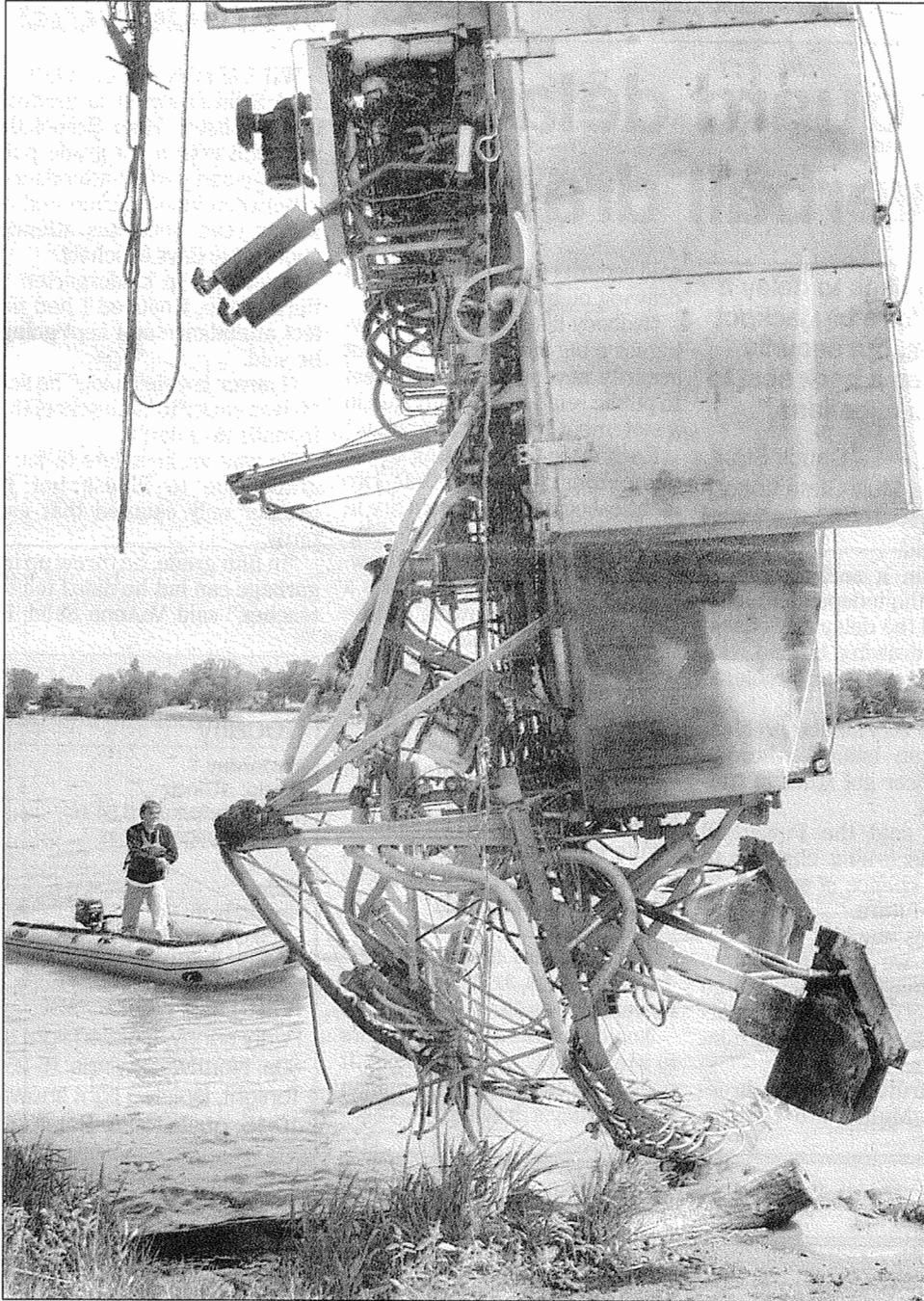
After last year's treatment, algae was still reported to be thick on the lake last summer.

Bernie Schmucker, president of the city's Lake Development Committee and a Lake Mitchell resident, said he thought the lake looked better this summer.

"I don't think it's as bad as it's been," he said. "I hope if it's looking better, the city can fund the program for another few years."

# Back on dry land

## Sunken alum barge retrieved from Lake Mitchell



Laura Wehde/Republic

**ABOVE LEFT:** Paul Eberhardt, of Sweetwater Technology Corporation in Aitkin, Minn., helps secure the barge Thursday morning that sunk in Lake Mitchell earlier this week. The barge, used by Sweetwater to apply alum treatments to Lake Mitchell, capsized and sank late Tuesday afternoon. The cause of the accident is not yet known. On Thursday morning, crews spent about 90 minutes lifting the barge out of the lake, turning it upright and loading it onto a trailer. The barge, which was under about 6 feet of water, will now be taken to the company's shop so the cause of the malfunction can be determined. It is not yet known when alum applications will resume.

**TOP RIGHT:** Thomas Eberhardt, center, president of Sweetwater Technology Corporation in Aitkin, Minn., and Chad Rach watch as the barge is lifted out of Lake Mitchell by crane operator James Pejsa of Bussmus Construction Co., Mitchell. **BOTTOM RIGHT:** Eric Paulson, of Sweetwater, pulls a cord to help align the 25-foot barge as it is being lowered onto a trailer.

# Alum treatments to resume at lake later this month

## Consultant: Spilled alum not harmful

By HAROLD CAMPBELL  
The Daily Republic

Aluminum sulfate applications on Lake Mitchell are tentatively scheduled to resume during the week of June 20, according to the consultant for the project.

This year's alum applications were halted May 24 after the barge used to apply alum into the lake as part of the city's algae-control project capsized and sank in about 6 feet of water close to the shore on the southwestern part of the lake.

Dick Osgood, president for Osgood Consulting of Shorewood, Minn., said Sweetwater Technology Corporation, the Aitkin, Minn., company which operates the barge, hopes to



OSGOOD

have repairs completed in time to resume applications later this month. Sweetwater hopes to test the barge on a lake near the company's Minnesota headquarters next week.

"I guess you could call it a 'wet run,'" Osgood said.

According to a report Osgood sent Wednesday to Mitchell Public Works Director Tim McGannon and David Kringen, project manager, about 2,100 gallons of alum leaked from the barge as a result of the accident.

"At this point, my assessment is that no significant environmental harm occurred as a result of the barge capsizing," Osgood said. "The only significant fluid spill was the liquid alum, which was to be put in the lake anyway. Obviously, it was not 'applied' as we had intended, but only about 1.75 percent of the total amount of alum planned to be applied was involved in the spill."

The report indicated about 1,300 gallons of alum spilled when the barge capsized, while another 800 gallons leaked as the barge was being dredged from the lake.

About 120,000 gallons of alum are expected to be applied to the

See ALUM, Page 11

# ALUM: Used for city's water purification process

Continued from Page 1

lake this year. When alum is added to lake water, it forms a white substance that neutralizes phosphates, which algae need to flourish.

Osgood said by removing phosphates, algae will not have the nutrients they need to grow, and the water will become clearer.

Alum poses no harm to humans or wildlife, he said, unless it is consumed directly. He added that alum is not registered as a herbicide or pesticide and therefore does not fall under Environmental Protection Agency jurisdiction.

One of the byproducts of aluminum sulfate when it mixes with water, he added, is aluminum hydroxide, the active ingredient in the over-the-counter stomach medicine Maalox. In addition, he said many cities, including Mitchell, use aluminum sulfate in their water treatment plants as a water clarifier.

"Alum has been applied to hundreds of lakes in the U.S. over the

past three to three and a half decades," he said.

He added that he saw no need to remove the 2,100 gallons of alum that concentrated near the site of the barge accident.

"It attaches to the bottom of the lake, so trying to extract it would be a challenge," he said.

Rich Pollreisz, city water superintendent, confirmed that alum is used as part of the city's water purification process. He said it helps settle dirt and other sediment and makes the water clearer.

No gasoline, engine oil or hydraulic fluid spilled into the lake, Osgood said. After the barge was returned to Minnesota, all gasoline, oil and hydraulic fluid were drained and accounted for.

"Because of the design of the fuel system, all of (the gasoline) remained trapped in the tank" he said. "Upon draining the engine, the full capacity of five quarts (of oil) was found inside. At no time

during the securing or recovery process was any sign of oil or gasoline detected."

Osgood said an inspection revealed the barge sank after a pump in a floatation compartment in the rear of the vessel failed for a still-undetermined reason.

This caused the barge to gradually take on water during the course of alum applications on May 24.

Sweetwater Technology has used the barge in nearly 20 jobs over five years without a similar incident.

Over those five years, the barge has applied more than 3.25 million gallons of alum.

To prevent a similar failure in the future, Sweetwater will be filling all floatation compartments with a type of urethane foam.

The 25-foot barge overturned late on the afternoon of May 24 as it was completing its final application of the day. Sweetwater began its three-day alum applica-

tion that morning and had been scheduled to complete applications May 25-26.

A crane pulled the barge from the lake on May 26.

Osgood said the effect of applying alum in June rather than May was still uncertain. Alum was applied in June two years ago in the first year of the applications, but he said some algae had already blossomed and the applications were not as effective as he would have liked.

Last year, alum applications occurred in mid-May and results were more positive, he said.

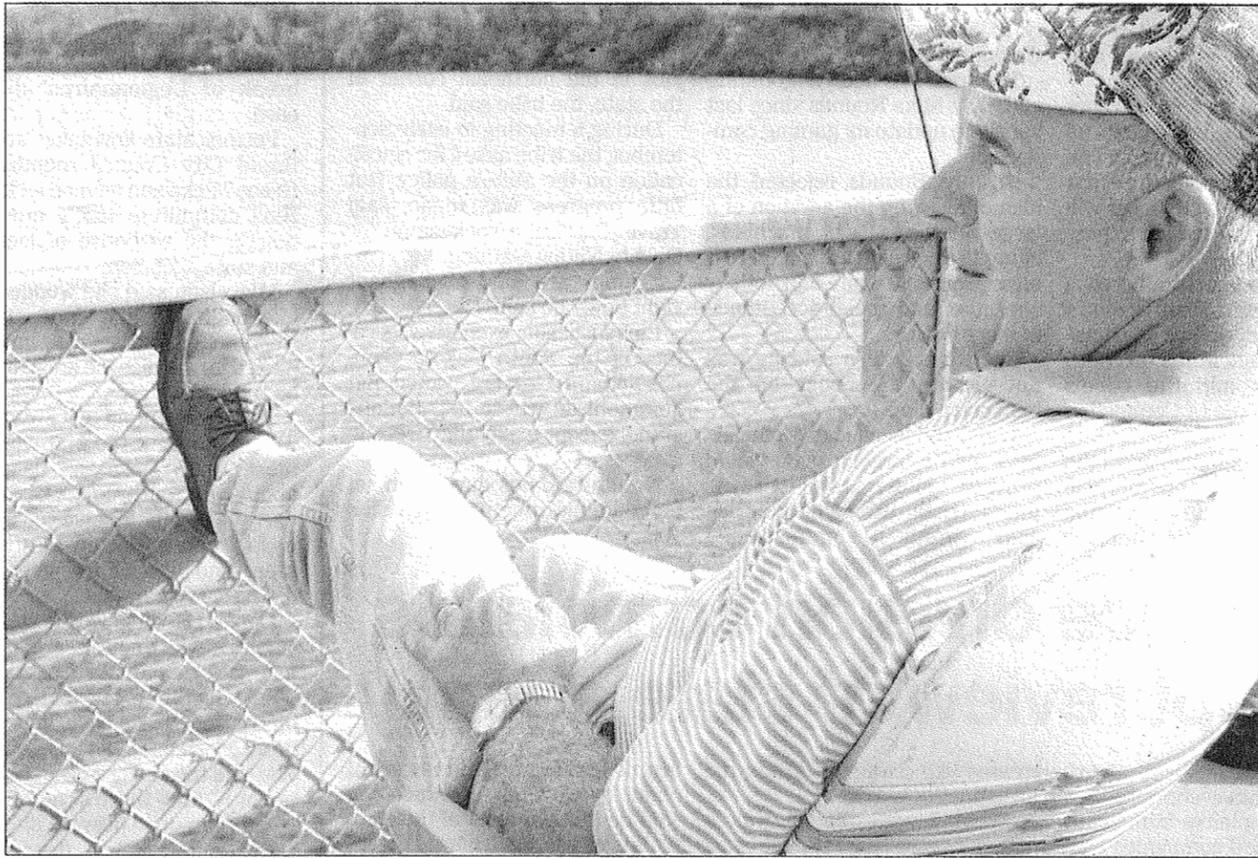
However, he said the effectiveness of later applications depended on water flow into the lake.

"The timing and the water character are all variables," he said. "We don't have all the answers yet."

Osgood said he would attend the regular June 20 Mitchell City Council meeting to provide Council members with a status report on the alum project.

# Murky waters

Lake Mitchell still is clouded with algae, despite a \$575,000 project to clear the water



Laura Wehde/Republic

Roland Preszler, Menno, fishes off of the West End Bridge Tuesday at Lake Mitchell. Lake Mitchell's water quality has been questioned in the past by recreational users of the lake.

## Councilwoman: Treatment didn't work

By WENDY ROYSTON  
The Daily Republic

Some Mitchell City Council members are expressing doubts that a \$575,000 project to clear the water at Lake Mitchell is working and say they are open to other alternatives.

Councilwoman Bev Robinson said she is unhappy with the treatments. When asked, other Council members, including Bill Rubendall, Jerry Toomey, Britt Bruner, Allen Lepke and Ken Tracy, all said they weren't sure if they consider lake treatments a success or failure.

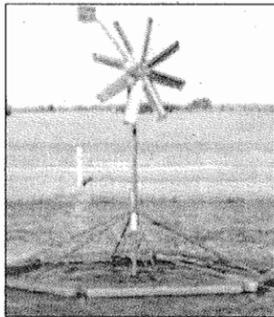
Doug Molumby and Terry Timmins could not be reached immediately Tuesday.

"I have not seen improvements," Robinson said of the alum treatments at Lake Mitchell, which have been ongoing for three years. "I have not heard from anybody that has seen notable improvement, and I don't think that dumping more chemicals in the lake ... is going to be the answer. I think we need to go back to more of a natural approach."

Lake Mitchell is known locally for its high algae content, which adds a green hue to the water each summer and often produces a foul smell. The problem is more about recreation, however, since less than 3 percent of the city's drinking water comes from the lake following the completion two years ago of a pipeline that pumps Missouri River water into the city. The lake is heavily used for recreation, especially during the summer months.

The City Council decided three years ago to begin a treatment process that would dump 120,000 gallons of aluminum sulfate into the lake each summer in an effort to combat the

See ALGAE, Page 11



A POND MILL is shown in this photo, taken from the Web site pondmill.com. Pond mills, some say, could be the answer to clearing the water at Lake Mitchell.



Laura Wehde/Republic

TWO-YEAR-OLD Kyoko Miwa of Mitchell builds a sand castle along the shore of Lake Mitchell Tuesday afternoon with some family and friends.

# ALGAE

Continued from Page 1

algae problem.

The price tag came to about \$575,000, of which about 50 percent was paid for in grant money.

While Robinson was the only Council member contacted Tuesday that outright said the treatments aren't working, other members said they hadn't yet decided.

"I have had several people tell me that they think that the alum treatment has been very beneficial, and I've had probably just as many people tell me (the treatments) aren't working at all," said Bruner.

Lepke said "there are times when it looks like it doesn't do any good and there are times when it does look like it's doing some good. But I'll wait to comment (further) until we get our report back."

Tracy said that "at least visually, it doesn't appear that it has done a great deal, but maybe it's too early to tell."

Rubendall, the Council president, said he doesn't consider alum treatments a failure, "but it really hasn't been the greatest success that I can see."

Dick Osgood, director of Osgood Consulting of Shorewood, Minn., says treatments are working.

"We did some ... sediment tests last year, and those showed the impact that we had hoped for," he said. "The amount of available phosphates has gone down."

Osgood said, however, that "Mother Nature has been playing some tricks on us."

Firesteel Creek usually does not produce much flow into the lake during the summer months, but in 2004 and 2005, Osgood said most of the water fed into the lake entered in July and August.

"Ninety-five percent of the time, the flow into the lake from Firesteel Creek ends sometime in June, so ... we designed the treatment so that, if it would occur about that time, that nothing else would flow into the lake after that, so the treatments would be effective for the summer," he said.

However, the late-season runoff "undid" the treatment, he said.

Funding for next year already has been budgeted, though a decision is yet to be made as to whether the project will continue. The grant that is helping pay for the project is set to expire this year, although it will help pay for

further study over the next two years, according to Public Works Director Tim McGannon.

McGannon said each year of the project, Osgood has delivered a progress report to the City Council, which has then decided whether the treatments should continue.

Osgood said he expects to have this year's report ready later this fall.

He said the project has not yet reached its goals, but that it was not expected to by this point.

William Tooley, who represents a company that sells water-clearing devices called pond mills, said he is concerned that the alum treatment could bring on another problem for the lake, because it can remove algae too quickly.

Monday, Tooley presented a plan to the City Council, saying pond mills may be the answer to clearing Lake Mitchell.

"It's a balance," he said during a telephone interview Tuesday. "Nature requires a balance, and the nice thing about the pond mills is they don't clarify the water all of the way down to the bottom right away," as alum treatments sometimes do, allowing sunlight to reach bottom vegetation, making it grow.

"In a sense, the algae is a blessing in disguise," he said, because it creates a blanket, shielding the weeds from sunlight.

Councilman Toomey said he thinks the Council needs to look at its options, in case the alum treatments do not work out.

"I think we need to get some alternative plans lined up, and start doing our homework, doing some investigation, and be willing to move forward with something different," he said.

Rubendall said he thinks something needs to be done to preserve the lake, whether it is continued alum applications or another plan.

"We've got to keep trying to do something out there to try to keep our lake in good condition," he said. "If we ever lose that lake, we're in trouble. (Property owners there are) paying a lot of taxes, and when they're paying a lot of taxes, we should at least try to make efforts to clean the lake up. It will never be as clean as we'd like it, but I think we should keep doing what we can do."

Toomey said the Council is in a tough situation.

"If you stop the program, the people at the lake are going to be mad that you stopped too soon, and if you keep going and it doesn't work, then you've thrown all of that money away, so you're kind

of in trouble either way," he said.

Some residents already are concerned, however, and say the alum applications are not paying off.

"I don't want (the Council) to spend any more money on something that isn't working," said Kerwin Miller, of Mitchell, who attended Monday night's Council meeting. "It's time for the city to make a decision on what they are going to do for their future plans with the lake, and I just want to have some other alternatives presented to them."

During Monday's Council meeting, Miller and Tooley discussed the possibility of replacing the current regimen of aluminum sulfate applications with pond mills.

Pond mills, they say, would be a better alternative for helping clear Lake Mitchell. A pond mill creates a vortex, drawing water from the bottom to the surface. They can be either wind- or electrically-powered.

Tooley said the process would continually expose the lake's water to oxygen and sunlight, to help the lake heal itself.

He estimated Monday that Lake Mitchell would require at least 20 pond mills to effectively reduce its algae content, each of which would cost approximately \$10,000. Tooley's company markets the Little River Pond Mill.

Tooley recommended the city primarily utilize wind-operated pond mills, because "they're the most efficient, most effective and the easiest to deal with."

Miller said pond mills are not a new phenomenon, but have been used in Canada for quite some time.

"They aren't getting the results with chemicals," Miller said. "I would sure think an all-natural approach would help restore the lake back to its natural balance."

As an independent insurance agent, Miller said he is dealing with several farmers who are addressing lagoon odor issues. He is directing those clients to Little River Pond Mills, he said, and has seen his clients happy with the result of their investments.

Tooley said he has been involved in reclaiming the natural balance of Lake Platte. In an attempt to avoid dredging that lake, local fishermen borrowed three pond mills from the City of Platte to put on the 150-acre lake, according to literature Tooley supplied to the council.

In the 1930s, when Lake Platte was constructed, it was approximately 16 feet deep, the literature said. Today, it is around four feet

deep. However, after having the pond mills in place for eight months, the lake deepened by about a half-inch each month.

Darwin Nuss, co-owner of Tim's Marine of Mitchell, said he worried, however, about fishermen on Lake Mitchell. A series of pond mills on the lake could impede recreation, he said.

"They're always ... trolling slow, and with that agitating, that's going to create a draw for the fish, and (their lines) are going to get snagged on (pond mills)," he said.

Nuss said he also is concerned about the safety of other recreational users of the lake.

Sometimes, he said, personal watercraft operators "don't realize how fast (they are) going. (Personal watercraft are) very responsive ... but, if you goof up, it could create a hazard of some sort."

He said he thought lake users would be responsive to any plan to reduce algae, however.

"Anything to get rid of that algae, I would be for it," Nuss said, even if it meant dodging a few pond mills, if the cost isn't too high.

Robinson said she has witnessed the pond mill process.

"I have been past the little Platte lake and seen what they are talking about in action. ... I think that they are on the right track, and I would like to see us at least do a pilot project," she said.

"... This may not be the only methodology, but I think it is definitely a good methodology to put to use in the lake," Robinson said.

She said cleanup along Firesteel Creek also may help with lake improvement efforts.

Bruner, a former science teacher, agreed that the mechanisms are legitimate. He also said he is not sure alum treatments are paying off.

"I believe that the science behind that is sound, but as long as we are treating the lake, we are treating the symptom, not the problem," he said. "The problem is the chemicals coming into the lake. Until we can address those problems, we are always going to have an issue out there at the lake, and, by putting that alum on or by putting the windmills in, it doesn't fix the problems. It's just a Band-Aid."

Osgood said he is not confident in the science behind the pond mills.

"It is my opinion that Mother Nature does that already," he said. "The wind ... mixes it to the bottom very thoroughly."

# Watershed project coordinator to give progress report to committee

By The Daily Republic

The Firesteel Creek/Lake Mitchell Watershed Project is still working toward its goal of a 50 percent reduction in the phosphate level by 2015, and 12 area feedlots have been equipped with ag waste systems, according to officials.

Dave Kringen, coordinator for the project, is scheduled to present the project's annual progress report to the City Council's public works committee tonight.

"I think we've been doing all right," he said. "We keep plugging away."

Kringen said annual measurements of the success or failure of the project are hard to determine, but "as we get more and more (done), I think we'll probably see some improvement. I think we're just sort of in the middle of things at this point."

More than 200 feedlots are located along Firesteel Creek, which feeds Lake Mitchell, and Kringen said a realistic expectation would be that the project place ag waste systems at 15 of them by 2008, when he anticipates the project's funding will run out.

"Obviously, we aren't going to do something with every one of them," he said.

Kringen said some smaller feedlots do not require ag waste systems to control runoff, but

could be sufficiently handled through the use of clean water diversions or sediment basins to capture moving solids.

The project, which began in 1999, is funded through several outlets, including the Environmental Protection Agency, the Natural Resources Conservation Service and the City of Mitchell. All work is done by volunteers.

"I think we're doing as much as we can," he said. "There are people who wish we could do more, but with a volunteer program, there's only so much we can do."

Kringen said the group appreciates the feedlot owners who have worked with the project so far.

He said that while the project is designed to help with algae reduction, further measures likely will have to be taken in order to lower Lake Mitchell's algae to a manageable population.

"Even with the 50 percent that we're targeting, we're probably still going to have to do some in-lake treatments, because the phosphorus levels are probably going to be high enough to where we're still going to have some concerns," he said.

Aluminum sulfate and other algae-reduction tactics will not be discussed at tonight's meeting, he said.

**Also tonight, the full Council will consider:**

■ A hearing on the application on a transfer of a retail liquor license from Elks Lodge #1059 to Elks of Mitchell Building Association Trustees, LLC, located at 119 E. 3rd Ave.

■ A hearing and adoption of a resolution declaring the necessity for construction of curb and gutter, base course, bituminous paving, engineering fees and miscellaneous expenses on the 1600 to 1800 blocks of South Miller Avenue.

■ Adoption of a resolution annexing the Wild Oak Golf Club Addition.

■ A resolution authorizing a transfer of appropriations.

■ A resolution platting Lots 5 and 6, Block 4 of Gamble Court of Woodland Heights First Addition.

■ A resolution ratifying and confirming Resolution 2296.

■ A resolution ratifying and confirming Resolution 2323.

■ A resolution giving approval to the issuance and sale of tax incremental revenue bonds not to exceed \$1,849,100.

■ A second reading and adoption of an ordinance rezoning Block 1 and Block 5 of Westwood First Addition.

■ A second reading and adoption of an ordinance for adult establishments.

■ A second reading and adoption of an ordinance for disaster/emergency preparedness.

■ A first reading of an ordinance for supplemental appropriations.

■ Discussion of Corn Palace rental.

■ Approval of a request by the Senior Citizen's Board of Directors.

■ An amendment of Resolution 2368, annexation.

■ An automatic supplement to the general fund, police, in the amount of \$50,000 for the 2005 COPS Secure Our Schools Grant for security equipment.

■ An automatic supplement to the general fund, police, in the amount of \$14,653 for equipment from grant funds.

■ An automatic supplement to the general fund, fire, in the amount of \$1,775 for equipment from grant funds.

■ An automatic supplement to the special revenue fund, playgrounds and athletics, in the amount of \$342 from a donation for volunteer shirts.

■ An automatic supplement to the special revenue fund, parks, recreation and forestry, to Cadwell Park baseball field improvements in the amount of \$1,600 from a donation of funds.

■ An automatic supplement to the enterprise fund, water, in the amount of \$12,790 for security cameras from grant funds.

■ Declaring 10 bicycles surplus.  
■ Paying estimates.

■ Paying bills.

**Sitting as the Board of Adjustment, the Council will consider:**

■ Setting a date of Nov. 22 for a hearing on the application of Jennifer Bruns for a conditional use permit to operate a daycare center in her home at 222 W. 5th Ave., Lots 8 and 10C, Block 13, Rowley's Second Addition.

■ Setting a date of Nov. 22 for a hearing on the application of Mark Graham for a variance to construct a house/garage at 145 S. Harmon Dr., the south 10 feet of Lot 71, Lot 72, Lot 73, except the south five feet thereof, Indianhead First Addition.

**Committees**

■ The Public Health and Safety Committee will meet from 6 to 6:25 p.m. to discuss a fireworks permit for Premier Pyrotechnics, a possible ordinance for view obstruction and street lights.

■ The Public Properties Committee will meet from 6:25 to 6:35 p.m. to discuss a request for funds for work on air handling concerns at the Public Safety Building.

■ The Public Works Committee will also discuss the landfill at its 6:35 p.m. meeting.

■ The Finance Committee will meet at 7:10 p.m. to discuss sales tax collections, authorization of transfer of appropriations and a golf course clubhouse improvements proposal.

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# FIRESTEEL CREEK NEWS

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Volume 7, Issue 1

December 2005

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## **NOW IS THE TIME TO SIGNUP FOR FEEDLOT IMPROVEMENTS AS PROJECT NEARS END**

Dave Kringen  
Project Coordinator  
Firesteel/Lake Mitchell Watershed Project

A little over six years have passed since the Environmental Protection Agency's 319 program (EPA 319) helped install the first animal waste management system in the summer of 1999. As of this writing, a total of 12 feedlot systems have been installed throughout the watershed using some combination of NRCS Environmental Quality Incentive Program (EQIP), EPA 319, City of Mitchell, and producer cash and in-kind match. While each system has proven challenging in its own respect, I sincerely hope that each producer I've worked with so far has walked away feeling they have gotten a fair shake.

The EPA money that was brought into this watershed in 1998 has significantly eased the financial burden for producers installing an animal waste management system, ESPECIALLY those operations that needed to be moved to a different location. Items such as perimeter fence, gravel, bunkline, security lights, and watering facilities that had to be abandoned in the old lot were replaced in the new with the help of the EPA 319 program and the City of Mitchell. These items would NOT have been cost-shared through an NRCS EQIP contract alone. I suspect we would not of had the success we have enjoyed at this point were it not for the 319 and City financial assistance. And while I speak for many in thanking those producers who have participated, I also hope those producers have appreciated the extra assistance they have received from the EPA and the City of Mitchell.

However, the flexibility that the EPA program offers will not be here ad infinitum. Both time and money are beginning to run out. At this time, the Firesteel project is due to end in March 2008, with all Best Management Practices (BMPs) to be paid 6 months prior. This means that all practices that are scheduled to be cost-shared through the 319 program need to be on the ground by the beginning of October of 2007. If you have considered making improvements to your feeding operation that could potentially reduce the amount of runoff into Firesteel Creek, now is the time to act. Schedule an appointment today by contacting myself or your local NRCS/conservation district office to learn more about the options available to you. If it is shown that there is a need for more funding, there is a good chance that more EPA dollars may be applied to our project area in the future. Remember, it is to your advantage to have this money available to you in your watershed. Don't delay!

'Twas the Night Before Christmas, and All Through the Watershed

by

Rebecca Buerkett, editor, F. X. Browne, Inc.'s Lake and Watershed News, December 2003

'Twas the night before Christmas, and all through the watershed,  
Not a creature was stirring; they'd all gone to bed.  
The river was nestled all snug in her banks,  
Not a sign of erosion, for this we give thanks.  
To the citizens who spent their time planting the trees,  
And the native wildflowers that attracted the bees.

When out near the lake there arose such a clatter,  
A deer raised its head to see what was the matter.  
It was merely a dog who barked to get loose,  
Chasing away another pesky Canada goose.  
The lake, how it shimmered.  
The water, how clean.  
Its hypolimnion well-aerated.  
Its IBI value a dream.

When what to my wondering eyes should appear,  
But signs all around me of people who care.  
Shoreline homeowners who'd come to their senses,  
Farmers ensuring their streambanks have fences.  
Well-maintained buffers all planted with trees,  
Townships installing their own BMPs.

Infiltration! Bioretention!  
Sand filters and more,  
To keep dirty stormwater  
From reaching the shore!  
With a staff gage in place at the monitoring station,  
And the permits acquired for wetland restoration,  
I marveled to myself as I surveyed the scene,  
Thank goodness for all who keep my watershed clean!

# Happy Holidays!

- from your friends at the Firesteel/Lake Mitchell Watershed Project

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# Lake debate blooms

## In near future, council to decide plan of action for algae at lake

By SETH TUPPER  
The Daily Republic

The algae at Lake Mitchell have retreated for the winter, but the dispute over the green menace is in full bloom.

The City Council is weighing two alternatives but has not yet decided on a plan of attack for this summer. For the past three years, on the advice of a paid consultant, the council has funded surface applications of aluminum sulfate. That consultant is now recommending the installation of an injection system to continue the alum treatments.

Meanwhile, another consultant has told the council that underwater circulators could do the job more effectively with less cost and lower risks.

With the spring thaw bearing down, council members either will choose one of the alternatives, try something else or do nothing. One option is to abandon in-lake methods and focus instead on the source of the problem — the Firesteel Creek watershed, which brings most of the algae-producing material into the lake.

"At some point," said City Councilman Ken Tracy, chairman of the Public Works

Committee, "I'm going to say it's better to take that money and go upstream instead of using a large amount of money as a temporary solution."

Both consultants admit that their approach addresses only the problems in the lake, and not the larger problem in the watershed. But that's about all they agree on.

William Tooley, head of the Platte-based SARC Technologies Group, says alum is a dangerous substance that could threaten people, fish and the environment. He says alum has been linked, although not conclu-

sively, to higher incidences of Alzheimer's disease.

"There are serious health concerns that haven't been answered," Tooley said. "I don't want a bunch of people in Mitchell having more Alzheimer's than anybody else in 20 years just because the council wasn't informed."

The other consultant, Dick Osgood, of Osgood Consulting in Shorewood, Minn., rejects Tooley's claims about the health hazards of alum.

"To put it bluntly, that's nonsense on a

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## ALGAE

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number of levels," Osgood said.

Osgood also dismissed Tooley's claims about dying fish and environmental damage. Osgood said he, too, had considered circulation but determined it would be ineffective.

Tooley has cited numerous examples of algae-infested lakes that he says were cleaned up quickly by circulation. What he's proposing in Lake Mitchell is a \$50,000 pilot program, followed by the installation of underwater circulators for no more than \$250,000. The total bill, then, would be as high as \$300,000 plus the future costs of running and maintaining the circulators, which Tooley said would be minimal.

Tooley's theory is that the circulators would rid the lake of algae by cycling water from the bottom of the lake and exposing it to the natural disinfecting properties of sunlight. The constant cycling would keep algae from blooming on the surface, he said.

The theory is based on observations from other lakes, not on data from Lake Mitchell. Tooley, by his own admission, is not a scientist or an expert in lake management. According to his SARC Technologies Web site, the company specializes in "design, planning, development and management of meat business projects." Should the city hire Tooley, he would bring in his own experts to do the work.

So far, the city and Tooley do not have a formal working relationship. Tooley has made presentations to the City Council and the Lake Development Committee,

and is scheduled to make another presentation to the Lake Development Committee at 4:30 p.m. next Thursday at City Hall.

The competing plan, offered by Osgood, is the result of findings from a project that the City Council authorized and provided partial funding for. Osgood, who has a graduate degree in aquatic science and has worked in lake management for 30 years, recommended alum treatments. Alum works to neutralize the phosphorus that algae need to flourish.

A separate company was hired to apply the alum. After last year's application, Osgood studied the effectiveness of the project and filed a final report.

The report recommends the installation of a low-dose alum injection system at a cost of about \$400,000. Specific alum doses are recommended this year and next year to treat the lake bottom, and annual doses are recommended after that on an as-needed basis to treat algae blooms as they develop.

The projected cost of the next two years' doses is as much as \$400,000, or \$352,000 if the doses are combined and both applied this year. Future doses will cost an estimated \$249,000 per year. Osgood also recommended the hiring of a full-time lake manager.

The total bill for Osgood's recommendations, then, could be as high as \$800,000 for the next two years, plus a projected average of \$249,000 per year for as long as the alum injections are necessary, and a full-time lake manager's salary.

If the council chooses to follow Osgood's recommendations, the alum applications probably will be deemed necessary until the enormous task of cleaning up the

350,000-acre Firesteel Creek watershed nears completion. Osgood said the project, which is under the direction of the Davison Conservation District, must reduce the algae-fueling materials that are flowing into Lake Mitchell by 80 percent to achieve long-term results. The leader of the watershed project, Dave Kringen, said he is "nowhere near" the 80 percent goal after seven years of work.

Until the watershed goals are reached, the Mitchell City Council must decide if it wants to spend money on continued efforts to combat algae in the short-term. And if the council decides to fund one plan or another, council members must determine whether to work with Osgood, Tooley, somebody else or nobody.

Tooley has labeled Osgood an "alum salesman," but Tooley himself stands to reap a financial benefit from his own advocacy on behalf of circulators. Some council members have called for a third, independent, expert to help them weigh the options.

Other council members are leery of that suggestion, because the city already has spent about \$170,000 on Osgood's algae project. Another \$230,000 has been supplied by other sources, including government grants.

In the end, there may be no concrete solution to reduce lake algae in the short-term. Todd St. Sauver, a Game Fish & Parks official who has worked on Lake Mitchell for nearly 20 years, said he is skeptical of any method that does not address the watershed.

"Aquatic systems are so incredibly complex," he said, "it is virtually impossible to nail down any one cause or effect to a certain reaction in the lake."

THE DAILY REPUBLIC THURSDAY, FEBRUARY 16, 2006

# Lake committee hears competing algae plans

By SETH TUPPER  
The Daily Republic

Two men who are proposing different solutions for the Lake Mitchell algae problem received contrasting receptions during a meeting of the city's Lake Development Committee Thursday at City Hall.

William Tooley, who wants to install underwater circulators in the lake, was barraged with skeptical questions and comments. Dick Osgood, the consultant who is proposing a continued program of aluminum sulfate



TOOLEY



OSGOOD

treatments, encountered some challenges but was never put on the defensive like Tooley.

Lakeside resident Carl Koch delivered the most critical comments toward Tooley. At the end of the meeting, Koch launched into a 20-minute diatribe punctuated by a blunt summary of his views on circulation:

"I simply don't believe it."

That seemed to be the view held by many of the roughly 25 people in attendance. Those who chal-

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Seth Tupper/Republic

MITCHELL RESIDENTS JEFF Krall, left, and Joe Krall, middle, speak Thursday to Mitchell Public Works Director Tim McGannon after a Lake Development Committee Meeting at City Hall. All three men were critical of a proposal to install underwater circulators in the lake.

## ALGAE

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lenged or criticized Tooley included committee chairman Bernie Schmucker, committee member and biologist Bob Tatina, city Public Works Director Tim McGannon and numerous lake residents.

The committee members took no action at the close of the two-hour, 20-minute meeting, and they apparently will not make a formal endorsement of either proposal. Schmucker said the meeting was meant only as an informational aid for City Council members, at least six of whom were in attendance.

The council has not yet decided what action, if any, it will take to combat the algae problem this summer. The following options are on the table:

- Continuing with Osgood's ongoing alum project, which has reduced the amount of algae-fueling phosphorus in the lake but has not yet dramatically reduced the algae itself;

- Switching to Tooley's circulators, which he says will clear the lake by harnessing the natural disinfecting powers of nature;

- Doing nothing;

- Or shifting more resources to an aggressive cleanup of the watershed that dumps the algae-producing material into the lake.

Committee members also raised the possibility Thursday of diverting Firesteel Creek during heavy flows, or building a holding pond above Lake Mitchell. Both ideas were deemed unfeasible by those who expressed opinions.

Osgood and Tooley each were given a chance to present their proposals Thursday, and each delivered the same PowerPoint presentations that they already had delivered separately at past City Council meetings. The two men did not speak to each other and sat on opposite sides of the room.

Osgood, of Osgood Consulting in Shorewood, Minn., has a graduate degree in aquatic science and has worked in lake management for 30 years. He showed evidence Thursday that alum applications during the past three years have reduced phosphorus levels in the lake, and his recom-

mended program of future alum treatments is based on extensive scientific observations made by himself and others.

The city already has contributed an estimated \$170,000 to Osgood's three-year project, and he is proposing the installation of a low-dose injection system to continue alum treatments for as long as they are necessary. The three previous alum treatments were applied with a barge.

The alum treats two sources of phosphorus: the enormous load that flows in from Firesteel Creek and its watershed, and the load that builds up on the lake bottom. Osgood said one additional heavy dose is needed to "seal" the sediment on the lake bottom, and annual doses are needed thereafter to combat the inflow of phosphorus from the creek.

Osgood's plan comes with a significant price tag. The injection system would cost \$400,000 to install, the sediment dose could cost up to \$400,000, and the annual doses after that would cost an estimated \$249,000 on average. There also would be minimal costs to maintain the injection system, and Osgood is recommending the hiring of a full-time lake manager.

The costs are high, Osgood said, because the problem is "huge."

"As we look at lakes and watersheds and what runs off into them, Lake Mitchell is 'up here' in terms of problems," Osgood said while holding his hand above his head. Then, dropping his hand to his knees, he added, "And many, many other lakes are way 'down here.'"

Some audience members questioned the safety of alum treatments, but experts from the city and state dismissed the concerns. An official from the Game, Fish and Parks Department said there is no evidence that alum harms fish, and McGannon said alum is commonly used to treat drinking water and poses no harm to humans.

Tooley, of SARC Technologies in Platte, has said that algae can harm fish, people and the environment. He also said there is a possible connection between alum and Alzheimer's disease, but he did not focus on safety concerns Thursday.

He focused instead on the dif-

ference between his plan and Osgood's.

"The problem we've got," Tooley said, "is that we're focusing on phosphorus when we should be focusing on algae."

Tooley cited other lakes where he said circulation has worked, but critics challenged him with arguments that the lakes were far smaller or had other qualities that make them incomparable to Lake Mitchell.

Tooley pressed on, doing his best to answer questions and sticking to his assertions. He called for the discontinuation of alum treatments, a \$50,000 pilot project and a one-time expenditure of no more than \$250,000 to install an as-yet unknown number of underwater circulators.

The half-horsepower devices would circulate the entire lake several times per day, Tooley said. Schmucker and others scoffed at the claim, saying half-horsepower machines would not have anywhere near the power needed to circulate all the water in the lake.

The root of the arguments against Tooley, though, seemed to be a general disbelief and distrust in the circulation method. Several audience members said Tooley does not have sufficient scientific proof to back his claims.

Tooley has admitted that he is not a lake expert, but he said he works with an expert from Canada. So far, Tooley does not have a formal working relationship with the city.

Thursday, no member of the committee spoke favorably of his plan.

There was one thing that everybody in the room could agree with Thursday: Either plan would just be a temporary Band-Aid on the root problem of the enormous phosphorus flows that enter Lake Mitchell by way of the 350,000-acre Firesteel Creek watershed.

Osgood, as part of his presentation, also called for more focus on the watershed and a greater investment in the ongoing project to clean it up. He said an 80 percent reduction in phosphorus inputs from the watershed is needed to correct the long-term causes of algae in the lake, and experts agree that the goal is still many years from being accomplished.

# Group endorses alum treatments

## Lake committee makes recommendations to City Council

By **SETH TUPPER**  
The Daily Republic

The city's Lake Development Committee recommended Thursday that the City Council continue funding aluminum sulfate treatments to combat algae blooms this summer in Lake Mitchell.

The group, which met at City Hall, also recommended that the council budget additional money for treatments in 2007, adopt an ordinance banning lakeside residents from using fertilizers that contain phosphates, and investigate a state loan fund and other programs to accelerate

cleanup efforts in the Firesteel Creek watershed.

The city has provided funding for alum applications each of the past three years. The treatments were recommended and overseen by a paid consultant who conducted a study of the lake in 2001.

There has been some debate about the efficacy of the project, and the City Council recently heard an alternative proposal to attack the algae with underwater circulators.

Committee members unanimously preferred continued alum treatments over

circulators. They said they did not believe that circulators would work, despite the claims of two men who said circulation had worked in other lakes.

"They didn't present any scientific evidence," committee member John Iverson said of the circulation proposal. "All they did was put pictures of other lakes on the screen."

Iverson and other committee members said the alum has been more effective than some people have claimed. City Councilman Britt Bruner, an ex-officio member of the committee, said the alum

treatments are a work in progress.

"If we stop after three years, we'll be throwing away money and we won't see the full effect," Bruner said.

The next application of alum, according to the city's paid consultant, Dick Osgood, of Minnesota, will target the phosphorus produced by sediments on the lake bottom. Once the lake bottom is "sealed," future alum applications will still be needed to combat the phosphorus that flows in from the lake's only tributary, Firesteel Creek.

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## ALUM

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Alum works to neutralize phosphorus, which fuels algae growth. Much of the phosphorus is carried into the Firesteel Creek watershed and then the lake by runoff from agricultural sources such as fertilizers and manure.

Osgood has shown that alum applications during the previous three years reduced phosphorus levels in the lake. Some people noticed a difference in water quality, but others said there was no noticeable difference.

Some committee members said Thursday that the public's expectations for the alum project were beyond the actual scope of the work. The first three applications, committee members said, were supposed to seal the phosphorus on the lake bottom and provide data to determine alum dosages in the future.

The dosage required to finish sealing the phosphorus on the bottom of the lake will cost a projected \$250,000 to \$352,000 if applied in one summer, or \$117,000 to \$200,000 per year if the dosage is split between two summers.

The city budget already contains \$130,000 for alum treatments this year, so the dosage apparently will be split over two years if the Council decides to

continue the project. The committee recommended that the City Council budget \$200,000 for next year.

Osgood also recommended, in a report filed in January, that the city install a low-dose injection system for future alum treatments. The system would save the city from hiring a barge operator every summer, but the system would cost a projected \$400,000 to install. The system also would allow the city to adjust its alum treatments based on the amount of phosphorus flows coming in from Firesteel Creek.

If alum is applied this summer, it will presumably be done by barge. The committee's recommendation does not address an injection system, and the city has not budgeted for one. Some committee members suggested Thursday that the city could save money by building or buying its own barge.

Osgood's report also recommends the hiring of a full-time lake manager. The committee's recommendation does not address that issue either, but committee members speculated that Dave Kringen, who is currently managing the Firesteel Creek watershed cleanup, would be the perfect person for the job.

Kringen attended Thursday's meeting and updated committee members on the watershed project. He has implemented 13 ani-

mal waste management systems with farmers and ranchers; written 15 nutrient management plans covering 17,000 acres; built water pipelines, water tanks, ponds, dams and dugouts to minimize the number of livestock that drink and graze along Firesteel Creek; installed fences and implemented grazing systems to eliminate heavily grazed, high runoff areas; planted buffer strips and grass seed on 1,002 acres; and conducted shoreline stabilization efforts around the lake.

Kringen said much work remains to be done over many decades. Committee members said Thursday that they would investigate methods to "ratchet up" the watershed cleanup, which is viewed as the only long-term way to reduce algae in Lake Mitchell.

The proposed ordinance to ban lakeside residents from using fertilizers that contain phosphates is viewed by many committee members as more of a public relations move than an enforceable law. The impact of lawn fertilizers around the lake is small when compared to the pollutants that flow in from the 350,000-acre watershed, but committee members reasoned that people throughout the watershed might be more apt to participate in the cleanup if they know people in Mitchell are doing their part.

■ THE DAILY REPUBLIC ■ FRIDAY, MARCH 17, 2006

# Debates about Carnegie, lake dominate City Council meeting

By SETH TUPPER  
The Daily Republic

Monday evening's City Council meeting was marked by confrontational debates over the Carnegie Library building and the Lake Mitchell algae problem, but no action was taken and neither issue seems any closer to being settled.

## Carnegie building

The Carnegie debate pitted Mayor Alice Claggett against Rube Adam, one of her opponents in the upcoming April 11 election. Claggett and the eight

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## DEBATES

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City Council members met at the Carnegie building for a tour prior to the council meeting; when they got there, Adam and some members of a local preservation group were waiting.

Everyone gathered under the building's dome, which is adorned with a mural by the late Oscar Howe and is among the most prized aspects of the 103-year-old structure. A half-hour discussion ensued, and Adam set the direction early on by challenging the mayor and council members to explain how they would protect the building's artistic and architectural features from being altered or destroyed by potential buyers.

Claggett said repeatedly that she does not believe any buyer would tear the building down, because the action would provoke a public outcry.

"I just would not imagine anybody doing it," she said. "I mean, they would have to move out of Mitchell."

Others at the meeting disagreed and said that the City Council, if it elects to sell the building, should consider requiring the buyer to sign a covenant or other document that would protect the building's public appeal.

The building is included on the National Register of Historic Places, but preservationist Lori Holmberg said the listing does not provide much protection. Any significant changes to the building's exterior would generate a mandatory review, she said, but the interior would not be protected. And mandatory reviews did not save two of Mitchell's other historic buildings, Graham Hall and the Notre Dame school, from being razed during the past year.

The city has owned the Carnegie building since it was built in 1903 with donated money from philanthropist Andrew Carnegie. The building has been empty since its last tenant, the YWCA, moved out in June 2005. The building is plagued by high utility costs, roof leaks and limited handicap accessibility.

The City Council has given the local preservation group a deadline of April 3 to come up with a viable public use for the structure; otherwise, the council plans to put the building up for auction. The preservation group is working with three local nonprofit groups on a plan to use the building cooperatively.

## Algae

The clash over Lake Mitchell's algae problem occurred during the regular council meeting at City Hall. The council heard a report of recommendations from its Lake Development Committee, which met last week and recommended continued aluminum sulfate treatments, an ordinance banning phosphate-containing fertilizers around the lake, and more aggressive measures to stop the flow of algae-causing phosphorus into the lake's 350,000-acre Firesteel Creek watershed.

After hearing the one-minute report, a motion was made to table the recommendations until the next meeting so that council members could give the matter more thought. Then, Councilwoman Bev Robinson asked for the floor, read a prepared statement and sparked an hour-long debate.

Robinson said she concluded from her own extensive investigation that continued treatments of aluminum sulfate, or "alum," would be ineffective. She favors alternative approaches, including the suggestion by a Platte man to install underwater circulators.

"It does not seem practical or wise to continue alum treatments with the minimal, if any, improvement that we have seen after dumping in approximately 400,000 gallons over the last three years," Robinson said.

From the audience, some lake-side residents said the alum treatments had made an impact on the algae. A consultant's report, filed in January, stated that the alum reduced the amount of phosphorus in the lake but did not make a significant impact on algae levels. The consultant recommended further treatments to "seal" the phosphorus being produced on the lake bottom and to attack the phosphorus coming in from Firesteel Creek.

Councilman Jerry Toomey also read a prepared statement. He said he is not ready to vote for more alum treatments, because he wants to investigate all options more thoroughly before spending additional money. The council has contributed an estimated \$170,000 to a study and alum treatments over the past three years, and thousands more have been supplied by grants.

"I just want to make sure we aren't spending millions of dollars when we don't have to," Toomey said, "because it's taxpayer dollars."

Claggett also spoke against alum treatments and said she wants council members to travel to Canada, where they could tour some algae-infested lakes that have reportedly been treated effectively with circulation.

Councilman Britt Bruner aggressively countered the anti-alum arguments, saying that the council should stay the course with the project it committed to. He said Robinson was not "giving any credit" to the Lake Development Committee and the informed opinions of its members.

At one point, Bruner and Robinson argued intensely. Bruner asked Robinson if she was questioning the expertise of the paid consultant who recommended the alum treatments.

She said, "I hope that's who we hired was an expert."

And Bruner shot back, "If you don't think he was an expert, you never should have hired him three years ago. But I think you did."

One local resident, Scott Houwman, suggested that the council should be looking for longer-term solutions. Whatever that solution is, he said, the council could raise money to fund it by selling off some public property around the lake.

All the council members seem to agree that the best long-term solution is to reduce the amount of algae-fueling phosphorus that flows into the watershed with agricultural runoff. But experts say a significant watershed cleanup, which already has begun, will take decades to produce results. In the meantime, the council must decide if it wants to attack the phosphorus inside the lake.

Robinson compared in-lake methods such as alum to "taking aspirin for a toothache."

"If you don't do something about the toothache," she said, "it's pointless to keep taking aspirin."

Tim McGannon, the city's public works director, said the council must decide by its April 3 meeting if it wants to continue alum treatments. If the decision is postponed any longer, it may be too late to hire an applicator for this summer.

# Survey: Alum may end at Lake Mitchell

By **SETH TUPPER**  
The Daily Republic

Results of a poll of the City Council and mayor suggest there will not be an application of aluminum sulfate this summer on Lake Mitchell.

Council members were split 4-4 this week when asked by *The Daily Republic* if they support another dose of the compound, which is commonly known as "alum" and has been used the past three years to combat algae in the lake. Mayor Alice Claggett opposes it, and she would cast the tiebreaking vote.

Unless Claggett or at least one council member has a change of heart, they will bring an early end to a planned five-year project that the city has contributed \$167,000 to during the last three years. The remaining \$340,500 of the project cost has been supplied by a federal grant.

A vote on alum could come as soon as the April 3 City Council meeting. Public Works Director Tim McGannon said he would like to know by then if he should

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## ALUM

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schedule a barge company to apply the alum this summer.

In recent weeks, the debate over algae has intensified as everyone from council members and government scientists to lake residents has expressed opinions about alum and other purported remedies. For many of the people involved, it has been a frustrating time.

"It sure would be nice," said Councilman Doug Molumby, "to have somebody walk in and say, 'That's what's going to fix it, and it'll fix it this year.'"

Unfortunately, the only surefire fix may be cleaning up the 350,000-acre watershed that feeds the lake's tributary, Firesteel Creek. A sweeping watershed project funded by the Environmental Protection Agency is working toward that goal, but the work is expected to take decades. In the meantime, the City Council must decide if it wants to continue funding in-lake efforts to temporarily reduce algae levels.

Alum has been applied to the lake each of the past three summers, pursuant to recommendations from lake expert Dick Osgood, of Shorewood, Minn. The city budget includes \$130,000 for a fourth application this summer.

Osgood said this summer's dose, or a split dose over the next two summers, is required to finish locking up algae-fueling phosphorus in the sediments on the lake bottom. A significant reduction of algae is not expected, Osgood said, until this final "sediment dose" is applied.

Annual applications are recommended thereafter to counteract the phosphorus that flows in from Firesteel Creek. Much of the phosphorus comes from agricultural runoff.

Those who oppose applying alum this summer — Mayor Claggett and council members Bev Robinson, Ken Tracy, Allen Lepke and Jerry Toomey — question the effectiveness of the project and do not want to pump

## Q&A ON ALUM FACTS

By The Daily Republic

**Q. What is alum?**

Alum (aluminum sulfate) is a compound derived from aluminum, one of the earth's most abundant metals. Alum has been used in water purification and wastewater treatment for centuries and in lake restoration for decades.

**Q. What does alum do?**

Alum reduces the growth of filamentous algae by trapping the nutrient phosphorus — algae's food source — in sediments. Like most other plants, algae require phosphorus to grow and reproduce. Algae growth is directly dependent on the amount of phosphorus available in the water. Without available phosphorus, algae cannot continue to grow and reproduce.

**Q. How does phosphorus enter lakes?**

Phosphorus enters the water in two ways:

- Externally, from surface runoff entering the lake;
- And internally, from the sediments on the bottom of the lake.

Phosphorus already in the lake naturally settles to the bottom and is periodically released from the sediments back into the water.

more money into it without looking more closely at alternatives.

"I would rather we make sure that whatever we're going to do is going to be effective," Tracy said, "rather than just doing something to make it appear that at least we're doing something."

Those who support at least one more alum application — council members Bill Rubendall, Terry Timmins, Britt Bruner and Doug Molumby — say the project has made a visible impact and should be supported through at least the fourth of the originally planned five years.

Bruner compared the alum treatments to taking a course of antibiotics.

"If we stop the alum treatments before we're done with the prescription, so to speak, it's

**Q. How does alum trap phosphorus?**

Alum is injected into water several feet below the surface. On the way down, it interacts with phosphorus to form an aluminum phosphate compound that is insoluble in water. Phosphorus in the water is trapped as aluminum phosphate and can no longer be used as food by algae.

On contact with water, alum becomes aluminum hydroxide (the principal ingredient in common antacids such as Maalox). This fluffy substance, called a floc, settles to the bottom of the lake.

As the floc moves through the water, it also collects other suspended particles in the water, carrying them down to the bottom and leaving the lake noticeably clearer.

**Q. What happens at the bottom of the lake?**

The floc settles to the bottom of the lake and combines with (and traps) the phosphorus as it is released from the sediments. The floc forms a layer that acts as a kind of phosphorus barrier, reducing the internal recycling of phosphorus in the lake.

— Source: *Minneapolis Park and Recreation Board*

going to bloom some more," Bruner said. "And then everything we've gained to this point will be lost."

Osgood said skipping this summer's dose will negate the effects of one of the earlier three applications. If the council would then resume the alum project in 2007, Osgood said, an extra dose would be needed to make up for the lost summer; essentially, it would take six total treatments instead of the planned five to complete the sediment dose.

Osgood's report on the results of the first three applications has been used as ammunition by both sides of the alum debate. Alum opponents quote Osgood's admission that the first three applications did not significantly reduce algae levels, and alum

proponents quote his assertion that results should follow the final sediment dose.

Members of the city's Lake Development Committee side strongly with Osgood. The committee's non-binding recommendation to the City Council is to continue with alum applications, and to take other measures to reduce phosphorus inputs.

John Iverson, a lakeside resident, has been a member of the committee for 23 years. He has spent much of the past 13 years listening to and studying all manner of anti-algae proposals. He is annoyed, he said, by City Council members who propose alternatives that were studied and discarded long ago at the committee level.

"We've had 10 people on the committee doing this for 13 years, including engineers and doctors of science," Iverson said. "And now we've got City Council people who think we ought to think through this a little more."

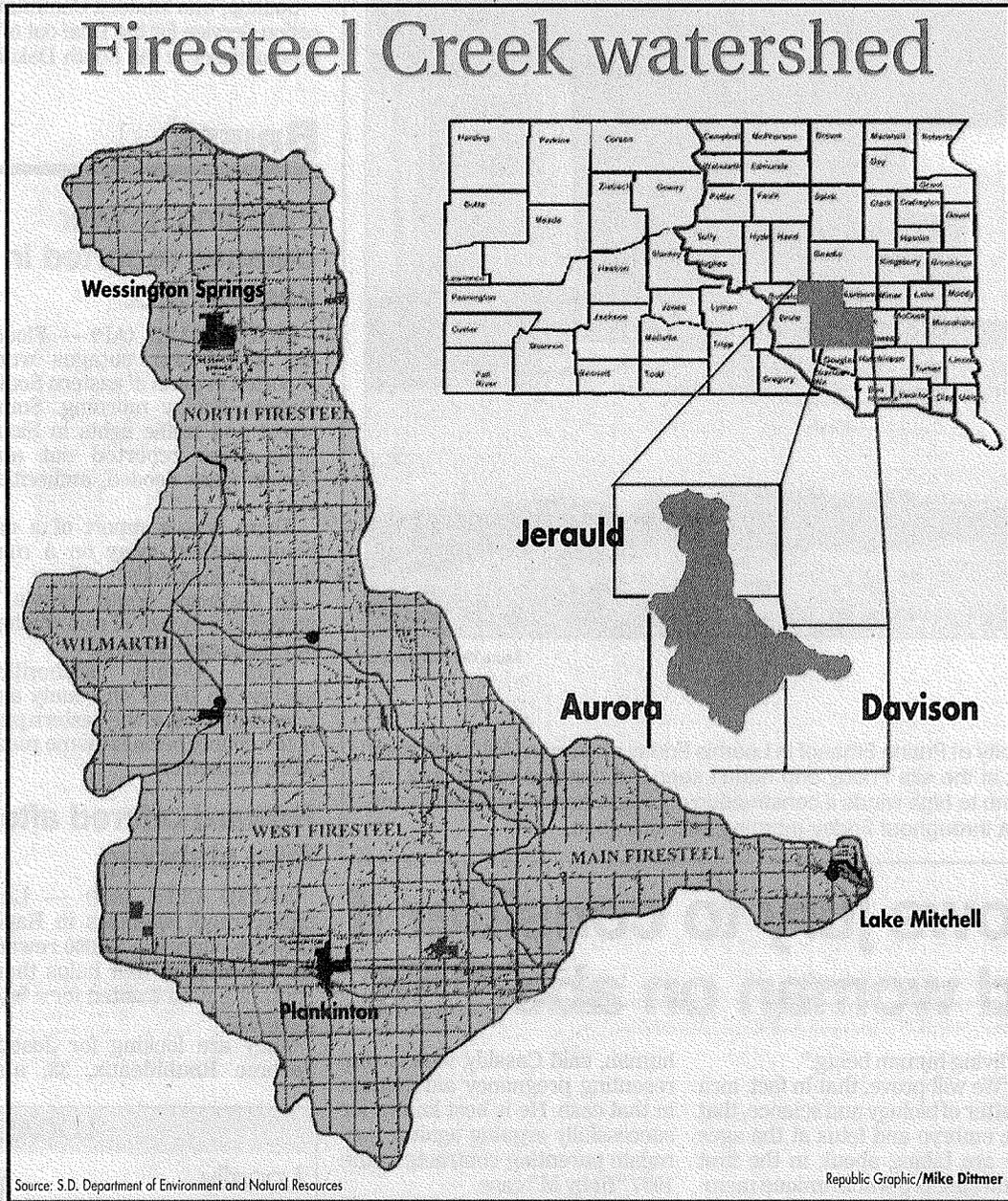
Iverson said algae mitigation requires a one-two punch: a long-term watershed cleanup, and in-lake efforts to temporarily reduce algae while the watershed goals are pursued. He and other committee members agree that alum is the best in-lake option, and they believe the algae will get worse if alum is not applied this summer.

Iverson and some other lakeside residents have aggressively refuted claims that the alum applications were ineffective. They acknowledge that the algae problem has not been solved, but they say the alum is making inroads.

"The point is not how much did the algae decrease," Iverson said, "but how much would it have increased if we wouldn't have done it."

Iverson and fellow Lake Development Committee member Troy Helleloid each sent letters to the City Council and mayor Friday in hopes of convincing them to continue the alum project. Iverson and Helleloid declined to discuss the letters publicly, saying they want to give the city officials a chance to read the letters first.

# Tracking algae to its source



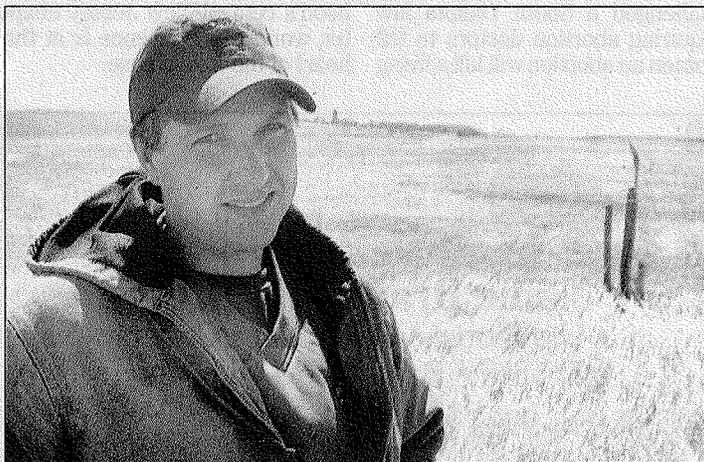
## As city discusses algae at Lake Mitchell, projects under way to clean up Firesteel watershed

By **SETH TUPPER**  
The Daily Republic

There's been a lot of talk among Mitchell City Council members lately about "going up the creek."

That's Firesteel Creek, to be exact. Council members want to escalate their role in the cleanup of the creek's watershed — the 350,000 acres of land in Jerauld, Aurora and Davison counties that drains into the waterway.

The council's renewed interest in the watershed is the result of algae problems "down the creek" at Lake Mitchell, which was created by damming Firesteel Creek in 1928. Council members want to attack algae-causing pollution at its source and prevent it from reaching the lake. One report says a main source probably is upstream cattle operations, but cleanup of the vast watershed



Laura Wehde/Republic

Jeff Burg, of rural Wessington Springs, stands by a portion of land that was recently enrolled into a wetland buffer program to reduce the amount of harmful runoff into Firesteel Creek.

likely will take decades to complete.

In recent years, blue-green

algae blooms on the lake have been an unsightly and smelly

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menace to boaters and swimmers. The algae feed on the excessive phosphorus that flows into the lake via the agricultural runoff in the watershed.

Until now, the City Council's approach to the problem has been mostly reactionary. For each of the past three summers, the council has tried to prevent algae blooms on the lake with applications of aluminum sulfate. "Alum," as it is commonly known, inhibits algae growth by trapping phosphorus in lake sediments.

Some people have questioned the effectiveness of the alum, and some council members have grown weary of pumping more money into the planned five-year project. The council's focus is quickly shifting from reactionary in-lake measures to preventative watershed measures.

Still, there was enough support for the alum project Monday to approve the scheduling of a fourth application. Some of the council members cast their votes begrudgingly, saying alum was their only timely option for this summer.

So far, the city has spent \$167,000 on alum treatments and has budgeted \$130,000 for this summer. Grants from the Environmental Protection Agency have covered the remaining \$340,500 of the project.

The planned fifth year of alum applications is in doubt, and the council seems more and more likely to focus its future efforts upstream.

### Wetland buffers

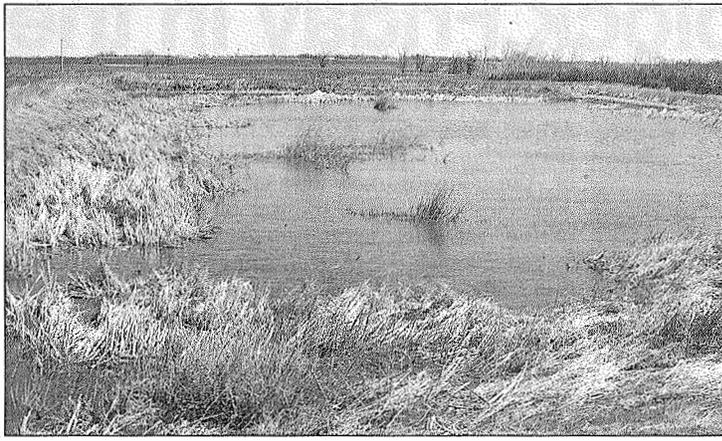
If council members decide to go upstream with the city's money, they first have to decide how to spend it.

"I think we certainly need to get more information," Councilman Ken Tracy said at Monday's meeting, "about what it is we're going to do with the watershed, how we're going to get started, and what all is going to be involved."

Some ideas have been proposed. One that seems to have support is encouraging more farmers and ranchers to enroll in the federally administered Marginal Pasture Wetland Buffer program, which is part of the Conservation Reserve Program, or CRP.

The wetland buffer program is open to everybody who has a qualifying stream, such as Firesteel Creek, running through their property.

Landowners accepted into the program agree to fence off tracts of land along the creek, and they agree to abstain from farming or grazing the land; in return, the landowners receive annual pay-



Laura Wehde/Republic

**THIS LAGOON, ON Jeff Burg's land in rural Wessington Springs, is part of a system that contains the runoff from his feedlot.**

ments from the government for up to 15 years.

Without the stress of farming and grazing, the land sprouts vegetation that filters runoff before it gets to the creek.

Steve Vlieger, a district conservationist for the Natural Resource Conservation Service in Hanson and Davison counties, said recently that the wetland buffer program holds promise. He also sees a supporting role for the city of Mitchell.

Some landowners are hesitant to participate in the wetland buffer program, Vlieger said, because there is a cap on the number of acres they can enroll. A typical enrollment might only cover the portion of a pasture that extends 130 feet out from the creek.

The rancher is then left to ponder a use for the remaining acres in the pasture. Vlieger said the city could offer to pay the rancher to keep cattle off the remaining acres – in essence, the city could run its own conservation reserve program in the watershed.

"If the city would put in the other acres, it might give some people enough incentive to go ahead with the project," Vlieger said.

### Existing efforts

Other conservation incentives already exist as part of the Firesteel Creek/Lake Mitchell Water Quality Improvement Project.

The project began with a study conducted by the city and the state Department of Environment and Natural Resources in 1993. The final report stated that concentrations of phosphorus in Lake Mitchell were 10 times the amount needed for algae to bloom.

The most likely culprits, according to the study, were the animal feeding operations in the watershed.

Phosphorus is found in animal

wastes, and the study detected large concentrations of fecal coliform in the lake. Phosphorus runoff comes from other sources, too, including farm and lawn fertilizers and naturally occurring phosphorus loads in the ground.

The No. 1 recommendation in the final report was the implementation of better waste management practices at animal feeding operations. In the Firesteel Creek watershed, many of those operations are cattle feedlots.

In 1998, the EPA awarded a grant for \$113,150 to begin implementing the study's recommendations. Since then, thousands more have been awarded to continue the project.

In 1999, Dave Kringen was hired to coordinate the watershed project. Kringen, a Flaudreau native, has a bachelor's degree in wildlife and fisheries management and a master's degree in agronomy. He still leads the project.

Kringen said numerous tasks have been completed during the project's first eight years, including:

- Construction of 12 animal waste management systems in the Firesteel Creek watershed, which contain all the runoff from feedlots that otherwise would drain into the watershed and creek;

- Drafting of 15 nutrient management plans covering 17,000 acres to guide farmers and ranchers in their application of fertilizers and manure;

- Installation of 10.2 miles of water pipeline, 25 water tanks, and 15 ponds, dams or dugouts to keep cattle away from the creek;

- Installation of 16.5 miles of fence, and the formulation of grazing systems for 11,802 acres, to limit the overgrazing that exacerbates runoff problems;

- Planting of 1,002 acres of buffer strips or grass seed to

## CREEK, LAKE IMPROVEMENTS

By The Daily Republic

Following is a timeline of some recent efforts to improve the water quality of Firesteel Creek and Lake Mitchell.

■ **1993-1997:** The city and the state Department of Environment and Natural Resources conducts a study and issues recommendations for a Firesteel Creek/Lake Mitchell Water Quality Improvement Project.

■ **1998:** The federal Environmental Protection Agency issues a grant for \$113,150 to begin implementing the recommendations of the study. Experts acknowledge that the project will take decades.

■ **1999:** The EPA issues a \$738,000 extension grant. The city of Mitchell agrees to contribute up to \$20,000 annually for eight years toward the project's feedlot improvements.

Dave Kringen, a Flandreau native with a bachelor's degree in wildlife and fisheries management and a master's degree in

agronomy, is hired to coordinate the project.

■ **2001:** The City of Mitchell commissions a \$37,782 study by lake expert Dick Osgood, of Shorewood, Minn., to evaluate and recommend a method of temporarily reducing algae until the watershed project produces a long-term reduction. Osgood recommends treating the lake with aluminum sulfate, which is commonly known as "alum."

■ **2003:** The EPA issues a \$340,500 alum demonstration grant to assist the city with alum applications for three summers. The city covers the remaining cost, which is \$167,000.

■ **2006:** The City Council approves a fourth application of alum this summer at a cost of \$130,000, to be paid completely by the city.

■ **2008:** The last of the EPA grant funds for the watershed project are scheduled to be spent. More grants could be forthcoming.

increase natural filtration of runoff;

■ And stabilization of 825 linear feet of Lake Mitchell shoreline.

### Changing practices

Animal waste management systems are a major focus of the watershed project. Participating feedlot owners pay 20 percent of the costs, while the EPA grant covers 60 percent and the city covers 20 percent. The city's contribution is limited to \$20,000 per year for eight years.

Jeff Burg, of rural Wessington Springs, used the cost-sharing program to move his feedlot away from the creek bank and to build a waste management system.

At Burg's former location, runoff from the feedlot drained directly into the creek.

"When it rained, you would see a steady stream of manure and water running down the channels," Burg said. "You don't see that anymore. It's all contained."

Runoff from the feedlot now drains away from the creek and into a sediment basin, where the solids settle out. The liquid then drains into a lagoon and evaporates. If the lagoon gets too full, Burg can pump some liquid out and spread it as fertilizer.

Burg also enrolled some land in the Marginal Pasture Wetland Buffer program – the same program that could be a basis for Mitchell's expanded role in the watershed project.

Burg said more landowners might be convinced to participate if the city shared more of the costs.

"Most people I know want to be a good steward and do what's right," Burg said. "They don't want to just shove the stuff in the creek."

That's exactly what happened, though, throughout much of this country's agricultural history. Portions of the federal government's 1972 Clean Water Act introduced the first widespread regulation of feedlot runoff, but enforcement was handled on a complaint basis until the EPA gave the state the responsibility to administer the regulations in 1993.

It's only been during the past decade that the EPA and DENR have required permits for what the agencies call "concentrated animal feeding operations," or CAFOs. A CAFO is generally defined as any facility that keeps a certain number of animals for a total of 45 days or more in any 12-month period. The headcounts that constitute a CAFO vary depending on the type of animal.

A cattle feedlot is considered a large CAFO that must earn a permit if it has 1,000 or more head. Smaller feedlots also can be required by the DENR to earn a permit if they meet other criteria, or if a complaint is filed and the DENR determines a

permit is necessary.

Permits require a cattle operator to have certain, specific waste management requirements in place.

Burg, who has expanded his operation to 2,500 head, is now required to have a CAFO permit and was grateful for the cost-sharing that allowed him to move and improve his operation. Some smaller farm and ranch operators do not need permits and might need more coaxing to participate in the watershed project.

The city of Mitchell could accelerate the coaxing by offering some more incentives, according to Vlieger, the NRCS district conservationist.

"It makes (farmers and ranchers) go ahead and decide to do the project," Vlieger said. "And also, it shows that the city is serious about helping solve the problem."

### Now is the time

Kringen said now is an opportune time for the city to investigate a potentially expanded role in the watershed project.

A computer model that predicts pollutant loads in the watershed is being updated and should be completed by mid-summer. Kringen said the new model will help "pinpoint where to target our money to get the biggest bang for the buck."

In addition to the wetlands buffers, other ideas have been floated to clean up the watershed and fight algae blooms.

The Mitchell Lake Development Committee, which is a unit of city government, has recommended an ordinance banning the use of phosphate-containing fertilizers around the lake.

Another idea is to research the availability of funds from the Clean Water State Revolving Fund Loan Program, a low-interest loan vehicle to finance the construction of wastewater facilities, storm sewers, and projects to control diffuse pollution that cannot be traced to one location.

Whatever methods are chosen, they will require money. The last of the watershed project's current EPA funding is scheduled to be spent in March 2008, but Kringen thinks additional two-year grants could be secured.

Still more grants or other funding could be required decades into the future.

"I think the more we do out there, the bigger impact we will have," Kringen said. "... It could potentially be an ongoing project for a long time."

# Permitting process aids in watershed cleanup

But prior to 1997, no laws kept manure out of creek

By SETH TUPPER  
The Daily Republic

With all the public discussion lately about fixing the algae problem in Lake Mitchell, one basic question lingers:

How did the problem get so out of hand?

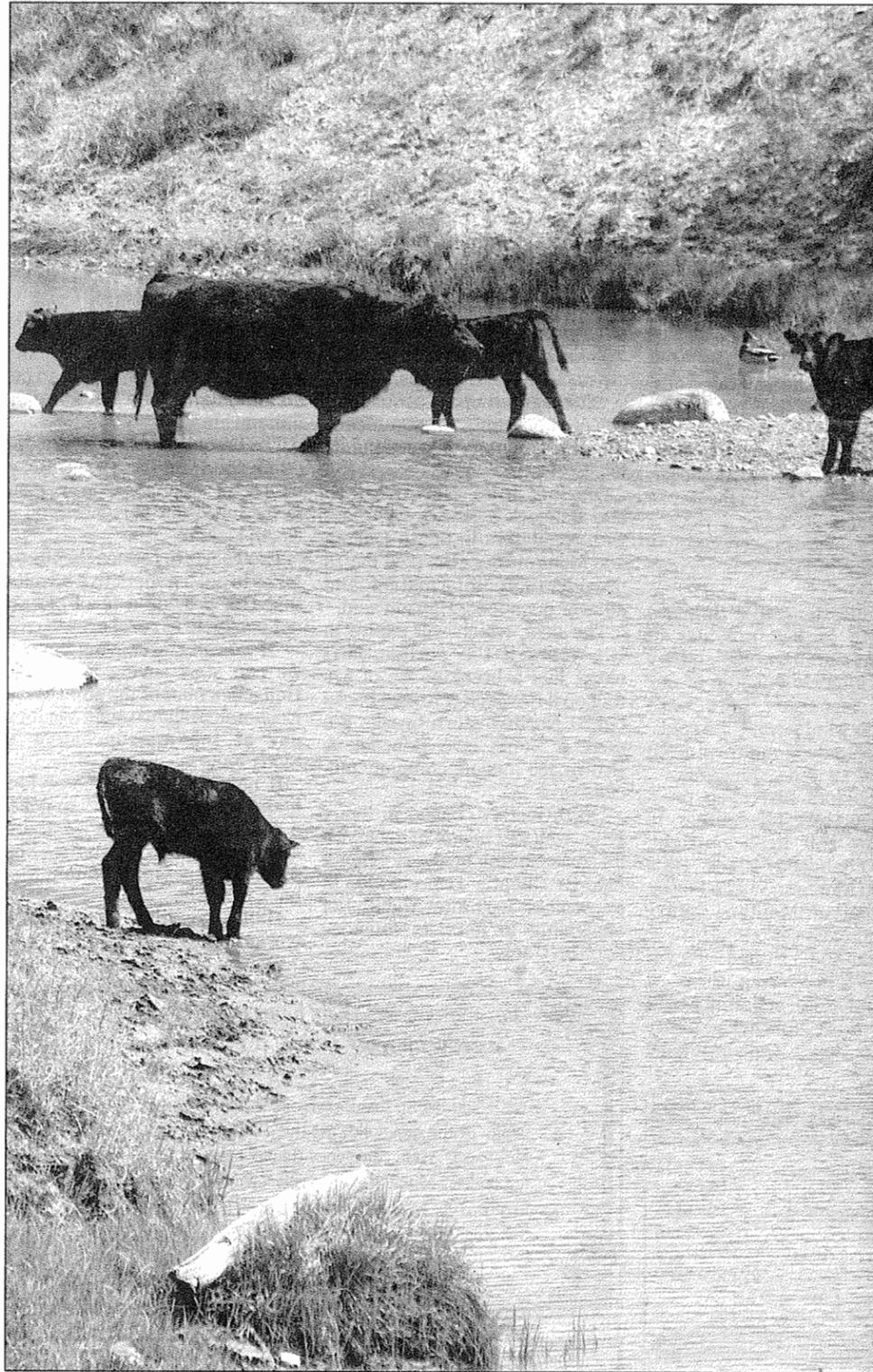
Part of the answer is that until 1997, South Dakota did not prevent animal feeding operations from discharging manure into public waterways.

"Historically, some of these systems were designed to get rid of manure that way, because there weren't any regulations for things like that," said Kent Woodmansey, a natural resources engineering director with the state's Department of Environment and Natural Resources.

Some cattle feedlots and other animal feeding operations located west and northwest of Mitchell were designed to drain into Firesteel Creek, which begins north of Wessington Springs and flows southeast to the James River near Mitchell.

Firesteel Creek was dammed in 1928 to create Lake Mitchell. Ever since, nutrients from upstream manure have been entering the lake and serving as a food source for smelly and unsightly algae. The Mitchell City Council has spent \$167,000 over the past three years on aluminum sulfate treatments to combat algae blooms on the lake, and another \$130,000 was approved earlier this month for a fourth aluminum sulfate dose this summer.

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Laura Wehde/Republic

Cattle drink from Firesteel Creek Wednesday afternoon west of Mitchell. The creek, which feeds Lake Mitchell, is dotted with cattle operations from the lake to its source, near Wessington Springs.

## CREEK

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Some council members have questioned the effectiveness of the aluminum sulfate project and are pondering upstream methods of reducing the phosphorus that enters the lake. The scale of the upstream problem, though, is daunting.

A study published in 1997 said Lake Mitchell contained 10 times the amount of phosphorus that algae need to bloom. The study blamed the lake's excessive nutrients on animal feeding operations in the Firesteel Creek watershed — the 350,000 acres in Jerauld, Aurora and Davison counties that drain into the creek.

The 1997 study counted 241 animal feeding areas in the watershed, including 116 that were contributing excessive nutrients. If those 116 areas were eliminated, the study theorized, the phosphorus input to Lake Mitchell would be reduced by 51 percent — enough to "reduce the intensity and duration of algal blooms and increase water clarity" in the lake.

Those 116 animal feeding areas have not been "eliminated," of course, but new laws have done much to reduce the amount of nutrients they contribute to Firesteel Creek and Lake Mitchell.

Today's laws had their beginnings in the federal Clean Water Act of 1972, which the PBS news series "NOW" has called "a response to the nearly unchecked dumping of pollution into our waterways." At the time of the act, two-thirds of the United States' lakes, rivers and coastal waters were unsafe for fishing or swimming.

The act, and its subsequent amendments, created wastewater discharge permits for what came to be known as Concentrat-

## PERMITTED CAFOS IN WATERSHED

By The Daily Republic

Following is a list, provided by the state DENR, of Concentrated Animal Feeding Operations in the Firesteel Creek watershed that have obtained a surface water discharge permit.

■ Curt Olinger, Jerauld County, two operations each permitted for up to 1,000 beef cattle.

■ Dale Fraser, Aurora County,

ed Animal Feeding Operations, or CAFOs.

A CAFO is defined today as a facility or lot with no growing season vegetation that keeps animals for at least 45 days in any 12-month period. CAFOs are classified as small, medium or large, depending on the number of animals they feed. Large CAFOs include feedlots with 1,000 or more cattle, and confinements with 2,500 or more large hogs or 10,000 or more small hogs.

The first CAFO permits were administered by the federal Environmental Protection Agency, which was created only two years before the Clean Water Act.

"The program was managed by the EPA out of Denver," Woodmansey said. "There was some occasional enforcement and things like that, but it wasn't a big priority for them."

EPA continued to administer the program until 1993, when the agency gave South Dakota the authority to create its own CAFO permits.

The state DENR finalized the rules for its permit program in 1997. Today's general permit for CAFOs, called a surface water discharge permit, requires CAFOs to construct a manure containment system.

Examples of manure containment systems include diverting feedlot runoff into lagoons, which facilitate the settling of solids and

up to 1,000 beef cattle.

■ Firesteel Ranch, Jerauld County, up to 2,500 beef cattle.

■ Mike Johnson, Aurora County, up to 1,000 beef cattle.

■ National Foods Corporation, Aurora County, up to 1.98 million chickens.

■ Tobin Ranch, Aurora County, up to 800 beef cattle.

■ Vern Niles, Aurora County, up to 1,000 beef cattle.

the evaporation of liquids.

Initially, the DENR focused its permitting activities on large CAFOs that were new or expanding. Then, about three years ago, the focus was expanded to include large CAFOs that existed prior to the creation of the permits.

All owners of existing large CAFOs were asked to file a notice of their intent to obtain a permit. The DENR then required all large CAFOs to earn a permit, or at least show progress toward a permit, by last September.

Some producers could not meet the deadline, so the DENR evaluated their progress and established new schedules for compliance. Some large CAFOs are still working toward their permits.

After all the permits are issued for large CAFOs that filed notices of intent, the DENR will go looking for any remaining large CAFOs that did not file notices and have not obtained permits.

CAFOs classified as small or medium are required to obtain a permit if they meet certain criteria, but the DENR's regulatory arm has not set a deadline for compliance. Instead, these operations are regulated on a complaint basis.

Meanwhile, the DENR's assistance arm is trying to get small and medium CAFOs to obtain permits voluntarily.

"Hopefully, when we get around to looking at those small to medium operations, a lot of them will already be addressed," Woodmansey said.

In the Firesteel Creek watershed, these voluntary efforts got under way in 1998 with the Firesteel Creek/Lake Mitchell Water Quality Improvement Project. The DENR has earmarked EPA grants for the project, and a project coordinator in Mitchell has been working with smaller producers throughout the watershed on various methods of reducing pollution.

Not many of the smaller producers in the Firesteel Creek watershed, though, are obtaining DENR permits. Of the eight permits issued so far within the watershed boundaries, seven are for large CAFOs.

Of those seven, five are feedlots permitted for up to 1,000 beef cattle, one is a feedlot permitted for up to 2,500 beef cattle, and one is a poultry operation permitted for up to 1.98 million chickens. The other permit was issued to a feedlot with up to 800 beef cattle.

All eight of the permits issued in the watershed are for operations in Aurora or Jerauld counties. At least two additional animal feeding operations in the watershed are working toward permits.

The larger permitted facilities are inspected at least once per year, and the smaller permitted facilities are inspected at least once every three years. Anybody can file a water pollution complaint against any permitted or non-permitted operation.

So far, though, no animal feeding operations in the Firesteel Creek watershed have been penalized for polluting the water.

"This makes sense," Woodmansey said, "because the purpose of the watershed project was to identify operations causing water quality problems and work with those producers to fix those problems."

# Lake group shuns calcium project

By **SETH TUPPER**  
The Daily Republic

The city's Lake Development Committee shunned a proposed calcium project on Lake Mitchell but lent its support Tuesday to a grant application that could extend funding for a watershed cleanup project.

The calcium proposal — the latest in a string of proposed fixes for the lake's algae problem — was presented to the committee previously by Genesis Soil Rite Calcium. The company asked for \$50,000 to apply 10 tons of calcium products, which the company said should clear the lake of algae.

Members of the committee already have seen nearly \$300,000 spent over the past four years on what some people call an ill-fated attempt to fight the algae with aluminum sulfate. Last spring, the committee dismissed a separate proposal to try and clear the lake with underwater circulators.

Tuesday at City Hall, committee members dismissed the calcium proposal as unproven and unscientific.

City Councilman Britt Bruner, an ex officio member of the committee, said he read on GSR's Web site that the company's products include "spices," and he joked that he didn't think "nutmeg and oregano" would help clear the lake.

Bob Tatina, a committee member and professor of biology at Dakota Wesleyan University, said he would not even favor letting GSR do its work for free.

"I don't think (GSR) has enough expertise to do anything," Tatina said.

The rest of the committee members, however, said they would consider allowing GSR to do a pilot project at no cost to the city. Nobody from GSR was at the meeting to say whether the company would be interested.

Meanwhile, the committee gave its support to an application for grant funding that could extend a watershed cleanup project that has been ongoing since 1998.

The project addresses water quality problems in the

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## LAKE

Continued from Page 1

350,000-acre Firesteel Creek watershed, which feeds man-made Lake Mitchell. The project has been funded largely by federal grants awarded through the state Department of Environment and Natural Resources, and the current grant is due to expire in March 2007.

John Deppe, of Lower James Rural Conservation and Development, serves as the grant writer for the project. He said the state is willing to entertain a two-year continuation, through June 2009.

Deppe also updated the committee on progress made so far. He said the number of livestock feeding operations rated as criti-

cal contributors of algae-fueling phosphorus in the watershed has been reduced from 37 to 17. The actual amount of phosphorus flowing into the lake has been reduced by an estimated 10 to 17 percent, he said, but he added that the estimate is very rough. The project's goal is to reduce the amount of phosphorus flows by 50 percent by the year 2015.

Federal grant awards for the project have totaled \$851,150 so far.

Local and state organizations, including the city, have contributed thousands more to aid the project. Deppe did not say how much money the project might receive from an additional federal grant.

Also Tuesday, the committee discussed creating a "menu" of

water quality projects for agricultural producers in the watershed. If producers had some choices, committee members reasoned, they might be more willing to participate in cleanup efforts.

One of the major efforts of the watershed project so far has been the development, with cost-sharing by individual producers, of waste management systems and nutrient management plans that reduce the amount of phosphorus running into Firesteel Creek. Some producers, though, have been hesitant to participate.

For the future, the Lake Development Committee also is considering developing a plan whereby the city could buy, lease or obtain easements on creekside land to create buffer zones that would filter more runoff.

THE DAILY REPUBLIC ■ WEDNESDAY, AUGUST 30, 2006

# Watershed cleanup effort may get boost

\$250,000 recommended by advisory task force

By **SETH TUPPER**  
The Daily Republic

A state environmental advisory group has recommended awarding a federal grant of \$250,000 to help continue the cleanup effort in the Firesteel Creek and Lake Mitchell watershed through 2009.

The state Nonpoint Source Task Force met earlier this month and reviewed applications for federal funding made available by Section 319 of the Clean Water Act. One of the organizations seeking funding is the Davison Conservation District, which is the lead sponsor of the Firesteel Creek/Lake Mitchell Watershed Project.

The \$250,000 recommendation will go to the state Board of Water and Natural

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## WATERSHED

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Resources in January, and then to the Environmental Protection Agency for final approval.

The Firesteel Creek/Lake Mitchell Watershed Project began in 1998 with the goal of reducing the algae-causing phosphorus load in the watershed by 50 percent. So far, according to the project's application for additional Section 319 funding, the phosphorus load has been reduced by an estimated 21.2 percent.

"It's slow but steady progress," said Dave Kringen, the project coordinator.

Current funding for the project is set to expire in March. Project leaders applied for \$283,110 to continue the work, but the Nonpoint Source Task Force cut the amount to \$250,000. Kringen said the \$33,110 that was cut had been earmarked for a proposal to lease creekside property in order to reduce the presence of cattle, which contribute to phosphorus-rich runoff.

The leasing proposal will now need an alternative funding source to get off the ground. Kringen and the city's Lake Development Committee are expected to discuss that issue, among others, during a portion of the committee's 4 p.m. meeting Thursday at City Hall.

During the watershed project's first eight years, it has received about \$1.6 million in funding,

## Panel to hear another proposal for killing algae

By **The Daily Republic**

Mitchell's Lake Development Committee will hear yet another proposal Thursday to rid Lake Mitchell of algae.

This time, it's another plan to use underwater circulators.

The Solar Bee company — a division of Dickinson, N.D.-based Pump Systems Inc. — will present a plan to attack the algae with its solar-powered water circulators.

The company's Web site states "it has been recognized

in the scientific literature for several decades that creating enough horizontal and vertical water movement can sufficiently disrupt (harmful algae blooms') preferred quiescent habitat so that they do not grow and virtually disappear from the water column."

A similar circulator proposal from another company was rejected earlier this year by the committee, as was a proposal to treat the lake with calcium.

according to the project's new Section 319 application. The largest share — \$558,794 — came from Section 319 funds.

Section 319 funds are meant for projects that control "nonpoint source" pollution — or, pollution that is carried into waterways by diffuse runoff instead of a single "point source," such as a factory.

In the 350,960-acre area of Jerould, Aurora and Davison counties that drains into Firesteel Creek, runoff from cattle feeding operations is thought to carry heavy loads of phosphorus. When the creek flows into manmade Lake Mitchell, the phosphorus feeds the summertime blooms of algae that have become the bane of the lake's recreational users.

The watershed project is

viewed as the best long-term solution to the algae menace; in the short term, the City of Mitchell has tried to treat the problem with aluminum sulfate, or "alum." Some Section 319 funds were used to treat the lake with alum and study the results, but no 319 funding has been requested for future alum treatments.

If the \$250,000 in Section 319 funding receives final approval, the watershed project leaders expect to receive additional funding of \$218,075 from local and state matching funds and \$121,790 from other federal sources. The total cost to extend the project through 2009, then, would be \$622,975.

# Another lake proposal



Laura Wehde/Republic

Joel Bleth, of the Solar Bee division of North Dakota-based Pump Systems Inc., presents a proposal Thursday at Mitchell City Hall to install 10 circulators in Lake Mitchell to battle blue-green algae blooms.

## Committee told by N.D. group that circulators will work in lake

By **SETH TUPPER**  
The Daily Republic

A North Dakota company has proposed placing 10 circulators in Lake Mitchell for two summers at a cost of \$246,561 to demonstrate how the technology could rid the lake of blue-green algae.

After the trial period, or any time during it, the city could buy the circulators with 60 percent of the rental payments applied to a purchase price of \$425,537.

Representatives of the eight-year-old Solar Bee division of Pump Systems Inc. made the pitch Thursday at City Hall to Mitchell's Lake Development Committee, an appointed group that advises the City Council.

Solar Bee's Joel Bleth and Michael Christensen said they have installed their solar-powered circulators in 180 bodies of water with a 95 percent success rate. Bleth said circulators can produce a permanent improvement in water quality within two weeks.

"We would expect you to have an 80 percent chance that you would have one major bloom sometime within a year to two years after they were installed," Bleth said, "but then that would be it."

The Solar Bee presentation was the latest in a string of proposed algae fixes heard by the Lake Development Committee. The committee already has rejected another circulator

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Photo courtesy of Solar Bee

PICTURED HERE IS a Solar Bee circulator on Lake Wildwood in California. Similar circulators would be placed on Lake Mitchell under a proposal presented Thursday to the city's Lake Development Committee.

## LAKE

Continued from Page 1

proposal, as well as a proposal to treat the lake with calcium.

For each of the past four summers, the city has applied aluminum sulfate, or "alum," to the lake on the advice of a paid consultant from Minnesota. The results have been debatable, and the city has dumped nearly \$300,000 into the applications. Another \$130,000 application is tentatively planned next summer.

Bleth said alum treatments are futile and have only been shown to work in two of the 130 lakes they've been tried in worldwide.

"Alum is worthless," Bleth said. "I'm sorry to break that to you, but that's shown by two separate independent studies."

Alum is supposed to work by trapping phosphorus, an algae food source, in sediments. The treatments in Lake Mitchell were meant as a short-term attack on the existing phosphorus in the lake. Meanwhile, a long-term attack has been under way since 1998 to reduce the amount of phosphorus that enters the lake via its tributary, Firesteel Creek, and the 350,960-acre Firesteel Creek watershed.

Both the Lake Development Committee and the City Council have reached a general consensus in recent times that phosphorus is the enemy, and most of the phosphorus enters the lake via the creek.

Bleth contradicted that theory.

Reducing phosphorus inputs is good for the watershed, Bleth said, but it is not a proven way to reduce blue-green algae in lakes.

"What we do is we say, 'We don't care about how much phosphorus you have,'" Bleth said. "It's not the amount that you have, it's what happens to it."

Bleth said the algae that bloom in the lake are an "inedible" type that thrives on warm, stagnant water. Circulation, he said, disrupts the bad algae and promotes small edible algae that are consumed by organisms in the lake's food chain.

"That's what we're doing is changing what happens to the nutrients," Bleth said. "Give us all the phosphorus you want. We don't care."

The proposal calls for 10 circulators to be anchored at crucial areas in the lake. The tops of the circulators would protrude from the water, and a long tube would extend down into the water.

Water from the bottom of a lake is drawn up through each circulator in the same manner as a straw and pumped horizontally across the surface with power supplied by solar panels. The circulators are said to move 10,000 gallons of water per minute.

Each circulator is 16 feet in diameter, weighs 700 pounds and extends to varying depths, depending on the situation. They are said to run quietly, require little maintenance, are lit at night, can be left in place through the winter and have an expected life of 25 years. They can be operated remotely with software that the

city is already buying for the water plant.

Solar Bee says it has more than 1,000 circulators currently installed nationwide. To the company's knowledge, Christensen said, only one circulator has been struck by a boat. The company says the circulators are safe for swimmers, because the force of the current coming out of the machines makes it difficult for most swimmers to get too close.

The proposed \$246,561 rental price for 10 circulators would cover an 18-month period — long enough for two summers. The company also has some used circulators that could be rented or purchased at a lower cost, depending upon availability.

Solar Bee's invitation to Mitchell came after Mayor Lou Sebert, former owner of Dakota Pump Inc., visited the company's booth at a trade show earlier this year in Dallas.

After the presentation Thursday, Sebert said the proposal

deserves serious consideration.

"For the cost and the maintenance and the upkeep, this is certainly cheaper than any other method we've seen," Sebert said.

The Lake Development Committee expects to meet sometime this month to discuss the proposal further before possibly making a recommendation to the City Council.



SEBERT

## Lake panel wrestles with algae problem

By ROSS DOLAN  
The Daily Republic

Mitchell's Lake Development Committee emerged from a Thursday meeting at City Hall with no solution and more questions regarding Lake Mitchell's ongoing algae problem.

Following the 90-minute meeting, committee chairman Bernie Schmucker said he will not be making a recommendation to the City Council and that more information is needed.

Dave Kringen, project manager for the Firesteel Creek/ Lake Mitchell Watershed Project, told committee members that six years of monitoring the lake shows that "there's nothing to support that alum is having any affect on algae growth at this point." The city has been applying alum in the lake in recent years in hopes of slowing algae growth.

Kringen's report showed that algal biomass in 2006 was at the second highest levels in the past six years. Average annual chlorophyll concentrations from May 1 to Sept. 30 were measured at:

■ 2001 - 31.8 parts per billion

See ALGAE, Page 15



SCHMUCKER

## ALGAE

Continued from Page 1

- 2002 - 86.4 ppb
- 2003 - 56.8 ppb
- 2004 - 27.9 ppb
- 2005 - 36.9 ppb
- 2006 - 73.2 ppb

In another report, Kringen showed that chlorophyll concentrations actually spiked at about 275 ppb on July 29, 2006, the highest recorded reading on the lake. The second closest reading was 175 ppb, taken on July 14, 2005. All other readings were considerably lower.

Lake water samples are taken every two weeks

An October 2006 report on Firesteel Creek-Lake Mitchell watershed reported that the city applied alum — aluminum sulfate — to the lake from 2003 through 2006 "to reduce in-lake phosphorus and to reduce phosphorus loading from lake sediments."

The alum treatments have cost \$300,000. Another \$130,000 application is tentatively scheduled for the coming summer. The watershed report stated that alum treatments in May and June reduced phosphorus close to target levels but those levels increased during summer months.

Kringen said that any number above eight ppb was considered poor, and that no solid evidence was available to explain why 2006 was a "very bad year."

Schmucker asked Kringen if there are any correlations that might suggest a reason for the high readings, but that information had not been developed.

Committee member Bob Tatina asked Kringen to forward his information to him for further analysis.

At a Nov. 30 meeting, Joel Bleth, of the Solar Bee Division of

Pump Systems Inc., told the committee that "alum is worthless" and the answer to the lake's problems was his company's solar-powered circulating pumps. The cost of placing 10 circulators in Lake Mitchell for two summers was estimated at \$246,561.

Carl Koch, a resident who attended Thursday's meeting, rejected the opinion that alum treatments have been ineffective and said more a more informed scientific opinion is needed.

"Something happened when alum was put in the lake," he said, "and we need to know what that is. Until we understand the science of this lake our chances of remedying this (algae) situation is zero."

Tatina said Madison, Wis., tried several Solar Bee circulating pumps in a lake for two years and results were inconclusive. He said further investigation is required. Schmucker suggested that a more limited trial of the Solar Bee system on a section of the lake might prove or disprove the system's effectiveness.

Mayor Lou Sebert expressed frustration with the lack of a clear direction.

"It comes to a question of whose science do we go with? I wish we could find agreement," he said.

Koch said Udai Singh, a water quality specialist with the Minnehaha Creek Watershed District in Deephaven, Minn., had offered to volunteer an opinion on the matter. Koch said he would attempt to contact Singh.

Committee member Britt Bruner wasn't convinced that the alum applications are useless, but he said public expectations were high for the treatments.

"I think everyone thought we'd have crystal clear water," he said. "My question is, what would the lake be like if we didn't do it?"

# Lake committee hears from director of Big Sioux project

By SETH TUPPER  
The Daily Republic

Along the Big Sioux River, landowners are offered money to establish buffer strips that protect the river from runoff pollution.

A similar program could be implemented along Firesteel Creek, members of the city's Lake Development Committee learned Tuesday at City Hall. Firesteel Creek feeds Lake Mitchell, which is burdened with summer algae blooms that are thought to be fed by agricultural runoff in the creek.

The primary culprits are thought to be cattle feedlots that drain into the creek and cattle that drink directly from the creek and contribute to erosion by trampling the banks.

See LAKE, Page 11

## Panel votes to discontinue local lake's alum treatment program

By SETH TUPPER  
The Daily Republic

The city's Lake Development Committee on Tuesday voted to postpone any further in-lake algae remedies at Lake Mitchell, a move that probably means the end of alum treatments on the local reservoir.

A fifth application of aluminum sulfate to combat the summertime algae problem was scheduled for this summer. Committee member Bernie Schmucker said the city should keep a close eye on algae projects in other lakes



SCHMUCKER

before committing to anything. The City Council could override the committee's decision. "Anything we do in Lake Mitchell, I'd like it to be conservative," Schmucker said. "Let's let somebody else bite the bullet before we spend any more money."

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## LAKE

Continued from Page 1

Pat Anderson, executive director of the Sioux Falls-based non-profit Northern Prairies Land Trust, was invited Tuesday to present a summary of the Big Sioux project. It is known as the Big Sioux River Conservation Easement Program and is a joint effort by Northern Prairies and the East Dakota Water Development District.

Landowners participate in the project voluntarily. If their land is accepted into the program, they grant Northern Prairies an "easement" — a right to make limited use of the property. The easements can stay in place forever, or for 30 years.

The terms of the easements are unique to each landowner, but they typically require the landowner to keep cattle away from the river and the bank. In return, the landowner receives a lump-sum payment when the easement is granted. The landowner also is eligible for cost-sharing to help with projects such as fencing off the easement area, planting grass and establishing an alternative water source for livestock.

Northern Prairies conducts annual inspections to ensure that landowners adhere to the terms of the easement. The hope is that vegetation will flourish in the easement areas and form a

## ALUM

Continued from Page 1

The city already has spent about \$297,000 of its own money — plus \$340,500 of grant money — on four straight years of aluminum sulfate applications that were supposed to reduce algae levels in the lake. The results were questioned by some, and it appears the city will not spend the \$130,000 it has budgeted for a fifth application this summer.

The city's public works director, Tim McGannon, said he has

been in contact with the company the city hired to apply the aluminum sulfate. A representative of the company, according to McGannon, said "he didn't think he had done any good for Mitchell in the four years of alum applications."

Dave Kringen, who manages a project aimed at cleaning up the Firesteel Creek/Lake Mitchell watershed, said he will continue to monitor the water in the lake. Committee members suggested studying the data late this summer to determine how the algae fared without alum treatments.

The committee took no action after the presentation. Anderson did not solicit the committee to develop a Firesteel Creek project with Northern Prairies, but he said he would take the matter to his board if the committee wished to pursue it.

The funding for the Big Sioux project comes from the East Dakota Water Development District, which has a federal grant to help fund it. Northern Prairies, which is involved in many other conservation activities, gets paid a fee of roughly several thousand dollars per easement to administer the program. The Big Sioux program is only one year old. Six applications have been accepted from landowners, but the easements are still in the process of being finalized.

# Time for new algae solution

**A**fter four years and nearly \$300,000 in city money, the great alum experiment at Lake Mitchell appears to be over.

The city's Lake Development Committee on Tuesday voted to discontinue the annual treatments, which consisted of direct application of aluminum sulfate into the lake in hopes of clearing the water of the ugly, smelly algae that invade each summer.

The total cost actually was approximately \$637,000, including about \$340,500 of grant money. If we choose to continue the project, it will cost another \$130,000 this summer.

It's been both interesting and disappointing to follow the war on algae. It seems that every couple of months, a new proposal is brought to the lake committee, each full of promise and hope.

Alum, calcium, aerators, regenerators, vortexes — the committee has heard about them all. One member of City Council even jokingly referred to dumping nutmeg and other spices in the lake. He said he didn't think that would help much.

We tend to agree.

But as all of the proposals generate optimism that we can actually dissipate the algae, all are a gamble. As aluminum sulfate has shown us, each idea costs money, but none comes with a guarantee.

What's next?

We liked what Pat Anderson, director of the Northern Prairies Land Trust, had to say during Tuesday's lake meeting. Anderson told the panel about the Big Sioux River Conservation Easement Program, in which landowners along that river participate voluntarily. If their land is accepted, the landowners grant Northern Prairies an easement, or right to make limited use of the property. The terms are unique to each landowner but typically require the landowner to keep cattle away from the river and riverbank. In return, the landowner receives a lump sum payment and is eligible for cost-sharing to help with other conservation-related projects.

Northern Prairies then conducts regular inspections to ensure that the terms are properly met.

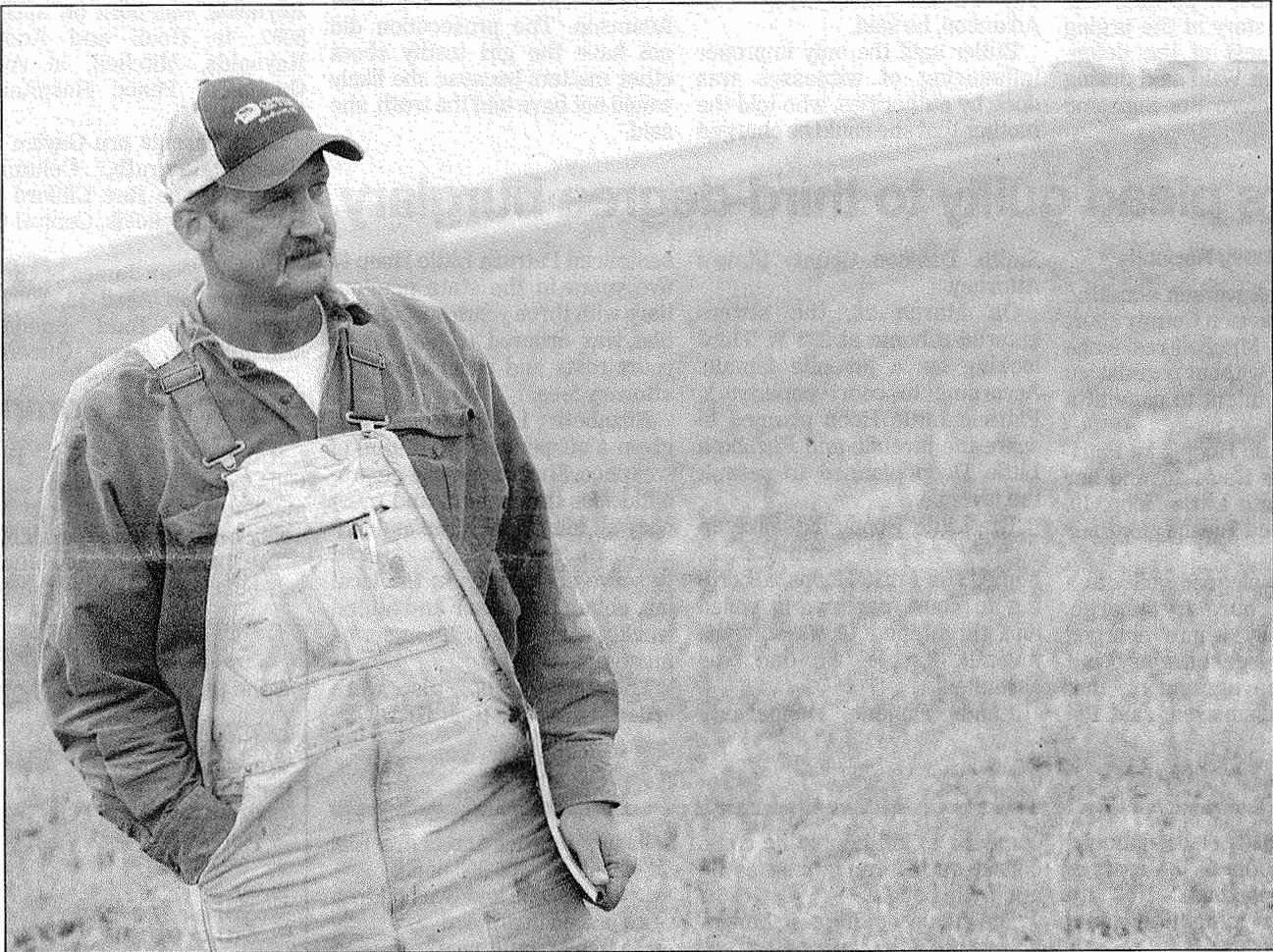
The result is a cleaner Big Sioux River.

Anderson wasn't making a pitch to the lake committee, but had been invited to speak. We liked what he had to say because we always have maintained that the problem with Lake Mitchell's algae is upstream, not in the lake itself. Perhaps the \$130,000 budgeted for alum this summer could instead be used as a startup fund for a project similar to the one Northern Prairies oversees on the Big Sioux.

Alum hasn't worked at Lake Mitchell and we're glad the lake committee has voted to discontinue the process.

Now, it's time to look for another solution. We feel creekside development upstream on the Firesteel is a good place to start.

# Aurora County board hears manure dispute



Laura Wehde/Republic

Paul Mayclin stands in one of the fields in Aurora County, where he has applied for permission to spread poultry manure. He has encountered some opposition over concerns about odor and water pollution.

## Mitchell officials eyeing decision, saying it could affect future of Lake Mitchell

By **SETH TUPPER**  
The Daily Republic

**PLANKINTON** — A dispute over poultry manure has landed in the laps of the Aurora County Planning and Zoning Board.

Paul Mayclin, a rural Plankinton farmer, wants to apply manure from the National Food Corporation poultry plant near Plankinton to some of his fields. He needs permission from the Planning and Zoning Board, which took input from Mayclin and some opponents Monday evening before tabling the issue until next Monday evening.

Opponents say the manure will smell bad and could pollute the west branch of Firesteel Creek, which feeds Lake Mitchell.

Ron Tobin, who lives near one of Mayclin's fields, is also concerned about the potential impact on cattle.

"If you dump manure when we have cattle out on pasture, you're going to have a lot of flies," Tobin said Tuesday, "and flies cause pinkeye."

Mayclin has been fertilizing other fields with poultry manure since 1992. He said the smell won't be that bad, other cattle owners have had no problems with manure spread on or near their pastures, and the manure won't be close enough to the creek to harm it or Lake Mitchell, located downstream approximately 20 miles to the east.

"This is about common sense," Mayclin said. "We are not dumb farmers. We're not trying to pollute the lake. We're trying to use a crop input to the best ability that we can."

There is some question as to whether Mayclin should have applied to the county before using chicken manure on other fields in the past. Mayclin said a lot of the activity was done before current zoning laws were

adopted, but he admits he may have spread manure in some fields without knowing all the requirements of the zoning code.

For the fields currently in question, the state Department of Environment and Natural Resources already has approved a nutrient management plan to regulate Mayclin's application of the manure. County approval is the only remaining hurdle.

County zoning regulations require a conditional use permit to spread the manure, and a variance to spread it farther than five miles from the poultry plant.

Mayclin has applied for a conditional use permit and variance that would cover parts of 10 quarters of land he recently rented. Some of the land is a few miles northwest of Plankinton, and the rest of it is about nine miles north of Plankinton.

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## MANURE

Continued from Page 1

The northernmost tract of land is in close proximity to the west branch of Firesteel Creek. State regulations prohibit the spreading of manure within 1,000 feet of the waterway, because it is classified as a domestic water supply.

When Mitchell Public Works Director Tim McGannon learned of Mayclin's application, McGannon

brought the 1,000-foot rule to the attention of Mayclin and the DENR. McGannon and Mitchell City Councilman Britt Bruner wrote letters to the Aurora County Planning and Zoning Board urging board members to consider the potential impact of Mayclin's application on Firesteel Creek and Lake Mitchell.

Tuesday, Mayclin said only a small portion of the land covered by his application is within 1,000 feet of the west branch of Firesteel Creek. He said he

would not spread manure in that area.

McGannon said he would be more comfortable with the application if the 1,000-foot rule is enforced.

"We're not trying to be antagonistic toward National Food or Mayclin Farms," McGannon said.

"We're just trying to make sure they know we're watching the 1,000-foot rule, and we'll know if the water in the lake changes."

The water in Lake Mitchell is

regularly tested as part of an ongoing effort to eradicate algae. The unsightly annual summer blooms of algae in the lake are fed by agricultural runoff from the 350,000 acres of land in Jerould, Aurora and Davison counties that drains into Firesteel Creek and the lake.

Consideration of Mayclin's application will be continued by the Planning and Zoning Board at 8 p.m. Monday at the Aurora County Courthouse in Plankinton.

# Area planning panel OKs poultry manure proposal

By The Daily Republic

PLANKINTON — The Aurora County Planning and Zoning Board approved a conditional use permit and variance Monday evening that will allow Mayclin Farms to apply poultry manure to some fields.

Some people had opposed granting the permit and variance because of concerns about odor and water pollution.

The board attached a lengthy list of conditions, subject to the approval of the state's attorney and the National Food Corporation poultry plant.

Those conditions:

■ The board may modify the conditions with a 10-day written notice.

■ Mayclin Farms shall ensure compliance with requirements to obtain additional conditional use permits and variances by Aug. 1 where manure from a confined animal feeding operation has

been applied since 1998.

■ No manure from a confined animal feeding operation shall be spread upon frozen ground.

■ Mayclin Farms shall ensure that the application of the manure adheres to all applicable restrictions.

■ No manure shall be applied to land within 1,000 feet of Firesteel Creek or its major tributaries.

■ All vehicles transporting manure on public roads must have adequate cover to ensure that the manure does not spill or blow onto roads or ditches.

■ The permit will require renewal after three years, though the fees and notice requirements may be waived at that time.

■ National Food Corporation and Mayclin Farms are encouraged to engage in composting, and whether or not they do so will be considering in the renewal process.

# City awaits test results



Laura Wehde/Republic

A locked gate and this sign at the Public Beach along Lake Mitchell forebode swimmers Monday. The beach was closed to swimmers Friday afternoon because water samples showed dangerously high counts of fecal coliforms, which are bacteria from animal or human wastes.

## With high bacteria counts, beach closed until at least Wednesday

By **SETH TUPPER**  
The Daily Republic

Wednesday afternoon is likely the earliest the North Lake Beach at Lake Mitchell could reopen, according to a state official.

The beach was closed to swimmers Friday afternoon because water samples showed dangerously high counts of fecal coliforms, which are bacteria from animal or human wastes. The remainder of the lake remains open to swimmers.

Monday, city workers mailed a new water sample from the beach to a state-run lab in Pierre. Test results could be available Wednesday afternoon, and the beach could reopen then if the results are

good. Otherwise, the beach will remain closed until a safe sample is taken.

Judene Holan, a natural resource scientist with the state Department of Environment and Natural Resources, said it was the first time the state has ordered a beach closure at Lake Mitchell in at least 12 years. Closures happen routinely at beaches throughout the state, though, and she said waiting for the coliform count to decrease is the only immediate course of action available to the city.

"Only Mother Nature is your cure," she said.

DENR rules state that a public beach must be closed immediately if any two consecutive water samples exceed 300

fecal coliforms per 100 milliliters of water. Holan said a May 30 sample from North Lake Beach had a count of 700 coliforms, and the next sample taken this past Wednesday had a count of 490. The beach cannot reopen until a sample is taken with a coliform count of 200 or fewer.

Holan and Mitchell city officials said they do not know exactly what caused the high number of fecal coliforms at the beach, but they speculated it was linked to excessive runoff from unusually wet weather. According to the Environmental Protection Agency, "fecal contamination can arise from sources such as combined sewer overflows, leaking septic tanks,

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## LAKE

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sewer malfunctions, contaminated storm drains, animal feedlots and other sources."

The EPA also states that "in themselves, coliforms generally do not pose a danger to people or animals, but they indicate the presence of other disease-causing bacteria, such as those that cause typhoid, dysentery, hepatitis A and cholera."

Holan said the health risks associated with fecal coliforms arise mainly from ingestion. People with open wounds or sores may be at risk from skin contact with coliforms, she said.

Tests of water samples from the city's other beach, West Lake Beach, have been deemed safe. Coliform tests are not required for any other areas of the lake besides the two beaches.

Holan said that, personally, she would stay away from North

Lake Beach until it is reopened but would be willing to swim at the other beach and in other areas of the lake.

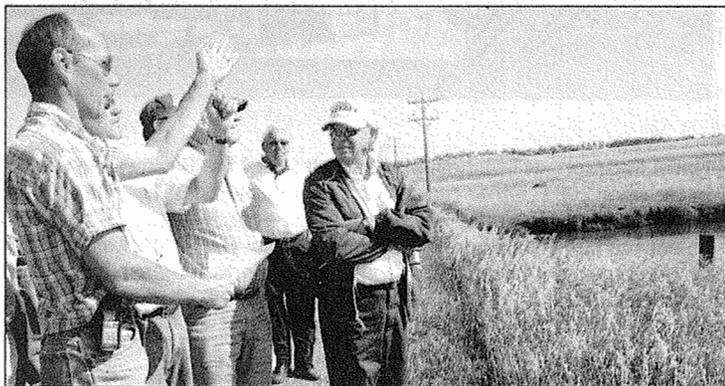
When the beach is safe to reopen, the City of Mitchell plans to announce it with a public notice. *The Daily Republic* did not receive a notice of Friday's closure, but was alerted to the situation by an email from someone who had been ushered away from the beach.

Randy Ahrendt, the city's director of parks, recreation and forestry, said he was out of town when the closure order came from the state, and he was therefore not able to coordinate the release of a public notice. He said Monday that his department hopes to issue public notices if any closures are announced in the future.

DENR rules do not require the city to issue a closure notice to the public. The only required action is the posting of signs stating "Beach Closed — Unsafe for Swimming"

THE DAILY REPUBLIC ■ TUESDAY, JUNE 12, 2007

# EPA official praises water-quality work



Laura Wehde/Republic

NATURAL RESOURCES CONSERVATION Service District Conservationist Steve Vlieger, left, Northern Prairies Land Trust Executive Director Patrick Anderson, Mitchell Mayor Lou Sebert, Mitchell Lake Development Committee member John Iverson and state Department of Environment and Natural Resources official Dennis Clarke, right, view part of the Firesteel Creek watershed area during a tour Wednesday northwest of Mitchell.

## East River outpaces West River in efforts to reduce agricultural waste in lakes, rivers

By AUSTIN KAUS  
The Daily Republic

Ranchers in eastern South Dakota are taking advantage of available technology to reduce agricultural waste in lakes and rivers, a representative from the Environmental Protection Agency said Wednesday during a Mitchell-area tour.

"The eastern half of the state has embraced this newer technology a little quicker than in the western half," said Steve Bubnick, South Dakota EPA project officer.

Bubnick and numerous other local and regional officials gath-

ered Wednesday morning for a tour of the work being done by the Firesteel Creek/Lake Mitchell Watershed Project. The project, which aims to reduce the amount of harmful nutrients entering the creek and lake through runoff, is funded in part by federal money.

Bubnick, who is based in Denver, said the higher populations of eastern South Dakota communities are probably what is driving farmers and ranchers to work with government officials toward reducing the amount of runoff entering waterways.

Funds are being provided by

the EPA to utilize alternative technology such as hoop barn systems, which use shelter and a holding pond to drastically reduce the amount of runoff produced by the mixture of precipitation with animal waste. Hoop barn systems channel liquid waste away from the barn and divert it to the holding pond, which dries out during normal summer conditions.

"The idea of different kinds of configurations for keeping all of the animals under some type of cover has arisen," Bubnick said. "It's been around for two years,

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## WATER

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but it's starting to become more and more embraced. As a ranch begins to use it and others start to see the success, there are more volunteers stepping forward."

No hoop barns are currently being used to reduce the amount of runoff heading into Firesteel Creek and Lake Mitchell, but plans are in the works to set up a barn in Davison County.

The cost to build a hoop barn varies, but can be \$6 to \$7 per square foot. Sixty percent of the costs for such a barn may be covered by the EPA with funds from Section 319 of the federal Clean Water Act. The remainder of the funds are the responsibility of the participating farmer or rancher.

Funding for Section 319 has increased dramatically since the program's establishment in 1990. During the program's first year, \$37 million was available in grant money. By 2006, the budget was approximately \$204.3 million.

Bubnick said he expects interest in hoop barns to surge.

"It's a lot easier for the management of the waste materials," he said.

"There's a lot less liquid that comes out of the system. You end up with a small volume of animal waste just through the natural process."

Dave Kringen, coordinator of the watershed project, said that alternative methods such as hoop barns and conventional methods, like sediment basins, are being encouraged through-

out the Firesteel Creek watershed to reduce the levels of algae-feeding phosphorus in Lake Mitchell. Sediment basins are formed by constructing an embankment that temporarily detains sediment-laden runoff, so sediment can settle out before the runoff is discharged. No matter what the method, residents should not expect immediate results, Kringen said.

"It might be 30 years before we actually see some real improvement in that lake," he said. "That's just the way it works."

# New method could help pinpoint lake problems



Republic file photo

Lake Mitchell, seen in this photo looking east, is annually plagued with algae. Earlier this summer, the lake's main public beach was closed due to fecal contamination, which came from an unknown source. New scientific techniques, known as bacterial source tracking or microbial source tracking, aim to determine the sources of fecal contamination in bodies of water.

## But some say 'source tracking' of bacteria isn't entirely accurate

By **SETH TUPPER**  
The Daily Republic

Some people assumed nothing could be done to identify the source of the fecal contamination that caused a beach closure earlier this month at Lake Mitchell, but new scientific techniques could have helped target or rule out several likely suspects.

In recent years, emerging research has produced a field known as "bacterial source tracking," or "microbial source tracking." The names are catch-all terms for the various methods used to link fecal contamination to the feces of specific warm-blooded animals, includ-

ing humans (See sidebar for more on source tracking methods).

Some companies that specialize in source tracking say they can test a water sample and determine what percentage of the fecal contamination was caused by humans, pets, livestock and wildlife. They even offer to pin the contamination to specific types of animals, such as cattle, horses or pigs.

The source of the fecal contamination that caused the June 8-13 closure of North Lake Beach at Lake Mitchell was not officially investigated. Mayor Lou Sebert expressed the thoughts of many when he said an investigation probably

would have been futile, given the 350,000 acres of mostly agricultural land that drains into the lake via Firesteel Creek.

"The watershed is so big and covers so many acres, I personally think it's impossible to pinpoint," Sebert said. "Most likely it's coming from numerous locations."

Others thought the contamination could have been the result of a fluke occurrence, given that it was the first beach closure in Mitchell caused by fecal bacteria in at least 12 years. Things as simple as a dirty diaper on the beach or a contaminated finger

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# LAKE

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touching a test bottle have been connected to high fecal coliform counts at other beaches around the country.

"Every 10 to 12 years isn't too bad," said Gene Stueven, an environmental senior scientist with the state Department of Environment and Natural Resources. "That could easily be somebody's pet on the beach."

Everyone agrees that the unusually heavy rain during the spring, which drove Mitchell's precipitation total almost 5 inches above normal, may have exacerbated the problem. The rain carried runoff into the creek and lake in large amounts, and the runoff may have contained the fecal bacteria that were detected at North Lake Beach.

"A lot of this material ends up coming in during rainfall runoff events," said Nels Troelstrup, a biology and microbiology faculty member at South Dakota State University who has been involved in source tracking experiments.

## 'All we have'

Source tracking, had it been used, may have provided an educated opinion about whether the fecal bacteria came from humans or animals, and which type of animals. That knowledge could have been used as the basis for further investigation. Sebert doubts, though, that the City Council would have been willing to invest in the effort.

During the past four years, the City Council spent \$297,000 on what some declared a failed approach to another water-quality problem at the lake — the annual summer blooms of algae.

The money was spent on four consecutive applications of aluminum sulfate, which was supposed to trap algae-fueling phosphorus in sediments on the lake bottom. The council had budgeted \$130,000 for a fifth application this year, but decided to discontinue the project because of questionable results.

Instead of spending the budgeted aluminum sulfate money on source tracking or other new water-quality efforts, Sebert said, city officials are likely to watch and learn from efforts at other lakes — especially the Cherry Creek Reservoir in Colorado, where an aeration system has been installed in hopes of reducing algae.

"I think we're going to put our concentration in those areas rather than hire some consultant



SEBERT

## QUESTIONS, ANSWERS ON SOURCE TRACKING

### From Virginia Cooperative Extension

#### What is source tracking?

Microbial source tracking (MST), also commonly referred to as bacterial source tracking (BST), is a method used to determine the sources of fecal bacteria and establish whether fecal bacteria are being introduced into water bodies through human, wildlife, agricultural or pet wastes.

#### What are fecal bacteria?

Fecal bacteria originate in the intestinal tract of warm-blooded animals and pass into the environment in feces. Fecal coliform bacteria are often used as indicators of disease-producing organisms in water.

#### How does source tracking work?

There are four categories of methods currently being developed and used in MST: biochemical (phenotype), molecular (genotype), chemical and immunological.

Though all four categories have the same goal of identifying sources of fecal pollution, they each accomplish this goal with various degrees of labor and expense. Generally, one method will be more suitable for a specific task than another. In some cases, two methods may be used simultaneously to verify results.

All methods in the first two categories (biochemical and molecular) first require the creation of a source library or database of host-origin or known sources such as human, cow, goose, etc. Source libraries are produced by collecting fecal samples and isolating fecal bacteria from them. After a source library is built, it can then be used to identify unknown-source fecal bacterial isolates gathered from an impaired water body by comparing the unknown isolates to those in the library.

at this stage of the game," Sebert said.

Had the council wanted to invest in a search for the cause of the fecal contamination at North Lake Beach, source tracking would apparently have been their only choice. Stueven, of the state's Department of Environment and Natural Resources, said source tracking is the only way to link fecal contamination in a water sample to a specific kind of animal or human feces.

"That's all we have, basically," Stueven said.

Stueven's department has worked with source tracking companies on some pilot projects

#### How does each method work?

■ **Biochemical:** The biochemical method is based on bacteria characteristics such as antibiotic resistance analysis (ARA). Because humans, domestic animals and wildlife are exposed to different antibiotics, fecal bacteria develop and express resistance to those different antibiotics. These distinctive resistances in each contamination source make the fecal bacteria found in a contaminated water body reasonably unique to their source.

This method includes isolating fecal bacteria from water samples and then testing the bacteria on a range of different antibiotics. Bacteria from different sources will grow (or not grow) in a specific way for each source, demonstrating a source-specific resistance pattern. This pattern is compared to a "source library" of patterns from bacteria that were isolated from specific hosts (e.g. humans, birds, cattle, deer, etc.) to determine which sources are causing water contamination. ARA is a fairly quick and inexpensive method but requires trained lab personnel to determine results.

■ **Molecular:** The molecular method is based on DNA patterns that are unique to each source due to variables such as the food consumption and health of the individual. As with the biochemical methods, fecal bacteria are isolated from water samples and a DNA pattern or "fingerprint" is obtained. The pattern is then compared to the library of patterns from specific sources to identify the source(s) of isolates in a sample.

There are over a dozen molecular methods currently under development; most require known-source libraries, but a few do not. Molecular

methods are comparable to biochemical methods regarding identification of broad categories such as human vs. non-human, but are believed to be more accurate for individual sources (e.g. deer, muskrat, chickens, horses, etc.). However, the molecular methods are also considerably more expensive and slower to perform in the laboratory.

■ **Chemical:** Chemical source-tracking methods are used to test water for various chemicals that are present as a result of human wastes. These chemicals can include laundry detergent, caffeine and other source-specific fecal materials (e.g. sterols and stanols). These methods have been used mostly to determine if fecal bacteria from polluted waters were from human sources or not. Detection of optical brighteners from detergents has been the most widely used chemical method to date. The fecal sterol method, while new and under development, does have the possibility of identifying sources from humans plus several other animals such as dogs, cattle, and birds.

■ **Immunological:** Immunological source tracking methods are based on unique proteins called antigenic determinants that are shed in the fecal matter of humans and animals. Detection of these antigenic determinants by immunological procedures should allow reliable detection and the identification of specific sources and, like chemical methods, would not require a known-source library. This method is also under development and is very new, so there is little information available about it at present.

— Source: *Microbial Source Tracking and the TMDL (Total Maximum Daily Loads) Process*, June 2005

and is partnering with the South Dakota Public Health Laboratory to develop the state's own method. He doubts the state will ever engage in source tracking on a regular basis, but he hopes to develop a reliable method that can be requested and paid for locally when events such as beach closures occur.

Stueven is not as confident in the present state of the science as some of the companies who are profiting from it. He said current source tracking methods can determine contamination sources with great, but not absolute, certainty.

"It might be right 60 to 70 percent of the time, but it's not enough to take to the bank and say, 'This is what it is,'" Stueven said.

Troelstrup, of SDSU, offered a similar assessment.

"The techniques are really in the testing and calibration phase," he said. "Most of the work with them has been done in really isolated studies where they really beat the heck out of one watershed."

The EPA, in its *Microbial Source Tracking Guide Document*, is more optimistic.

"It is evident that (microbial

source tracking) is transitioning from the realm of research to that of application," the document says.

Pessimism lingers about the cost of source tracking, which can get expensive if done on a large scale. A couple of water samples can be tested for no more than a few thousand dollars, but that's just a start. If the initial samples identify a high percentage of contamination in Lake Mitchell from cattle feces, for example, more tests might be needed at various points in the lake or even upstream in Firesteel Creek and its tributaries to pinpoint the source. The cost of additional samples could add up quickly.

## Cattle and sewers

Because no official investigation was conducted into the cause of the North Lake Beach closure, there has been nothing to specifically link cattle wastes or any other type of animal or human waste to the fecal contamination. But runoff from cattle feeding and grazing operations is a confirmed problem in the 350,000-acre Firesteel Creek watershed, which feeds the creek and Lake Mitchell.

Efforts to reduce the cattle-waste problem have been ongoing since 1998, when the Environmental Protection Agency awarded a grant to implement the recommendations of a 1997 study of water quality in the creek and the lake.

The study found 116 animal feeding areas — mostly involving cattle — that were contributing excessive nutrients such as algae-fueling phosphorus to the watershed. The study's findings, the EPA grant and some matching local and state funds gave rise to the Firesteel Creek/Lake Mitchell Watershed Project, which set a goal of working with cattle producers to reduce the phosphorus load in the watershed by 50 percent. As of late last year, according to the project's application for additional EPA funding, the phosphorus load had been reduced by an estimated 21.2 percent.

The effort to clean up the watershed should help reduce fecal coliform contamination, too. In the meantime, project manager Dave Kringen said upstream sources such as cattle feeding operations should not be automatically blamed for fecal pollution in Lake Mitchell. He said fecal coliform levels in Firesteel Creek have been higher in previous years than they have been so far this summer.

"There is a real possibility that this closure could have been the result of a localized event (i.e. a

domestic pet or wildlife waste or even human waste) that may have happened in the area near the time that they took the sample," Kringen wrote in an e-mail to *The Daily Republic*. "... I don't want us to always point upstream for the blame when it could have happened within the lake itself."

In addition to animal feeding operations, the 1997 study also said three storm sewers were draining into the lake and contaminating it with fecal coliforms. In 1993, the study said, flooding caused the city's sanitary sewers to back up into the storm sewers, which in turn drained into Lake Mitchell.

Fecal coliform counts in Lake Mitchell during the 1993 flooding were as high as 510,000 coliforms per 100 milliliters of water — 729 times higher than the first of the two tests that caused the closure of North Lake Beach this month. Fecal coliforms are not a health threat on their own, but according to the EPA they "indicate the presence of other disease-causing bacteria, such as those that cause typhoid, dysentery, hepatitis A and cholera."

The local study recommended rerouting the storm sewers to a settling basin away from the lake. In 1997, the city followed the recommendation and rerouted most, but not all, of the storm drainage points at Lake Mitchell.

It remains a possibility, then, that sewer backups could have gotten into the storm drainage system and caused the fecal contamination in Lake Mitchell. But Public Works Director Tim McGannon said he doesn't think that happened.

"We don't know of any sewer backups this year that would've affected the lake," McGannon said recently. "Can it happen without me knowing? It's possible. But we usually hear about sewer backups."

## Septic systems

The EPA states that fecal contamination can arise from "combined sewer overflows, leaking septic tanks, sewer malfunctions, contaminated storm drains, animal feedlots and other sources."

If sewer and storm drain problems were not the culprit, and if animal feeding operations upstream cannot be blamed, that leaves septic tanks and wild animals as possible causes.

McGannon, the city's public works director, said he does not

# LAKE

Continued from Page 10

know of any operational septic systems around the immediate vicinity of the lake. New septic systems have to be at least 350 feet from the lake, by city rule.

The number of septic systems in the Firesteel Creek watershed is not known, but they apparently are abundant.

About one-quarter of residences statewide have septic systems, and Scott Hipple, an environmental program scientist with the DENR, said "everybody who lives out in the country has a septic system."

In the Firesteel Creek watershed, a lot of the people live "out in the country." There is no official count of the number of people in the watershed, but John Deppe, coordinator of the Lower James Resource Conservation & Development District, estimates the watershed population to be between 5,000 and 8,000. A small portion of Mitchell is in the watershed, and some of the other residents of the watershed live in a few small towns. Deppe said the remainder of the people in the watershed live on one of 250 farms or an unknown number of residential acreages.

The state enforces regulations for septic systems but does not have a listing of them, so it cannot say how many septic systems are in the Firesteel Creek watershed. Neither can the state say how many of the septic systems in the watershed are operating legally, because the state conducts inspections only when complaints are received.

State records indicate eight septic tank complaints dating to 1993 from the three counties — Davison, Aurora and Jerauld — that have land within the Firesteel Creek watershed. The violators repaired or replaced their systems, and no enforcement actions were necessary.

Septic systems are not addressed in the Firesteel Creek/Lake Mitchell Watershed Project. Given that fact, and given the state's lack of information on the status and scope of septic systems in the watershed, the likelihood of septic systems contributing fecal bacteria to the watershed is unknown.

The lack of thorough septic sys-

tem information, paired with McGannon's and Kringen's doubts about the culpability of storm sewers and animal feeding operations, leave the trail of the fecal contamination in Lake Mitchell cold. Wildlife or domestic pets could have contributed the fecal bacteria, but the comings and goings of those animals are probably harder to track than any of the other potential sources.

## Where next?

The lack of investigation into the problem has left at least one local resident perturbed.

"I'm concerned," said Dan Matthews, "that in the city's interest to try and maximize the tourist assets that we have, that they may be shortsighted and are not considering the health issues as much as they should be."

Matthews, a former state lawmaker, wonders why the city conducted no official investigation into the cause of the fecal contamination. He thinks the city should consider testing the entire lake for fecal coliform, in addition to the beaches. Without the additional testing, he said, there was no way to know if the rest of the lake was safe from the contamination that caused the beach closure.

Kringen, the manager of the watershed project, said he already does fecal coliform counts above and below the lake. He is seeking permission from his project overseers to begin taking fecal coliform counts in the lake as part of his regular grant-funded work.

In-lake tests could help determine the safety of other water areas besides the beaches and could perhaps give a clue about where fecal contamination is coming from. Source tracking, if utilized, could provide further clues.

But even with in-lake testing and source tracking, it's possible the source of fecal pollution would remain a mystery.

"We drain 600 square miles of watershed into Lake Mitchell," said McGannon, the city's director of public works. "After we check the lake, where do we go next? Plankinton? I don't know."

"In that 600 square miles, there are an awful lot of feedlots, pastures, houses with septic systems, and everything else."



McGANNON

See LAKE, Page 11

# GF&P looks into fish kill of crappies at Lake Mitchell

By The Daily Republic

A fish kill that appears to only be affecting crappies at Lake Mitchell is being investigated by regional Game, Fish and Parks Department employees.

Andy Petersen, a local conservation officer, said he saw as many as 2,000 dead crappies at Lake Mitchell Friday afternoon. He was joined later in the day by Todd St. Sauver, a fisheries biologist who works from the state GF&P regional office in Sioux Falls.

The duo spent the afternoon investigating the cause, but couldn't determine exactly what was behind the deaths.

"We're going to look for a (crappie) that is close to expiring," Petersen said. "If it looks like it's showing some effects, we can take it back and see if there is some kind of infection. We won't know until we can get a sample."

Petersen said he hopes to know an answer early next week, but early indications show that it's some sort of bacteria. A bacteria itself isn't necessarily fatal, Petersen said, but coupled with other stressors — such as high water temperatures — a bacteria could produce a large kill off.

He said there shouldn't be a concern for humans for other fish species and, in addition, "probably not every crappie has it. If you catch a crappie, it's probably healthy."

# Cause of crappie deaths at lake still not determined

Not a health concern for humans, GF&P official says

By KORRIE WENZEL  
The Daily Republic

It appears the worst of a fish kill at Lake Mitchell is over, according to a Game, Fish and Parks fisheries manager, but it's still going to take another week or two to determine an exact cause.

Fisheries manager Todd St. Sauver, who works out of the GF&P's regional office in Sioux Falls, said Monday that crews will continue to look into what caused the death of possibly more than 1,000 crappies at Lake Mitchell. Since live, but sick, fish are

required to help pinpoint the problem, GF&P workers will continue to search for specimens to be sent to a laboratory in Bozeman, Mont.

"Crews were on the lake (Monday) but found only four fish that looked like they had recently died," St. Sauver said. "Unfortunately, these fish were dead and did not make a viable testing sample."

Ironically, the GF&P this week also is conducting its annual fish population surveys at the lake. St. Sauver said that since crews there already are netting on the lake, it should help in the investigation. He said he expects workers to gather a sample of crappies from nets, which will be transported to

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Laura Wehde/Republic

BRYCE GADES OF the Mitchell Parks and Recreation Department fishes out a dead crappie from Lake Mitchell Monday. The cause of the fish kill at the lake, which has only affected crappies, won't be known for another week or two.

— Video on  
[www.mitchellrepublic.com](http://www.mitchellrepublic.com)

## CRAPPIES

Continued from Page 1

state specialists. From there, culture samples can be sent to the United States Fish and Wildlife Service in Bozeman.

There, the samples will be tested for various bacterial and viral maladies that could be responsible for the fish deaths.

St. Sauver can't yet speculate on exactly what caused the deaths, but said it appears that whatever the cause, it's probably not related to water quality or some sort of toxin, since only one species of fish — crappies — were found dead.

St. Sauver also said that since it is limited to only crappies, it's unlikely there is danger for humans. No fish pathogens are harmful to humans, he said, adding that crappies are a "touchy" fish.

Also, since crappies are a smaller-sized species, even a large crappie kill is unlikely to

affect overall water quality at the lake, he said.

Crews spent part of Monday cleaning up and disposing of the dead fish.

Local conservation officer Andy Petersen went to Lake Mitchell Friday afternoon and found many dead crappies — probably more than 1,000, he said. St. Sauver came from Sioux Falls and also investigated.

Monday, St. Sauver said that initial examinations of the fish did not show any obvious infections.

"Usually, in a serious infection, you see ulcers on the fish, or massive internal hemorrhaging, but we did not see that."

He also said he thinks the "main event" of the fish kill is over. There were considerably fewer dead fish at the lake Monday than Friday, he said.

Fish kills are a part of nature, he said.

"Fish kills like this are not uncommon," he said. "They are uncommon in Mitchell, where we

haven't seen anything like this for a while."

He doesn't know what the effect will be on fishing. Whereas other species in the lake appear entirely untouched, the crappie population will take at least a little bit of a hit, he said.

"Obviously, every fish that dies is one less chance of catching one," he said. "If our net catches are way down, we can assume that the fish kill affected the population. But honestly, without knowing how many fish are in the lake to begin with, it's really hard to judge the impact of a kill."

The GF&P last stocked crappies into Lake Mitchell in 2003, when 20,640 were released there.

"I know there are a lot of concerns (in Mitchell)," St. Sauver said. "We're concerned, too — we don't like to see these things happening. We're trying to do what we can to put people's mind at ease. These things happen and we're going to take reasonable steps to try to identify exactly what happened."

THE DAILY REPUBLIC ■ TUESDAY, JULY 10, 2007

# Expert gives opinion on lake

## Says local lake is managed well

By **SETH TUPPER**  
The Daily Republic

A Minneapolis-based water quality specialist praised Mitchell officials Saturday morning at City Hall for their efforts to improve water quality in Lake Mitchell and recommended more monitoring to make their efforts even more effective.

Udai Singh, water quality specialist with the Minnehaha Creek Watershed District, spoke to nine people during an informal meeting. Singh was invited to the city by Lake Mitchell resident Carl Koch. Among the others in attendance Saturday were city staff, members of the City Council and Lake Development Committee, and the mayor.

They liked what they heard from Singh.

"Your lake is being managed much better than a lot of lakes are, not only in neighboring states but throughout the nation," Singh said, "especially considering how much agricultural waste the watershed drains into your lake."

Singh had reviewed some of the numerous studies done on Lake Mitchell and its Firesteel Creek Watershed, and Koch had taken Singh for a drive around the lake and a boat ride on it. After the meeting, a local pilot planned to take Singh up for an aerial inspection.

Singh works for a decades-old watershed district that he and Koch say is one of the most respected in the nation. Singh said officials in his district feel obligated to share the knowledge and expertise they have developed, so they were happy he volunteered to consult with people in Mitchell.

Mitchell city officials currently are not using any in-lake measures to improve water quality, but they recently conducted an experiment with aluminum sulfate to combat blooms of blue-green algae and are helping fund an ongoing project in the watershed to reduce the amount of algae-fueling nutrients entering the

## LAKE

Continued from Page 1

water. City officials also are eyeing projects at other lakes, where methods such as aeration and circulation are being used in attempt to reduce algae levels.

Singh said city officials are taking the right approach. He said no method is guaranteed to work, but some may work better in certain

locales than others. The key, he said, is to do enough monitoring to know what effect the methods have on the water. Now that the aluminum sulfate experiment is over, Singh said, it will be crucial for the city to have data to compare to the years when aluminum sulfate was applied.

Officials at the meeting said some monitoring of the water in Lake Mitchell is conducted by Dave Kringen, the coordinator of

the watershed project. Kringen was not able to attend the meeting. Singh said additional monitoring may be advised and could be carried out at a relatively low cost.

Tim McGannon, the city's director of public works, proposed that the city consider sending a small group of interested people to Minneapolis to meet with Singh and study the water-quality projects under way in his watershed. No decision was made on when the

trip will be undertaken or who will go.

Singh invited future cooperation between the city and his district. He told city officials to keep up the good work and to be patient, because improvements in water quality do not happen overnight.

"I have to commend all the people who have taken leadership," Singh said. "Your lake is managed really well."

THE DAILY REPUBLIC ■ MONDAY, JULY 23, 2007

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# No cause found for fish kill

## U.S. Fish and Wildlife Service lab says tests inconclusive

By KORRIE WENZEL  
The Daily Republic

Tests to determine the cause of a large fish kill at Lake Mitchell were inconclusive, a state Department of Game, Fish and Parks fisheries official said Thursday.

Todd St. Sauver, a fisheries biologist from the GF&P's Sioux Falls office, said the U.S. Fish and Wildlife lab in Bozeman, Mont., couldn't pinpoint a reason for the death of 1,000 to 2,000 crappies last month at the local lake.

He also said that in an effort to rebuild the crappie population at Lake Mitchell, it's likely the lake this year will be stocked with the species for the first time since 2003.

"We suspected that it was a viral or bacterial pathogen. We were hoping these tests would confirm that, but unfortunately, they didn't," St. Sauver said. "The reason for that, we believe, is the kill had already run its course before we were able to collect samples. We collected our samples and those fish

were healthy and not infected with any viruses and bacteria that initially could have caused the kill."

Dead crappies began appearing the first week of July. State officials began their investigation on a Friday but ran into problems that hindered their efforts. First, it was late in the week and labs are closed over the weekends and second, only live fish can be used for accurate testing. It appeared the problem had already run its course by the

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## FISH

Continued from Page 1

time the investigation began and live fish could be netted, St. Sauver said.

The GF&P did capture 20 live crappies the following week and sent them to the lab at Bozeman, but again, no conclusive results could be obtained.

"We collected our samples, but those fish were healthy and not infected with any viruses or bacteria that could have caused the kill initially," St. Sauver said. "We

still believe, even though we can't prove it, that this kill was caused by a bacterial infection that attached itself to the fish's gills."

That type of infection, he said, destroys a fish's ability to gather oxygen from the water.

As for the safety of the lake's water, St. Sauver said "we have no reason to believe it's not (safe)." He said the GF&P has heard reports recently of small numbers of other fish turning up dead on the lake, but said that's somewhat typical this time of year.

The GF&P now has scheduled a stocking of crappies at the lake.

St. Sauver said the kill likely is to blame for fewer numbers of crappies turning up in the agency's annual survey, which was conducted in mid-July.

Whereas there were 50 crappies per trap net during last year's survey, there were only nine per net this year. Other fish populations appear stable, although St. Sauver said walleyes likely will be stocked this year as well.

In 2003, the GF&P stocked 20,600 fingerling crappies into Lake Mitchell.

The stocking will either take place in the fall or spring, he said.

# FIRESTEEL CREEK NEWS

Volume 9, Issue 1

May 2008

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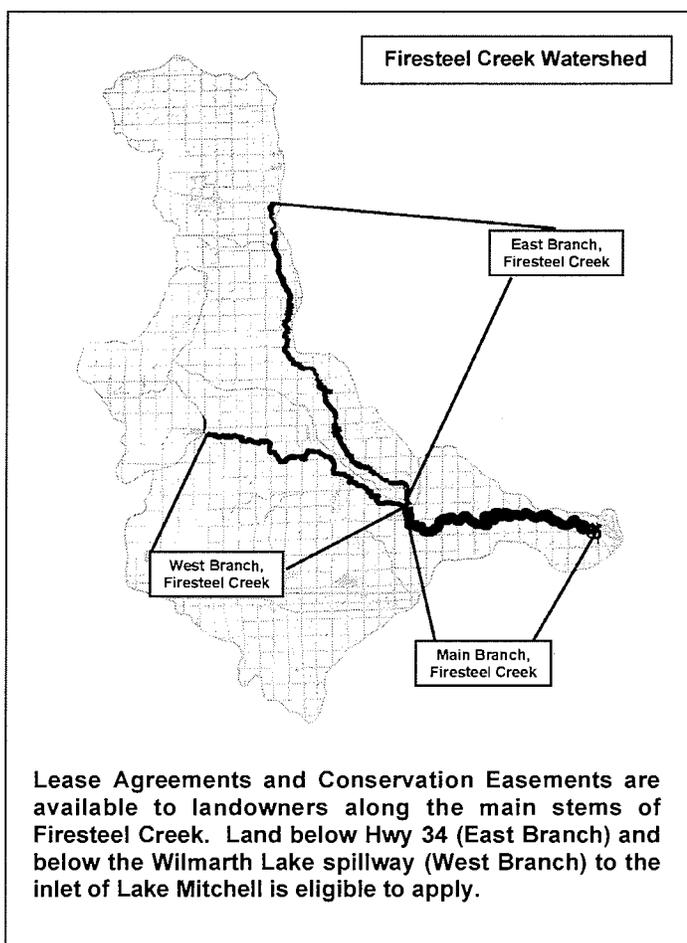
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## FIRESTEEL CREEK RIPARIAN AREA MANAGEMENT (RAM) PROGRAM

The Firesteel Creek Riparian Area Management (RAM) Program is a new, locally-funded effort designed to provide landowners an incentive to establish buffer strips along Firesteel Creek to improve the water quality of Lake Mitchell. Traditionally, the only option for producers interested in installing a buffer on land currently being grazed or cropped has been through the USDA Continuous Conservation Reserve Program (Continuous CRP). While a popular program, Continuous CRP only allows a maximum average buffer width of 120 feet from the streambank. Landowners can enroll areas into the RAM program beyond the maximum allowable width that CRP offers. Enrolling additional acres gives the landowner more flexibility to square up a buffer on crop ground or can make it easier to fence off a riparian area in a pasture. Though acres enrolled in the RAM program will generally be adjacent to tracts that qualify for CRP, RAM acres may

stand alone if the area is considered a high priority. Lease agreements will be for 15 years and payments will be made annually for the life of the contract by the Davison Conservation District.



Lease Agreements and Conservation Easements are available to landowners along the main stems of Firesteel Creek. Land below Hwy 34 (East Branch) and below the Wilmarth Lake spillway (West Branch) to the inlet of Lake Mitchell is eligible to apply.

For those interested in a long-term alternative, 30-year and/or permanent conservation easements are also available. Easements can be placed on lands currently under a USDA Continuous CRP contract or may stand alone. The land offered must currently be used as grazing land for livestock or cropped up to the streambank. Land which is maintained as a riparian area will be considered a lower priority. Buffers developed under the easement option will be a minimum of 75 and a maximum of 150 feet from the streambank. Conservation easements will be held by Northern Prairies Land Trust of Sioux Falls. Payment for the easement will be made in one lump sum on the date of closing.

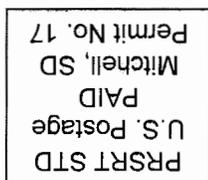
This program is funded in part by a grant from the US EPA Section 319 Nonpoint Source Program administered through the SD Department of Environment and Natural Resources, the City of Mitchell, and the James River Water Development District. If you are interested in more information regarding the Firesteel Creek RAM program, contact your local NRCS/conservation district office.

## RANGELAND MANAGEMENT ASSISTANCE AVAILABLE TO LIVESTOCK PRODUCERS

The Mitchell USDA Service Center is now headquarters for Mitch Faulkner, a Rangeland Management Specialist with the Natural Resources Conservation Service. Mitch is available to work with NRCS field office staff and private landowners on grazing land planning and the development of prescribed grazing plans. His primary area of responsibility is the greater James River and eastern Missouri River watershed area. Mitch will also be assisting with the development of NRCS rangeland technical standards and guides, and will be available to assist with soil survey activities as needed. To contact Mitch, talk to your local NRCS Field Office or call him directly at 605-996-1564 (x132).

Mitch often works with grazing systems featuring riparian management along rivers and streams and offers the following rules of thumb to ensure healthy riparian plant communities.

- Riparian areas are often focal points of grazing management plans since they provide critical habitat for a variety of wildlife and because excess grazing can create poor water quality. Livestock naturally gravitate toward riparian areas due to the lush green forage they provide, and their cooler environment and persistent source of water usually results in heavy grazing use and makes stream banks susceptible to trampling and degradation. Riparian management usually includes livestock exclusion, but carefully planned riparian livestock grazing can be very successful as well.
- Ideally, grazed riparian areas should be fenced into their own grazing units and managed as riparian units. This way targeted grazing management can be directed at riparian areas and surrounding uplands can be managed separately.
- Adequate stream bank protection by healthy deep-rooted vegetation is critical for sediment filtering and energy dissipation of water during high flow events. Heavily-grazed riparian areas often have low vegetation cover and are easily eroded during periods of high water flow. This results in poor water quality and continuously-eroding stream banks. Short-term (usually less than 21 days) and light grazing (less than 50% of the grass removed) of riparian areas that ensures adequate rest for the regrowth of desirable riparian plant species is optimal. Timing of grazing should also be targeted to periods when stream banks are the most firm, and are least vulnerable to trampling.



Davison Conservation District  
1820 North Kimball, Suite B  
Mitchell, SD 57301

# County auctions off two-year land lease for nearly \$22,000

## Grant provides future watering

By ROSS DOLAN  
The Daily Republic

Further confirming the rising value of area farmland, the Davison County Commission on Tuesday auctioned a two-year lease of county land worth nearly \$22,000.

Mitchell auctioneer Ralph Kiner directed the spirited bidding among a dozen area farmers at the Davison County courthouse. Commissioners had set a \$5,000 minimum bid for the roughly 64-acre tract in Badger Township west of Lake Mitchell.

The winning bidder was Andrew Ewing of Letcher, with a bid of \$10,900 per year.

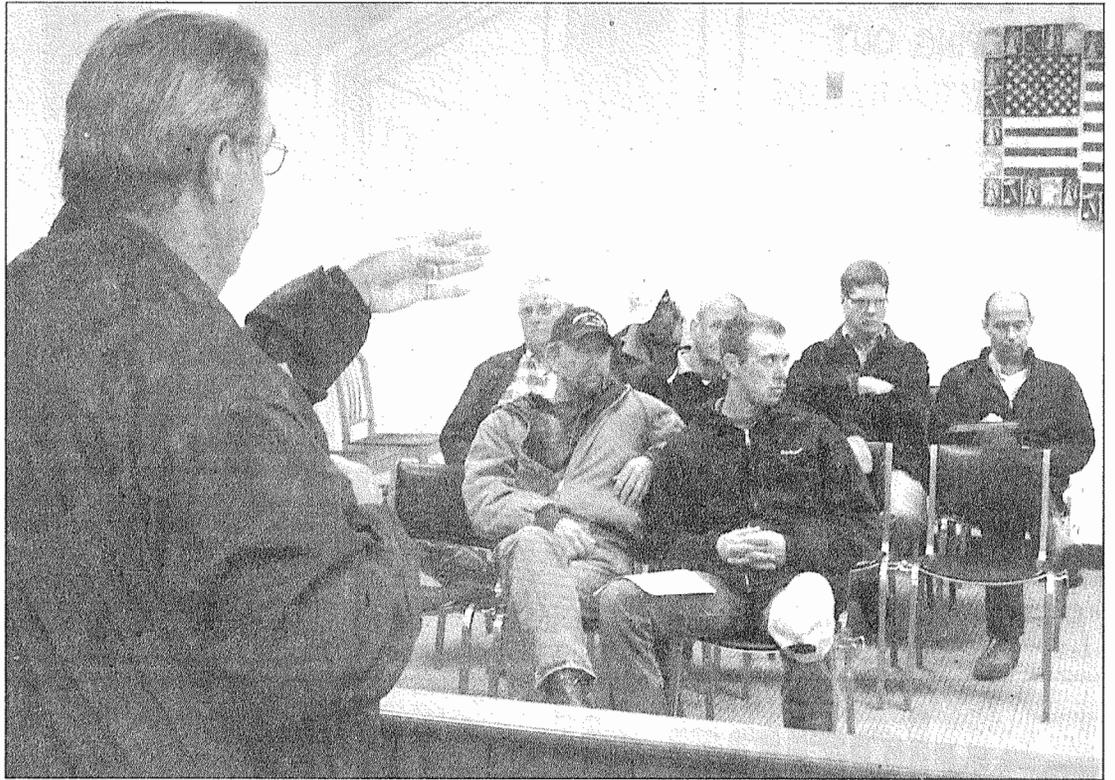
An added bonus is that the property eventually will have watering facilities provided through a water quality grant received through the Department of Environment and Natural Resources and the Davison Conservation District. The money is being used to clean up water entering Lake Mitchell.

Grant money, said Steve Vlieger, district conservationist with Natural Resources Conservation Service, will pay about 70 percent of the \$25,000 required to fence the land into four pastures, drill a well, run piping and install a solar-powered pump and central stock-watering facilities. The remainder will be paid with contributions, in-kind and otherwise, from the City of Mitchell and the county, he said. As part of the water quality grant, pasture access to Firesteel Creek will be fenced off, said Vlieger, to prevent a possible lake contamination.

A requirement of the lease is that the lessee can have no more than 25 cow-calf pairs and one bull on the property. The cattle will be rotated among the four pastures.

Ewing will have access to the land as early as June 1, said commissioners.

About five years ago, the county leased the same land for about \$5,600. It was most recently leased to MTI for its agricultural program for about \$2,700, a concession granted for educational purposes. The school declined



Ross Dolan/Republic

LOCAL AUCTIONEER RALPH Kiner faces enthusiastic bidders for a two-year lease on county land during Tuesday's county commission meeting. The winning \$10,900 annual bid was made by Andrew Ewing of Letcher, pictured front right.

negotiating a higher price and it was put to public auction.

Commissioner Jerry Fischer was not surprised at the price, considering the rising price of land.

"We're pleased with the lease," agreed Commissioner David Weitalla.

In other business Tuesday, commissioners:

- During the public input portion of the meeting, heard from Todd Thompson, a trucker from Tobin Township who asked commissioners for help in cleaning up Highway 41. Thompson said dirt and asphalt from the deteriorating highway can be captured by the dual wheels of trucks and tossed into vehicle windshields.

- Commissioners asked Highway Superintendent Rusty Weinberg to attend to the matter. Weinberg said the first step will be to broom off any loose material and then proceed with scheduled repairs to the road. Commissioners noted that the roadway surface is narrow on the controversial highway and truckers must often ride the shoulders for safe passage.

- Following a brief executive

session, gave Veterans Service and Welfare Director Steve McClure permission to hire Dawn Grissom as an office assistant at a probationary rate of \$10 an hour.

- Approved the seasonal hire of Molly Gosmire at a rate of \$8 per hour at the county extension offices.

- Approved a raffle permit for the American Cancer Society for a June 7 event.

- Approved a motion to sign the 2009 Planning District III contract for \$22,681, an amount that is about \$600 higher than previously budgeted.

- Appointed former Commissioner Bernie Schmucker as a member of the county canvassing board during the June 5 absence of Commissioner John Claggett.

The board will confirm results of the June 3 primary. The canvass will be part of the regular meeting of the commissioners which will be held Thursday because of the conflict with Tuesday's primary.

- Sitting as the Board of Adjustment, approved three items: a conditional use permit

(CUP) for Donovan and Michelle Tilberg to operate a part-time farm machinery repair shop at their Beulah Township at the junction of Cemetery and Betts roads; a variance in lot size for Mary Puetz for property east of Firesteel Creek; and a setback variance for Chad Mulenburg to the east property line of his land in Rome Township west of Highway 37 on 264th Street.

- Declined a request from Ronald Halweg to rezone land in Lisbon Township from agricultural to rural estates. The Davison County Planning Commission previously recommended against the zoning change.

- Briefly discussed the status of dismantling the upstairs courthouse library with Judge Sean O'Brien, who said help could be made available through the courts to facilitate the process of moving out old books. Commissioners declined making hard plans on emptying the library because the county's maintenance staff has a full schedule for the summer. It's uncertain if staff will be available to supervise community service workers.

# FIRESTEEL CREEK NEWS

Volume 9, Issue 2

June 2008

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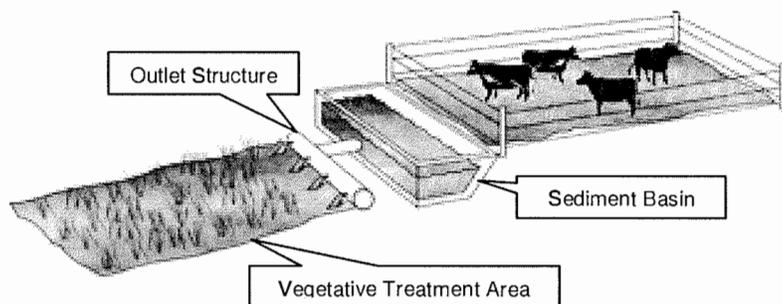
## Vegetative Treatment Systems (VTS) A Common Sense Way to Improve Water Quality

John Lentz

NRCS Resource Conservationist

There is one thing we all agree on, clean water is important for us, our children, and our grandchildren! We do, however, have differing opinions on how to improve the quality of our surface and groundwater resources here in South Dakota. For years the only option available to livestock producers wanting to prevent surface or groundwater degradation was with large holding or evaporation ponds that contained up to a year's worth of storage capacity. Now, due in large part to research being conducted by land grant universities such as South Dakota State University and the University of Nebraska-Lincoln, there may be alternatives. Earlier this month members from the SD Natural Resources Conservation Service attended a tour of four Vegetative Treatment Systems (VTS) in Nebraska. The systems showed several options that have considerable potential here in SD.

So what is a Vegetative Treatment System? A VTS is a combination of practices used to manage feedlot runoff. A typical system would be comprised of a settling structure to capture the solids leaving a feedlot, an outlet structure to convey liquids, a distribution system to properly manage flow, and a vegetative treatment area (VTA) to utilize the nutrients from feedlot runoff. The advantage to this type of system is its potential to lower both installation and operating costs. It also can be a good source of forage from the VTA, and has no large pond to see, smell, or manage. Currently, the major disadvantages are they are not able to be permitted by most state regulatory agencies, and since the technology is relatively new, expect to have a learning curve during the initial operation of the system.



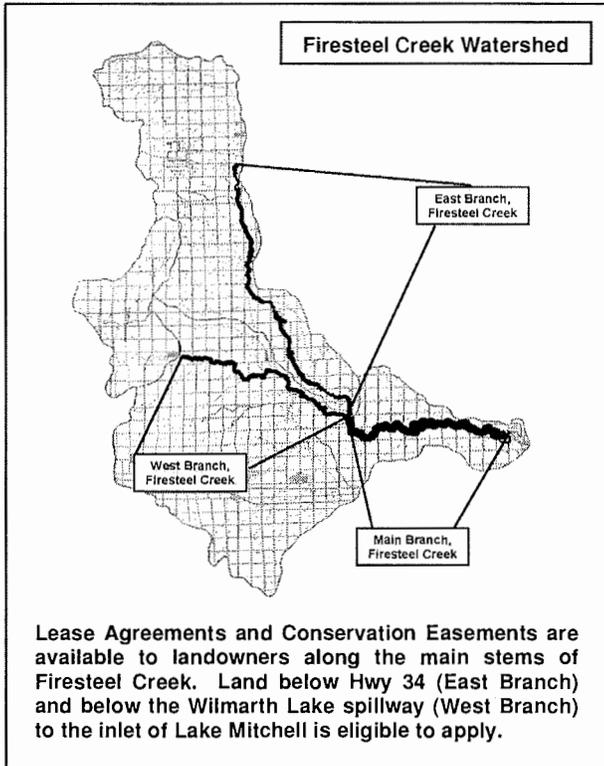
You must also keep in mind that this type of system is typically best suited for smaller operations (< 300 Animal Units) but may be able to work for operations up to 999 AUs if site conditions are ideal. The ideal site would be located at least 500 feet from a receiving water, have a slope of 0.5% to 6.0%, be located over good soils such as loams (no sands or gravel), have a naturally deep water table, be outside of any natural floodplain, and have enough area below the existing feedlot to allow construction of VTA (a 1:1 to 1:2 ratio of feedlot area to VTA area is typically required).

For more information on Vegetative Treatment Systems, contact your local NRCS, Conservation District or Watershed Project office. The University of Nebraska-Lincoln web page can be accessed at <http://afo.unl.edu>. You may also contact the SD NRCS Agricultural Nutrient Management Team (ANMT) at (605) 996-1564 Ext. 5 or [john.lentz@sd.usda.gov](mailto:john.lentz@sd.usda.gov).

# FIRESTEEL CREEK RIPARIAN AREA MANAGEMENT (RAM) PROGRAM

## SIGNUP DEADLINE JULY 31, 2008

Applications are currently being accepted now through July 31<sup>st</sup> for the Firesteel Creek Riparian Area Management (RAM) program. This program is designed to provide an incentive to landowners to establish buffer strips along the main stems of Firesteel Creek. If desired, landowners can enroll areas into the RAM program beyond the maximum allowable width that the USDA Continuous Conservation Reserve Program (Continuous CRP) offers. Enrolling these additional acres gives the landowner more flexibility to square up a buffer on either cropland or pasture along Firesteel Creek. Lease agreements will be for 15 years and payments will be made annually for the life of the contract.



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Thirty-year and/or permanent conservation easements are also available for those interested in a long-term alternative. Easements can be placed on lands currently under a Continuous CRP contract. Land offered that is not enrolled in the Continuous CRP program must currently be used as grazing land for livestock or cropped up to the streambank. Land which is maintained as a riparian area will be considered a lower priority. Conservation easements will be held by Northern Prairies Land Trust of Sioux Falls and payment for the easement will be made in one lump sum on the date of closing.

To find out more, contact the Firesteel/Lake Mitchell Watershed Project at 605-996-1564 Ext. 131 or email me at [david.kringen@sd.nacdn.net](mailto:david.kringen@sd.nacdn.net).

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# FIRESTEEL CREEK NEWS

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## Pollution Prevention – Lawn Care and Lakes



Research has shown that nutrient runoff from nonpoint source pollution (pollution that occurs from ill-defined or diffuse sources such as runoff from cultivated fields, grazing land, or urban areas) will contribute to rapid plant growth in lakes and streams. One of these nonpoint sources, often overlooked but deserving of attention, is surface runoff from over-fertilized lawns and landscapes.

In terms of fertilizer inputs, nutrient application rates applied to urban lawns can be as much or more as those used for farm row crops. But not all residents understand that lawn fertilizers containing phosphorus can cause water quality problems. Too much phosphorus in lakes

causes explosive algae growth, called “algae blooms”. The scientific name for such rapid plant growth in a lake is called “eutrophication”, which can be thought of as accelerating the aging of a lake.

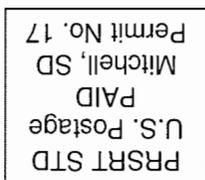
Algae blooms can clog a boat’s intake and makes for undesirable swimming conditions. They also block light from reaching other plants. When algae blooms die, masses of bacteria break them down, using up the dissolved oxygen in the water. As oxygen levels get low, fish and other aquatic animals can die.

Phosphorus is usually considered the “limiting factor” for algae blooms. Other nutrients, such as nitrogen and potassium, are also needed for aquatic plant growth but are usually found at adequate levels in fresh water. Nitrogen can sometimes be the limiting nutrient but bluegreen algae have the ability to fix nitrogen from the atmosphere if there is not enough available in the water. Phosphorus is the primary nutrient that drives eutrophication and small amounts of it entering a lake can go a long ways to stimulate algae growth.

Most fertilizers contain a blend of nitrogen, phosphorus, and potassium which grasses and other plants use in various amounts to grow and stay healthy. But the majority of soils in our region already contain all the phosphorus that an established lawn will need. Nevertheless, many homeowners will still fertilize with phosphorus at least twice a year. Additional loading of soils already high in phosphorus will result in increased phosphorus concentrations in runoff to nearby lakes and streams.

## Lawn Care Tips for Protecting Lakes

- Test your soil before fertilizing. If soils are high in phosphorus, use a low or phosphate-free fertilizer. Soil testing information and fertilizer recommendations are available at your local extension office. If a lawn care professional is used, quiz them on their fertilization program.
- Before making fertilizer applications, check the weather forecast. Make applications when a heavy rain isn't likely to wash the fertilizer directly into the lake.
- Control soil erosion around homes. Bare soil is easily washed away with rain, carrying phosphorus with it. Keep soil covered with vegetation or mulch.
- Keep grass clippings and leaves out of the lake. Leaves and grass can be a major source of phosphorus to lakes as they break down.
- Keep fertilizers on the lawn and off paved surfaces. Use a broom to sweep up excess fertilizer on paved surfaces and reapply it to the lawn.
- Pick up pet waste promptly. Pet waste can contain harmful bacteria as well as nutrients.
- Use lawn mowers that mulch grass clippings and leave them on the lawn. These mulching mowers also reduce the need for fertilizer. Grass clippings are the ideal food source for a lawn, providing essential nutrients by releasing them slowly into the soil. Grass clippings also provide organic matter, which reduces soil compaction.



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