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WHAT'S HAPPENIN'



The Iowa Geological Survey's Geographic Information Systems Bi-Monthly Section Newsletter

The Iowa Geological Survey's GIS Section continues its efforts to better inform users of GIS data changes, updates, and new datasets. This month's edition of "What's Happenin'" will focus on a new application being developed by the AFO and GIS sections of the DNR to help assess proposed sites for Animal Feeding Operations (AFOs). We will also look at how Iowa Fisheries are utilizing GIS and how they are developing new uses of GIS for future needs.

Much has happened in the GIS Section since the last newsletter. Chris Ensminger has accepted the GIS Section Supervisor position. Chris formerly worked for the Section 319 program as a GIS analyst where he used GIS to address nonpoint source pollution and other water quality issues. Chris is located on the 5th Floor of the Wallace Building, near the GIS compound.

The GIS Section also hosted its first in a series of GIS Users' Group meetings on January 7, 2005. The Users' Group meetings are intended as a forum to share ideas and information among the GIS section and other GIS users in the DNR. Goals for these meetings include introducing new data and applications, identifying needs of users, and sharing of information. The next meeting is scheduled for April 8, 2005 in Grinnell. All interested DNR staff are encouraged to attend. An agenda and other materials can be requested from Chris Kahle.



Currently, eighty percent of Iowans rely on groundwater for their drinking supply. Therefore, it is essential that we consider carefully the impacts our actions may have on the quality and quantity of this indispensable resource. Assessing the potential impact the placement of proposed animal feeding operations (AFOs) would have on groundwater resources is one of the most visible and sensitive tasks for the DNR.

According to Iowa law, one way to protect groundwater is by requiring new AFO construction or the expansion of existing AFOs to be located outside the 100-year floodplain and not within 1,000 ft of a sinkhole. DNR staff may be required to assess new or expanded AFOs for these conditions during the permitting process and DNR staff is available to help determine whether these regulations apply to the site of a proposed AFO construction or expansion. When the site is found to fall within one of these areas, appropriate regulations will be applied. When one of these conditions is met, available options include prohibiting construction or requiring additional steps in construction, maintenance and groundwater monitoring to minimize the risk to groundwater supplies.

Definitions

Karst terrain in Iowa is concentrated mainly in the Northeast quadrant, with some scattered throughout the Southeast quadrant. Karst areas have soluble bedrock (limestone and to a lesser degree dolomite) within 50 feet of the land surface and are characterized by sinkholes, springs and losing streams (surface streams that suddenly disappear beneath the ground surface). The large openings in the rock allow rapid movement of water from the land surface into the water table (Figure 1). Iowa Administrative Code prohibits new and expanding confinement operations from constructing within 1000 ft of a sinkhole unless secondary containment is provided. Any new confinements in karst terrain with more than 500 animal units must provide the DNR with soil borings indicating the depth to bedrock below the proposed formed structures.

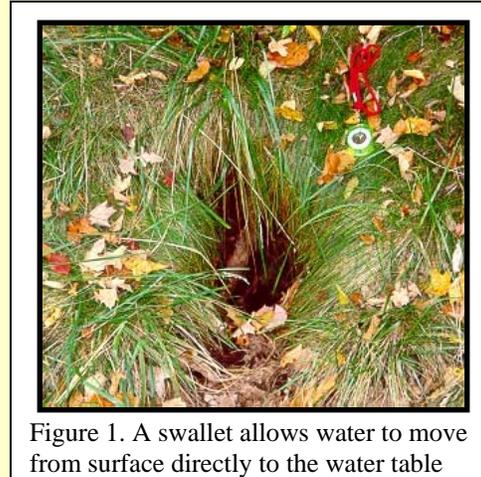


Figure 1. A swallet allows water to move from surface directly to the water table

Alluvial soils which are often used as an **approximation** of the 100-year floodplain are found throughout the State, mainly in active or inactive waterways. Alluvial soils are formed from sediments that were deposited by running water and are most often found within a floodplain. Often the sediments are comprised of sand to silt-sized particles which allow water to move rapidly from the surface to the water table. As a consequence, contaminants introduced to alluvial soils can be drawn into wells, springs, and streams and become potential health hazards. It is necessary for anyone wishing to build a confinement or manure storage structure in alluvial soils to get a declaratory order from the department. Regulations for locating in alluvial soils are varied in regards to number of animal units, total drainage area structure will be located in and designation of waterway. Building specifications may also be affected when locating in alluvial soils.

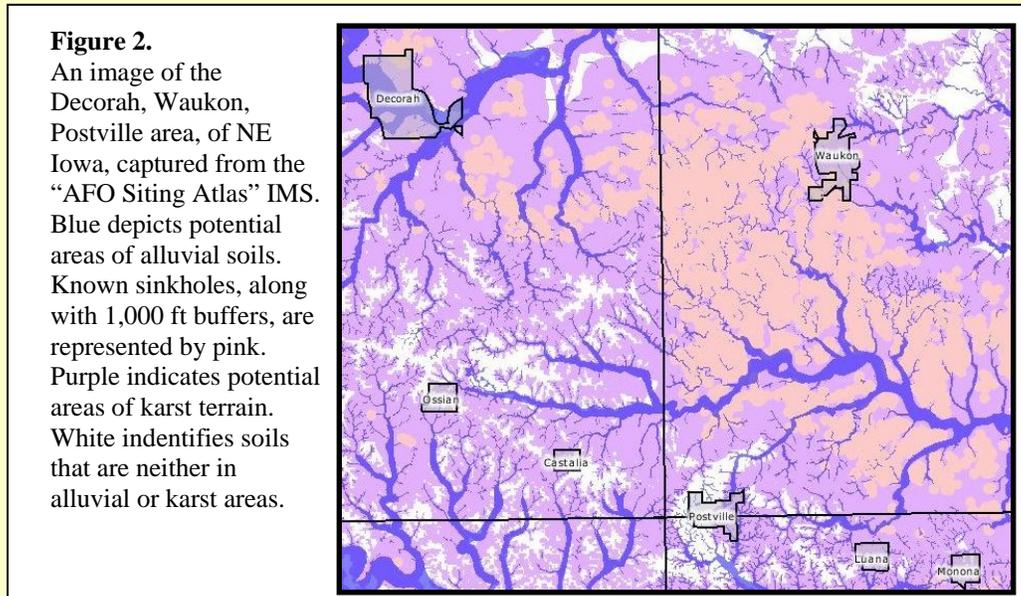
If a livestock producer wishes to locate a new or expanded AFO in one of these highly susceptible areas, they will have to consult with a DNR geologist who will take a closer look at maps of the area and use other information to make a definitive determination of the site's properties. The regulations are different for open feedlots and confined feeding operations, but all animal feeding operations are subject to the State of Iowa's karst and floodplain regulations. More information about AFOs including their regulation, producer's responsibilities when building and any new legislation can be obtained at <http://www.iowadnr.com/afo/index.html>.

Improving the Process with GIS

During a recent DNR Kaizen process improvement event for the Field Services and Compliance Bureau, participants from the AFO section decided that it would be advantageous for producers, consultants, and DNR staff to have access to maps that indicate areas of regulatory concern. The DNR staff wanted to assist livestock producers, who are responsible to meet the requirements of state law, by providing information that

can be used when siting new animal feeding operations or expanding existing operations. By making this information readily available, via the internet, DNR staff hope it will be used during the initial planning stages of an AFO to help eliminate the occurrence of producers having to reapply – thus helping to streamline the process. Producers and consultants can know up front if they have potential karst or alluvial soils, and either rule out construction or follow the additional steps required in the permitting process.

Since data for a highly detailed analysis are unavailable, the Iowa Geological Survey created maps that contain all of the potential karst and potential alluvial areas in the state.



Two customized GIS datasets were created to use in AFO site assessments. The resulting datasets can be thought of as “footprints” that outline areas containing karst terrain and alluvial deposits (Figure 2). The karst areas dataset consists of a GRID comprised of areas within 1,000 feet of known sinkholes and areas where carbonate bedrock is 50 feet or less from the land surface. The GIS dataset representing alluvial areas (used as an approximation of the 100-year floodplain), was drawn from soil mapping units where the parent-material type was alluvium combined with previously mapped alluvial deposits.

The two datasets have been made available as a new web-based internet mapping service (IMS). This will allow producers, contractors, and DNR staff to quickly locate a potential site location and evaluate the economic, environmental, and regulatory ramifications of siting the AFO. This site can be explored by navigating to www.iowadnr.gov, clicking on “Animal Feeding Operations”, then click on “Maps” on the lower left of the page under “Additional Information”.

Or use the following link [AFO Siting Atlas](#).

Contact Information

For questions related to AFOs, contact Claire Hruby at claire.hruby@dnr.state.ia.us or by phone at (515) 242-6848.



Iowa Fisheries Management Teams are embarking on an expanded statewide fish and habitat monitoring effort. Plans are being developed to coordinate the Fisheries effort with studies being conducted by the DNR's Water Quality Bureau to maximize sampling coverage, allow more areas to be sampled, and minimize duplication of effort. As part of the fisheries group's effort, assessments of available stream fish habitat and fish populations are being conducted in conjunction with development of a long-term GIS integrated database that will help to track changes in stream condition.

Fish collection data from Iowa streams dating back to 1854 is already available online via the Iowa Rivers Information System (IRIS), <http://maps.gis.iastate.edu/iris/>. This new monitoring effort will allow habitat and other parameters collected in the field to be added to this website. Plans are in place to enable data entry into the IRIS system over the internet for future monitoring efforts. Historic data collections are also being used to plan future monitoring efforts. GIS tools have been used to overlay historic collection location data on a statewide Hydrologic Unit Code (HUC) 12 coverage to determine watersheds which have never been sampled or have not been recently sampled. HUC 12 watersheds are presently being used as a "filter" for determining areas in need of sampling.

Additionally, the Fish Kill database and associated coverages are being continuously updated using information collected by fisheries management biologists and staff from the Water Quality Bureau. When this data is combined with habitat information, a more refined picture of what is going on with Iowa's fish population may be drawn.

This article was contributed by Jeff Kopaska. For more information regarding these efforts contact Jeff at Jeff.Kopaska@dnr.state.ia.us , or by phone at (515) 432-2823.

Updates and New Data

A listing of updates and new data added to the [NRGIS Library](#) in the last year can be accessed by clicking "Updates" in the upper left corner of the library website linked above or go to http://www.igsb.uiowa.edu/nrgislibx/updates_frame.asp .

Contact Us

If you would like to contribute to this newsletter by letting others know how your section uses GIS, or if you have questions, concerns, or suggestions regarding this newsletter contact Chris Kahle (ckahle@igsb.uiowa.edu), or Andy Asell (aasell@igsb.uiowa.edu).