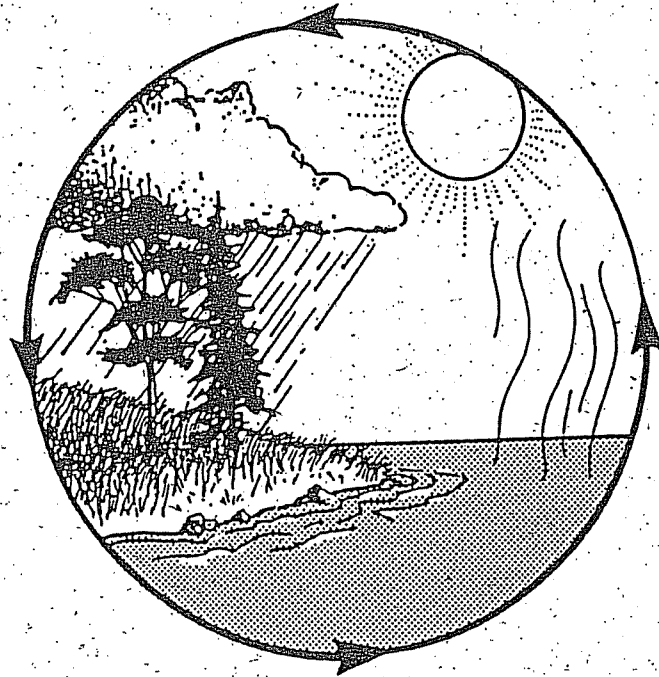

Feedlot Inventory Guidebook



June 1991



This Guidebook is printed on recycled paper.

Feedlot Inventory Guidebook

Prepared by the Minnesota Board of Water and Soil Resources
in cooperation with
Minnesota Department of Agriculture
Minnesota Geological Survey
Minnesota Department of Health
Minnesota Department of Natural Resources
Minnesota Pollution Control Agency
Minnesota State Planning Agency / Land Management Information Center
June 1991

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for layout and publishing



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Forward

This handbook, as part of a series of inventory guidebooks, has been prepared in the true spirit of the local-state partnership that has emerged out of comprehensive local water planning in the state. These inventory guidebooks were developed in response to identified needs in local plans and involved representatives of local, state and federal government.

If followed closely the guidebooks will produce a local inventory which is compatible to state data systems and standards. This is a crucial point as Minnesota Law requires that all natural resources data collected that has common value to the State must be collected in such a manner that is compatible with state systems and standards.

Included at the end of this guidebook is an evaluation form. Because this guidebook has been developed for local government we would appreciate any comments or suggestions on how it might be improved.

All of the State Agencies involved in this guidebook support and encourage your efforts. Therefore, do not hesitate to contact your local agency representative for guidance and assistance in the use of this guidebook.

11/20/07



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Feedlot Inventory Guidebook

Many county comprehensive water plans have identified livestock facilities as a source of surface and groundwater pollution. Many of these plans proposed doing an inventory of the feedlots within the county. The feedlot inventory guidebook was developed to provide a common form and framework for counties to use in conducting an inventory.

This guidebook was developed in cooperation with staff of the Minnesota Pollution Control Agency, Minnesota Department of Agriculture and the Minnesota Board of Soil and Water Resources.

Purpose

This guidebook will assist the county in performing a livestock facility inventory. Feedlots are defined as livestock confinement facilities where vegetation cannot be maintained within the enclosure.

Location and management of livestock facilities can greatly affect the potential for water pollution from manure produced by livestock. Runoff from manure storage areas and livestock confinement facilities (feedlots) may cause surface water pollution, and underground manure storage facilities can contribute to ground water pollution if improperly constructed or managed.

Feedlot Pollutants

Animal manure in the right places is a valuable resource. In addition to providing essential nutrients, manure provides organic matter and increases the soil's moisture holding capacity. The nutrients present in manure are beneficial to crops and soil, but when carried to surface or ground water can have detrimental effects.

Excess nutrients from feedlot runoff or soil erosion accelerate the natural eutrophication or aging process of surface waters. Increased phosphorus levels cause the plants and algae in a lake to grow at a much faster rate. Oxygen depletion caused by the increased plant growth and decomposition can kill fish or other aquatic species in both lakes and streams.

Leaching of manure from feedlots or manure application sites can increase the levels of nitrates in ground water. High levels of nitrates in drinking water can cause methemoglobinemia (blue baby syndrome) in human infants and the young of warm-blooded animals. Manure also contains fecal coliform bacteria, which are often associated with disease-producing organisms that can infect humans and livestock.

Use of Inventory Forms

An inventory can be conducted at three different levels. At Level 1, the inventory simply notes sites where livestock are present. At Level 2, information is gathered which can help identify sites that may have potential pollution problems from livestock facilities. At Level 3, pollution problems may be identified.

A county may wish to conduct inventories at different levels in different areas. For example, an inventory at Level 1 could be conducted throughout the majority of the county, but in a lake watershed

where there were plans to assess and improve lake water quality, the inventory could be conducted at Level 3. The inventory at Level 1 may be done through phone surveys and use of maps. Inventory Levels 2 and 3 require site visits to collect information.

Each of the three inventory levels has a different purpose. These are:

- Level 1**
 - Identify individual livestock facilities
 - Identify number of livestock facilities within an area such as a watershed. Once the number of livestock facilities within a specific area are identified, this information could be used to estimate the staff time required to conduct the inventory at Level 2 or Level 3
 - Prioritize areas where resources should be concentrated.
- Level 2**
 - Identify feedlots that are "potential" pollution problems
 - Determine staff time required to advance to Level 3
 - Identify feedlots in sensitive areas such as shoreland or ground water recharge areas.
- Level 3**
 - Identify sites that are creating pollution problems
 - Estimate staff time involved in correcting pollution problems. The information gathered in the inventory could also be used to estimate costs to correct individual pollution problems to make most efficient use of cost-share monies

Data Collection

The following data collection forms are provided as guidance to organizations collecting information about feedlots.

The Local Water Planning Inventory (LWPI) Form provides instructions for delineation of feedlot locations on base maps and for providing basic locational information on feedlots. The format is consistent with forms being used to inventory other activities such as dumps, abandoned wells, and storage tanks, and promotes consistency in collection of information on all types of potential contaminant sites.

The specific feedlot forms define the information which should be collected at feedlot inventory levels 1, 2, and 3.

The County Property Identifier is found on both forms (LWPI and feedlot forms) and may be used to relate information on a particular site from different inventory forms.

Local Water Planning Data Collection Guidelines

Capturing and recording information is critical to any inventory activity. With consistent methods, the information collected will be suitable for entry into computerized data bases and will be of great value at the inter-county, regional, or state levels. The information may be more valuable to you for future applications, as well.

This section describes base mapping procedures and explains how to record the most basic descriptive and locational information necessary to make your inventory data consistent with that collected in other counties and during other inventories. Using a standard base map for local inventories will assure that the information collected can be automated into a common statewide base map in the future. Recording of the standard data elements on the Local Water Planning Inventory Form will lead to consistent information on location, inventorying agency, inventory date, and activity inventoried. This will be especially useful with abandoned wells, because with a common base map it will be possible view the spatial relationships of abandoned wells to contamination sources and to private or public water supplies. Viewing the data in this manner will make it easier to determine which abandoned wells have the most potential to impact human health. This base information, common to all guidebooks, is then supplemented with information specific to the particular activity being inventoried (e.g., feedlots, dumps). In order to tie together information about the same activity on the general inventory form and the specific activity forms, users need to use a consistent identifying number for the site or activity on all of the relevant forms.

Base Maps

Over the past few years a number of federal, state, and local units of government in Minnesota have debated the issue of data standardization and base maps through an organization known as the Minnesota Geographic Information System/Land Information System (MnGIS/LIS) Consortium. This Consortium, through a consensus of its members, has identified the 7.5-minute (1:24,000) USGS Quadrangle Map Series as the base maps for natural resources planning. The maps are not suitable for site-specific work, but are broadly used in county, regional, and state assessments. Many important data layers, including land use, streams, lakes, watersheds, National Wetlands Inventory, and well locations are being delineated on and automated from this map series into a statewide natural resources Geographic Information System (GIS).

Plotting Local Water Planning Inventory sites on this base map series assures that the sites inventoried could become part of the GIS information base needed by state and local governments. For instance, feedlot sites identified by counties could be evaluated for proximity to surface water and shallow wells, surrounding land uses, and the like. Therefore, in order to automate these layers consistently, this guidebook recommends that this data inventory effort include plotting of the site inventoried on a USGS 7.5-minute quadrangle map.

Directions on how to proceed with base mapping is included in the instructions for the Local Water Planning Inventory form. This information is expanded upon in a separate guidebook on locational data and mapping guidelines.

NOTE: If a local unit of government accepts or uses state funds to generate or collect water resources or related information of common value to the state, Minnesota Statutes require that it must be collected in such a way or format that it is compatible with state systems and standards. Basically this means you would be required to plot inventoried sites on the USGS 7.5-minute quadrangle sheets.

Local Water Planning Inventory Form

The Local Water Planning Inventory Form is designed to capture basic information about the activities inventoried in a standard format which is consistent whether the activity inventoried is a feedlot, a dump, or other related activity. The form contains information on the type of activity inventoried at the site, the agency doing the inventory, the inventory date, and location of the base map, and the location of the site in Public Land Survey coordinates. It also asks for an identifying number for the site, which is used to tie together all information about that site. The PLS location is a common geographic location method, and is used in data bases to retrieve information by area.

Users contemplating creating a grid cell geographic data layer (in a system such as EPPL7 or GRASS) from the PLS data on the form should consult the separate guidebook on locational data and mapping standards.



LOCAL WATER PLANNING INVENTORY FORM

MPCA/6-91

1. AGENCY: (Check the agency conducting the inventory)

[] Local: _____ / _____ / _____
[] County: [] Health Dept. [] Watershed Dist. [] Env. Dept. [] SWCD
[] Other: _____

2. DATE COLLECTED:

_____ / _____ / _____
month day year

3. COUNTY CODE: _____ DOES THE SITE CROSS COUNTY LINES: _____

[] YES [] NO

4. SITE/FACILITY NAME: _____

5. COUNTY PROPERTY ID NUMBER: _____

6. SITE MAP:

- [] TOPOGRAPHIC [] PLAT
- [] ENGINEERING DIAGRAM [] SCS SOIL SURVEY
- [] OTHER: _____

7. BASE MAP: Record the site on a 7.5' USGS topographic (quadrangle) map. _____

8. NAME OF TOPOGRAPHIC MAP: _____

9. SITE DIRECTIONS AND OTHER INFORMATION: _____

MAP SCALE: 1 : _____, 000 (no greater than 24,000)

OR

Show relative locations of points of interest.

Large empty rectangular box for site map and relative locations of points of interest.

10. REMARKS: _____

11. TOWNSHIP: _____

12. RANGE: _____

13. SECTION: _____

Cook County Ranges Only [] East [] West

14. QUARTER: (largest unit to smallest unit): _____ / _____ / _____ / _____

15. SITE ADDRESS: _____

street number / street name

city

MN

zip code

16. TYPE OF SITE	17. SOURCES ON SITE	18. IDENTIFICATION NUMBERS	19. STORAGE TANK SITE #
<input type="checkbox"/> Agricultural chemical applicator	<input type="checkbox"/> Agricultural chemical mixing/loading	<input type="checkbox"/> EPA IDENTIFICATION (Hazardous Waste) #	_____
<input type="checkbox"/> Agricultural chemical dealer	<input type="checkbox"/> Agricultural chemical waste disposal	_____	_____
<input type="checkbox"/> Airport	<input type="checkbox"/> Agrichemical storage	<input type="checkbox"/> SOLID WASTE PERMIT #	<input type="checkbox"/> FEEDLOT PERMIT #
<input type="checkbox"/> Boat yard	<input type="checkbox"/> Agricultural chemical burning	_____	_____
<input type="checkbox"/> Car wash	<input type="checkbox"/> Animal burial	<u>S</u> <u>W</u> _____	_____
<input type="checkbox"/> Cemetery	<input type="checkbox"/> Automotive fluid storage	<u>S</u> <u>W</u> _____	_____
<input type="checkbox"/> Construction site	<input type="checkbox"/> Chemical warehousing, distribution	_____	<input type="checkbox"/> TIRE #
<input type="checkbox"/> Dry cleaner	<input type="checkbox"/> Chemigation	_____	_____
<input type="checkbox"/> Dump	<input type="checkbox"/> Cleaning supply storage/distribution	<input type="checkbox"/> NPDES / SDS PERMIT #	_____
<input type="checkbox"/> Farm	<input type="checkbox"/> Disposal Well	<u>M</u> <u>N</u> _____	_____
<input type="checkbox"/> Feedlot*	<input type="checkbox"/> Equipment repair / washing	<input type="checkbox"/> WATER APPROPRIATIONS PERMIT #	<input type="checkbox"/> OTHER #: _____
<input type="checkbox"/> Foundry	<input type="checkbox"/> Electroplating	_____	_____
<input type="checkbox"/> Gas station / truck stop	<input type="checkbox"/> Fuel storage (heating oil, LP gas, propane)*	_____	_____
<input type="checkbox"/> Golf course	<input type="checkbox"/> Hazardous waste storage / management	_____	_____
<input type="checkbox"/> Hazardous waste/superfund site	<input type="checkbox"/> Manure spreading /storage	<input type="checkbox"/> UNIQUE WELL # / "W" SERIES	<input type="checkbox"/> OTHER #: _____
<input type="checkbox"/> Housing development	<input type="checkbox"/> Motor vehicle repair	_____	_____
<input type="checkbox"/> Landfill (Demolition / Municipal)*	<input type="checkbox"/> On-site septic system	_____	_____
<input type="checkbox"/> Lagoon:septic,ash	<input type="checkbox"/> Open burning	_____	_____
<input type="checkbox"/> Laundromat	<input type="checkbox"/> Petroleum production,distribution	_____	<input type="checkbox"/> OTHER #: _____
<input type="checkbox"/> Lumberyard	<input type="checkbox"/> Recycling / waste reduction	_____	_____
<input type="checkbox"/> Machine shop	<input type="checkbox"/> Road deicing (stockpiling)	_____	_____
<input type="checkbox"/> Manufacturer	<input type="checkbox"/> Sewer line	_____	_____
<input type="checkbox"/> Medical facility	<input type="checkbox"/> Spills (toxic / hazardous waste)	_____	<input type="checkbox"/> OTHER #: _____
<input type="checkbox"/> Mine	<input type="checkbox"/> Stormwater runoff/retention basins	_____	_____
<input type="checkbox"/> Municipal incinerator	<input type="checkbox"/> Tanks: storage, piping, loading*	_____	_____
<input type="checkbox"/> Nursery	<input type="checkbox"/> Tire stockpiling	_____	_____
<input type="checkbox"/> Photography lab, printer, photocopier	<input type="checkbox"/> Waste storage /transfer	<input type="checkbox"/> AGRICULTURE PERMIT AND LICENSE #	<input type="checkbox"/> OTHER #: _____
<input type="checkbox"/> Railroad track, yard	<input type="checkbox"/> Waste treatment	_____	_____
<input type="checkbox"/> Research lab	<input type="checkbox"/> Wells*	_____	_____
<input type="checkbox"/> Road maintenance yard	<input type="checkbox"/> Wood treatment	_____	_____
<input type="checkbox"/> Scrapyard, salvage	<input type="checkbox"/> Other: _____	_____	_____
<input type="checkbox"/> Other: _____	_____	_____	_____
<input type="checkbox"/> Other: _____	_____	_____	_____

* Additional guidance available

LOCAL INVENTORY DATA COLLECTION INSTRUCTIONS

ABOUT THIS SECTION

The following section explains how to collect those data that are essential for an inventory, the recommended "minimum data elements." Collecting this information will give you inventory data that can be the basis for a geographic information system (GIS). It will also provide basic information about the site, like where it is and why it is of interest. Some segments of the instructions offer alternate methods for collecting data. Choose the methods that meet your needs and resources.

Please follow the suggested format. It reflects the formatting typical of other groundwater-related data bases that exist in state or county agencies. Having similar formats will make it easier to share inventory information between counties and throughout the state. Certain data fields will probably contain identical information for all sites in your area. Consider creating a master data collection form by completing these fields and copying this form to reduce the amount of information you enter manually, save time and reduce the chance of errors. If you have suggestions, questions or want to discuss alternate methods for collecting information, please contact your Project Coordinator, the Board of Water and Soil Resources, or the Land Management Information Center of the Minnesota State Planning Agency.

INSTRUCTIONS

1. **AGENCY:** Identify the agency or organization that performed the inventory. Check all boxes that apply and write in the organization name, if applicable.
2. **DATE COLLECTED:** Give the first three letters of the month. Give the day and year as numbers.
3. **COUNTY CODE:** Record the code from the list below. If the site crosses county lines check "yes".

01 AITKIN	02 ANOKA	03 BECKER	04 BELTRAMI	05 BENTON
06 BIG STONE	07 BLUE EARTH	08 BROWN	09 CARLTON	10 CARVER
11 CASS	12 CHIPPEWA	13 CHISAGO	14 CLAY	15 CLEARWATER
16 COOK	17 COTTONWOOD	18 CROW WING	19 DAKOTA	20 DODGE
21 DOUGLAS	22 FARIBAUT	23 FILLMORE	24 FREEBORN	25 GOODHUE
26 GRANT	27 HENNEPIN	28 HOUSTON	29 HUBBARD	30 ISANTI
31 ITASCA	32 JACKSON	33 KANABEC	34 KANDIYOHI	35 KITSON
36 KOOCHICHING	37 LAC QUI PARLE	38 LAKE	39 LAKE OF THE WOODS	
40 LE SUEUR	41 LINCOLN	42 LYON	43 MCLEOD	44 MAHNOMEN
45 MARSHALL	46 MARTIN	47 MEEKER	48 MILLE LACS	49 MORRISON
50 MOWER	51 MURRAY	52 NICOLLET	53 NOBLES	54 NORMAN
55 OLMSTED	56 OTTER TAIL	57 PENNINGTON	58 PINE	59 PIPESTONE
60 POLK	61 POPE	62 RAMSEY	63 RED LAKE	64 REDWOOD
65 RENVILLE	66 RICE	67 ROCK	68 ROSEAU	69 ST. LOUIS
70 SCOTT	71 SHERBURNE	72 SIBLEY	73 STEARNS	74 STEELE
75 STEVENS	76 SWIFT	77 TODD	78 TRAVERSE	79 WABASHA
80 WADENA	81 WASECA	82 WASHINGTON	83 WATONWAN	84 WILKIN
85 WINONA	86 WRIGHT	87 YELLOW MEDICINE		

4. **COUNTY PROPERTY IDENTIFICATION NUMBER:** Record the site's property identification number. Generally, this is an 11 to 15-digit number and it can be found in your county tax records. Some counties have two identification numbers. If you must choose between identification numbers, use the number that incorporates township, range and section information.
5. **SITE MAP:** Show the locations of potential contaminant sources on the site and label them. Locate potential contaminant sources in relation to at least two permanent, identifiable landmarks.

- * Show scale or measured distances.
- * Show surveyed benchmarks and baselines.
- * Show the point you will mark on the Base Map (see # 6), so the two maps can be oriented to each other.
- * Indicate North.

If you prefer, make your notations on a map of a suitable scale (1 inch less than or equal to 2000 feet; no greater than 24,000), such as an engineering diagram, SCS Soil Survey map, or plat map, rather than on the data sheet. Indicate the type of map used and its scale. Attach a clear photocopy of the site map to this form, if possible, for future reference.

6. **BASE MAP:** The state of Minnesota is adopting the USGS 7.5-minute map series as the standard base map for statewide planning-level geographic data development. Many important data layers are being delineated on and automated from this map series, including land use, streams, lakes, watersheds, wetlands, and well locations. Plotting site locations on this map scale will, at a minimum, allow the data to be digitized into a statewide, automated base map, that can be analyzed with other map layers.

Mark the location of the site on a USGS 7.5-minute topographic (quadrangle) map. Label the location with the site's property identification number (or unique number, if it is a well). Even if you are not using a geographic information system now, it will save effort later if you accurately locate the site as part of your inventory work.

Use of a paper 7.5-minute base map is sufficient for inventory purposes. Use of a stable-base mylar overlay is recommended if you want to keep several inventory layers in separate overlay sheets, and is required if you plan to electronically "scan" the layer directly into a GIS.

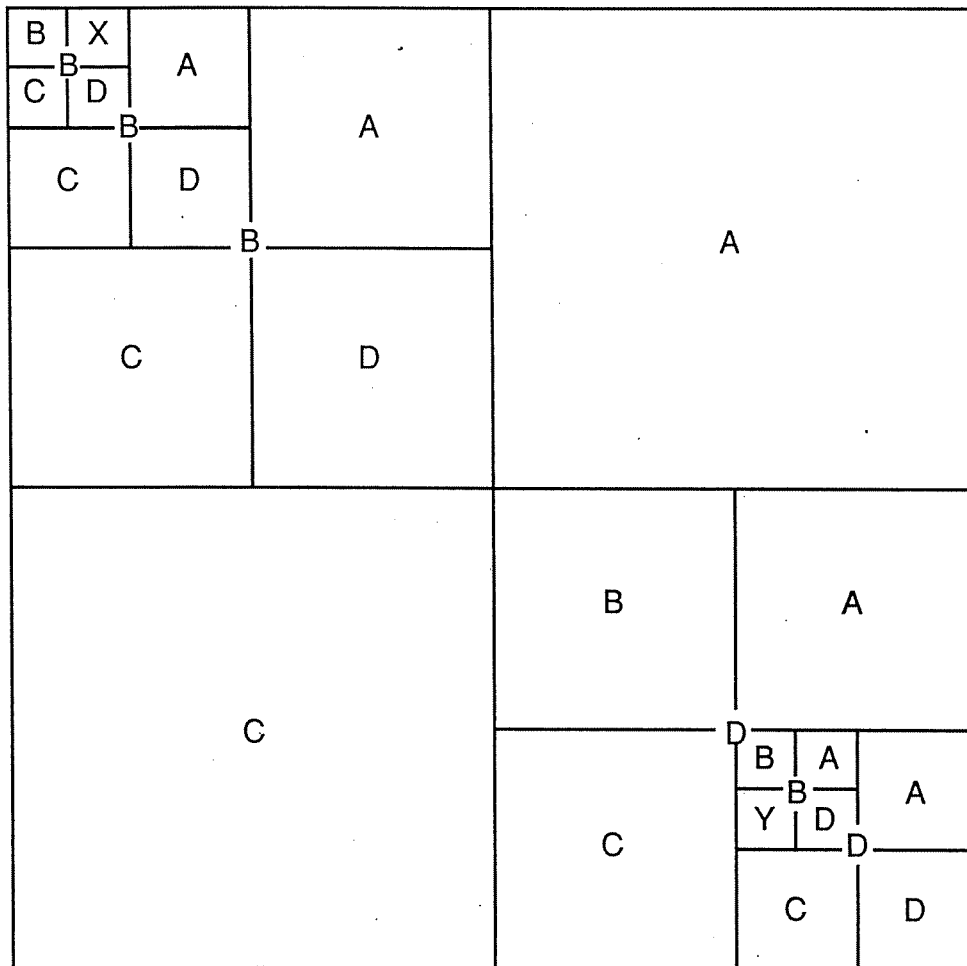
If a stable-base mylar overlay sheet is used, great care should be used to transfer quadrangle corner tics from the paper base map to the overlay. The quadrangle corner tics are used to register all delineations on the map to real world geographic coordinates. This is the key to geographic information system development. Sloppy transfer of these tics will distort the registration of the map features, and the information automated will not line up correctly with other layers. Corner lines should be traced carefully with a narrow width pen.

Note: Whether or not you have plans to automate the information you collect, maps should be rolled or stored flat, NEVER FOLDED. Folding distorts the map, increasing the difficulty of electronic data capture and reducing accuracy. Where a more detailed site map is to be used (e.g. plat book, SCS Soil Survey, or engineering diagram) such as for a Wellhead Protection Area Site Assessment, the map should have four identifiable geographic reference points to assure that the locations depicted on it can be digitized and incorporated into a Geographic Information System (GIS).

7. **NAME OF TOPOGRAPHIC MAP:** Give the name of your topographic (quadrangle) base map in #5.
8. **SITE DIRECTIONS AND OTHER IMPORTANT INFORMATION:** Explain what someone would need to know to travel to, and gain access to, the site. Include any other important information (such as the person to contact for access, dangers on-site, etc.) in this field.
- 9 - 12. **PUBLIC LAND SURVEY DESCRIPTION:**

9. TOWNSHIP: Township numbers begin with "T" and run North/South along the map's side margins. Record the township number.
10. RANGE: Range numbers begin with "R" and run East/West on the map's top or bottom margin. Record the range number. For Cook County ranges ONLY, check the box indicating whether the range is East or West.
11. SECTION: Find the section where the site is located and record the section number.
12. QUARTER: Record the site location from the LARGEST unit to SMALLEST unit. Give the location to at least four quarters, if possible. Give it at least to two quarters and at most to six quarters.

Assign codes to the quarters according to the pattern in the box to the right. For example, the point "X" in the upper left corner of the illustration is located at B/B/B/A. Point "Y" in the lower right corner is located at D/D/B/C.



13. SITE ADDRESS: Give the complete address of the site, if there is one.

14. TYPE OF SITE: Mark all facilities, or other potential contaminant sources present on the site. List any important items not already listed under "other". Guidebooks are available for those items marked with ""
15. SOURCES ON SITE: Mark all activities that occur on the site. Guidebooks are available for those items marked with ""

OPTIONAL INFORMATION. Some information is helpful, but not necessary for every inventory. You may or may not need the following information.

16. IDENTIFICATION NUMBERS: A variety of numbering systems exist for keeping track of regulated activities and facilities. If available, include numbers that apply to the activities or entities you checked under #14 and #15.
17. LEGAL DESCRIPTION: The County Assessor's Office may have already recorded PLS coordinates and property survey descriptions. Is this information:

AVAILABLE? [] YES [] NO

IN YOUR DATABASE? [] YES [] NO

18. COORDINATE LOCATIONS: Location coordinates can be determined more accurately by other coordinate-based systems. If you used satellite-based Geo-Positioning Systems (GPS) give the coordinates below.

Latitude / Longitude: / / . / / / .
deg / min / sec /deg /min /sec

If you used UTM or State Plane, enter the coordinates below.

UTM: / /
 easting / northing / zone

State Plane: / /
 x coordinate / y coordinate / zone

19. OWNER'S NAME. Give the full name of the owner of the site.

Last Name

First name

Middle Initial

20. OWNER'S MAILING ADDRESS/TELEPHONE NUMBER. Fill in the complete mailing address and telephone number.

street number

street name

city

state

zip code

(_____) _____
telephone

21. OWNER OCCUPIED. YES NO

22. SITE CONTACT. Give the person and number to call about the site, if different from #20.

Last name

First name

Middle Initial

(_____) _____

telephone

FEEDLOT INVENTORY

File Name _____

Date of inventory _____

Inventory done by: _____

Title of person doing inventory: _____

COUNTY PROPERTY ID NUMBER.

INVENTORY LEVEL 1

1. Are there livestock on pasture at the site? Yes _____ No _____
2. Are there livestock confined to barns or open concrete or dirt lots?
Yes _____ No _____

FEEDLOT INVENTORY

File Name _____

Date of inventory _____

Inventory done by: _____

Title of person doing inventory: _____

COUNTY PROPERTY ID NUMBER.

INVENTORY LEVEL 2 - Completion of inventory Level 2 will give more information about potential pollution hazards from the site. If the answer to question 2 is yes, the livestock facility may present a potential pollution hazard and further study may be necessary to determine if the facilities cause water pollution. Inventory Level 3 may be completed to gather this additional information, or the facilities may be assessed using the computer Feedlot Model listed in the Reference Section.

If the answers to question 2 is no, no water pollution hazards are likely.

3. Please list the range of numbers of animals present at the site during the year:
 - A. _____ Calves (150 - 500 lb)
 - B. _____ Feeder cattle (500 - 1200 lb)
 - C. _____ Beef cows
 - D. _____ Young dairy stock (500 - 1000 lb)
 - E. _____ Replacement heifers
 - F. _____ Dairy cows

- G. _____ Nursery pigs (up to 55 lb)
- H. _____ Grower/feeder pigs (55 - 100 lb)
- I. _____ Finishing hogs (100 lb - Market wt.)
- J. _____ Sows
- K. _____ Boars
- L. _____ Sheep
- M. _____ Turkeys
- N. _____ Layer chickens
- O. _____ Broiler chickens
- P. _____ Horses
- Q. _____ Other (list type _____)

- 4. Are there any surface waters present within 1,000 feet of the livestock facilities? Yes _____ No _____
- 5. Are there any open lots for animal confinement? Yes _____ No _____
- 6. Are there any below ground manure storage pits? Yes _____ No _____
- 7. What is the shortest distance from any livestock confinement facility or manure storage area to a well?

FEEDLOT INVENTORY

File Name _____

Date of inventory _____

Inventory done by: _____

Title of person doing inventory: _____

COUNTY PROPERTY ID NUMBER.

INVENTORY LEVEL 3 - Proceed to determine if a pollution hazard exists.

8. Based on the following figures, how many animal units are present at the site?

Note the following for calculating animal units (A.U.) (list number of animals from question 3 above, then multiply by number of animal units):

- _____ mature dairy cows x 1.4 animal unit = _____ A.U.
- _____ slaughter steers or heifers x 1.0 animal unit = _____ A.U.
- _____ horses x 1.0 animal unit = _____ A.U.
- _____ swine over 55 pounds x 0.4 animal unit = _____ A.U.
- _____ ducks x 0.2 animal unit = _____ A.U.
- _____ sheep x 0.1 animal unit = _____ A.U.
- _____ swine under 55 pounds x 0.05 animal unit = _____ A.U.
- _____ turkeys x 0.018 animal unit = _____ A.U.
- _____ chickens x 0.01 animal unit = _____ A.U.

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For animals not listed specifically, the number of animal units shall be defined as the average weight of the animal divided by 1,000 pounds.

_____ other x average weight / 1000 = _____ A.U.

Total number of animal units _____

Questions 9 through 13 may be skipped if you choose to complete the "Feedlot Evaluation System" form at the end of this section. The "Feedlot Evaluation System" will identify facilities that may be considered pollution hazards by the Minnesota Pollution Control Agency.

9. What is the approximate area of open lots used for livestock confinement (don't include pastures)?

10. If open lots are less than 1,000 feet from a surface water, approximately how far are the lots from those surface waters (streams, road ditches, tile inlets, wetlands, lakes, drainage ditches, etc.)?

11. Do these lots drain towards these surface waters? Yes _____ No _____

What type of surface water? _____

Name of surface water? _____

12. Are there any runoff control measures present at these open lots (berms, runoff storage basins, clean or dirty water diversions, etc.)?

Yes _____ No _____

Please list runoff control measures present:

13. What proportion of the time are animals in the open lots compared to inside buildings? _____

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14. How many below ground manure storage pits are present at the facility:
Number of concrete pits _____ Storage time _____
Number of clay-lined basins _____ Storage time _____
Number of earth-lined basins _____ Storage time _____
Number of other below ground manure storage structures _____
Type of lining material _____ Storage time _____
15. Does manure flow by gravity or is it pumped to the storage area (check one)? Gravity flow _____ Pumped _____
16. Above ground manure storage:
concrete stacking slab Yes _____ No _____
earthen manure stockpile area Yes _____ No _____
liquid manure tanks (Slurrystore-type) Yes _____ No _____
17. If this is a dairy facility, how is milkhouse waste disposed of?

-
18. If pollution prevention measures are in use, were they designed by the Soil Conservation Service or Soil and Water Conservation District personnel?
Yes _____ No _____
19. Is a formal manure management plan in use for this facility?
Yes _____ No _____
20. How many acres are used for spreading of manure? _____
21. Does the facility operator own all acres used for spreading manure?
Yes _____ No _____

22. What method is used for applying manure (check type)?

Surface spreading _____

Surface spreading with immediate incorporation _____

Injection _____

Irrigation _____

23. Crop rotation or type _____

24. Include a sketch of the site if possible, showing buildings, manure storage structures, open lots, surface waters, direction of runoff, etc.

The following pages may be used to gather the information needed to run the computer feedlot evaluation listed in the Reference section. This evaluation can be used to identify feedlots which cause water pollution. Feedlots which receive a rating greater than zero in this evaluation may be considered pollution problems by the Minnesota Pollution Control Agency.

Feedlot Evaluation System Animal Lot Evaluation Data

Operator _____ Location _____
(Section, Township, Range)

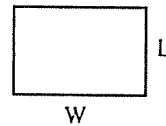
This is a system for evaluating the potential pollution hazard of runoff from an open animal lot. It provides numerical ratings for both the surface water pollution hazard and the groundwater pollution hazard.

Calculations and Notes

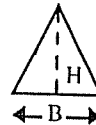
Information for Step 4: $43,560 \text{ ft}^2 = 1 \text{ acre.}$

Formulas for calculating areas:

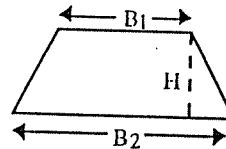
1. Square or Rectangle: $= L \times W$



2. Triangle $= \frac{B \times H}{2}$



3. Trapezoid: $= \frac{(B_1 + B_2) \times H}{2}$



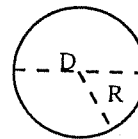
c. $A = 0.785 D^2$

4. Circle: a. $A = \pi r^2$

or

b. $A = \frac{\pi D^2}{4}$

or



The following steps should be taken to evaluate and rate an animal lot:

Surface water pollution potential

Step 1. Carefully study the animal lot and the area immediately surrounding it. Briefly describe the discharge point, using the name of the receiving water if applicable, in the blank on page _____.

Step 2. On the back of this form, sketch the local watershed. For those portions of this watershed outside the animal lot itself, indicate soil types (use the best available soils information) and ground cover (use the categories in Table 1). Determine the outside (plan) dimensions of the roofs of barns, feeders, and other buildings. Scale all land dimensions needed for the sketch, using the best available maps and photos, or pace the distances. If the lot is partly paved and partly earthen, estimate the proportion of the total which is paved.

Indicate in Areas 1, 2 and 3 on the sketch. Divide Areas 2 and 3 into sub-areas (2a, 2b, 2r; and 3a, 3b, 3c, 3d) if there are differences in soil types or ground cover or if parts are paved or roofed.

Step 3. Determine the design rainfall (R) from rainfall map (Fig. 1) for a 25 yr, 24 hour rainfall.

$$R = \text{_____ in} \quad (1)$$

Step 4. Complete all blanks in the following table, inserting "0" in all blanks not otherwise filled. Record the ground cover of each area or sub-area as well as their sizes. (Ground cover was indicated on the sketch.) Sizes may be determined from the dimensions on the sketch or, if sketch is drawn to scale, a planimeter or an SCS transparent area scale may be used.

Area 1 Feedlot	_____	ft. ² = _____	ac	(2)
Area 2a	_____	ft. ² = _____	ac	(3)
Area 2b	_____	ft. ² = _____	ac	(4)
Area 2r	Roof Area	_____	ft. ² = _____	ac (5)
Area 3a	_____	ft. ² = _____	ac	(6)
Area 3b	_____	ft. ² = _____	ac	(7)
Area 3c	_____	ft. ² = _____	ac	(8)
Area 3d	_____	ft. ² = _____	ac	(9)

Step 5. Enter soil cover complex number (CN) for the animal lot (Area 1) based on the following table:

% paved	0-24	25-49	50-74	75-100
CN	91	92	93	94

$$CN = \text{_____} \quad (10)$$

Step 6. Complete all blanks in the following table, inserting "0" in blanks not otherwise filled. Soil type was indicated on the sketch. After determining the soil hydrologic group from Table 2, find the soil cover complex number from Table 1.

	Soil Type	Soil Hydro- logical Group			
Area 2a	_____	_____	CN	=	_____ (11)
Area 2b	_____	_____	CN	=	_____ (12)
Area 2r Roof Area					
Area 3a	_____	_____	CN	=	_____ (13)
Area 3b	_____	_____	CN	=	_____ (14)
Area 3c	_____	_____	CN	=	_____ (15)
Area 3d	_____	_____	CN	=	_____ (16)

Step 7. Identify the buffer. If there is no buffer, enter zero on line 17 and continue with Step 8.

The total length of the buffer is the shortest distance, measured along the line of flow, from any part of the animal lot to the discharge point. This length may be analyzed as one or more sections so that each is fairly uniform in both ground cover and slope. Note that the calculator will accept any number of buffer sections. If using more than two, write in the margin.

Survey the slope of each section. If slope is surveyed as zero, record as .01. Refer to Table 1 for the surface condition constant C.

Section a.

Slope (S) = _____ % (17)

Ground Cover _____ (C) = _____ (18)

Distance (L) = _____ (19)

Section b.

Slope (S) = _____ % (20)

Ground Cover _____ (C) = _____ (21)

Distance (L) = _____ (22)

Animal Lot Evaluation Data

Operator _____

Step 8. Enter the number of animals in the lot and the animal type factors from Table 3 for chemical oxygen demand (COD) and total phosphorus (P).

<u>Animal Type</u>		Number of			
_____		Animals	=	_____	(23)
		COD Factor	=	_____	(24)
		P Factor	=	_____	(25)
_____		Number of			
		Animals	=	_____	(26)
		COD Factor	=	_____	(27)
		P Factor	=	_____	(28)
_____		Number of			
		Animals	=	_____	(29)
		COD Factor	=	_____	(30)
		P Factor	=	_____	(31)

**** End of data entry ****

Groundwater Pollution Potential

Step 9. Consider the first (upper) buffer section.

A) Note the soil type as shown on the sketch _____.

Determine the hydrologic soil group from Table 2, and indicate the soil group and soil factor on the table below.

<u>Hydrologic Soil Group</u>	<u>Soil Factor</u>
A	2
B	1
C	0
D	0

B) Note the minimum depth to groundwater or bedrock, and indicate source of this information (for example: site inspection or SCS - soils - 5 soil interpretation).

Minimum depth _____

According to _____

Determine the depth factor and indicate on the table below:

<u>Minimum depth</u>	<u>Depth Factor</u>
0-2 ft.	3
2-4 ft.	2
4-6 ft.	1
more than 6 ft.	0

Animal Lot Evaluation Data

Operator _____

C) Rating value for groundwater pollution:

Soil factor plus depth factor = _____ (32)

Step 10. Results of evaluation:

Surface water:

Total volume of runoff at the discharge point _____ Acre-inches (33)

COD concentration at the discharge point _____ mg/l (34)

Description of discharge point and/or name of receiving water if applicable (from Step 1.):

Animal lot rating for surface water pollution
(0 = no hazard, 100 = very severe hazard) _____ (35)

Groundwater: (from line 32)
(0 = minor hazard, 5 = very severe hazard) _____ (36)

Additional comments:

Step 10.9. If the feedlot operation includes separate animal lots in immediate proximity to each other that are interdependent in use or management, combine ratings for all such animal lots and enter the results here.

Total volume of runoff from feedlot _____ Acre inches

Weighted average COD concentration _____ mg/l

Feedlot rating _____

Prepared by _____ Date _____

Inventory Updating

The Minnesota Pollution Control Agency (MPCA) has a record of feedlots that have been reviewed for potential pollution hazards and have received feedlot permits. The MPCA will provide interested counties with a current list of MPCA permitted facilities in their county, and can provide annual updates of this list. Counties that have conditional use zoning for feedlots can update their inventories by monitoring the conditional use permits issued.

References

The following list is provided to acquaint you with the role of the agencies and programs that may be involved with feedlots.

MINNESOTA POLLUTION CONTROL AGENCY (MPCA): responsible for administering state and federal rules on feedlot-related pollution. Central Office staff are primarily responsible for permit review and issuance, enforcement and education. Regional Office staff are available for inspections, education, complaint investigation and to provide assistance with feedlot permit applications. The MPCA has offices in St. Paul, Duluth, Rochester, Brainerd, Marshall, and Detroit Lakes.

WATERSHED DISTRICTS: these districts may regulate land use within a specific watershed area and provide technical assistance for projects to protect or enhance water quality within the watershed.

SOIL AND WATER CONSERVATION DISTRICTS (SWCD): offer state cost-share and technical assistance to landowners installing livestock waste control systems. Offices in each county.

SOIL CONSERVATION SERVICE (SCS): federal agency (USDA) which provides technical assistance to feedlot operators to review, plan, design, and install livestock waste control systems. Offices in each county.

AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE (ASCS): federal agency (USDA) which provides federal cost-share assistance to landowners installing livestock waste control systems. Offices in each county.

Responsibilities:

Feedlot regulation: Minnesota Pollution Control Agency

Cost-share assistance: Agricultural Stabilization and Conservation Service Soil and Water Conservation District

FEEDLOT INVENTORY GUIDEBOOK

Technical Assistance: Soil Conservation Service
Watershed District
Soil and Water Conservation District

For further evaluation of livestock feedlots for potential pollution hazards, a computer program was developed by the U.S. Department of Agriculture. Most Soil Conservation Service offices have this program available. The text accompanying this computer program is titled "An Evaluation System to Rate Feedlot Pollution Potential," authors Robert A. Young, Michael A. Otterby, and Amos Roos. This is U.S.D.A. Agricultural Research Service publication ARM-NC-17, published April 1982.

For more information contact the Soil Conservation Service or Minnesota Pollution Control Agency.

Glossary

A

Animal Lot - an open lot, or a combination of open lots, intended for the confined feeding, breeding, raising or holding of animals and specifically designed as a confinement area in which manure may accumulate, or where the concentration of animals is such that a vegetative cover cannot be maintained within the enclosure. This includes poultry ranges, but does not include pastures. "Animal area" is equivalent to "animal lot."

Area 1 - The animal lot or lots, less any area covered by a roof. (Roof area is considered part of Area 2 if it drains across the lot. Otherwise, it may be part of Area 3 or outside the local watershed entirely.)

Area 2 - Area tributary to the animal lot, that is, the area from which runoff will drain through the lot or wash across it. Usually includes part of the roof area of buildings adjoining the lot and often includes part of the farmstead.

Area 3 - That part of the local watershed which contributes runoff to the discharge point but is not included in Area 1 or Area 2. Area 3 includes the entire buffer, plus any other area whose runoff flows over the buffer.

B

Buffer - That part of Area 3 in which runoff from the animal lot receives effective treatment as it flows over surface vegetation.

D

Discharge Point - The point where runoff from the local watershed becomes channelized and no longer receives effective treatment as it flows over surface vegetation. The discharge point may be a tile inlet, the edge of a sinkhole, drainage ditch or grassed waterway*, or the normal high water mark of a perennial or intermittent stream, lake or marsh, if animal lot runoff drains to such a point. The discharge point may also be some other point, closer to the animal lot, at which sheet flow of animal lot ceases - for example, a point where the runoff enters a dry run, gully or large rill.

L

Local Watershed - The smallest watershed that includes the animal lot and the buffer. Consists of Areas 1, 2 and 3.

* If an animal lot and its associated Area 2 comprise the majority of the drainage area of a grassed waterway, and the waterway is designed principally to treat feedlot runoff, the grassed waterway constitutes a buffer and its outlet should be considered the discharge point.

Feedlot Inventory Guidebook Evaluation

The purpose of this evaluation form is to collect information on the usefulness of the guidebook and determine what changes local government feel are necessary or would be beneficial to them. The information collected will be used by the BWSR and the 103B.301 (110B) Technical Committee to assess its efforts and make appropriate changes.

1.) Is the guidebook written in an easy to follow format?

Very Useful				Not Useful At All
5	4	3	2	1

2.) Was the guidebook easy to understand?

Very Useful				Not Useful At All
5	4	3	2	1

3.) Did the guidebook provide sufficient guidance to allow you to complete the inventory independently?

Very Useful				Not Useful At All
5	4	3	2	1

4.) Were any of the sections of the guidebook not useful or unnecessary?

List _____

5.) Describe what you would add, modify, change, or delete to more fully have the guidebook meet your needs.

Please return evaluation to:
BWSR
Southbridge Office Building
155 South Wabasha, Suite 104
St. Paul, MN 55107