LIVESTOCK WASTE
MANAGEMENT GUIDELINES
LIVESTOCK WASTE MANAGEMENT GUIDELINES

General Considerations

The tremendous quantity of animal wastes produced and their low economic value make the solution to livestock waste management problems difficult, while public reaction to the potential for disease transmission, water pollution and such associated nuisances as odors, dust, and flies make it imperative. The first step of the livestock industry toward solution of these problems must be to accept the responsibility of managing livestock production units in such a way as to render them environmentally compatible with the public interest. Some major and expensive steps may have to be taken by individual producers and by the livestock industry as a whole in order to implement modern waste management practices. Part of the cost of such steps may be recovered through increased efficiency built into new systems and eventually the use or sale of by-products may help to offset these costs, but a complete commitment is nevertheless required in order to solve the problems.

On the other hand, failure to solve livestock waste management problems would destroy public confidence in the ability of the livestock industry to produce a clean, wholesome and consumable product. Livestock production units must be designed, operated, and maintained in such a manner as to present an attractive appearance so as to suggest proper waste management. The image of a wholesome consumer product is a valuable asset which cannot be jeopardized by failure to commit to environmental quality programs.

Application of Guidelines

The guidelines which are presented here are intended to be used by livestock producers of Washington. The general concepts of proper waste management should apply to all livestock production enterprises. However, many of the details and suggested waste management practices which are outlined here are intended only for those enterprises which are confined feeding operations. By “confined feeding” is meant the confined feeding of animals for food, fur, or pleasure purposes in lots, pens, pools or ponds which are not normally used for raising crops and in which no vegetation, intended for animal food, is growing. This will not ordinarily include a wintering operation for cows in lots or on farming ground unless the operation causes a pollution problem.

Objectives of Waste Management

Animal wastes, of course, contain many varied organic substances, the concentrations of which are a function of several parameters including the size of the animal, the diet of the animal, as well as the method of handling the wastes. The result of present manure handling practices is that the material is very concentrated and not well suited to treatment by usual waste treatment methods. The high concentrations and volumes of wastes offer some very significant problems to the determination of which management practices might be utilized. Some possible waste management objectives are as follows:

1. Control of objectionable odors, dust, flies, rodents and other nuisances.
2. Management of the nitrogen content for ground water pollution control.
3. Control of waste movement so that wastes do not come in contact with streams, lakes, or reservoirs.
4. Improvement of the characteristics of waste for ease of handling.
5. Management of wastes to prevent health and safety hazards to man and animals.

While the above stated objectives are the general objectives of livestock waste management, the overriding objective at the present time is to manage and dispose of all wastes associated with livestock production in a manner that will not create a surface water or ground water pollution problem. Current economic conditions of the livestock production industry and present waste treatment technology offer little hope for biological or chemical treatment of wastes to the extent that the effluent would be of sufficient quality for discharging into a surface or subsurface body of water. Therefore, the practice recommended as a general guideline is to insure, through waste management practices, that manure and other wastes are retained upon the premises until ultimate disposal on the land. These wastes must be retained in a manner that they will not cause surface water or ground water pollution.

In order to fulfill the above objectives, the following waste management practices are recommended:

A. Site Evaluation. Site evaluation is a major factor in controlling water pollution from livestock operations. In the past, few livestockmen have realized or been concerned with the water pollution potential of their operations when evaluating the location of their confinement lots. If water pollution from confinement livestock operations is to be controlled economically, adequate consideration must be given to pollution control during the site selection process.

The following guidelines are recommended in site evaluation:

1. Maps showing contours, topographic features, ground water profiles, streams and natural drainage ways, existing and proposed building locations, soil classifications and manure disposal areas may be required to accomplish the above objectives and guidelines.
2. The confinement lot should be located a considerable distance (100 yards if possible) from any active or intermittent stream, drainage channel or irrigation canal.
3. A site should be selected with as much vertical distance as possible between the ground surface and the water table.
4. The confinement lot should be located outside the ten-year flood plain of major streams.
5. Confinement lots should be developed preferably in agricultural areas to facilitate finding suitable areas for ultimate disposal of manure.
6. The ultimate disposal area for the manure should be selected prior to final selection of the confinement lot site.
7. Confinement lot sites should be situated so as to eliminate any run-off onto, through, or from the livestock operation.
8. Expected growth of residential areas or other developments should be considered in site selection.
9. Prevailing wind directions are a major factor in proper site selection for the confinement lot.
B. Solid Waste Management Systems.

1. One or more retention or storage ponds should be located on the premises to store and control storm run-off from the confinement area. Diking or other means of diverting surface run-off from adjacent land areas should be provided to minimize the size of the retention structure and to reduce the hazards of causing unwanted spills from the retention structure. In some waste management systems, these ponds may have to be fenced to avoid health and safety hazards.

2. In areas where natural soil permeability may be excessive, an impermeable seal should be installed in the pond to prevent excessive permeability and contamination of ground water. The Washington Department of Ecology requires that permeability should be limited to one-quarter inch per day.

3. Diversion dikes and ditches used for transporting run-off around the confinement area should have a proper gradient and/or control structure to prevent soil erosion. Grassed waterways, as described by Soil Conservation Service specifications, may also be used to control this excess run-off without erosion.

4. Silage storage areas should be provided with drainage facilities which discharge into the retention structure.

5. Manure solids from the dairy lot should be stockpiled in an area not accessible to the cows for later disposal or hauled directly to the ultimate disposal area. Means of controlling run-off from the stockpile area shall be provided and should discharge into the retention structure. It may be necessary to pave the stockpiling area in order to prevent ground water pollution.

6. Subsequent to storm run-off periods, the contents of the retention structure should be discharged to the ultimate disposal area at the earliest appropriate time to insure storage capacity for future run-off.

7. Overflow, from continuously flowing water troughs should be conveyed from the watering trough by buried drain pipe to a drainage channel outside the feeding area and downgrade of the feeding area and retention structure.

8. Fly reproduction should be controlled by keeping the manure stockpiles dry during fly propagating periods. If other conditions prevent drying, the manure should be sprayed with a suitable insecticide. The retention structure and contents may also have to be treated to prevent fly propagation. Specifications for suitable insecticides to be used for this type of fly control are available at local county Extension offices.

9. Odor control may be a serious problem with livestock operations. The odor generates from the anaerobic decomposition of organic wastes. This type of decomposition will occur on the inside of moist manure piles or in the retention structure contents. The solution to the problem is not easy when dealing with stockpiled manure due to water pollution restrictions and the intensity of the odor when the stockpiled manure is disturbed. This problem can be minimized by keeping the stockpile dry and by disturbing the pile only when wind conditions will carry the odor away from nearby populated areas or during very early morning hours before neighbors are awake. Controlling the odors with a chemical may also be possible, although this generally has only a masking effect and may be offensive to some people.

10. State laws govern the construction of embankments for storage. Therefore, technical assistance should be obtained before construction is begun.
C. Liquid Waste Management Systems.

1. Livestock operations with flush-type or wash-down type liquid waste handling systems require adequately designed and constructed retention storage facilities to contain flush water and waste plus storm water for the period of time when contents cannot be discharged to the ultimate disposal area. In some locations this period may be as long as six months. The contents of the storage facility should be discharged at the earliest appropriate time. The volume of waste to be stored can be minimized by using high pressure wash-down equipment. The table and chart at the end of this publication can be used as a guide in estimating the capacity requirements for the storage facility.

Toxic and explosive gases are formed in these manure storage facilities. Caution should be exercised accordingly.

2. Odors from the liquid storage area may be controlled by means of mechanical or hydraulic aeration to establish aerobic conditions as opposed to anaerobic conditions. Liquid manure handling facilities designed for mechanical or hydraulic aeration should be operated according to design provisions. Overloading of such facilities is the most frequent cause of problems. Some form of aerobic treatment should be possible for any liquid manure setup and should be strongly encouraged as an attractive alternative to intolerable odors. Professional help should be obtained in designing such systems.

D. Ultimate Disposal. Land disposal is currently the only acceptable method for ultimate disposal of animal wastes. The primary consideration in disposing of the wastes, therefore, is selecting a method, a time, and a place which will minimize the nuisance potential and eliminate pollution hazards. Recommendations for disposal of wastes are as follows:

1. Productive agricultural land should be provided preferably adjacent to the livestock operation to receive liquid and/or solid wastes. The manure should be incorporated into the soil as soon as possible after spreading to reduce run-off hazards, and to allow better utilization of the nutrients by crops.

2. Spreading of manure on land adjacent to any water course or drainage may be restricted. (Distances in the range of 50 to 500 feet have been suggested by various governmental agencies.) The required distance will depend upon ground slopes, soil types and climatic conditions.

3. Spreading of manure or retention pond contents upon frozen or saturated soil should be avoided if a run-off potential exists.

4. Land area required to receive liquid manure waste should be determined by balancing the agricultural crop nutrient requirements against the nutrient content of the liquid manure. In other words, add only that amount of manure which the particular soil-crop system can utilize. The amount of land area required per animal unit will therefore vary depending upon climatic conditions, soil conditions, and other pertinent variables.
5. Application rates of retention pond contents or of other liquid manure wastes should be determined by:
   a. The infiltration rate of the soil;
   b. The soil-moisture deficiency at time of application;
   c. The crop consumptive use; and
   d. The crop root zone storage capacity.

6. Irrigation and storm run-off from fields receiving manure wastes, either solid or liquid, should be managed and controlled in such a manner that the run-off water does not discharge into a stream, lake, or reservoir.

List of Available Professional Assistance

1. County Extension Offices
2. County Health Departments
3. Soil Conservation Service—District or Area Office
4. Consulting Engineers
5. Department of Ecology (for waste discharge permits and lagoons only)

Run-off Storage Chart

![Run-off Storage Chart](image)

Note: Run-off for an 8" rainfall can be found by multiplying the 2" rainfall run-off value by 4.