Appendix O – Water Quality Trading with Barnyards and Feedlots

Last Revised: March 2026

1.1 Introduction

According to the Department of Agriculture, Trade, and Consumer Protection (DATCP), Wisconsin is home to roughly 1.28 million cows and 5,200 dairy farms. Other significant livestock sectors include poultry, hog, and mink production. Small to medium sized farms define the agricultural landscape in many areas of rural Wisconsin. The outdoor areas occupied by high concentrations of animals have the potential to cause water quality impacts via nonpoint source runoff to surface waters. The extent to which a barnyard or feedlot impacts water quality is based on factors such as proximity to waterways, slopes, concentration of animals, and manure management activities, amongst other things.

Water quality improvement efforts in agricultural areas commonly focus on mitigating impacts of barnyard and feedlot runoff via various manure and animal management strategies. State grant funding is available to counties to help address some barnyard or feedlot sites. Other sites may be addressed voluntarily by a landowner/operator or via grants associated with county land and water resource management or nine key element watershed based plans. Water quality trading is a relatively new mechanism that can incite change at barnyard or feedlot sites that would otherwise continue to pollute. Municipalities or industries facing restrictive phosphorus or TSS effluent limits can cause a pollution reduction to occur at a barnyard or feedlot and receive water quality trading credits in their WPDES permit. To calculate credit quantities, current and post-BMP pollutant loading values must be calculated using accepted modeling methods. The intent of this appendix is to convey documentation and quantification expectations to individuals or organizations developing water quality trades involving barnyards and feedlots.

1.2 Recommended Modeling Methods: APLE-Lots WI

The Annual Phosphorus Loss Estimator (APLE) for Feedlots and Barnyards is an empirical water quality model based on observed relationships between lot characteristics and edge-of-lot pollutant loading values. The model was first released in 2015 and was updated with a web-based interface for Wisconsin in 2019. Staff members of several organizations led the model's development, including the USDA Agricultural Research Institute, University of Wisconsin Madison Department of Soil Science, and UW Extension. APLE-Lots WI is calibrated to feedlot conditions specific to Wisconsin. In side-by-side tests, APLE-Lots WI delivered more accurate results than the BARNY model, which was DNR's previous recommended modeling approach for barnyards and feedlots. For simplicity, the APLE-Lots WI tool will be referred to as 'APLE-Lots' in the remainder of this appendix.

This appendix assumes the user is working within APLE-Lots to quantify barnyard/feedlot pollutant loads. If other quantification approaches are desired, contact DNR staff as soon as possible to determine the overall viability of the alternative and, if viable, what types of data need to be obtained to accurately quantify pollutant loads and credit quantities.

This appendix assumes the reader has a basic working knowledge of APLE-Lots and is not intended to replace the various user manuals, training resources, and model documentation already available from other sources. See the following list of resources that may be helpful to gain proficiency using APLE-Lots:

APLE-Lots User notes and Quick Guide (https://aplelots.wisc.edu/docs/APLE%20LOTS%20USER%20NOTES.pdf)

APLE-Lots Technical Documentation (https://aplelots.wisc.edu/docs/APLE-Lots%20TECHNICAL%20DOC_final.docx)

Wisconsin Land & Water / DNR Training Video (https://wisconsinlandwater.org/members-hub/on-demand-training/using-aple-lots-annual-phosphorus-lots-estimator-to-estimate-annual-phosphorus-and-sediment-loss-from-wisconsin-cattle-lots)

APLE-Lots Web-based Model (https://aplelots.wisc.edu/)

1.3 Barnyard and Feedlot WQT Credit Threshold

As discussed in Guidance for Implementing Water Quality Trading in WPDES Permits, Edition 3, water quality trade agreements must be the causal factor for the pollution-reducing practices put in place for a water quality trading project. As an offset for point source discharge, WQT projects are expected to reduce pollution beyond the current pollutant load or applicable credit thresholds, including those set by preexisting pollution control requirements. Several efforts for controlling barnyard or feedlot pollution are underway in the state, including the Notice of Discharge (NOD), Targeted Runoff Management (TRM) and Surface Water Runoff Management (SWRM) Grant programs. If state funds are provided for barnyard or feedlot pollution-reducing practices, those same practices cannot generate credits for a permitted discharge. State or local regulations restrict or prohibit direct discharge of pollutants from barnyards or feedlots to surface waters. If a barnyard or feedlot is currently subject to enforcement action(s), the required remedies must be put in place prior to credit generation. After the enforcement issue is resolved, additional practices may generate credits by reducing the barnyard or feedlot pollutant loading beyond what the enforcement actions achieved.

Over the past decades, a trend of centralized animal agriculture at larger farms has been observed, with many smaller animal operations selling their herds due to economic pressures. Water quality trading is recognized as a funding source that can help small farms stay in business. A water quality trade agreement may financially support a farm while animal agriculture continues. A water quality trade agreement may, conversely, stipulate that the farm sell/remove animals from the site while paying a monetary incentive to the farm. In cases where the farm has formally committed to removing animals from the site (via a sales contract, for example), prior to execution of a water quality trading agreement, the trade will need to utilize a credit threshold that observes the credit sales contract. Therefore, the animals set for removal must be excluded from the baseline pollutant load modeling.

The following factors must be addressed when defining barnyard/feedlot baseline conditions and associated modeling:

- Any requirements found in applicable CAFO permits (i.e. discharge prohibition)

- Any actions the farm has formally committed to (including removal of animals) prior to executing a water quality trade agreement
- The pollution-reducing activities required to resolve enforcement actions
- The outcomes of contacts stipulating that pollution-reducing activities occur, or any actions/practices paid for by state funding

1.4 TMDL Credit Threshold

Several areas within Wisconsin are subject to a Total Maximum Daily Load (TMDL) that stipulates how much pollution reduction is needed from all different sources so that a receiving water can achieve water quality standards. The TMDL credit threshold for feedlots and barnyards is determined by applying the percent reduction for nonpoint/agriculture to the site's current pollutant load. Consider the following simple example: A feedlot located in a TMDL area is estimated to discharge 100 lbs/year of phosphorus to surface water. The TMDL prescribes a 40% reduction for agricultural sources in the subbasin in which the feedlot is located.

100 lbs/yr × 0.40 = 40 lbs/yr reduction stipulated by TMDL

100 lbs/yr – 40 lbs/yr = 60 lbs/year loading complies with the TMDL

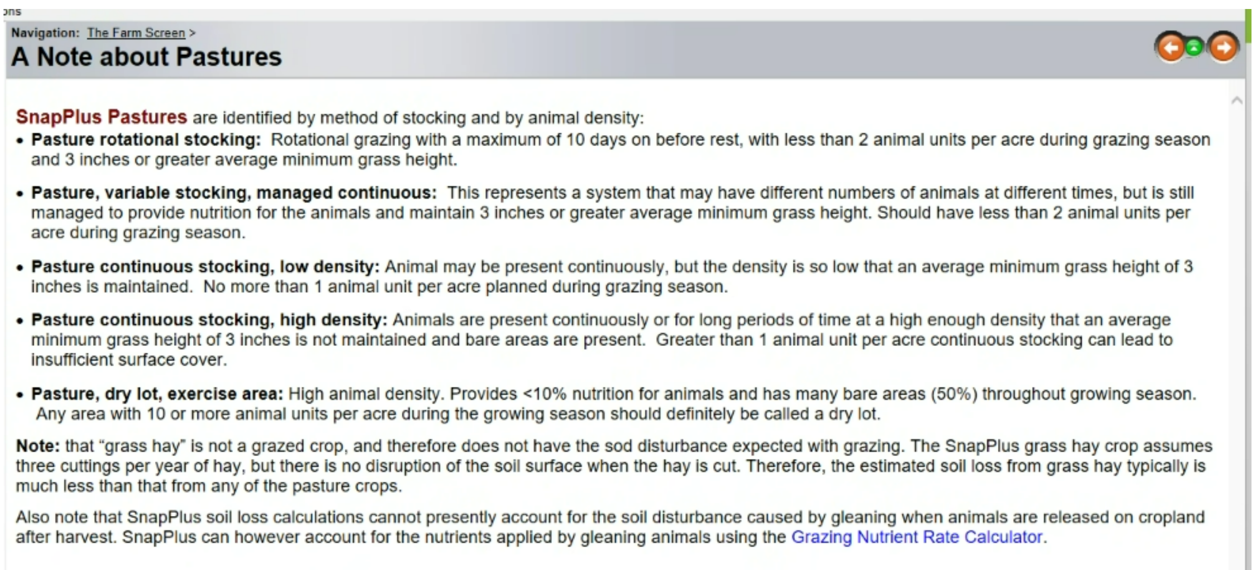
In the above scenario, the TMDL credit threshold for the feedlot is defined as 60 lbs/yr. Reductions above the credit threshold are considered interim credits, and reductions below the credit threshold are considered long-term credits. Projects that do not meet the credit threshold do not generate credits.

1.5 Setting up the APLE-Lots Model: Delineating Barnyards and Feedlots

One of the first steps to use the APLE-Lots model is to define a lot area and its conditions. A lot boundary can be drawn using the map interface, which yields an automatic calculation of lot area in square feet. Water quality trading plans should include a map (created in APLE-Lots or other mapping utility) that shows lot boundaries relative to important landmarks. Using an aerial photograph basemap is recommended, as these often show the lot location relative to structures, roadways, and surface waters. The lot boundaries may be accurately drawn from the aerial photograph as well.

APLE-Lots is intended to handle barnyard, feedlots, animal exercise lots, or over-wintering lots. These all have regular concentrated animal usage which results in soil compaction, reduced vegetation coverage, and frequent manure deposition. Farm infrastructure, including paved areas, gravel roads, and buildings often increase the impervious area prone to generating large amounts of runoff. When delineating areas within APLE-Lots, the contributing impervious areas to the lot should be defined and documented. Areas such as pastures, wetlands, cropped fields or other non-barnyard/feedlot land uses should not be included in the lot delineation. Doing so may overestimate phosphorus loading.

It is appropriate to use the Snap Plus model in pasture areas where animal and infrastructure densities do not align with the above APLE-Lots assumptions. SnapPlus has several pasture options to select based on animal density. See "A Note about Pastures" and "Grazing Herd Setup" in the Snap Plus Version 20 help utility and excerpt below as Figure O-1. Note that SnapPlus V3, a web application released in 2025, also contains options for setting up pastures. More information about using SnapPlus V3 to specify a range of pasture management scenarios can be found in the SnapPlus V3 Quick Guide and on the SnapPlus V3 Wiki. After the pasture conditions are captured within SnapPlus, the SnapPlus P Trade report can be used to quantify phosphorus loss from pastures.



Navigation: The Farm Screen >

A Note about Pastures

SnapPlus Pastures are identified by method of stocking and by animal density:

- **Pasture rotational stocking:** Rotational grazing with a maximum of 10 days on before rest, with less than 2 animal units per acre during grazing season and 3 inches or greater average minimum grass height.
- **Pasture, variable stocking, managed continuous:** This represents a system that may have different numbers of animals at different times, but is still managed to provide nutrition for the animals and maintain 3 inches or greater average minimum grass height. Should have less than 2 animal units per acre during grazing season.
- **Pasture continuous stocking, low density:** Animal may be present continuously, but the density is so low that an average minimum grass height of 3 inches is maintained. No more than 1 animal unit per acre planned during grazing season.
- **Pasture continuous stocking, high density:** Animals are present continuously or for long periods of time at a high enough density that an average minimum grass height of 3 inches is not maintained and bare areas are present. Greater than 1 animal unit per acre continuous stocking can lead to insufficient surface cover.
- **Pasture, dry lot, exercise area:** High animal density. Provides <10% nutrition for animals and has many bare areas (50%) throughout growing season. Any area with 10 or more animal units per acre during the growing season should definitely be called a dry lot.

Note: that "grass hay" is not a grazed crop, and therefore does not have the sod disturbance expected with grazing. The SnapPlus grass hay crop assumes three cuttings per year of hay, but there is no disruption of the soil surface when the hay is cut. Therefore, the estimated soil loss from grass hay typically is much less than that from any of the pasture crops.

Also note that SnapPlus soil loss calculations cannot presently account for the soil disturbance caused by gleaning when animals are released on cropland after harvest. SnapPlus can however account for the nutrients applied by gleaning animals using the Grazing Nutrient Rate Calculator.

FIGURE O1: SCREENSHOT OF SNAP PLUS PASTURE OPTIONS

1.6 Defining and Documenting APLE-Lots WI Model Inputs

Typically, barnyard and feedlot water quality trades are quantified using two model runs. An "existing conditions" model captures the pollutant load that is currently occurring based on average rainfall, stocking, and other factors. A "planned conditions" model shows how the barnyard or feedlot will be managed in the future pursuant to the water quality trade agreement. The difference in annual average pollutant loading between existing conditions and planned conditions provides the calculated pollutant load reduction upon which credit quantities are based.

Obtaining accurate and well-documented model inputs is an important step for any water quality trading effort. This section addresses each APLE-Lots model input and provides guidance for defining inputs and documenting on-the-ground conditions to accurately estimate pollutant loads, reductions and credit quantities. The WQT plan for a barnyard or feedlot should include a narrative and map(s) that describes the farm in terms of animal types, the number of animals, any seasonal stocking patterns that may be occurring and, if present, adjacent pastures used by the animals. WDNR staff will review model inputs to ensure that selected values are supported by the narrative and other documentation.

Paved vs. Earthen Lots

APLE-Lots pollutant loading equations differ between paved and earthen lots. Users should define the total square footage for any lot being modeled. If the lot contains a combination of earthen and paved area, the square footage for each will need to be measured and entered separately into the model. The lot map included in the WQT plan should show which areas are paved and which are earthen. In some cases, it may be necessary to subdivide an area into multiple areas defined in APLE-Lots WI to accurately represent distinct lot conditions. Users should consider this option when the number of animals, vegetative cover, or other management factors create marked differences in conditions across an earthen or paved area. Pastures used by animals adjacent to paved or earthen lots should not be modeled in APLE-Lots, as they do not reflect the model assumptions and lot runoff data used to calibrate the model calculations. The SnapPlus model can be used to estimate pollutant loading from pastures adjacent to barnyards or feedlots to surface waters. SnapPlus has several pasture management options users can select, based on animal density and vegetation/lot conditions, to estimate pasture pollutant loads. The SnapPlus P Trade report can be used to quantify phosphorus loss from pastures.

Vegetated Cover Percentage

The amount of vegetation on a lot heavily influences its ability to retain soil and deposited manure during runoff events. APLE-Lots requires the user to define a vegetated coverage percentage. The value is assumed to represent live canopy coverage over a long-term annual average basis.

Several challenges exist when attempting to define a long-term annual average value. Vegetation coverage will typically be lower during the colder months and higher during the growing season. Animal stocking patterns may also influence when lots see the greatest use and highest impacts to vegetation. Prior years' vegetative cover also needs to be understood for situations where a single year is not representative of the lot's long-term average condition. To effectively measure vegetative coverage, two methods are recognized as providing a measurable and well-documented baseline: ground-level photographs of vegetative cover and aerial imagery interpretation.

For lots that have uniform vegetative coverage in all seasons and years, photographs taken at ground level during a single site visit may be sufficient to document coverage. Standard photos showing the lot layout and large-scale vegetation patterns should be taken for inclusion in the WQT plan. Additional photos should be taken at a near-vertical angle, so that any vegetation present is directly between the viewer and ground surface. Multiple photos should be taken at representative locations within each lot, and location of photos depicted on a map in the WQT plan. These photos can be visually assessed for vegetative coverage and/or analyzed quantitatively to arrive at a % vegetated value.

Large-scale coverage delineations can be aided with aerial imagery. If the lot contains areas of differing vegetation coverage, aerial photos are the best tool for determining areas associated with different conditions. Air photos viewed within a geographic information system such as ESRI's ArcGIS or Google Earth have measurement tools that can be used to quickly and accurately measure areas of differing vegetation coverage.

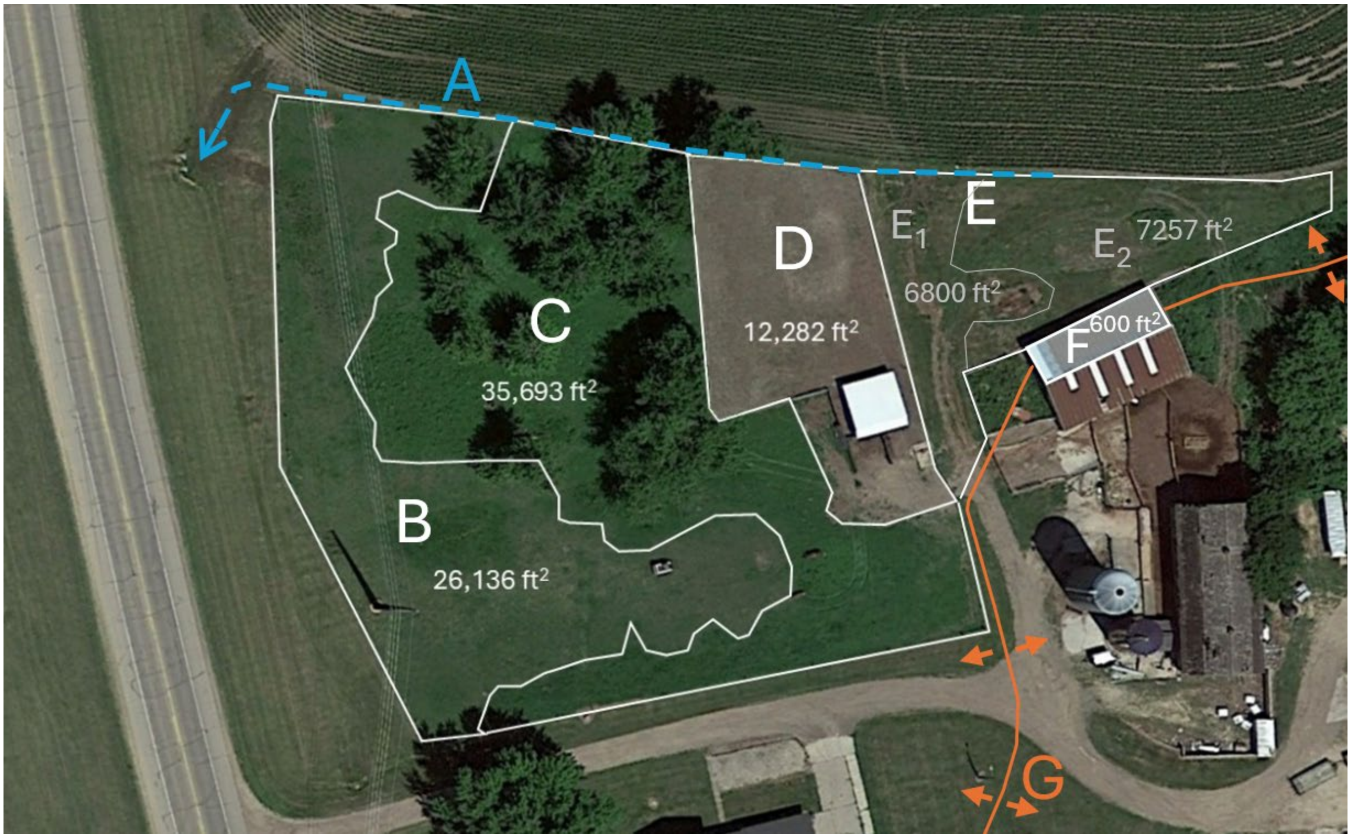


FIGURE O2: EXAMPLE COVERAGE DELINEATION AND MEASUREMENT

The above example shows various elements relevant to the APLE-Lots model and documentation for water quality trading purposes. It is recommended that WQT plans include a similar map that shows locations of the following elements:

A: Flow path is marked on the map to demonstrate that runoff leaves the lot and travels in concentrated flow to a perennial surface water. In this case a ditch forms the northern border of the lots, which lead to a culvert under the adjacent roadway. A perennial stream is found immediately west of the road and receives the culvert's flow.

B: Pasture with an area of 80% vegetative coverage delineated. This area would not be modeled in APLE-Lots, but could be modeled in Snap Plus.

C: Pasture with an area of 95% vegetative coverage delineated. This area would not be modeled in APLE-Lots, but could be modeled in Snap Plus.

D: High-intensity exercise lot with 10% vegetative cover. This aerial photo and photos taken from the ground during site visits support a uniform 10% vegetative cover.

E: Mixed-use lot with varying levels of vegetation density. Area E_1 is used more heavily and has 50% vegetative cover while area E_2 sees less use and has 80% vegetative cover. To generate a growing season average cover value for Lot E, the percentages should be weighted by area as follows:

$$(.50 \times 6{,}800) + (.80 \times 7{,}257) \div 14{,}057 = 0.65\%$$

Where total lot area = 14,057 square feet

Result = 65% vegetation coverage

For vegetation coverage that varies by season, additional weighting should be used to generate the annual average. For example, if the above lot's average vegetative coverage dwindled to 40% during three winter months (25% of the year), a temporally-weighted average could be arrived at via the following:

$$(65 \times 0.75) + (40 \times 0.25) = 59.5\%$$

The lot's vegetated cover percentage should be entered into APLE-Lots as 59.5%

F: This barn roof is sloped towards lot E and does not have gutters. A contributing area of 600 ft2 can be added to lot E.

G: The orange line represents a watershed divide. The area east and south of the watershed divide does not contribute flow to the ditch and is therefore excluded from pollutant loading calculations. There may be opportunities in this area to evaluate runoff and concentrated flow to a different channel when working with this farm.

Days Between Cleanouts

The average number of days between lot cleanouts should be defined for paved lots. Earthen lots do not have this model functionality applied.

Number and Duration of Animals on Lot

APLE-Lots has the functionality for the user to define the type and number of animals on each lot for each month of the year. The WQT plan farm narrative should speak to the size of the operation in terms of animal numbers and land/infrastructure used for raising the animals. Seasonal patterns in stocking or types of animals may also be important to describe. These aspects should be captured in the animals on lot calendar. DNR may request more detailed information supporting model inputs.

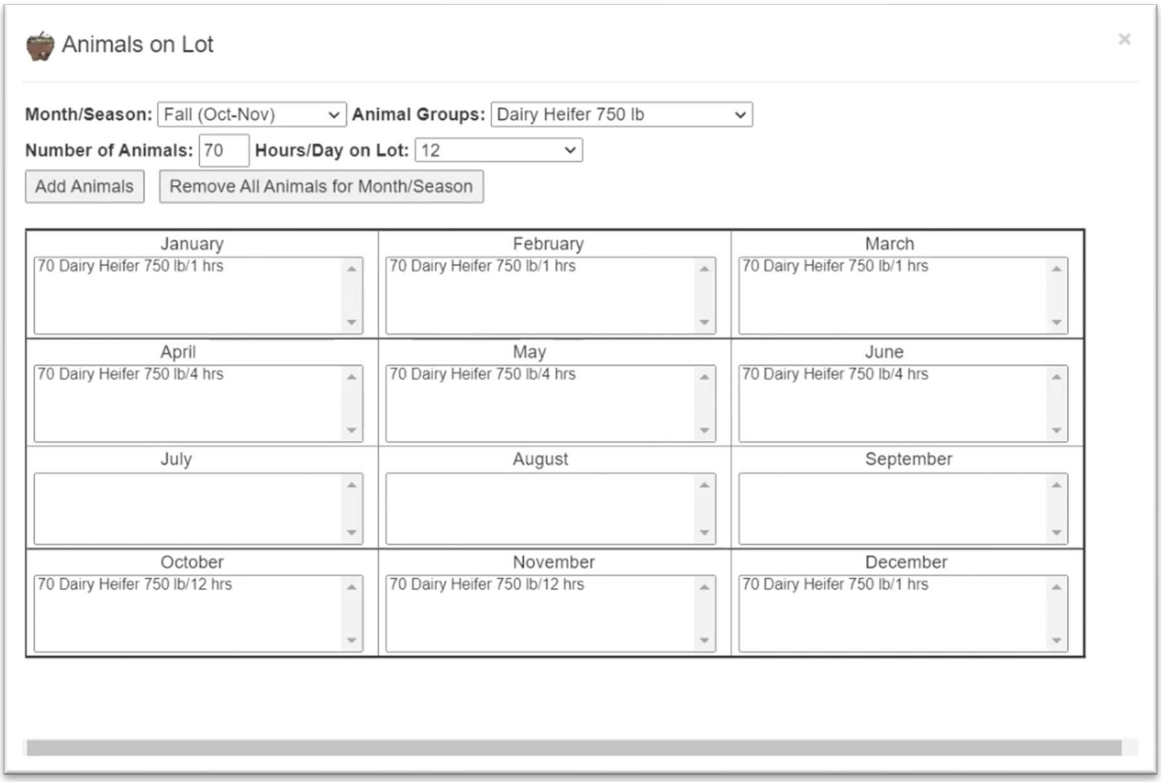


FIGURE O3: SCREENSHOT OF THE APLE-LOTS ANIMALS ON LOT CALENDAR INTERFACE

Soil Test Results

According to APLE-Lots documentation, the model is set up for Bray-1 soil test phosphorus values to be entered. Use UW A-2100 protocols for conducting soil sampling of feedlots. Collect soil sample locations and include those on a map within the WQT plan. Include lab result sheets in the WQT plan.

Contributing Areas and Lots

Areas of land that contribute overland flow to a lot may cause additional runoff beyond what is caused by precipitation falling directly on the lot. The size and properties of a contributing area should be defined in APLE-Lots. A land use type, curve number, and hydrologic soil group should be defined for contributing areas. In the model, contributing areas are assumed to contribute sheet flow to a barnyard or feedlot. If diversions or ditches concentrate runoff around or through a lot, the area draining to the ditches would not be considered a contributing area.

Documentation for contributing areas is recommended to be based on a topographic map, upon which the contributing area is delineated. Photos taken during site visits may provide additional information for flow direction or channelization. Some fine-scale topographic features may not be discernable in topographic map data. In these cases, additional photos and a topographic survey may be necessary to better define these areas.

If the contributing area is an additional active barnyard or feedlot, APLE-Lots can accommodate modeling multiple lots in series. As with non-lot contributing areas, the model assumes sheet flow is contributed from up-gradient lots. Documentation of conditions supporting sheet flow should be provided in WQT plans.

1.7 Pollutant Delivery from Lot Edge to Surface Waters

APLE-Lots calculates a pollutant load to the edge of the lot; a delivery function is needed when the barnyard is not immediately adjacent to perennial surface water. The delivery function used in SnapPlus can be found in the supporting documentation "Current Calculations in the Wisconsin P Index (https://wpindex.soils.wisc.edu/wp-content/uploads/sites/206/2011/10/PIndexdocumentforwebNov-182010final.pdf)" dated 11/18/2010. The delivery function is summarized in the table below and accounts for slope and distance to stream. The dominant slope in the table below refers to the slope between the field and nearest stream. The slope categories provided match with soil mapping unit names to allow this information to be easily estimated from a soil map.

TABLE O1: P INDEX DELIVERY VALUES

Dominant slope	Distance from stream	Total phosphorus delivery factor
0-2%	0- 300 ft	1
0-2%	300 -1,000 ft.	0.95
0-2%	1,001-5,000 ft	0.87
0-2%	5,001 -10, 000 ft	0.72
0-2%	10,001 - 20,000 ft.	0.55
0-2%	> 20,000 ft.	0.45
2-6%	0- 300 ft	1
2-6%	300 -1,000 ft.	0.96
2-6%	1,001-5,000 ft	0.91
2-6%	5,001-10, 000 ft	0.79
2-6%	10,001 - 20,000 ft.	0.65
2-6%	> 20,000 ft.	0.56
6-12%	0- 300 ft	1
6-12%	300 -1,000 ft.	0.98
6-12%	1,001-5,000 ft	0.92
6-12%	5,001-10, 000 ft	0.81
6-12%	10,001 - 20,000 ft.	0.69
6-12%	> 20,000 ft.	0.61
> 12%	0- 300 ft	1
> 12%	300 -1,000 ft.	0.98
> 12%	1,001-5,000 ft	0.93
> 12%	5,001-10, 000 ft	0.83
> 12%	10,001 - 20,000 ft.	0.71
> 12%	> 20,000 ft.	0.64

The above-referenced document states: “This table is based on modeling work conducted using APEX (ARS Temple, TX) and P8 (W.W. Walker). The delivery modeling assumed a drainage system comprised of a field drained via a trapezoidal grassed waterway to a receiving stream.”

Topography, drainage pathways, and proximity to surface waters are key to understanding delivery of pollutants. When barnyard or feedlot site conditions are not consistent with the P-Index model delivery assumptions described above, the amount of pollutant load delivered from a lot can be overestimated, particularly in situations where lot runoff enters flat areas or depressions causing ponding or infiltration, contacts heavy grass or wetland vegetation, or does not have a defined flow path or channel that connects with surface waters. In these cases, where delivery to surface waters cannot be clearly established or quantified with accuracy, the site should not be used to generate credits.

A WQT plan needs to include a topographic map that allows a reader to discern the direction of flow across the lot and down gradient from the lot into nearby surface waters. In cases where portions of a lot partially discharge to a perennial water and other portions pond or infiltrate (discharge to wetlands or adjacent fields, for example), topographic data should be used to define lot boundary as the portion of the lot that discharges to perennial surface waters.

1.8 Default Uncertainty Factors and Technical Standards

In the APLE-Lots evaluation report “Monitoring Sediment and Phosphorus Loads in Runoff from Dairy Feedlot/Exercise Lots to Facilitate Model Parameterization” edge-of-lot monitoring results are compared to model outputs. These results show that APLE-Lots is generally accurate (within 23% of measured results for three out of four trials). There is a potential for inaccuracies as well, demonstrated by results for DFRC 2 in 2013, where APLE-Lots predicted total phosphorus loading at over twice the measured amount.

Table O2: Summary of 2013 – 2014 Barnyard Results

Study Lot ID	Study Period	Measured Phosphorus Load (Pounds)	APLE-Lots WI Phosphorus Load (Pounds)	BARNY Phosphorus Load (Pounds)
DFRC 1	April-November 2013	62	54	-
DFRC 2	April-November 2013	44	90	-
DFRC 1	April-November 2014	45.4	56	69
DFRC 2	April-November 2014	99	92	10.7

Evaluating the accuracy of a model by comparing modeled results to monitored results speaks to part of the uncertainty equation. Another aspect of uncertainty is interannual variability, which captures the degree that baseline pollutant loads change from year to year, assuming the same management practices are employed across all years evaluated. The primary driver of interannual variability is precipitation – the timing and magnitude of rainfall events that generate runoff and drive nonpoint pollutant loading. Interannual variability is source-specific rather than model specific. One datapoint for barnyard/feedlot interannual variability is provided in the above-cited study and summarized below in Table O-3.

TABLE O3: TOTAL P LOADS FROM APRIL 2013 THROUGH NOVEMBER 2014 ON ADJACENT CONCRETE (DFRC1) AND EARTH (DFRC2) LOTS.

	Concrete	Earth
April 2013 through November 2013	231 lbs/acre	46 lbs/acre
December 2013 through March 2014	33 lbs/acre	19 lbs/acre
April 2014 through November 2014	135 lbs/acre	83 lbs/acre

By comparing 2013 and 2014 monitoring results for lots in the study, it is apparent that loads from concrete lots were 42% lower in the 2014 growing season than the 2013 growing season. Earthen lots' pollutant loads increased 80% between the 2013 and 2014 growing seasons.

When considering model accuracy and barnyard interannual variability, a minimum uncertainty factor of 2 is recommended for all barnyard projects.

TABLE O4: DEFAULT UNCERTAINTY FACTORS AND TECHNICAL STANDARDS FOR BANYARD PRODUCTION AREA PRACTICES

Barnyard Production Area Practice	Default Uncertainty Factor	Applicable Technical Standard	Notes
Animal Removal / Perennial Vegetation Restoration	2	WI NRCS 327 or 512	
Clean Water Diversion	2	WI NRCS 362	Modeled in APLE-Lots by altering contributing area. An increased uncertainty factor (+1) is required when barnyard/feedlot sites continue to violate NR 151.08(4) following installation of practices.
Roof Runoff Structure	2	WI NRCS 558	Modeled in APLE-Lots by altering contributing area. An increased uncertainty factor (+1) is required when barnyard/feedlot sites continue to violate NR 151.08(4) following installation of practices.
Vegetated Treatment System	4	WI NRCS 635	An increased uncertainty factor (+1) is required when barnyard/feedlot sites continue to violate NR 151.08(4) following installation of practices.

1.9 Operation, Maintenance, and Inspection of Practices

It is recommended that all parties involved in a water quality trade review the WQT plan and agreement documents carefully. The WQT plan and agreement should stipulate that the site be managed consistent with the "planned conditions" model that was used to calculate the pollution load reduction. For example, operation and maintenance provisions in the WQT plan should specify cleaning schedules, animal numbers and durations, and vegetation cover percentages when these are aspects of the planned conditions model. For projects that remove animals and restore the site, vegetation establishment and maintenance will likely be a focus of the operation and maintenance plan. If BMPs are used, the applicable BMP technical standards have their own O&M section that will also inform the O&M provisions of WQT plans and agreements.

Inspections should occur annually, at a minimum. Inspections should seek to verify that planned conditions model inputs are still accurate, and that O&M provisions are being carried out. Photos should be taken of the barnyard / feedlot area and any associated infrastructure. These should be included in the annual inspection report. For practices that rely on vegetation, an inspection protocol to evaluate vegetation health and coverage should be defined.

1.10 Quantifying TSS Credits

The APLE-Lots model output includes sediment loss in tons per year. This sediment loss value may translate to TSS credits in addition to phosphorus credits. Depending on sediment characteristics and delivery parameters, the sediment loss value may need to be modified when calculating TSS credits. Contact DNR staff when planning barnyard or feedlot water quality trades with the intent of quantifying TSS credits.