APLE-Lots
*A*nnual *P*hosphorus *L*oss *E*stimator
for Outdoor Cattle Lots

User's Manual
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Model Description

APLE-Lots is a Microsoft Excel spreadsheet model that runs on an annual time step. The model simulates runoff, total solids loss, and dissolved and sediment bound phosphorus (P) loss in surface runoff from outdoor cattle lots, including barnyards, feedlots, and other outdoor exercise lots. It does not consider subsurface loss of P through leaching or artificial drainage. It is intended to estimate edge-of-lot P loss for uniform lots. **APLE-Lots** does not simulate P transport beyond the edge of lots, such as vegetated filter strips. The model considers only beef or dairy lots.

APLE-Lots is intended to be user-friendly and does not require extensive input data to operate. All data are input into directly into the worksheet page and include:

- For earthen lots, Mehlich-3 soil test P (ppm)
- The area of the lot (ac)
- The annual precipitation amount (in)
- The daily number of cows in the lot, including beef cattle and calves, dairy lactating and dry cows, and dairy heifers and calves.
- The number of days between lot cleanouts.
- The lot surface type (earthen or paved)
- The % vegetative cover of the lot.

Data Input and Description

The model runs in a Microsoft Excel spreadsheet. All data required for the model to operate are input directly into the spreadsheet. The following describes the input variables needed.

Variable Name	Definition
Mehlich 3 Soil P	This is the soil test P content in ppm for the surface material of the lot that underlies any freshly deposited manure. The model is currently designed based on Mehlich 3 soil extraction data. Other soil test data should be converted to a Mehlich 3 equivalent. For these modeling purposes, it can be assumed that Mehlich 3 P is equal to Bray-1 P, and twice as much as Mehlich-1 P, Olsen P, Fe-oxide strip extractable P, and anion exchange resin extractable P.
Lot Area	This is the area in acres of the lot being simulated. The cell should not be left blank or set to 0 because that will cause errors in calculations.
Precipitation	Enter the total annual precipitation (rain, snow, and irrigation) in inches.
Cattle numbers	Enter the daily total number of cattle in the lot. For example, if 50 lactating cows were in the lot each day for 4 hours, the value entered should be 8.3 (50x4/24).

Days Between Cleanouts   Enter the average number of days between lot cleanouts. If a lot is never cleaned, just enter 365.

Lot Surface type   Enter 1 for paved and 2 for earthen. If a lot has both types of surfaces, the model could be run for each area and then a weighted average of the total P loss could be calculated.

% Vegetative Cover   Enter the average % vegetative cover for the year. For example, if a lot has no cover for 3 months because of high stocking, and then 50% for the other 9 months, the annual cover would be 37.5%.

Model Output

The worksheet displays annual output results in lb/ac for eroded sediment P loss, soil and manure-derived dissolved P loss, and total P loss. A graph visually depicts the same output data.