INSTRUCTIONS: Agricultural Nutrient Assessment Tool (PLAT/NLEW)

(Version 4.3, 10/21/03)

When To Use the Phosphorus Loss Assessment Tool (PLAT)

All nutrient management plans developed to support USDA programs must meet the Nutrient Management (590) standard in the NRCS Field Office Technical Guide. Per this standard, the Phosphorus Loss Assessment Tool (PLAT) must be used to assess the potential P loss to surface water from fields receiving animal waste as part of a nutrient management plan developed for USDA programs. PLAT must also be run for all plans in areas considered impaired due to agricultural nutrients. See the NRCS Nutrient Management Standard (590) for additional information. PLAT may be required by state laws and regulations to assess potential P loss for permitted operations. For more information on the use of PLAT to meet regulatory requirements, contact the North Carolina Department of Environment and Natural Resources.

When To Use the Nitrogen Loss Evaluation Tool (NLEW)

The NRCS nutrient management standard does not specify the use of the Nitrogen Loss Evaluation Worksheet (NLEW). This tool is used to estimate the reductions in nitrogen loss for the North Carolina Agricultural Cost Share Program. NLEW is also used in Nutrient Sensitive Basins to compute N loss reductions to meet Basin goals.

Use of the Field Data Collection Worksheet

The Agricultural Nutrient Assessment Field Data Collection Worksheet can be used to collect the data for both PLAT and NLEW while in the field. Data can be entered directly onto the North Carolina Agricultural Nutrient Assessment Tool (NCANAT) screen which contains both tools. Completing this sheet assures that all the data required by NCANAT has been collected. Since NCANAT produces a report that identifies not only the site's rating, but also the parameters for the site, maintaining the Field Data Collection Sheets in the case file is not required.

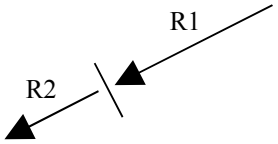
Completing the Field Data Collection Worksheet

Complete the worksheet, using the following instructions. Each column on the Worksheet represents a separate site (either field or sub-field).

General Information	Enter the producer's name, producer ID from NCANAT, tract and field number, date, county, planner, and agency or organization.

Field/Location Sketch	Sketch the field boundaries and all pertinent features, including: ♦ Field/Sub-field delineations (use dashed lines to identify sub fields for the purpose of nutrient management): identify field numbers or sub-field IDs (e.g. 1A, 1B). ♦ The location of the closest downslope permanent or intermittent water bodies (intermittent or perennial streams, ponds, surface open ditches). ♦ The location of existing or planned structural conservation practices (such as grassed waterways, terraces, diversions. ♦ Significant in-field concentrated flows. Significant in-field concentrated flows are those locations where a grassed waterway should exist to prevent gullies or soil erosion if the field were cultivated. ♦ Symbol(s) showing R1 (slope length & percent used in soil loss computation and R2 receiving slope (remaining slope to edge of field if present) Use standard NRCS plan symbols for conservation practices and perennial or intermittent streams. Use 3-dot lines for in-field concentrated flows.
Field/Sub-field Identification	
Field Number or Sub-field ID	Enter field number from Conservation Plan or from FSA. Note that space is provide to collect PLAT data for two fields or sub-fields on a single PLAT worksheet. Fields may be subdivided into sub-fields for the purposes of nutrient management planning. Designate sub-fields with a letter designation, e.g. 1-A, 1-B, etc. See the section "Identifying Nutrient Management Sub-fields" for guidance on the use of sub-fields when using PLAT.
Acres	Enter the number of acres in the field or nutrient management sub-field.
Predominant Soil type	Enter the symbol for the predominant soil type in the field or sub-field. This symbol should represent the mapping unit from the most recent soil map legend.

Crop Data	NLEW – Enter the current crop in the rotation. Nitrogen loss will be computed for BMPs using this crop. PLAT – Enter the most erosive crop in the rotation. It is usually the one with the least protective average vegetative cover. Surface vegetative cover generally reduces runoff and soil erosion. For example, cropland is considered less protective than pastureland, pastureland is considered less protective than hay, and conventional tillage is less protective than conservation tillage.
Tillage Method	For the crop specified, enter the tillage method. Definitions: For conservation tillage, high residue is ≥ 80% cover after planting (HR). Minimum residue is 30-79% after planting (MR). Conventional tillage is < 30% residue after planting (CV).
Additional NLEW Factors	Enter these data for use with NLEW only. Cover Crop: Enter the unfertilized cover crop, if planted and retained as a BMP to scavenge excess nutrients. In order to claim this cover crop as a scavenger, no fertilizer may be applied, it must be planted by November 1, and may not be killed earlier than March 1 in the Coastal Plains or March 10 in the Piedmont/Mountains. Codes: Wheat (W), Oats (O), Rye (R). Barley (B), Triticale (T). A cover crop should only be entered if planted early enough and left long enough to scavenge nutrients. Field Slope: Enter the dominant field slope in percent. Use the concept of dominant slope as explained in RUSLE. Realistic Yield Expectation (RYE): This is optional. The planner may enter the actual yield based on producer's records for the field. Use the criteria as defined in the NRCS nutrient management standard (590) for determining actual RYEs.
RUSLE Info Avg. Soil Erosion Rate (T/A/Y)	Enter the predominant or weighted average soil erosion rate for the field or nutrient management sub-field using the procedures defined in the appropriate RUSLE Manual. Attach a RUSLE Worksheet, unless these are included in the conservation plan/case file. Use standard conservation planning procedures and RUSLE methodology for subdividing fields when the erosion rate is highly variable within the field. The NCANAT Field Data Collection Worksheet has blank columns for two field subdivisions.

Receiving Slope Distance	Enter the average length of the Receiving Slope (in feet) for the area represented by the RUSLE slope. The Receiving Slope is defined as the distance from the toe or bottom of the RUSLE slope to either (a) the edge of the field, or (b) concentrated flow. The Receiving Slope may be 0 feet in cases where the end of the RUSLE slope is the edge of the field, or in cases where the RUSLE slope ends at concentrated flow (e.g. a grassed waterway or a gully). The location of the predominant RUSLE Slope and the Receiving Slope should be shown on the Field Sketch using the symbols shown below. Use "R1" to show the RUSLE slope(s) and "R2" to show the corresponding Receiving slope(s). 
Soil Test P-Index, P-I (Mehlich 3P) 0-4 or 0-8 inches	Note: If needed, convert soil test P (ppm or mg/kg) to P-I, Where P-I = [(mg P/kg) / 1.2] * (W/V). This will not be required for samples from North Carolina Department of Agriculture and Consumer Services (NCDACS) Agronomic Lab, which provides a soil test P-I. Enter the soil test P-I or equivalent from soil test report. Use only P-I values determined using the Mehlich 3 procedure. The depth (0-4" or 0-8") and number of samples required should be based on recommendations of the NCDACS Agronomic Division. Sample depth of 0-4 inches is used for agronomic soil samples on conservation tillage or grassland. A sample depth of 0-8" is used on conventionally-tilled cropland.

28-32 inches (if required)	If required by the PLAT software, enter the soil test P-I or equivalent from soil test report for this depth. The sample at 28-32" or at a critical depth (may be the depth to bedrock if less than 30 inches from surface) is only required by PLAT when the phosphorus level in the surface of soils susceptible to leaching reaches an identified threshold for the specific soil. When this threshold is exceeded, the PLAT software will automatically require the P-I at the 28-32" layer in order to complete the PLAT rating. If the PI at 28-32 inches exceeds an identified subsurface threshold, then the site will be rated minimally as HIGH. This means that on some sites, PLAT will rate a site as HIGH or VERY HIGH, even though the overall PLAT index is less than 50. If this occurs, PLAT informs the planner that the rating is HIGH based on the subsurface P-I. The PLAT assessment should be completed to determine if the losses from other pathways results in a VERY HIGH rating. Note: Guidance is available for producers, consultants, agency staff, and others on the proper methodology for collecting the subsurface sample. This guidance is available at the NC Nutrient Management web site.
Weight: Volume (W/V)	From a soil test report, enter the weight: volume ratio in the appropriate depth ranges. This entry is optional, but highly recommended. This information is available on the soil test from NCDACS. It may also be available from other testing facilities upon request. Generally, the higher the W/V ratio, the lower the estimated delivery of P offsite, due to the increased ability of the soil to bind phosphorus.
Hydrologic Condition	Enter the estimated hydrologic condition for the most erosive crop in the rotation. (To select the hydrologic condition, use the following criteria from Chapter 2 of the NRCS Engineering Field Manual.) Hydrologic condition is based on factors that affect infiltration and runoff, including density and percent canopy of vegetation, amount of year round cover, amount of grass or close-seeded legumes in rotations, percent of surface residue cover, and degree of surface roughness. <u>Cropland Conventional Tillage</u> (Choices are good or poor) Poor condition is a finely prepared seedbed, not drilled, with a low plant population, and not in rotation with a sod. Good condition is rough seedbed, high plant population, and in rotation with sod, high residue-producing crop, or conservation tillage. <u>Cropland Conservation Tillage</u> (Only choice is good) <u>Pasture</u> (Choices are good, fair, or poor)-Poor condition is over-stocked, under fertilized, low year-round plant population and poor plant condition. Good condition is properly stocked, adequate nutrient management, and a full plant population (nearly 100% cover). Fair condition is represented by factors less than GOOD and better than POOR, and is determined at the planner's discretion.

Buffers/Trapping BMPs	
Buffer Practices	Determine if the sediment or runoff being delivered from the field passes through a vegetated buffer (herbaceous, trees, shrubs) prior to entering a perennial stream in sheet flow. Enter the width in feet for each of the following vegetation classes: ♦ Trees/Shrubs/Vines (existing) ♦ Trees/Shrubs/Vines (planned) ♦ Grasses or forbs (existing) ♦ Grasses or forbs (planned) Enter the total width (in feet) of the vegetated area between the edge of the field and the nearest down-slope perennial or intermittent stream. ♦ Total (existing) ♦ Total (planned) ♦ To include a nutrient reduction credit in PLAT, the practice must meet vegetation criteria only of NRCS standards 386, 390, 391, 393, or other applicable FOTG standards that identify nutrient trapping as a purpose or planning consideration. Although PLAT allows planners to identify buffers for PLAT credit that are narrower than NRCS standards, all practices that are planned as part of a conservation plan must meet all applicable NRCS standards.
Other Trapping BMPs	Identify if the sediment/runoff being delivered from the field passes through a pond, sediment basin, or structure for water control prior to entering a perennial stream. Enter No (N), Existing (E), or Planned (P). To include credit for this practice, existing structures do not have to meet NRCS standards for 350 or 378. The conservation plan MUST, however, include the landowner's decision to maintain the sediment basin and structure for water control practices per applicable NRCS standards (350, 587, 641). If buffers or other trapping practices do not currently exist, but are "planned" for the purpose of the PLAT rating, the practice MUST be included in a Conservation Plan, with an installation date scheduled within 1 year. All practices planned in a Conservation Plan must be designed to the appropriate NRCS standards. The conservation plan should include the landowner's decision to operate and maintain this practice per the NRCS standards.
Acres Served	Enter the acres that are (or will be) served by the buffer or water control structure practices. Acres served are those from which the runoff flows through the practice. Planners should note that in many if not most cases, only portions of fields flow through a riparian buffer. Note: This requirement exists for NLEW purposes only.

Inorganic Fertilizer	The Data Collection Worksheet allows the planner to enter two applications of inorganic fertilizer. Additional applications should be recorded and attached. NCANAT allows for multiple applications. Note that in the NCANAT software, the nitrogen applied is only applicable to NLEW, and is entered on the main screen. The phosphorus applied is applicable to PLAT, and is recorded in the Nutrient Application table.
Product being applied	Enter the grade or analysis i.e. 10-10-10.
Amount applied	Enter the application rate per acre for the product applied. Also enter the units of measure for the amount provided, e.g. lbs, gallons.
Application method	Enter the code that identifies the application method used to apply the majority of the product. Injected (J), Incorporated w/in 48 hrs. (I), Incorporated w/in 48 hrs. to 4 weeks (W), Incorporated w/in 4 weeks to 3 mos. (M), Surface applied (S)

P Application From Animal Waste Sources	Note: Nitrogen from animal sources is not collected through NCANAT because NLEW is not designed to operate with organic sources.
Manure Type	Enter the code for the manure type to be applied. If multiple sources are used, record the additional applications on separate attachment or in margins. PLAT allows planners to identify multiple applications of different materials on a single site. <u>Codes</u> 1 Beef – Lagoon Liquid (ac-in) 2 Beef – Lagoon Sludge (1000 gal) 3 Beef – Slurry (1000 gal) 4 Breeder – House Litter (tons) 5 Broiler – Fresh (tons) 6 Broiler – House Litter (tons) 7 Broiler – Stockpiled Litter (tons) 8 Dairy – Lagoon Liquid (ac-in) 9 Dairy – Lagoon Sludge (1000 gal) 10 Dairy – Scraped (tons) 11 Dairy – Slurry (1000 gal) 12 Layer – Highrise Stored (tons) 13 Layer – Lagoon Liquid (ac-in) 14 Layer – Lagoon Sludge (1000 gal) 15 Layer – Slurry (1000 gal) 16 Layer – Undercage (tons) 17 Roaster – House Litter (tons) 18 Swine – Lagoon Liquid (ac-in) 19 Swine – Lagoon Sludge (1000 gal) 20 Swine – Slurry (1000 gal) 21 Turkey – Stockpiled (tons) 22 Turkey Grower Hen – House Litter (tons) 23 Turkey Grower Tom – House Litter (tons) 24 Turkey Poult – House Litter (tons)
Application Method	Regardless of the fertilizer source, enter the code for the application method. The codes are identified on the Data Collection Worksheet. If multiple application methods are used for the same material, enter the method that is the most likely to result in P being transported from the site. As a guide, S>M>W>I>J (codes identified in Inorganic Fertilizer-Application Method).
Application Rate	Enter the application rate for the product applied per acre. Also enter the units of measure for the amount provided, e.g. tons, 1000 gallons, ac-in.
Waste Analysis (Optional)	Enter the lbs P2O5/unit from the waste analysis (optional). To use the standard nutrient values from the Waste Utilization standard, leave this line blank. It is often in the producer's interest to use actual data, rather than depending on the default data.
Drainage	Enter **Y** if the field or sub-field is drained by artificial drainage (e.g. surface ditches or subsurface tile lines. When drainage as described is not present enter **N**. If artificially drained, enter the spacing and depth information as follows:
Average depth	Enter the estimated average depth for drains (in inches) from the soil surface

Average Distance to Drain	For regularly spaced drainage ditches or tile drainage, simply enter the drain spacing. For irregular systems, divide the area of the field served by the drainage (in square feet) by the total linear feet of drains (open ditches and tile lines). This will be the drainage spacing. For areas of the field which do not have shallow water tables or do not require drainage due to topography or soil type, PLAT may be calculated separately as undrained using the appropriate soil mapping unit for this portion of the field. Although this will require that a sub-field be identified and PLAT run separately, this will more accurately estimate the potential for excessive P losses from a field.

RUSLE Information

RUSLE version 1.04 must be used to determine the average annual sheet and rill erosion rate used by PLAT. Guidance for the current version of RUSLE is contained in Section I of the NRCS FOTG. The factors used to determine the average soil erosion rate should be documented on a RUSLE Worksheet and attached or included in the producer's Conservation Plan.

Note: Requests for a K factor on organic soils should be submitted to Bobby Brock, Conservation Agronomist, 919-873-2121 (Bobby.Brock@nc.usda.gov).

Determining the PLAT Rating

The factors from the PLAT worksheet will be entered into the Agricultural Nutrient Assessment software, and a composite rating for the site will be reported.

Interpreting the Results from PLAT

PLAT will rate each site as LOW, MODERATE, HIGH or VERY HIGH. As described in the nutrient management standard, planned manure application rates for sites rated as LOW or MODERATE shall be based on the nitrogen needs of the crop. Planned manure application rates for sites rated as HIGH shall be based on the phosphorus removal of the crop. Sites rated as VERY HIGH shall have no additional phosphorus application planned.

Regardless of the PLAT rating, a starter fertilizer may be recommended in accordance with NCSU recommendations.

If the initial PLAT analysis results in a rating of HIGH or VERY HIGH for the field, the producer has several options:

1. Reduce the manure application on the site.

The N.C. Nutrient Management software will automatically limit the planned application of nutrients accordingly when a HIGH or VERY HIGH rating is designated. For cases where the producer has additional land for application, this may be the easiest option.

2. Verify that the most accurate information for the site has been used in the computations. For example, using site specific data for the weight:volume ratio from the soil test may reduce the liklihood for P loss. Similarly, using the operation's historical data on nutrient content of

manure applied (rather than relying on the default data from the NRCS 633 standard) may lower the PLAT rating.

3. Identify Best Management Practices to reduce the potential for P transport from the field, and re-evaluate the field using PLAT.

This should be done by identifying which of the potential loss pathways are significantly contributing to the rating. Some options the planner may explore with the producer include:

If Particulate P transport is the most critical ….	Identify BMPs which reduce in-field soil erosion losses. These include conservation tillage, contouring, installation of practices which reduce slope length, cover crops and crop residue. Identify BMPs which will trap soil leaving the field, either buffers, filter strips, or other practices.
If Runoff P is the most critical …	Identify options which may reduce runoff, including managing soil cover, increasing the level of conservation tillage, and hydrologic condition (e.g. increasing surface residue, changing landuse). See the factors contributing to hydrologic condition in Chapter 2, EFM, Table 2-3.
If Source P is the most critical …	Consider modifying the planned application method or amount. Consider buffers that trap source P. Identify BMP options which reduce Runoff P (see above).
If Leached P is the most critical …	No BMP options are available, other than reducing the application amount.

The above BMP options may allow the producer to reduce the rating from HIGH or VERY HIGH to MODERATE or LOW. Planned practices given credit in PLAT MUST be included in the producer's conservation plan, and be scheduled for installation within one year.

4. Redefine the field into nutrient management sub-fields, and re-evaluate the sub-field using PLAT.

It is recommended that PLAT be run on the entire field as a first step. If a rating of LOW or MODERATE is achieved, then there is generally no reason to identify nutrient management sub-fields to address potential P transport from the field.

When the field is rated as HIGH or VERY HIGH, an additional option for the planner/producer is to define nutrient management sub-fields, and limiting manure application to selected portions of fields. By identifying sub-fields, the planner can eliminate portions of the field that are steep,

more erodible, difficult to farm on the contour, contain soils more susceptible to leaching, or have other features that increase potential P losses. After redefining nutrient management sub-fields, PLAT should be re-run, excluding the more sensitive sub-fields. This option, by eliminating or reducing manure application on the more sensitive portions of the field, may allow a LOW or MODERATE rating to be achieved on significant parts of the field.

5. A producer may appeal the PLAT rating by presenting actual site data collected to verify that excessive P is not being transported from the site.

Criteria for this appeal process is currently being developed by the N.C. Interagency Nutrient Management Committee, and will be available at the NC Nutrient Management web site.

Interpreting the Results from NLEW

NLEW results will be provided on the NCANAT printed report in the near future. More information will be provided in the future.