CONSERVATION PLANNING GUIDELINES FOR OUTDOOR SWINE OPERATIONS

PLANNING—Background

- Conservation planning is the focus of the Tech Note, using the NRCS planning process as the basis for development of conservation plans on pasture-based or dry lot operations.

- Outdoor swine operations (OSO) have a high potential for excessive nutrient losses through erosion, surface runoff, and subsurface transport. Because of the difficulty in maintaining acceptable levels of vegetative cover in pasture-based operations, and the necessity of nutrient removal in dry lot operations, it is likely that in many cases NRCS assistance will be limited to planning practices that will mitigate water quality impacts, such as exclusion fencing along streams, riparian buffers, and surface water management.

- Through a USDA-approved 2007 Conservation Innovation Grant, NRCS is partnering with NC State University to identify and implement appropriate conservation management practices for outdoor swine operations using this Tech Note as a “starting point” for evaluation of conservation management scenarios. Closely monitored farm demonstrations and technical training will be designed through this CIG agreement, which will run through 2009. Results of CIG-based demonstrations and technical training will be incorporated into the Tech Note as warranted.

PLANNING—Pasture-Based Pork Operations

- A pasture-based pork operation (PBP) is one where a plan is developed and implemented that will ensure maintenance of a 75% vegetative cover at all times through a carefully planned stocking rate, intensive pig rotations, and appropriate vegetative selection and management.

- The pasture-based planning scenario is primarily for management of cover to prevent erosion and surface runoff and is considered to be a management strategy that allows shorter “recovery” periods. Frequent rotations of appropriate numbers are essential to maintaining cover.

- A planner-located sacrifice area is an essential part of the pasture-based system that will allow for maintenance of cover during periods of drought, excessive rain, or wear. This sacrifice area will be located as far from environmentally sensitive areas as possible.

- If nutrients are not removed through grazing/haying and site removal, the Pasture-based system is not sustainable in the long-term. Tables in the Tech Note show the potential P surface buildup over a period of years (based on NCSU/NCDA waste data table calculations of P generated and its affect on P indices). Therefore, the pasture
based system should include periodic harvesting and removal of the forage to reduce nutrient buildup. Periodic grazing with cattle or other animals can remove or control the growth of the pasture grasses and remove about 50-75% of the nutrients as would a hay harvesting operation.

- Although PBP operations are primarily grass-based systems, cropland may occasionally be used to provide “recovery periods” for permanent grassland. Winter & Summer annuals are examples of acceptable “cropland” vegetation for pig rotations. Cropland may also be used for limited periods of time following harvests, with annuals planted for nutrient removal after pigs rotated back to grassland.

- Minimum desired grass heights necessary for reintroduction of pigs in a rotational management system are noted by species.

- Table 8 in the Tech Note gives recommendations for various seasonal cropping rotations and vegetative types that may be used for pasture-based management scenarios.

- Producers should always check with potential buyers who are seeking “pasture-raised” pork to determine how they plan to assess cover.

**PLANNING—Dry Lot Operations**

- Operations that do not perform the intensive management necessary to maintain vegetative cover are considered Dry Lot operations.

- The dry-lot planning scenario is primarily for removal of nutrients through a cropping rotation that excludes animals until 75% of excreted P is removed (first year nitrogen is problematic because of its high degree of mobility). “Rest period” for crop nutrient removal concept is a long-term management strategy.

- The nutrient management aspect of the document for dry lot planning scenarios is primarily focused on crop removal of phosphorus during cropped “rest periods”. It is acknowledged that generation of waste-related nitrogen by pigs on areas that do not have established vegetation presents a risk of substantial nitrogen loss. It is essential that buffers be well-established to mitigate the impact of nitrogen loss to the maximum possible extent.

- The length of cropped “rest periods” will depend on stocking rate and crop grown for required nutrient removal. Crop-specific P removal rates by soil type and county are available at [http://nutrients.soil.ncsu.edu/yields](http://nutrients.soil.ncsu.edu/yields). Rest periods of multiple years will be necessary for required nutrient removal.

- Wide buffers (at least 100’) meeting NRCS filter strip standard 393 are required on all dry lot operations.

- For dry lots, NRCS conservation plans should not include having pigs on steep slopes or HEL where Erosion Index (RKLS/T) > 8. No concentrated flow is allowed through a dry lot to ensure buffer function.
• If 75% P removal cannot be achieved on a dry lot operation due to excessive stocking rate or insufficient land or crop rotations, then NRCS assistance will be limited to practices that mitigate water quality impacts (exclusion-type fencing, buffer practices, surface runoff management)

STOCKING RATES

• MAXIMUM recommended stocking rate for PBP operation:
  # Sows (including litters) <= (Acres of permanent grass) + (cropland acres/5)

• MAXIMUM recommended stocking rate for Dry Lot operation:
  # Sows (including litters) <= Proposed rotation acres x Proposed Crop P removal rate/105

• Recommended per acre stocking rates for sow and finishing operations based on nutrient generation (from NCSU/NCDA tables—“Swine-paved scraped—Broadcast”) the need for protection of established or natural cover, and crop P removal. Calculations based on the NCSU/NCDA waste tables show that each sow (and litter) would generate **143 lbs Plant Available P annually** and **88 lbs Plant Available N**. The NCSU/NCDA waste generation tables also show that 11 feeder-to-finish pigs would generate approximately the same amount of PAP and PAN as 1 sow (and pigs).

• Before determining a final stocking rate, the planner should work with the producer to develop rotation scenarios (this is especially important for sow operations with multiple groups of pigs) that will allow for cover maintenance and/or nutrient removal through rest periods. The fewer acres that are available for pig rotation, the more difficult to rotate adequately at maximum suggested stocking rates.

NUTRIENT MANAGEMENT PLANNING

• Nutrient Distribution. In contrast to the lagoon/sprayfield uniform land application method of confined swine operations, outdoor pigs managed by either the PBP or Dry Lot type of system will distribute waste materials/nutrients in an erratic manner that has little uniformity in the rotational area. It is important that producers set up rotational frequencies and paddock sizes that will favorably influence nutrient distribution efficiency in order to ensure that grassland and cover crops have sufficient nutrient bases to promote crop health. Uniform distribution of nutrients to the maximum possible extent will also help prevent accumulated “point” nutrient sources in either in the soil or in surface runoff from negatively impacting ground and surface water quality.

• Because of the significant potential for off-site transport of nutrients from outdoor swine operations, a modified nutrient management plan should be prepared as part of the outdoor swine planning process. Unlike typical nutrient management planning, the plan for crop uptake for outdoor swine operations is based on crop removal during the rest periods. It is important for planners to understand that because commercial feed generally provides 90 to 100 percent of the nutrition for outdoor pigs, the manure generated by the pigs should be considered an applied organic source in the nutrient management plan. This means that soil testing and PLAT should be used to assess the potential for excessive P loss from the planned
operation at the time the initial plan is developed. It is recommended that PLAT be rerun at least every 3 years on OSO rotational areas. Under USDA policy on nutrient management, the nutrient management plan is valid for five years, after which the plan should be updated and PLAT rerun if: (1) requested by producer, or (2) required for USDA program or NC regulatory purposes.

- PLAT is recognized as a tool that can help evaluate the rotational areas. PLAT must be run on rotational areas during the initial planning process, and results used to determine necessary rest periods and stocking rates. If “Very High”, then NRCS can provide limited assistance for surface water quality benefits.

- The effects of surface P indices on PLAT ratings are shown in example tables in the Tech Note, illustrating that P levels will reach non-sustainable levels with continued organic inputs and limited nutrient removal.

- The limitations of PLAT for use in planning on outdoor operations are acknowledged. Hydrologic condition is critical in assessing potential for P loss. Less than 75% cover would result in a “FAIR” hydrologic condition that may dramatically increase PLAT ratings.

- The “Hoop House” concept that would allow for collection and distribution of nutrients is recognized as a management method that could result in flexibility for stocking rates, but could raise other issues in regards to permitting, cost, and land available for waste application.

**MANAGEMENT**

- Several plant species (along with an Appendix that details potential seasonal cropping rotations) are recommended as traffic-tolerant.

- Watering and feeding sites should be moved around as much as possible to minimize vegetation destruction and nutrient hot spots.

- Buffers should not be “grazed” by pigs at any time during the year. If possible, it would be best to harvest the growth as hay and remove nutrients from the buffer. However, short duration graze periods (less than 3 days) by cattle, goats, horses or sheep could be used periodically.

- Diversions or land shaping should be used to reduce soil erosion and soluble nutrient runoff from dry lot paddocks, sacrifice areas, and farrowing areas.

- Visual/Odor barriers such as hedgerows are recommended.

- Methods of shade management are discussed, with woodland not allowed as part of rotational management areas for stocking rate determination.

- Methods of wallow/pool management are discussed, with placement as far from sensitive areas as possible recommended.

- Tables showing nutrient generation (using the NCSU/NCDA tables), live weight on-site with specific stocking rates, and seasonal cropping scenarios are attached to the Tech Note.