NMP PLANNING
To develop the NMP follow the guidance and processes in the NRCS General Manual – Title 190, Part 402 – Nutrient Management. Additional information is available in the current Iowa Nutrient Management (590) Conservation Practice Standard and the Conservation Activity Plan’s (CAP) Nutrient Management Plan Criteria Practice Activity Code (104) (No.) document which is potentially updated annually.

A Nutrient Management Plan (NMP) addresses, as a minimum, the following resource concerns to the planning criteria level:
- DEGRADED PLANT CONDITION – Undesirable Plant Productivity and Health,
- WATER QUALITY DEGRADATION – Excess nutrients in surface and ground water;

Optionally, the NMP addresses the following resource concerns:
- AIR QUALITY IMPACTS – Emissions of Particulate Matter - PM - and PM Precursors
- AIR QUALITY IMPACTS – Emissions of Greenhouse Gases – GHGs
- AIR QUALITY IMPACTS – Emissions of Ozone Precursors
- AIR QUALITY IMPACTS – Objectionable odors
- SOIL QUALITY DEGRADATION – Compaction

Additionally, the plan will address, if they are used, the proper utilization of manure, municipal and industrial biosolids, and other organic by-products as plant nutrient sources.

If this Nutrient Management Plan is part of a Comprehensive Nutrient Management Plan (CNMP), be aware of the linkages with the CNMP (e.g. amounts of manure and nutrients generated; estimated manure analysis, sheet, rill, and ephemeral gully estimates; acres needed to apply manure; etc.) and maintain communication with the other planners. Section 1, below, the Record of Decisions for Land Treatment Areas may have been completed by the CNMP Planner along with the National Air Quality Site Assessment Tool resource concern analysis. Some Case File items may be provided by the CNMP planner.

NUTRIENT MANAGEMENT PLAN DELIVERABLES
Self-certify completion of deliverables using this SOW as a checklist. If a box is left unchecked, provide an explanation why information was not applicable or completed. Submit the deliverables in an organized format including a table of contents. When a template for Purdue Manure Management Planner has been finalized as the Job Sheet/Implementation Requirements, this document will be updated to align with that format.

Though NRCS suggests using Purdue Manure Management Planner, the NMP is written for the client. The planner is encouraged to provide additional guidance or to design additional tables or maps to present the information in the NMP in ways that the client can better understand the plan and can successfully implement it.

Provide copies/verification/documentation for each deliverable to NRCS. Include an electronic copy of the deliverables in addition to the hard copy.
1. Record of Decisions for Land Treatment Areas (Cropland, Pasture, or other land receiving manure application).
   a. Plan map or sketch for each land application sites (GIS-developed map is preferred). Follow map requirements in NPPH Title 180, part 600.31 subpart A. Include the following, if applicable, but not limited to:
      i. fields delineated with ID and acres,
      ii. Location of existing and planned conservation practices necessary for the NMP to function
   b. Soils map and interpretations
      i. Identification of soil representing the dominant critical area (Choosing the Planning Area of a Field by “Dominant Critical Area”)
   c. Topographic map
   d. Reports of resource concern assessments using Resource Concern Measure and Assessment Tools. Document that the Planning Criteria is met. Use the current tool and Basic Assessment Level. (National and State Resource Concerns (RC) and Planning Criteria (PC), FOTG, Sec. III).

<table>
<thead>
<tr>
<th>Resource Concern (RC)</th>
<th>Tool</th>
<th>RC Identified</th>
<th>Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SOIL EROSION – sheet, rill, &amp; wind erosion</td>
<td>RUSLE2, Integrated Erosion Tool</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• SOIL EROSION – concentrated flow erosion</td>
<td>field measurement &amp; observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Other (specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Meeting the Planning Criteria for sheet, rill, and wind erosion ("T") or for concentrated flow erosion is not required for a NMP, though it is highly recommended. If plan is part of a CNMP, meeting “T” is required. However, the resource concern analysis will be used in the Iowa P-Index below and the PC will be met there.

e. Record of Decisions for the crop/pasture land - Provide list the conservation practices for the land receiving the manure, including tract, land unit type, and planned amount/date.
   i. Check the box(s) to indicate supporting practices needed for the NMP to function.

   - Conservation Crop Rotation (328) Ac.
   - Constructed Wetland (656) Ac.
   - Contour Farming (330) Ac.
   - Cover Crops (340) Ac.
   - Critical Planting Area (342) Ac.
   - Denitrifying Bioreactors (605) Ac.
   - Diversion (362) Ft.
   - Drainage Water Management (554) Ac.
   - Field Border (386) Ft.
   - Filter Strip (393) Ac.
   - Grade Stabilization Structure (410) No.
   - Grass Waterway (412) Ac.
   - Heavy Use Production Area (561) Sq. Ft.
   - Nutrient Management (590) Ac. *(see sec. 2)*
   - Residue and Tillage Management, No-Till (329) Ac.
   - Residue and Tillage Management, Reduced Till (345) Ac.
   - Riparian Forest Buffer (391) Ac.
   - Saturated Buffer (604) / Vegetated Subsurface Drain Outlet (739) Ft.
   - Terrace (600) Ft.
   - Underground Outlets (620) Ft.
   - Water & Sediment Control Basin (638) No.
   - Other (specify) ___
   - Other (specify) ___

f. For practices installed prior to this plan verify and document that the practices are functioning. Reference or include the Implementation Requirements/Job Sheets or Plans and Specifications, Operations, and Maintenance (e.g. state that, “Engineering plans and Operations and Maintenance requirement for [specified practice] are located in [client’s] case file at the NRCS/SWCD [specific location] Field Office”). For practices installed without NRCS assistance note in the Record of Decisions that the
structure was installed without NRCS technical or financial assistance. To ensure the client understands and can successfully implement the plan include practice Operation and Maintenance information as needed.

g.  }

For newly planned agronomic conservation practices (e.g. No-Till (329); Cover Crop (340), etc.) include the completed Implementation Requirements/Job Sheets or Plans, Specifications, Operations, and Maintenance. The implementation requirements for Nutrient Management (590) will be documented in section 2, Nutrient Management.

h.  }

For newly planned engineering practices the implementation requirements will be completed at the time of implementation. However, for the client to understand the full implications of the NMP to their operation, consider providing implementation requirements for relevant new engineering practices in this plan as needed and feasible.

2. Nutrient Management

a.  }

Client’s nutrient management objectives.

b.  }

Statement of local, state, and/or federal standards and/or requirements the plan is designed to meet; tools and data sources used; and assumptions made.

i.  }

Assessment of the adequacy of the acres for land application of manure from this animal feeding operation.

c.  }

If manure, biosolids, or other organic by-products are applied, include:

i.  }

Estimated annual amounts of manure, biosolids, or other organic by-product (if appropriate)

ii.  }

When the product is available for application,

iii.  }

Total annual available nutrients (N-P-K)) from the products,

iv.  }

Total annual available nutrients (N-P-K) available after losses from storage and application. (use ISU interpretations)

v.  }

Estimated land requirements for N and P based on clients cropping practices and yields (optional until report is available in MMP).

1.  }

Alternatively, the plan could report how much total product could be applied and when.

d.  }

Plan map or sketch for each land application sites (GIS-developed map is preferred). May be part of the conservation plan map for section 3. Follow map requirements in NPPH Title 180, part 600.31 subpart A. Include the following, if applicable, but not limited to:

i.  }

Fields delineated with ID, total acres, and spreadable acres (if different). Make sure the field IDs make sense to the client and are consistent among maps and tables.

ii.  }

Location of water quality sensitive areas including lakes, ponds, streams, other perennial water bodies, Iowa Designated Wetlands, High Quality Water Resources (DNR 117), sinkholes, drainage wells, wells, classic gullies, drainage ditches, tile line surface and blind inlets for tile lines which run unmitigated to surface or groundwater, or other direct conduits to surface or groundwater.

iii.  }

Setbacks or Filter Strip (393) to protect the sensitive area, if required. Or for tile inlets specify alternative practice(s) from the Nutrient Management (590) standard.

iv.  }

Identify areas which flood more than once every 10 years.

v.  }

Other site information features which may influence manure application, such as property boundaries, nearby residences, or other locations where humans may be present on a regular basis (parks,
schools, churches, etc.), and any identified meteorological (e.g., prevailing winds at different times of the year), or topographical influences that may affect the transport of odors to those locations.

e.  
   □ Soils map and interpretations (may use from Section 2)  
   i. Identify soil representing the dominant critical area (Choosing the Planning Area of a Field by “Dominant Critical Area”)  

f.  
   □ Topographic map (may use from Section 2)

g.  
   □ Reports of resource concern assessments using Resource Concern Measure and Assessment Tools. Document that the Planning Criteria is met. Use the current tool and Basic Assessment Level. (National and State Resource Concerns (RC) and Planning Criteria (PC), FOTG, Sec. III).

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<tr>
<td>• DEGRADED PLANT CONDITION – Undesirable Plant Productivity and Health (REQUIRED)</td>
<td>Client Input/Planner Observation, Nutrient Management 4Rs</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>• WATER QUALITY DEGRADATION – Excessive sediment in surface water</td>
<td>Iowa P-Index</td>
<td>☐</td>
<td>☐</td>
</tr>
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<td>• WATER QUALITY DEGRADATION – Excess nutrients in surface and ground water (REQUIRED)</td>
<td>Iowa P-Index</td>
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<tr>
<td>• WATER QUALITY DEGRADATION – Excess pathogens and chemicals from manure, bio-solids, or compost applications</td>
<td>Iowa P-Index</td>
<td>☐</td>
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<tr>
<td>• AIR QUALITY IMPACTS – Emissions of Particulate Matter - PM - and PM Precursors</td>
<td>NAQSAT*</td>
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*Use the NAQSAT tool results from Section 1 assessments for transport and application of manure.

h.  
   □ Soil Test Result Data.  
   i. Specify type of sampling based on ISU guidelines  
      1. Sample represents no more than 10 acres, random zigzag pattern from each sampling area OR  
      2. If using grid-point sampling, sample represents no more than 2.5 acres  
      3. Number of cores/sample.  
   ii. Map of soil sampling areas with site name/number -- e.g. client’s name for the field – georeferenced to correlate with Tract and Field.  
   iii. Sampling date (Soil samples no older than 2 years)  
   iv. Specify sample depths,  
   v. Specify P and K lab method (e.g. Bray P1, Mehlich 3 K, Field-moist, etc.)  
   vi. Test, at a minimum, for pH, BpH (if applicable), P, K, and organic matter.
vii. Use ISU interpretations and recommendations of the soil test (may vary from lab interpretations and recommendations)

i. Summary of existing manure, wastewater, biosolid, compost, etc. sample analyses (if applicable), include:
   i. Total Ammonium-N, Total Organic-N and Total N Values.
   ii. Total P and K values.
   iii. Percent moisture / dry content.
   iv. Use ISU interpretations of plant available nutrients depending on management (may vary from lab interpretations).

j. Land application sites – Summary table that includes:
   i. Site number or site name & legal description.
   ii. Land owner name, address and contact number.
   iii. Land operator, address and contact number.
   iv. Spreadable acres (subtract setback acres), separate irrigated and non-irrigated acres.
   v. Setbacks required or narrative setback statement.
   vi. Crop type & yield.

k. Soil & Risk Assessments
   i. Develop summary table(s) representing risk assessments results for P to include the following:
      1. Site number/name,
      2. P-Index risk value (numeric).
         a. Include estimate of ephemeral gully erosion.
         b. Include interpretation and verify that the site vulnerability ratings criteria are met for each field in the plan,
         c. All conservation practices used for the risk assessment are included in the Section 2 conservation plan.
         d. Soil phosphorus test values are same as in the soil test reports,
      3. RUSLE2 or Purdue Manure Management Planner erosion estimate for soil loss (T/ac). May reference section 2.
         a. Verify that all fields are at or below “T”, Tolerable soil loss (Alternative Conservation Systems are not adequate).
         b. Verify that all relevant manure and fertilizer passes are included
         c. Verify if residues are removed by bedding or biofuels, that this was included
      4. Leaching Index value (Optional. No interpretation is required)
   ii. If any phosphorus risk assessments result in a high or very high rating, provide a narrative statement on nutrient application plans (P-based or no manure) and if any plans are being made to incorporate land treatment or additional management practices for that land site.

l. Complete nutrient management plan for nitrogen, phosphorus, and potassium for five years or the length of one crop rotation – whichever is longer – for all planned nutrient applications (manure, wastewater, biosolids, commercial fertilizer, etc.) showing:
   i. Crop nutrient requirements based on planned crop and realistic yield potential using Iowa State agronomic recommendations.
      1. State how the realistic yields were determined (i.e. field data, use of values in the eFOTG, etc.).
   ii. Nutrient Credits (if applicable)
   iii. Planned nutrient recommendations and applications from all sources (i.e. manure, commercial fertilizer, etc.). For each source, provide:
      1. Nutrient source including any Enhanced Efficiency Fertilizer formulations (e.g. nitrification or urease inhibitors),
      2. Estimated application rates/amounts per acre,
      3. Application placement,
4. Application timing (fall (soil temp >50° or <50°), spring, sidedress (specify), or summer).

iv. Manure Application
1. Description of application method and equipment
2. Estimated loads and/or hours of application per season based on annual manure/wastewater production (optional)
3. Account for manure applications prior to plan years if they will impact the plan
   a. Recommend starting rotation one year prior in MMP as results are more consistent
4. Specify timing, e.g.
   a. for fall applied ammonia N such as anhydrous ammonia, manure in which > 20 lbs/acre NH₄⁺-N is applied, or MAP/DAP plan to apply late in the fall when the mid-day soil temperature, at 4” soil depth, is below 50°F and trending colder.

v. Verify and document.
1. Using the Corn Nitrogen Rate Calculator (Maximum Return to Nitrogen), CROP 3073: Nitrogen Use in Iowa Corn Production, or PM 1714: Nitrogen Fertilizer Recommendations for Corn in Iowa for the N-rate.
   a. For recommendations that are a range, specify why a specific part of the range is used.
   b. If IDNR documents are used and different N-rates are used, provide guidance to client on how to use this conflicting data.
   c. Account the N in MAP and DAP
   d. Optional – Include Rescue N guidance
3. The N, P, and K units are as consistent as is feasible in the document and well labelled to avoid confusion.

m. If P applications are in excess of crop removal (possible for manure applications when the P-Index is very low, low, or medium and soil test P is optimum or higher),
   i. State the rationale for the excess application (e.g. disposing of the manure)
   ii. If the soil test phosphorus levels are high or very high and/or increasing,
      1. include a discussion of the risk associated with phosphorus accumulation,
      2. estimate using the P-Index when P should no longer be applied,
      3. propose a P stabilization or draw-down strategy to optimum soil test P, and
      4. formulate alternative manure management strategies to reduce application rates (i.e. use it to fertilize more land to better optimize the use of the resource),

n. If plan includes precision/variable-rate application:
   i. Include geo-referenced maps showing spatially variable application areas (site-specific recommendation or as-recommended maps).
   ii. Document the nutrient recommendation guidance and recommendation equations used to convert the GIS base data layer or layers to a nutrient source material recommendation GIS layer or layers.
      1. Follow Iowa State University recommendations
   iii. Document if a variable rate nutrient or soil amendment application was made.
   iv. Provide application records per management zone or as applied map within individual field boundaries (or electronic records) documenting source, timing, method, and rate of all applications that resulted from use of the precision agriculture process for nutrient or soil amendment applications.
   v. Maintain the electronic records of the GIS data layers and nutrient applications for at least 5 years.

o. Operation and Maintenance. Provide guidance in the plan to:
   i. Specify the soil test cycle
      1. Monitor fields receiving animal manures and/or municipal or industrial biosolids for the accumulation of phosphorus.
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ii. Specify the manure test cycle, if applicable. If feed management, animal numbers or type, manure handling strategy, storage time, etc., change significantly, re-inventory the manure resource and re-analyze the manure.

iii. Conduct periodic plan reviews to determine if adjustments or modifications to the plan are needed. At a minimum, plans must be reviewed, evaluated, and, if needed, revised, with
1. Each soil test cycle,
2. Changes in manure volume or analysis, or
3. Changes in crops or crop management.

iv. Specify calibration of manure and fertilizer application equipment at least annually to ensure proper placement or material at planned rates. Provide clear guidance on how to calibrate, i.e.
1. Use ISU PM-1941 “Calibration and Uniformity of solid Manure Spreaders” or PM-1948 “Calibrating Liquid Tank Manure Applicators.”
2. For custom applicators or rented equipment, verify that the operator or owner has calibrated applicators.
3. For anhydrous ammonia traditional calibration is dangerous. Rather, verify that the applicator is properly plumbed. See PM-1875 “Improving the Uniformity of Anhydrous Ammonia Application” for guidance. Note that other effective manifolds are now available. Verify that anhydrous ammonia is injected to the proper depth and good soil coverage is provided.

p. Record Keeping
i. Maintain records for at least 5 years – longer if required by other Federal, state or local ordinances, or program or contract requirements – to document plan implementation and maintenance. As applicable, include:
1. Soil, plant tissue, water, manure, biosolid, and organic by-product analyses resulting in recommendations for nutrient application.
2. Nutrient sources and analyses, rates as applied, placement, timing (dates) of nutrients applied, and a summary of actual pounds of nutrients applied per acre.
3. Weather conditions and soil moisture at the time of application; lapsed time to incorporation; and rainfall or irrigation event.
4. Record of equipment calibration.
5. Crops planted, planting and harvest dates, yields, nutrient analyses of harvested biomass (if applicable), and crop residues removed, and
6. Identify variations from the nutrient management plan, evaluate why the variation occurred, and determine if a plan needs to be updated. Document decision.
7. Dates of plan review, name of reviewer, and recommended changes resulting from the review.

3. Case File Information for NRCS NMP Client File (In addition to requirements outlined above (190 GM-402 NMP)). Note: This is a list of what should be in the case file. For a list of specific TSP deliverables, see Exhibit F – CAP 104 NMP Administrative Checklist.

a. Printed and electronic copy of the NMP document or reference where these are located

b. Client Information;

c. Client’s Objectives and Resource Concerns;

d. Environmental Documentation – Form NRCS-CPA-52 “Environmental Evaluation Worksheet” and any other documentation needed to meet the requirements of NEQP or other applicable environmental requirements, such as ESA. (Completed by NRCS only);

e. NMP and record of decisions (practice schedule), with planner, decision maker, and local conservation district (if required signature);
f. □ Assistance Notes
   i. Include information about conservation practices (e.g. to address air quality) that the client had interest, but chose not to put in the NMP.

  
g. □ Inventory
   1. Cropping and Yield History,
   2. Tillage Information,
   3. Soil Test Results (no older than three years),
   4. Manure Analyses (all reports up to 5 years);

h. □ Geospatial layers (if available) for planned land units, practices, resource inventory, and other map features;

i. □ Maps used in NMP development process – conservation plan, soils, NMP map of headquarters with livestock support facilities and features, land treatment maps, and any other maps needed to communicate the existing and planned practices;

j. □ Forms and worksheets used in developing and evaluating alternatives;

k. □ Local conservation district information related to the plan;

l. □ Inventory Analysis and Resource Risk Assessments data;
   i. RUSLE2 runs P-Index erosion estimator values for each land treatment site,
   ii. Phosphorus Index Summary Reports for each land application site, soil test run or management unit. Reports should be labeled properly to correspond with land unit site number and/or name.
   iii. Air quality site assessments (as applicable):
   1. NAQSAT Baseline Report and
   2. NAQSAT Updated Report for planned changes.

m. □ Photographs, audio and video files (Properly labels with dates, location and responsible party);

n. □ Determinations (i.e. HEL, wetland);

o. □ Other supporting documents and local or State-required documentation;

p. □ Engineering notes, if applicable;

q. □ All electronic files or printed documents (if electronic files are not available (used for design and nutrient management planning).

COMMENTS: Use this space for installation notes or explanation of unchecked items (attach additional pages as needed):

SUPPORT REFERENCES

  - Iowa eFOTG, Section IV - Conservation Practices (include titles and dates. Copies are not required)
    - Nutrient Management Standard (590) (Required)
    - Other practices as cited in the plan
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SUPPORT FORMS

- Purdue Manure Management Planner or equivalent. [http://www.purdue.edu/agsoftware/mmp/](http://www.purdue.edu/agsoftware/mmp/)

STATE CONTACT

NRCS State Resource Conservationist
210 Walnut Street, Room 693
Des Moines IA 50309-2180
515/284-4370