Update on Agriculture Protocol Development at the Reserve

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Reserve Agricultural Protocol Development

• **Nitrogen Management Project Protocol (NMPP):** $\text{N}_2\text{O}$ emission reductions resulting from a change in nitrogen management
  – Version 1.0 Adopted on June 27, 2012

• **Rice Cultivation Project Protocol (RCPP):** $\text{CH}_4$ reductions resulting from a change in water and/or residue management
  – Version 1.0 Adopted on December 14, 2011

• **Soil Carbon:** Initiating research on land-use change opportunities, including preservation of grasslands and/or conversion of marginal cropland to grassland
NMPP Development Goals

• Develop a standardized approach for quantifying, monitoring and verifying GHG offsets resulting from changes in nitrogen management practices that reduce N$_2$O emissions from U.S. croplands

• Maintain consistency with or improve upon existing methodologies
  – NMPP v 1.0 most consistent with MSU-EPRI methodology

• Ensure accuracy and practicality of projects
NMPP Project Definition

• The adoption and maintenance of an approved project activity that reduces nitrous oxide ($N_2O$) emissions.

• In NMPP version 1.0, the only approved project activity is:
  – Reduction in the annual nitrogen fertilizer application rate (N rate) compared to recent historic application rates at the site, without going below N demand.
  – Only reductions in synthetic N are creditable.
  – Applicable to corn cropping systems in the North Central Region of the United States

• Future versions of the protocol will include additional regions, crops, and project activities, once data is available.
NMPP Eligible Geographic Area within the North Central Region

- The North Central region includes the 12 states shown at left:
  - IA, IL, IN, KA, MI, MN, MS, NE, ND, OH, SD, WI

- Eligibility limited within the NCR to counties with mean annual precipitation in the range of 600-1200mm (shaded green)
Project Aggregation (NMPP + RCPP)

- Project Aggregate = A project comprised of two or more fields, which can be located on one or more farm operations.
- Aggregation is optional, but likely to be common in both protocols.
- Credits issues to the aggregator (growers can be their own aggregator).
- Aggregates are unlimited in size.
- Eligibility rules, start dates, and crediting periods associated with individual fields, not the aggregate.
  - But reporting period uniform for the aggregate, regardless of field start dates.
- Fields have limited opportunity to switch aggregates.
# Eligibility Rules (NMPP, Section 3)

| 1. Location                  | North Central Region of the United States  
|                             | (with additional restrictions, see 5.1) |
| 2. Project Start Date       | The first day of a new cultivation cycle (e.g. the first day after harvest of the previous year’s crop) on a given field during which an approved project activity is implemented.  
|                             | For the first 12 months after protocol adoption, fields with start dates on or after June 27, 2010 are eligible. |
| 3. Additionality            | Meet performance standard (exceed RTA threshold)  
|                             | Exceed legal requirements throughout project |
| 4. Ecosystem Services       | Fields not eligible if NRCS conservation payments for approved project activities received prior to Start Date/Submittal to Reserve.  
| Payments Stacking          | Fields stacking NRCS payments are only eligible to receive CRTs for the portion of project not funded by public dollars (e.g. 50%) |
## Eligibility Rules (NMPP, Section 3)

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<thead>
<tr>
<th>5. Regulatory Compliance</th>
<th>Compliance with all applicable laws</th>
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<td>6. Crediting Period</td>
<td>5 eligible crop years (over a period of up to 10 years)</td>
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<td>Crop years may be non-consecutive, but reporting must be continuous</td>
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<td>Renewable one time</td>
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<td>7. Other Criteria</td>
<td>Lands with no previous cropping history ineligible</td>
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<td>Lands designated as highly erodible land and/or wetlands ineligible.</td>
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<td>Management records from past five years (or past three years of eligible crop in a rotation) required to set the baseline</td>
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<td>Frequency of eligible crop (corn) may not increase due to the project.</td>
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<td>8. Applicability Criteria</td>
<td>Additional criteria specific to the quantification methodology (Section 5.1)</td>
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Applicability Criteria (NMPP, Section 5.1)

1. No organic soils and/or histosols
2. Project must be located in counties where the mean annual precipitation is between 600 mm and 1200 mm (see Figure 5.2, next slide)
3. No corn cropping systems which are typically irrigated.
   - Emergency irrigation allowed in years of severe drought.
4. No tile-drained fields.
5. Both synthetic and organic fertilizer may be applied to project fields, but only N\textsubscript{2}O emission reductions from reductions in the synthetic N rate shall be credited.
6. Total organic N applied may increase or decrease in the project area, but total annual N applied (synthetic and organic) must decrease below baseline levels.
Performance Standard  (NMPP, 3.5.1)

- Projects pass the performance standard when the project field’s nitrogen use efficiency exceeds the state average.
  - Specifically, nitrogen use efficiency is calculated as the ratio of N removed (by crop) to N applied (as fertilizer), or the Removed to Applied ratio (RTA)

\[ RTA_{\downarrow f} = (Y_{\downarrow f} \times NC) / NR_{\downarrow f} \]

- Field RTAs are calculated each reporting period using fixed historic yield (from 5 crop years prior to project’s start date), so farmers know the maximum amount of N that may be applied each year
- State RTA thresholds are calculated from state average yield and state average N-rate data
NMPP Quantification Approach

• Primary effects quantified with an emission factor approach based on:
  – Study of direct N\(_2\)O emissions from corn crops in Michigan (Hoben et al. 2010 – used in MSU-EPRI methodology)
  – IPCC emission factor for indirect N\(_2\)O emissions

• Secondary effects must be quantified
  – From leakage due to yield loss
  – Increased emissions from cultivation equipment
  – Secondary effects associated w/ changes (+/-) in manure use are not quantified (determined to be outside GHG boundary, as changes will not be the result of a project)
NMPP Monitoring, Reporting & Verification

• Significant revisions to monitoring, reporting, and verification requirements, due to concerns raised during public comments.

• A low cost “Corn Stalk Nitrate Test” (CSNT) is required for each field to provide greater assurance of N-rate reductions and to inform the risk-based portion of verification site visit sampling.

• Different verification site visit requirements for different size aggregates.
  – Verification of large multi-participant aggregates (e.g. with 20 fields or more) will include site visits on only 5-15% (variable) of eligible fields in any given year.

• Greater guidance provided to verifiers on how to verify N-application rates through the triangulation of data from multiple sources.
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