Nutrient Management Project Protocol (NMPP)

CLIMATE ACTION RESERVE

Workgroup Meeting #3

August 1, 2011

10 AM - 4 PM PDT

Welcome and Introductions

Today's Purpose

- Walkthrough draft protocol in detail
  - Discuss questions, options and identify directions for further improvement
  - Gather preliminary feedback & discuss specific topics raised by Reserve ("green boxes") and workgroup
  - Build consensus on protocol policies and concepts
  - Develop questions for Science Advisory Committee
- Updates on protocol development progress and plans
- Discuss Next Steps
  - Note: Workgroup will be asked to also provide written comments

Agenda

- 10:00 – 10:45 Welcome and Overview
  - » Protocol Progress and Highlights
- 10:45 – 12:30 Begin protocol walkthrough
  - » Project Background and Definitions (Section 2)
  - » Eligibility Rules (Section 3)
- 12:30 – 1:00 Break for lunch (provided)
- 1:00 – 3:30 Continue protocol walkthrough
  - » Eligibility Rules Continued (Section 3)
  - » GHG Assessment Boundary (Section 4)
  - » GHG Reduction Calculation (Section 5)
  - » Monitoring/Verification of Project Aggregates
- 3:30 – 4:00 Wrap up and Next Steps

Protocol Progress and Highlights

Methodology Synthesis Paper	May 6, 2011
WG Meeting 1 (conference call)	May 18, 2011
WG Meeting 2	June 27, 2011
Background Paper Completed	July 18, 2011
Draft protocol to workgroup	July 27, 2011
WG Meeting 3 (Los Angeles)	August 1, 2011
Second draft protocol to WG and SAC	Week of Aug 29, 2011
Science Advisory Committee Meeting	September 7, 2011
WG Meeting 4 (conference call)	Week of Sept 12 or 19, 2011
Revised protocol & start of 30-day public comment period	November 1, 2011
WG Meeting 5 (conference call)	Week of November 14, 2011
Public workshop	Week of November 28, 2012
Protocol adoption by Reserve Board	February 2012

Protocol Progress and Highlights

- Draft provides good overall sense of the methodology
  - Draft is complete, addresses all required protocol sections
  - Gives a basis for assumptions, definitions, and eligibility criteria
  - Aggregation requirements integrated into relevant protocol sections
  - Outlines the quantification methodology
- Many aspects are still in development
  - Actual performance standard thresholds
  - Guidance on ecosystem credit stacking
  - Refined/specific guidance on using DNDC
  - How to account for leakage
  - Monitoring, Reporting, Verification sections

Protocol Progress and Highlights

- Version 1.0 may have limited geographic coverage
  - Thresholds for high priority areas will be developed
  - Model validation/calibration demands may limit use
- Development plans for Version 2.0
  - Complete performance standard threshold development
  - Initiate a DNDC validation study to expand reach of v2.0
    - Assess the major gaps in N2O validation studies
    - Collate existing field N2O measurement data from various sources across the US, prioritizing filling in gaps
    - Revalidate DNDC with the expanded dataset using most recent version
    - Develop refined uncertainty deductions and update NMPP
    - Develop process to periodically update the validation

Protocol Progress and Highlights

- Aggregation goals
  - Integral to methodology
  - Flexible enough to enable participation
  - Allow project aggregator to accept risk and responsibility
  - Streamline requirements w/out compromising integrity
  - Improve estimation accuracy

Protocol Progress and Highlights

- Quantification approach uses biogeochemical model
- Emission factors
  - Disregard impacts of crop type, soils, climate and management
    - Local emission factors could better accommodate variation
  - Based on annual N budgets
    - No carry-over effect from one year to the next
- Biogeochemical models
  - Simulate N budget and N transformation over many years
  - Accuracy of *daily* GHG fluxes is low, but acceptable for *annual* GHG fluxes
  - Difficult to calibrate with room for arbitrary decisions
- Leakage methodology TBD

Protocol Progress and Highlights

- NMPP Scientific Advisory Committee (Sept 7)
  - Steven Del Grosso USDA ARS, CSU Natural Resource Ecology Laboratory
  - Ray Desjardins, Agriculture and Agri-Food Canada
  - Peter Groffman, Cary Institute of Ecosystem Studies
  - Ardell Halvorson, USDA ARS, Colorado
  - William Horwath, UC Davis
  - Tim Parkin, ARS, Iowa
  - Phil Robertson, Michigan State University
  - Cliff Snyder, International Plant Nutrition Institute
  - Rod Venterea, USDA ARS/ University of Minnesota
  - Reynald Lemke, Agriculture and Agri-Food Canada

  - Administered by Alison Eagle at Nicholas Institute, Duke University

Protocol Progress and Highlights

- Credit Stacking Subcommittee
  - Rachel Tornek, Climate Action Reserve*
  - Katie Goldman, Climate Action Reserve*
  - Teresa Lang, Climate Action Reserve*
  - Nicholas Bianco, WRI
  - Simon Bird, AgRefresh*
  - Bobby Cochran, Willamette Partnership
  - David Cooley, Nicholas Institute at Duke
  - Jessica Fox, EPRI
  - Mark Lambert, Terra Global Capital*
  - Belinda Morris, EDF*
  - Meredith Niles, UC Davis*
  - Lydia Olander, Nicholas Institute at Duke
  - Michael Wara, Stanford Law*

(*Members of NMPP workgroup)

Protocol Progress and Highlights

Subcommittee Objectives

- To provide options and make recommendations to the Reserve and the NMPP workgroup on policies to address:
  - credit stacking, focusing on the issuance of water quality credits and Reserve-issued carbon offset credits
  - payment stacking
- Help inform Reserve's overarching policies on stacking

Protocol Progress and Highlights

Credit Stacking Subcommittee Timeline

Subcommittee call	July 12
Subcommittee call	August 10
Subcommittee call	week of September 12
Options memo	**mid-September**
Subcommittee call	week of October 3
Subcommittee to make recommendations to workgroup	**week of October 10**
Protocol draft for public comment	*November 1*
Subcommittee call	week of December 5
Subcommittee call	week of January 16, 2012
Final protocol for Board	*February 2012*

- General Questions or Comments?
- Priority Issues for Protocol Walkthrough Discussion?

Nutrient Management Project Protocol

Reducing Nitrous Oxide Emissions through Improved Nutrient Management in Crop Production

2.2 Project Definition (p. 4)

- Definition: "the adoption and maintenance of approved practices that improve nitrogen use efficiency of crops, including a reduction in the amount of inorganic nitrogen fertilizer applied annually to crops"
  - Minimum of five fields combined for a single project area
  - Fields need not be contiguous or under same management
  - Projects that encompass fields under different management are considered a **Project Aggregate**
  - All fields must implement at least some number (TBD) of approved practices, which vary by region, one of which must be a reduction in the amount of inorganic nitrogen fertilizer applied annually to crops

Approved Practices (p. 5)

Approved Practice Changes	Description
Reduce nitrogen application rate	Reduction in the annual nitrogen application rate compared to recent historic application rates at the site for the specific crop rotation during the project. Practices listed below may enable the rate reduction.
Optimize the timing of N fertilizer application	Change the timing of N fertilizer application to optimize the application for crop N demand, minimizing the N lost as emissions. Options include specific timing of application relative to planting date and crop emergence. Includes split application technology and management.
Placement of fertilizer	Improve the placement of fertilizer by placing it closer to the active root uptake zone, maximizing the efficiency of N uptake by the plant. Includes injecting near seeds during sowing, injecting in sub-surface drip irrigation (fertigation), and precision agriculture (GPS-aided fertilizer application, optimized for the soils at each specific location)
Include mixed cover crops in a rotation	Plant mixed cover crops to scavenge residual nitrogen and immobilize this nitrogen during the off-season and/or to use leguminous cover crops as a nitrogen source. To minimize increased emissions from using cover crops, the timing between cover crop incorporation and planting should be as minimal as possible.
Changing fertilizer composition	Change in the chemical composition of fertilizer used (anhydrous ammonia to urea) or change to controlled-release nitrogen fertilizer, which have coatings designed to provide a slow but steady release of mineral N.
Use of organic amendments	Complete or partial replacement of inorganic N with organic amendments (such as, manure or compost).
Use of nitrification and urease inhibitors	Use of nitrification and urease inhibitors to slow the biological transformation of nitrate and urea, respectively, leading to greater N use efficiencies
Adding deep rooting plants into crop rotations (e.g. alfalfa or other hay plants)	Add in deep rooting plants (e.g. alfalfa) to crop rotation, which can scavenge residual nitrogen and redistribute nitrogen through the soil profile by root uptake.

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2.2.1 Defining the Field Boundaries (p. 6)

- Fields must be defined by the following criteria:
  - Under the direct management control of a single grower
  - Management within the field boundary must be homogeneous
    - Specifically, a field must have the same crop/crop rotation grown (including cover crops), and homogeneous fertilizer management (rates, timing and placement).
  - The field must be calibrated and modeled independently of all other fields, using soil, management, and climate data inputs specific to the defined boundary

2.3 Project Developer (p. 6)

- Project Developer
  - Has an active account on the Reserve
  - Submits a project for listing and registration with the Reserve
  - Is responsible for all project reporting and verification
  - May represent a project or a project aggregate
  - May be agricultural producers (including landowners or land tenants), GHG project developers, aggregators, or other entities.

2.3 Project Developer (p. 6-7)

- Project Participants
  - Agricultural producers who elect to enroll in a project aggregate
  - Must be responsible for making management decisions for crop production on their fields enrolled in the project
  - Are **not** required to hold an account on the Reserve
- Project Aggregate
  - Fields may not change ownership, tenant occupancy, or management control during crediting period.
  - No upper limit on the total number of fields or acres enrolled in a project aggregate.
  - No single field may comprise more than 33 percent of the total combined acreage in an aggregate.

2.3 Project Developer (p. 7)

- Aggregators
  - May be a corporation or other legally constituted entity, city, county, state agency, individual or a combination thereof.
  - Must have an account on the Reserve
  - Act as official agents to the Reserve on behalf of project participants and are ultimately responsible for submitting all required forms and complying with the terms of the NMPP.
  - Manage the flow of ongoing monitoring and verification reports to the Reserve and may engage in other project development activities such as developing monitoring plans, modeling emission reductions, managing data collection and retention etc..
- Scope of aggregator services is negotiated between project participant and aggregator and reflected in contracts between the parties.
  - Such contracts must include mandatory components (TBD)

2.3 Project Developer (p. 7)

- In all cases, the project developer must attest to the Reserve that they have exclusive claim to the GHG reductions resulting from the project.
- Each time a project or project aggregate is verified, the project developer must attest that no other entities are reporting or claiming (e.g. for voluntary reporting or regulatory compliance purposes) the GHG reductions caused by the project.
- Reserve's Attestation of Title form, available at: http://www.climateactionreserve.org/how/projects/register/project-submittal-forms/

3. Eligibility Rules (p. 8)

Eligibility Rule I:	Location	→	*U.S. and U.S. tribal areas*
Eligibility Rule II:	Project Start Date	→	*No more than six months prior to project submission**
Eligibility Rule III:	Additionality	→	*Meet performance standard*
		→	*Exceed regulatory requirements*
Eligibility Rule IV:	Regulatory Compliance	→	*Compliance with all applicable laws*
* See Section 3.2 for additional information on project start date			

3.2 Start Date (p. 8)

- Each field has a unique start date, defined as the first day of the “cultivation cycle” during which the approved project activities were implemented for the first time.
  - Cultivation Cycle: Begins immediately post-harvest, runs through the end of the next year’s harvest (~365 days)
- Minimum of 5 fields with start dates within the same year to originate a project (“originating fields”)
- Earliest start date of originating fields is start date of aggregate
  - Additional fields with different start dates may join aggregate later

3.2 Start Date (p. 8-9)

- Pre-existing projects
  - Projects with start dates </= 24 months prior to the Effective Date are eligible if listed during 12 months after v1.0 take effect [~Feb 2012].
    - Start dates after Feb 2010 are eligible if submitted by Feb 2013
    - Start dates prior to Feb 2010 are not eligible
- New projects
  - Projects with start dates after Effective Date of v1.0 must be submitted no more than six months after the start date

3.3 Crediting Period (p. 9)

- Project/project aggregate has a 10 year crediting period, with opportunity to enroll in a 2nd crediting period
  - To enroll in a 2nd crediting period, the project must meet the eligibility requirements of the most current version of this protocol, including any updates to the Performance Standards.
- A field may participate for a maximum of 20 years; years can be split between projects/project aggregates
  - Fields must meet eligibility requirements pertaining to the aggregate in which it is enrolled at the time it enrolls.
- Crediting ends if an activity becomes required by law, regardless of point in time within crediting period.

3.4 Other Eligibility Criteria (p. 9-10)

- Projects on histosol (organic) soils not eligible.
- Projects only eligible if DNDC calibration for crop/location meets requirements.
- Increases/decreases in yields allowable, but yield decreases may require estimation of leakage effects.
- The crop production system/practices:
  - Must have a min. of 5 yrs of data on crop production practices for each field
  - Management practices during the project must be consistent with past 5 yrs
  - Primary crops produced and/or rotation schedule must be maintained on a field for the duration of its participation in a project or project aggregate

3.5 Additionality (p. 10)

- Projects must satisfy the following tests to be considered additional:
  - **The Performance Standard Test**: By meeting the performance threshold for a specific management activity, a field demonstrates that nutrient management exceeds the regional common practice standard for nitrous oxide emissions management.
  - **The Legal Requirement Test**: Ensures project activities are not a result of legal obligations

3.5.1 Performance Standard (Part I) (p. 10)

(1) Nitrogen Application Rate Threshold: The amount of synthetic fertilizer applied during the cultivation cycle must be equal to or less than the threshold amount for the region and crop grown on that field during the cultivation cycle [TBD].

  – Soil tests can be used to set the threshold if standardized thresholds result in a rate insufficient to meet crop N demand w/out compromising yield.

- Purpose is to ensure projects achieve a certain *level* of performance; is *not* to determine the baseline

  – Baseline quantified using data on site-specific historic rates

3.5.1 Performance Standard (Part II) (p. 11)

(2) Nutrient Management Practice Standard Threshold: At least [X] more practices adopted from list of approved region and crop specific practice.

For example:

- Minimal adoption rate of planting a mixed cover crop for at least a certain number of months
- Minimal adoption rate of nitrification and urease inhibitors at a certain minimal adoption rate
- At least X% of N is supplied by manure and compost, where X is, for example, 30%
- More than X% of N is supplied within 30 days prior to planting, where X is, for example, 50%

3.5.1 Performance Standard (p. 11)

- Practice standard chosen for a field cannot change for the duration of the field's eligible period.
- In years where a given field cannot meet the performance standard for whatever reason, that field cannot earn CRTs for the period but maintains eligibility and can earn CRTs in future cultivation cycles provided both performance standards are met.
- If either performance threshold is not met for [two] years in a row, for any reason, the field becomes ineligible (or must exit the project).

3.5.2 Legal Requirement Test (p. 11)

- A project passes the Legal Requirement Test when there are no laws, statutes, regulations, etc. that require the project activity
- Reserve has found no federal laws that explicitly require the project activity
- However, state and local-level implementation of the federal Clean Water Act (CWA) may require some of the approved nutrient management project activities

3.5.2 Legal Requirement Test

- CWA typically requires a Nutrient or Conservation Management Plan (CMP), which allows for selection of practices from a menu of options (p. 11-12)
  - For the purposes of this protocol, all practices selected for compliance with CMP requirement, will be considered “legally required” and non-additional
  - Producers may self-select their CMP so that at least some practices do not become part of the plan, allowing for voluntary & additional practices above and beyond legal requirement
- If one or more approved practices under a project become required by law, ERs may be reported until that practice is required by law (p. 12).
  - At that point, the legally required practice must be modeled into the new baseline
  - The project must demonstrate that it still meets the Performance Standard, which may require adoption of additional practices.

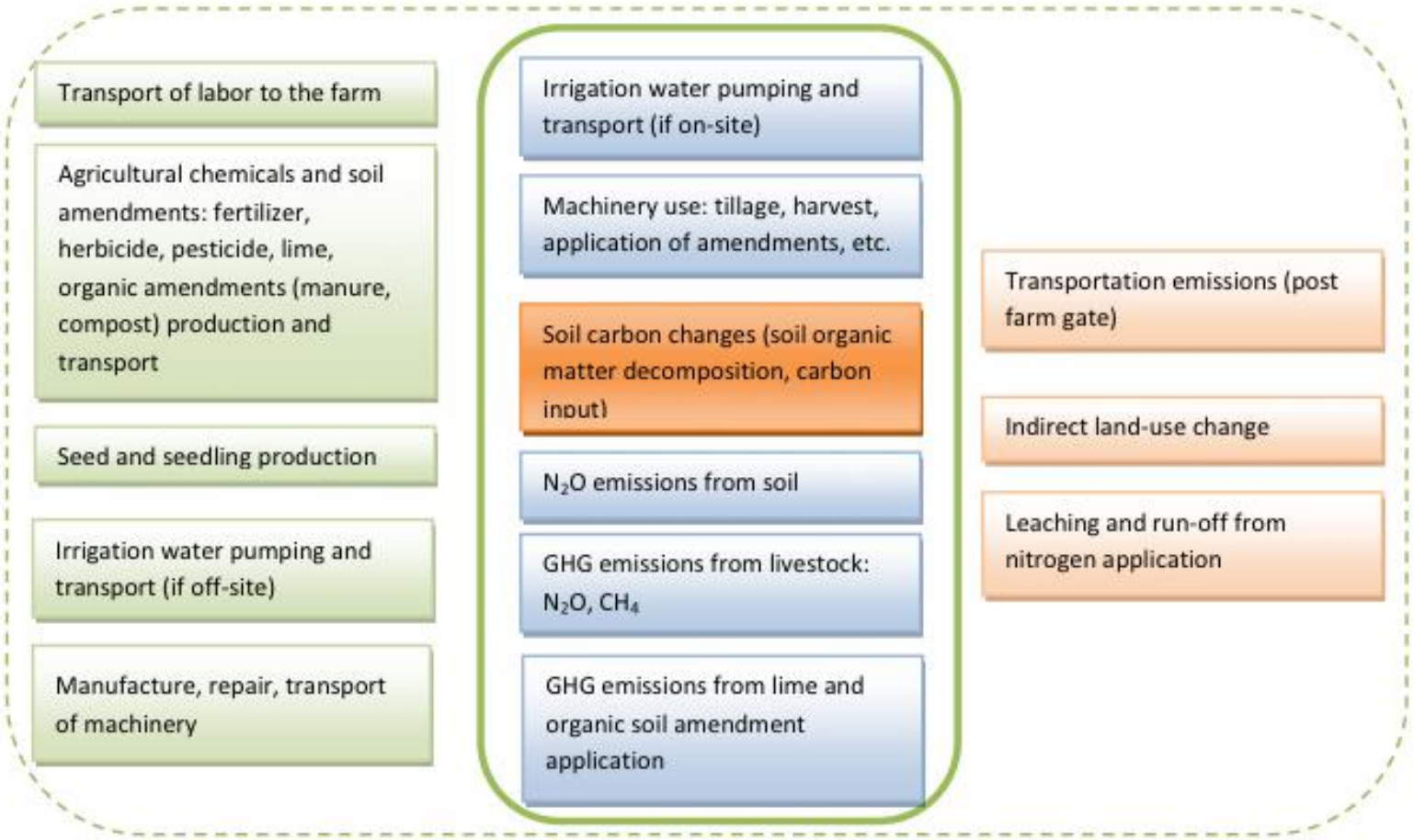
3.6 Regulatory Compliance (p. 14)

- Project must be in compliance with **all** Federal, state, and local laws and mandates
- Generally includes: air, water quality, water discharge, nutrient management, safety, labor, endangered species protection
- Includes compliance with Clean Water Act, which may be incorporated into local and state-level regulations

Potential Environmental Impacts

- Do any of the approved NM project activities have potential negative environmental impacts?
- Due to the Reserve's "Do No Harm" Policy, the protocol must attempt to mitigate any potential negative unanticipated impact on the environment
- We have not identified any potential harms from nutrient management practices, only positive co-benefits.

GHG Assessment Boundary Conceptually



4. GHG Assessment Boundary (p. 15)

- Defines Source Sinks and Reservoirs (SSRs) that must be assessed to accurately quantify GHG reductions
  - Primary Effect Sources:
    - SSR 1 - Soil 'Dynamics'
      - Modeled with DNDC (N2O, CH4, Soil C impacts included)
  - Secondary Effect Sources:
    - SSR 2 – Manure Incorporation (included)
    - SSR 3 – Cultivation Equipment (included if increase in emissions)
    - SSR 4 – Leaching and Runoff (included)
    - SSR 5 – Volatilization (included)
    - SSR 6 – Leakage: Shifted Production Outside Project (included)
- See also Table 4.1 p. 17-18

5. Quantifying GHG Reduction (starts p. 19)

- **DNDC model** is used for primary emissions
- Strict guidelines on how to select **input parameters** (measured, from database, fixed)
- Strict guidelines which parameters can change between **project and baseline scenario**
  - E.g., number of N applications and N rate during each application, cover cropping, etc.
  - NOT climate, soil, etc.

5. Quantifying GHG Reduction

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- Unambiguous procedures on how to **calibrate crop growth**
- **Uncertainty deduction** based on GHG fluxes measured in the field and expected variability in input
- **Secondary emissions** are accounted for using emission factors
  - Leakage methodology needs to be developed

Monitoring, Reporting, Verification for Project Aggregates (p. 26-27)

- Aggregator selects verification body, must have no COI w/ aggregator or project participant
- Site visits of a sample of fields required on periodic basis, eventually 100% of fields must successfully completed site visit verification by (5 or 10?) yrs.
- Annual monitoring report must be prepared for all fields required
- Desk review audit of annual monitoring reports (blind random sample of reports audited each verification)
- Successful verification of site visit and monitoring reports must be completed for CRTs to be issued
  - If a field has unsuccessful verification, no CRTs issued for that field, and additional participating fields must be verified to meet the above requirements
  - If verification requirements aren't met by a certain time, crediting for entire aggregate may be suspended

Next Steps

- Workgroup written comments due Aug 10
- Quick turnaround revision of protocol for SAC (by Aug 29)
  - Will include revisions from today's meeting that can be immediately incorporated and new green boxes for SAC questions
- Schedule next WG meeting seek of Sept 12 or 19
  - Review SAC feedback and direction
  - Review progress on:
    - Performance standard threshold development for priority areas
    - DNDC methodology development
    - Secondary Effects and Leakage methodology development

Thank You

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