Rice Cultivation Project Protocol (RCPP)

CLIMATE ACTION RESERVE

Workgroup Meeting #3

June 6, 2011

10 AM - 4 PM PDT

Welcome and Introductions

Purpose

- Walkthrough draft protocol in detail
  - Discuss questions, options and identify directions for further improvement
  - Provide venue for discussion, focusing on specific topics for feedback in written comments
- Provide updates on ongoing research and analysis
- Discuss Next Steps

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Agenda

- 10:00 – 10:15 Welcome and Overview
- 10:15 – 11:00 Background and Terminology, Project Definition and Eligibility Rules
- 11:00 – 11:45 Performance Standard Research and Regulatory Issues
- 11:45 – 12:15 Wildlife Habitat Discussion
- 12:15 – 12:30 GHG Accounting Boundary
- 12:30 – 1:00 Break for lunch (provided)
- 1:00 – 1:30 GHG Reduction Calculation Overview
- 1:45 – 3:00 Discussion of DNDC Model Validation, Uncertainty, Leakage
- 3:00 – 3:30 Monitoring, Reporting and Aggregation
- 3:30 – 4:00 Wrap up and Next Steps

Protocol Development Timeline

WG Meeting 1 (conference call)	February 9
WG Meeting 2 (conference call)	May 11
Draft protocol to workgroup	June 02
WG Meeting 3 (Los Angeles)	June 06
WG Written Comments on Draft Protocol Due	June 28
WG Meeting 4 (conference call)	Week of September 12
Start of 30-day public comment period	September 23
Public workshop	Early October
WG Meeting 4 (if necessary)	Late October
Protocol adoption by Reserve Board	Early December

Draft Rice Cultivation Protocol

- Section 2 – Background, Definition
- Section 3 – Eligibility Criteria
- Section 4 – GHG Assessment Boundary
- Section 5 – Calculations
- Section 6 – Monitoring Requirements
- Section 7 – Reporting and Aggregation
- Section 8 – Verification Guidance (under construction)

Section 2 – Background and Project Definition

- Background on Rice Cultivation Techniques (Terminology)
  - Flooding Systems
    - Continuous flood: Flooded prior to seeding, through harvest
    - Pinpoint Flood: Fields drained after seeding for 3-5 days
    - Delayed Flood: Dry or irrigated seeding, fields kept dry for first 3-4 weeks until crop canopy is established
  - Seeding:
    - Water Seeding: Sowing of dry or soaked seed into a flooded field
    - Dry Seeding: Sowing seed into a dry seedbed by drilling or broadcasting

Project Definition

- Definition: “the adoption and maintenance of one or more of the approved rice cultivation management changes on an individual rice field, with at least five individual fields combined into a single project area.”
  - All fields must implement at least one approved RC management change
  - Fields with Soil Organic Carbon (SOC) > 3% in top 30cm ineligible (Sacramento Delta Region)

Approved RC Management Changes	Description	Geographic Scope
Dry seeding (DS)	A seeding method that involves sowing of dry seeds into dry or moist, non-puddled soil. Dry seeding can be performed by spreading seeds onto the soil surface and transferring soil on top of the seeds or by drilling seeds into a prepared seedbed, a practice known as "drill seeding."	CA
Post-harvest rice straw removal and baling (Baling)	After harvest, rice straw residue is traditionally left on agricultural fields and incorporated into soil, however; rice straw can be removed by baling. Baled straw can be sold even though the market is small. In California, Rice straw can be used for erosion control, animal bedding or as an alternative feed for cow and calf producer	CA
Decreased frequency and/or duration of winter flooding (DWF)	For fields that use winter flooding as a preferred method for managing rice residue, the frequency of flooding a field (measured over a five year period) can be reduced. Similarly, the duration of each flood period may be reducible in any given year. Both activities would result with decreased overall winter flooded conditions.	CA

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Defining the Field Boundaries

- An individual rice field must be defined by the following criteria:
  - The defined field boundary must be under the direct management control of a single rice producer
  - The field management must be homogeneous across the entirety of the defined field boundary
  - The field must be calibrated and modeled independently of all other fields, using soil, RC management, and climate data inputs specific to the defined boundary

Section 3 – Eligibility Rules

Eligibility Rule I:	Location	→	*California*
Eligibility Rule II:	Project Start Date	→	*Within six months prior to project submission**
Eligibility Rule III:	Anaerobic Baseline Conditions	→	*Demonstrate baseline flooded rice cultivation practice*
Eligibility Rule IV:	Additionality	→	*Meet performance standard*
		→	*Exceed regulatory requirements*
Eligibility Rule V:	Regulatory Compliance	→	*Compliance with all applicable laws*
Eligibility Rule VI:	Wildlife Habitat Protection	→	*Compliance with all habitat protection criteria*
* See Section 3.2 for additional information on project start date			

Start Date (Section 3.2)

- The first day of the ‘cultivation cycle’ during which one or more of the approved cultivation management practice changes is adopted on each of the fields comprising the project area
  - Cultivation Cycle: Begins immediately post-harvest, runs through the end of the next year’s harvest.

- Question for WG: Should we require all fields in a Project Aggregate to have same start date?

Anaerobic Baseline Conditions (Section 3.4)

- Project developers must demonstrate that previous rice cultivation practices resulted with anaerobic conditions.
  - Each rice field has been under continuous rice cultivation for five years preceding the start date, with no more than one fallow season, and
  - Each rice field is flooded for a period of at least 100 days during each growing season, and
  - Management records for each of the rice fields are available for each of the five years preceding the project start date. At a minimum, management records must include:
    - **Annual rice yields**
    - **Planting and harvest dates**
    - **Flooding and draining dates**
    - **Fertilizer application dates and amounts**

Standardized Additionality

- 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 rice field demonstrates that cultivation management exceeds the regional common practice standard for methane emissions management.
  - **The Legal Requirement Test**: Ensures project activities are not a result of legal obligations

Performance Standards (Section 3.5.1)

Region	Approved RC Management Changes	Performance Standard Test	Justification
CA	**Dry seeding (DS)**	A rice field passes the PST by implementing dry seeding. Individual fields that employed dry seeding [at any point] in the past 5 years prior to the project start date are ineligible.	Research indicates that dry-seeding is currently practiced on less than 3% of the CA rice acreage.
	Post-harvest rice straw removal and baling (Baling)	A rice field passes the PST by implementing post-harvest rice straw 'bailing.' Individual fields that employed bailing [at any point] in the past 5 years prior to the project start date are ineligible.	Research indicates that residue removal (baling) is currently practiced on less than 8% of the CA rice acreage.
	Decreased frequency and/or duration of winter flooding (DWF)	Individual fields that employed winter flooding for less than seven of the last ten years prior to the project start date are ineligible.	Research indicates that winter flooding practices are highly variable in CA, both regionally and temporally. Therefore it is necessary to determine the baseline practice on a field-by-field basis. Increasing trends of winter flooding indicate that, once adopted as a preferred method, it is likely to remain so.

Update on PS Research

- INSERT BILLS SLIDES ON WINTER FLOODING

Questions for WG:

- For winter flooding: Thoughts on current approach. Should we require demonstration of 'preferred practice'? If so, does 7 out of 10 years seem reasonable for capturing those that typically winter flood, barring extreme draught conditions.
- Based on initial performance standard research, it would seem that the only other option for additional activities in CA is Mid-Season Drainage. Should we explore including this project activity?
- Any other cultivation management changes come to mind that we haven't included or discussed?

Legal Requirement Test

- 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, state or local laws found that explicitly require the project activity
  - Question for WG: Are we missing anything?
- *But*, there are some regulations that may indirectly require some part of the project activity
  - State and Local-level Water Conservation Mandates

Legal Requirement Test

- State and Local-level water conservation mandates
  - California – Water Rights Standard Permit Term 91 ("Term 91")
    - Governs water rights in Sacramento-San Joaquin River Delta
    - Only enacted in years of extremely high water stress
    - When enacted, a legal requirement to NOT flood rice fields
    - Even a threat of Term 91 can reduce winter flooding
      - Question for WG: Should we exclude crediting reduced flooding in years w/ threat of Term 91? If so, how?
  - Questions for WG: Any other water regulations to include?

Regulatory Compliance

- 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
- In California, will include compliance with the Conditional Rice Straw Burning Regulation
- Endangered Species Act and other special status species regulations may be relevant

Regulatory Compliance

- CA Conditional Rice Straw Burning Regulation
  - Allows removal (via burning) of rice straw residue when disease is present (up to 25% of acreage, maximum)
  - Protocol will require quantifying rice residue burned in both baseline and project scenario, when it occurs
  - Verifier will review rice burning permits to ensure regulatory compliance
- Endangered Species Act (ESA) and other Special-Status Species Protection
  - Must be in compliance with both ESA, any state-level equivalent, and any associated legally binding agreement
    - e.g. Habitat Conservation Plans (HCP) and Safe Harbor Agreements (SHA) are legally binding agreements between rice producer and Fish and Wildlife Service (FWS)

Wildlife Habitat Issues

- Wildlife (particularly waterfowl and other birds) use flooded rice fields as surrogate habitat.
- Up to 31 special status species in CA rice lands, 1 of which is federally endangered
- Reduced winter flooding may result in a “significant habitat modification” for all species using these fields.
  - In the case of ESA, this may result in the unlawful “take” of an endangered species, which may require Habitat Conservation Plan and Incidental Take Permits
  - Where HCP or SHA already in place, reduced winter flooding may not be allowed.
  - Compliance with ESA regulations will be assessed by verifier

Wildlife Habitat Issues

- Questions for WG:
  - How common are HCPs or SHAs on ricelands?
  - Do we need to be concerned that pre-existing HCPs/SHAs may prevent implementation of a project in some cases?
  - Do you know of any circumstances where an HCP was required for changing rice cultivation management practices (specifically, reduced flooding)?
  - Should we be concerned that HCPs may be required to mitigate incidental take from the project activity?

Wildlife Habitat Conservation Criteria

- Due to the Reserve's "Do No Harm" Policy, the protocol must attempt to mitigate the potential impact on wildlife
- The Protocol proposes adoption of "Wildlife Habitat Conservation Criteria"
  - Set of activities mitigating habitat effects, which would be required (like "eligibility" criteria) for the life of the project
  - WG will discuss potential options

Wildlife Habitat Conservation Criteria: Options for WG Discussion

- Limit total reduction of area under winter flooding to no more than 10% reduction from baseline (VCS methodology)
- Limit the reduced duration of winter flooding to no more than a 2 month reduction between harvest and planting (VCS methodology)
- Rotational reduction in flooding (rotating which fields are not flooded, with an effort to distribute the flooded/non-flooded fields in a random patchwork)
- Varying water depths across all rice fields (ranging from 1 to 10 inches), to benefit a wider variety of species (CalRicePilot / NRCS)
- Flatten berms between rice field checks and reduce vegetation (CalRicePilot)
- Develop natural habitat areas/corridors on the edges of farm fields to attract more wildlife (CalRicePilot / NRCS)
- Directly require project developers to implement components of relevant NRCS practice standards for a certain portion of rice lands (NRCS)
  - E.g. NRCS 646 – Shallow Water Development and Management, NRCS 644 – Wetland Wildlife Habitat Management, NRCS Wildlife Habitat Incentive Program (WHIP), California Waterfowl Habitat Program
- Require site-specific baseline and annual or bi-annual bird sampling/census

Wildlife Habitat Conservation Criteria: Questions for WG

- Do you believe these options will successfully mitigate habitat effects?
  - Other options?
- Are these options practical for the rice producer?
- How to include in protocol?
  - How do we maximize flexibility for rice producers in implementing these habitat mitigation options? (e.g. Require 1 or 2 out of larger pool of options?)
  - Combination of wildlife monitoring / mitigation criteria?
    - If we require monitoring, what is an appropriate threshold for impact on habitat?
- Is requiring a bird count (either consultant or self-assessment) too burdensome on rice grower?
  - Are there are other options?
  - Ways to shift responsibility to aggregator?
- Reserve has identified 2 NRCS practice standards and California program as potential pre-existing standards which could be included
  - others?

GHG Assessment Boundary (Section 4)

- 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 (CH4, N2O, Soil C impacts included)
  - Secondary Effect Sources:
    - SSR 2 -Water Pumps (excluded)
    - SSR 3 -Cultivation Equipment (Included if increase in emissions)
    - SSR 4 – Emissions from 'Baling' Equipment (Included if 'baling')
    - SSR 5 –Rice Straw Management/End Use (Included if 'baling')
    - SSR 6 – Emissions from Shifted Production Outside Project Boundary (Leakage)
      - Leakage occurs if there is a decrease in yield as a 'direct' result of project activity. Must be quantified.

Quantifying GHG Reduction (Section 5)

$$ER = SDER - SE$$

- SDER: Soil Dynamics Emission Reductions (SSR1)
  - DNDC Modeled Emission reductions resulting from project management changes
  - Each 'field' must have independent model run
- SE: Secondary Emissions
  - Increased CO_2 from additional use of cultivation equipment (SSR 3)
  - Increased CO_2 from baling (SSR 4)
  - CH_4 from residue management/end use (SSR 5)
  - Increased GHG Emissions from Production Shifting (Leakage) (SSR 6)

Basics of DNDC Methodology

- Use historical records to determine baseline parameters for:
  - Critical Inputs (project activity parameters):
    - seeding, residue mgmt, winter flooding frequency/duration
  - Non-critical Inputs (not related to project activity):
    - climate, soil characteristics, other mgmt practices,
- Run historical model run for 20 years to attain equilibrium of certain variables
  - Use last 5 years of model run to calibrate DNDC crop growth model to actual crop yields
- Using actual climate, mgmt data:
  - Model Baseline Emissions (assuming continuation of current practices)
  - Model Project Emissions (change only those parameters related to project activity that occurred onsite)
- Run Monte Carlo Simulations for BE and PE models (to account for input uncertainty)
- Adjust modeled reduction based on input uncertainty adjustment
- Adjust modeled reductions for entire project area based on DNDC structural uncertainty adjustments

Critical Inputs and Baseline Scenario

Baseline Practice	Critical Input
Seeding	Dates of flooding relative to the planting date
	Dates of all fertilization events relative to planting date (both pre-flood and top-dressed after flooding)
Residue Management	Proportion of straw removed after harvest (0 if no straw removed)
	Quantity of additional fertilizer used to account for nutrient losses following straw removal
Winter Flooding	Frequency of winter flooding during 5 year period
	Start date of each winter flooding event
	End Date of each winter flooding event

Question for WG:

1. Would Farmer have records to set these values for previous 5 years?
2. VCS Draft Protocol requires re-assessment of baseline assumptions after 5 years, Reserve typically credits reductions from a set baseline for 10 years without re-assessment. Is there a reason we shouldn't set baseline for 10 years?

Soil Data

- INSERT BILLS SLIDE ON SOIL DATA OPTIONS

Crop Model Calibration

- Proper parameterization of soil physical conditions (which drive soil moisture dynamics) and crop simulation plays a crucial role in modeling C and N biogeochemistry and N2O emissions.
- Users shall calibrate the DNDC crop model for cropping systems to be included in the project.

Questions for WG:

1. Does this procedure make more sense as an Appendix?
2. How can we improve guidance for clarity / consistency?

Accounting for Input Uncertainty using Monte Carlo Simulations

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DNDC Model Structural Uncertainty

- INSERT BILLS SLIDE FOR STRUCTURAL UNCERTAINTY

Quantifying Secondary Impacts

- Must quantify *increased* CO_2 emissions from cultivation equipment
  - WG Question: How do project activities impact equipment use (dry seeding v. water seeding, winter flood v. no winter flood, baling v. incorporation)
- Must quantify CH_4 from rice straw end use / management
  - Could be significant emissions depending on end use
  - We are still developing emission factors for primary end-uses (starting with those from VCS draft)

Quantifying Emissions from Production Shifting (Leakage)

- Project must demonstrate that yields have not been impacted due to the project activities.
  - However, yields fluctuate annually depending on climate
- Therefore, yields must be:
  - (1) compared to the natural variation of the yields during previous five years and
  - (2) normalized to average annual county yields from NASS statistics.
- Two options:
  - Test each field, if yields are significantly smaller than caounty averages, field may become ineligible
  - Test the 'aggregate' . If combined yield across project area is significantly smaller than county averages, apply a discount to the emission reductions from entire aggregate.

Questions for WG

- Preference for Option 1 (test applied to each field) or 2 (test applied to entire aggregate)
- Should we set the applicability criteria to indicate that yields cannot be reduced by 10% or more due to the project
- If we apply a 'leakage' deduction to aggregate, how should this be quantified?
  - Is the rice market perfectly elastic (i.e. a drop in yield of 10% will result with an increase in production of an equivalent amount the next season)
  - Given that market is probably not perfectly elastic, is there research we can use to develop elasticity factor?

Project Monitoring (Section 6)

- Reserve requires a Monitoring Plan to be established for all monitoring and reporting activities associated with the project
- Projects must sample or determine:
  - Soil Input Data
  - Ongoing Management Data
- Table 6.1 provides detailed list of all inputs for DNDC model

Aggregation and Reporting Guidelines (Section 7)

- Aggregation guidelines still under development (See also Appendix E)
- Basic Structure:
  - Protocol written for 'aggregators' rather than individual rice producers
  - Aggregator:
    - Official point of contact with Reserve (must have account on Reserve)
    - Manages submittal process, signs attestation documents, manages verification process for entire aggregate
    - Likely performs monitoring, record keeping, DNDC modeling for each field in aggregate

Aggregation Questions for WG

- Are fields allowed to enter/leave aggregates at will, or must they commit to a minimum five year period?
  - Leaving an aggregate mid-way through a reporting period will cause much complexity.

- Verification schedules are typically set for other Reserve protocols so that every site has to have annual verification with site visit.
  - Should we allow for less than annual site visits to each field?
  - Do verification activities need to occur every year during a 5 year reporting period?

- Provide thoughts on general structure (which is quite different from the CAR Forest Protocol aggregation structure).

Reporting and Verification Schedules

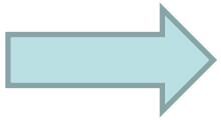
- In order to verify (ex-post) that the frequency of winter flooding was reduced over a full five year period, we cannot issue CRTs for less than a 5 year period.
- Current draft requires 5 year reporting period for any project aggregate that implements reduced winter flooding

Questions for WG:

1. Should we require all projects to have minimum 5 year reporting period for simplicity? Other options?
2. Should we require some sample of site visits to fields every year?
3. How often does each field have to have site visit?

Next Steps

- Continue to refine performance standard options
- Continue targeted research on wildlife habitat issues
- Continued development of Aggregation Guidelines
- Continued work on DNDC uncertainty analysis and procedures



- May have more informal sub- work group meetings on specific topics
- WG Written Comments on draft due June 28

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Thank You

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Leakage Discussion– Ratoon Crops

- Certain climatic conditions along with the early maturity of commonly grown varieties allow for a second or ratoon crop during a single season in certain regions (TX, LA).
- Methane emissions from ratoon crops can be extremely high in comparison to the primary crops.
- Removal of ratoon crops could lead to significant methane emission reductions on a per acre basis. However, leakage becomes an important issue.

Ratoon Crop Data and Discusion

- If we assume that the loss of yield of ratoon rice is compensated by increased area of the main crop the following year, back of the envelop calculations for CH4 reductions for removal of 100ha of ratoon rice would lead to an additional 25 ha of main crop rice (due to ratoon yields being 25% of MC yields)
- Reductions likely still significant after accounting for leakage

Questions for WG

- Should we consider avoidance of ratoon crop as a project activity for future versions?
  - If so, need to develop criteria for additionality and for accommodating for potential leakage.
  - Do changes in acreage of ratoon crop from one year to the next influence the acreage of main crop the following year (leakage)?
    - Can we infer anything about market elasticity based on examination of ratoon crop data?