Introduction to the Rice Cultivation Project Protocol (RCPP)

CLIMATE ACTION RESERVE

Special Topic Webinar

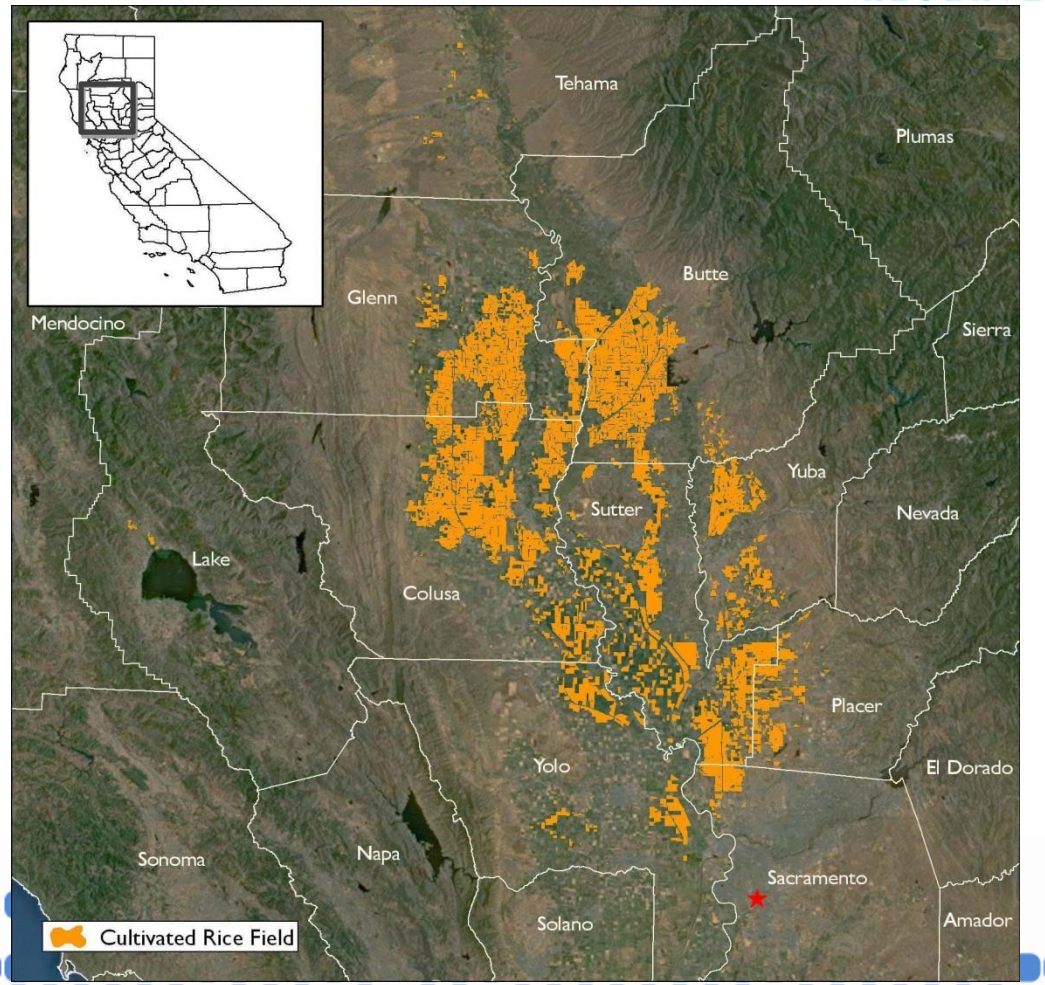
February 16, 2012

Agenda

- Introductions
- Brief summary of the Rice Cultivation Project Protocol (RCPP)
- Overview of Environmental Defense Fund's California rice pilot projects
- Q&A

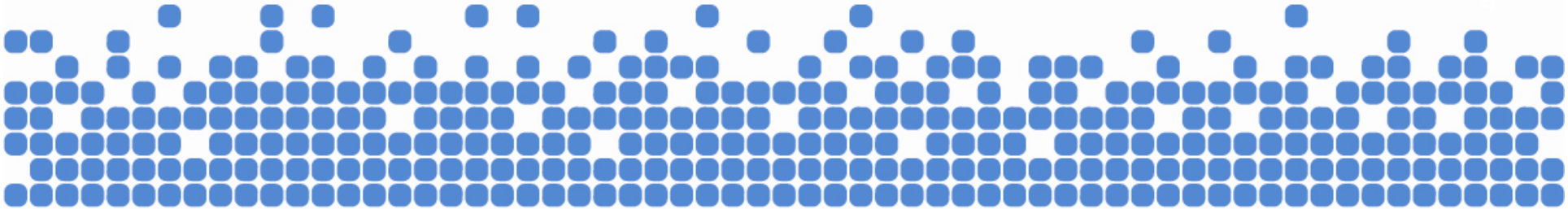
Background - U.S. Rice Cultivation

- U.S. Rice cultivated in three geographic areas:
  - Mid-South: Arkansas, Louisiana, Mississippi, and Missouri
  - Gulf Coast: Florida, Louisiana, and Texas
  - California's Sacramento Valley



Background – Rice GHG Emissions

- U.S. Emissions: 6.2 Mt CO_2e (EPA 2007)
  ~1% of total U.S. CH_4 emissions
- Global Emissions: 708Mt CO_2e (EPA 2010)
  ~11% of global Agricultural GHG Emissions
- Methane Emissions:
  - Field flooding leads to anaerobic soil conditions
  - Actual Emissions depend on numerous factors, but can generally be reduced with changes to:
    - Water management (shorter flood durations during growing season and/or winter season)
    - Plant residue management (removing degradable organic carbon from the field)



Development of the (RCPP)

- Kicked off development in early 2011
- Seed document: Draft Version, *Emission Reductions in Rice Management Systems* (EDF, CalRice, Terra Global Capital, Applied Geosolutions)
- Draft protocol taken through stakeholder work group and public comment process
- Initially focused on California due to data limitations
- Version 1.0 – Adopted by Reserve Board of Directors on December 14, 2011

Workgroup

California Rice Commission

Carbon Solutions America

Deloitte Consulting

Environmental Defense Fund

ibLaunch Energy, Inc.

National Wildlife Federation

NRG Energy

Terra Global Capital

Trinity Carbon Management, LLC

University of California Cooperative Extension

U.S. Environmental Protection Agency

U.S. Department of Agriculture – Natural Resources Conservation Service

Technical Contractor

William Salas, Ph.D - Applied Geosolutions, Inc.

Summary of the Rice Cultivation Project Protocol

Project Definition

- The adoption and maintenance of one or more approved project activities:
  - Dry seeding with delayed flood ("dry seeding")
  - Post-harvest rice straw removal and baling ("baling")

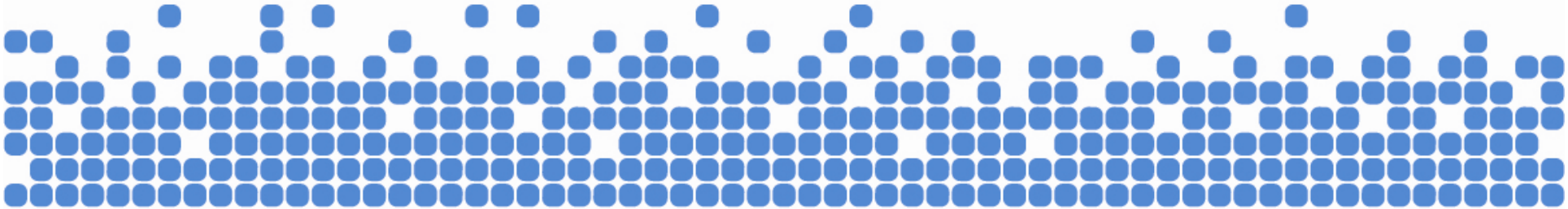
- At least one project activity must be adopted and maintained on each individual rice field
  - Single-field projects (1 field)
  - Project aggregate (2 or more fields)

Reduced Winter Flooding

- Original draft protocol included an additional approved practice of “reduced winter flooding”
- The Reserve ultimately decided not to include the practice:
  - Unpredictable trends in the use of winter flooding made developing a performance standard too difficult without more information
  - Potential impacts on important wildlife habitat

Eligibility Rules

Location	California Sacramento Valley
Project Start Date	Fields must be submitted before the end of the first cultivation cycle after the start date
Anaerobic Baseline	Demonstrate flooded rice cultivation baseline
Additionality	Meet performance standard
	Exceed legal requirements at start of crediting period
Ecosystem Services Payments Stacking	Fields not eligible if NRCS EQUIP conservation payments received prior to Start Date for approved project activities
Regulatory Compliance	Compliance with all applicable laws
Crediting Period	5 years, renewable up to three times



Performance Standard

- Practice-based threshold is met with adoption and maintenance of approved project activities
  - Use of an approved practice in past 5 years is modeled into baseline

- Performance Standard Test is applied once at the beginning of each crediting period

Legal Requirement Test

- No existing laws or regulations identified that obligate the project activities
- Project developers required to submit signed Regulatory Attestation at each verification
  - Aggregators attest on behalf of project participants
- Fields eligible to earn CRTs for entire crediting period regardless of future changes in legal requirements
  - Such requirements may preclude future credit period renewal

GHG Assessment Boundary (Section 4)

- Source Sinks and Reservoirs (SSRs) that must be assessed to accurately quantify GHG reductions
  - Primary Effect Sources:
    - Soil 'Dynamics' (i.e. GHG flux from soil)
      - Modeled with DNDC (CH4, N2O, Soil C impacts included)
  - Secondary Effect Sources:
    - Cultivation Equipment (Included if increase in emissions)
    - Emissions from 'Baling' Equipment (Included if 'baling')
    - Rice Straw Management/End Use (Included if 'baling')
    - Emissions from Shifted Production Outside Project Boundary (Leakage)
      - Leakage is assumed to occur if there is a decrease in yield as a 'direct' result of project activity. Must be quantified.

The DNDC Model

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Background

- **DNDC** stands for **D**e**N**itrification-**D**e**C**omposition
- DNDC is a soil biogeochemical model that has been used for quantifying GHG emissions from agricultural soils for over 20 years.
- DNDC is a process (as know as mechanistic) model that simulates the biogeochemical processes to drive C and N cycling in agricultural soils.
- Long history of peer-reviewed publications (well over 100 publications).

Use for Rice Emissions Modeling:

- DNDC can simultaneously simulate anaerobic (flooded) and aerobic (non-flooded) conditions in soils.
- DNDC can model both Methane and Nitrous Oxide emissions: critical for rice agro-ecosystems.
- DNDC has been extensively validated for rice globally.
- Most viable option for rice given complicated emissions pathways

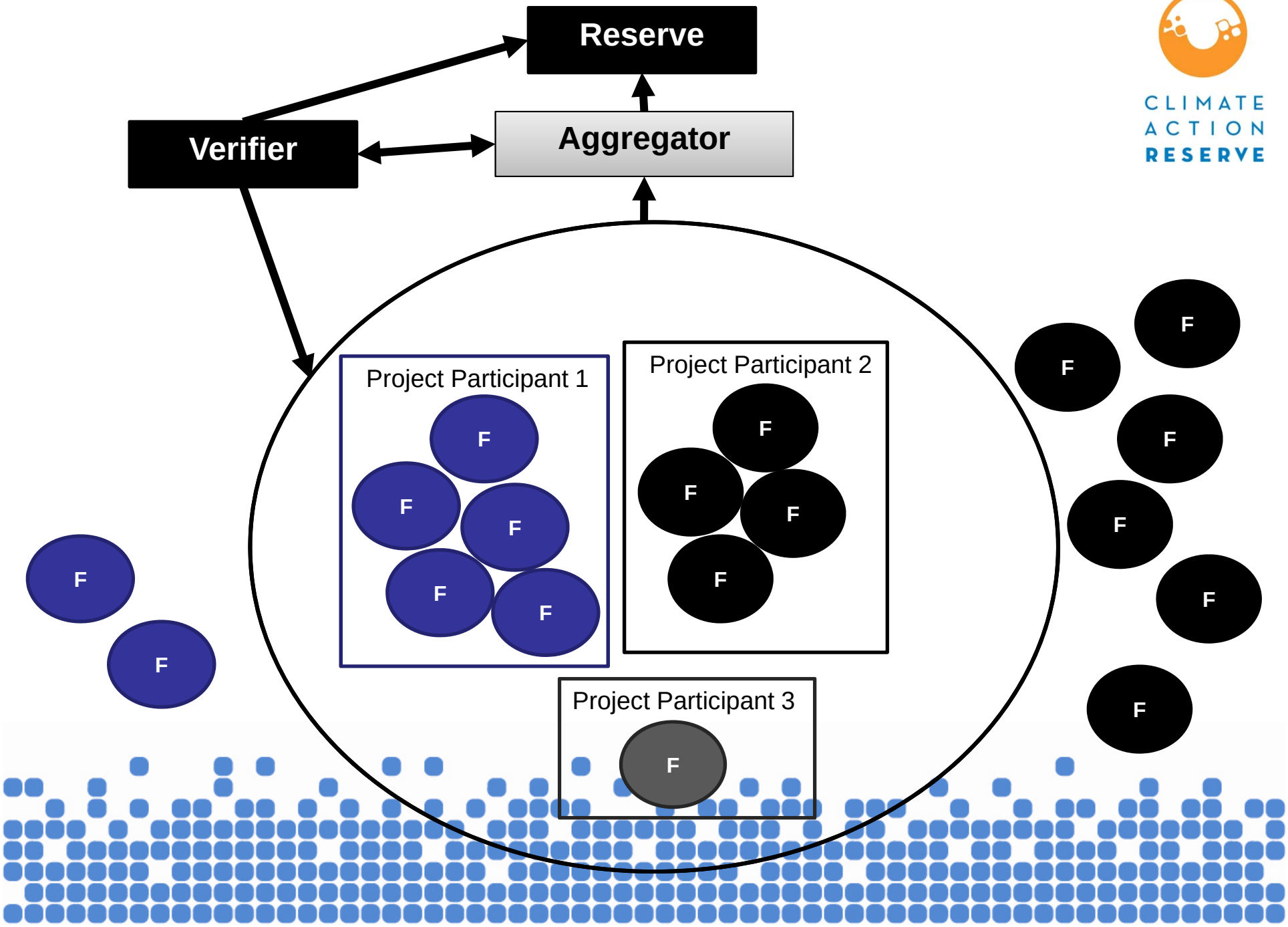
DNDC Model Uncertainty

- Two sources of uncertainty if using DNDC:
  - Input parameter uncertainty
  - Structural uncertainty
- Input uncertainty deductions determined for each field using 'Monte Carlo' simulations in DNDC
- Structural uncertainty is applied programmatically
- Deducted on a programmatic level - i.e. all fields will apply the same factor, which is based on total participation in Reserve program

Number of fields in program ( )	(kg CO2e)
1	174.0
2	123.1
3	100.5
4	87.0
5	77.8
6	71.0
7	65.8
8	61.5
9	58.0
10	55.0
15	44.9
25	34.8
50	24.6
100	17.4
1000	5.50

Aggregation

- Growers can allow aggregators to take on project development on their behalf
- Meant to encourage participation, reduce costs, and provide rice growers with easier access to the carbon market
- Clear and consistent requirements for:
  - entering and leaving an aggregate
  - monitoring and reporting
  - verification schedules and practices


Reserve
Verifier
Aggregator
Project Participant 1
Project Participant 2
Project Participant 3
F

Reporting Period and the Verification Cycle

- Annual verification required for each aggregate or single field project
  - For aggregates, a subset of fields are randomly selected each reporting period for either a site visit verification or a desk verification
  - Verification schedules determined by size of aggregate

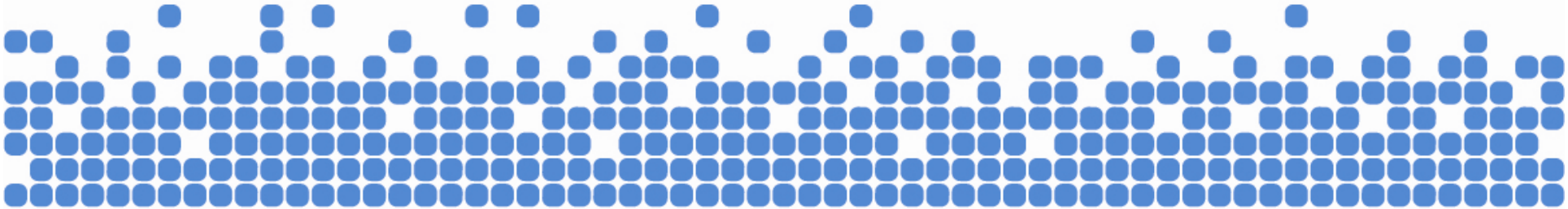
• Small aggregate	≤ 10 fields
• Large single-participant aggregate	> 10 fields, One Grower
• Large multi-participant aggregate	> 10 fields, Multiple Growers

Issuing CRTs to the Aggregate

- CRTs ultimately issued by the Reserve to the Aggregator
- The aggregator must attest to the Reserve that they have exclusive claim to the GHG reductions resulting from all fields in the project aggregate
- Protocol does not dictate the terms for how title will be established
- Aggregator must also inform land owner with a “Letter of Notification of the Intent to Implement a GHG Mitigation Project”

Plan for Version 2.0 RCPP

- Incorporate improvements based on pilot projects
- Expand geographic scope (Mid-South)
- Include more practices for California
  - Early pre-harvest drainage
- Simplify DNDC calculation approach and field data requirements
  - Automating DNDC with user-friendly interface and conservative default values, or
  - Tier 2 emission factors



Thank You

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Upcoming Events

Webinars: http://events.climateactionreserve.org

- General Information Webinar, March 1st
- Legal Issues of AB32 Webinar, March 15th

Workshops

- Reserve 101, April 10th 2012, San Francisco, CA

Annual Conference

- Navigating the American Carbon World
- April 10-12 2012, San Francisco, CA
- www.NACW2012.com