CLIMATE ACTION RESERVE

Discussion of Nitrogen Management Stakeholder Survey Results and Next Steps for Protocol Revision

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Presentation by:

Trevor Anderson, Policy Associate
Teresa Lang, Senior Policy Manager

Agenda

- Introductions
- Background on NMPP
- Survey
  - Regions
  - Crops
  - Nutrient Management Practices
  - Quantification Methodologies
- Biggest Takeaways
- Next Steps
- Conclusion

Climate Action Reserve

- Largest, most trusted carbon offset registry in North America
  - 88+ Million offset credits issued
  - Approximately 400+ projects in our system, including 170+ ARB Compliance Offset Projects
- Collaborative and Inclusive
  - Work with industry, government, environmental, and academic sectors in open, transparent workgroups when developing protocols
  - Aim to create protocols that are robust, rigorous, accurate, usable, and standardized

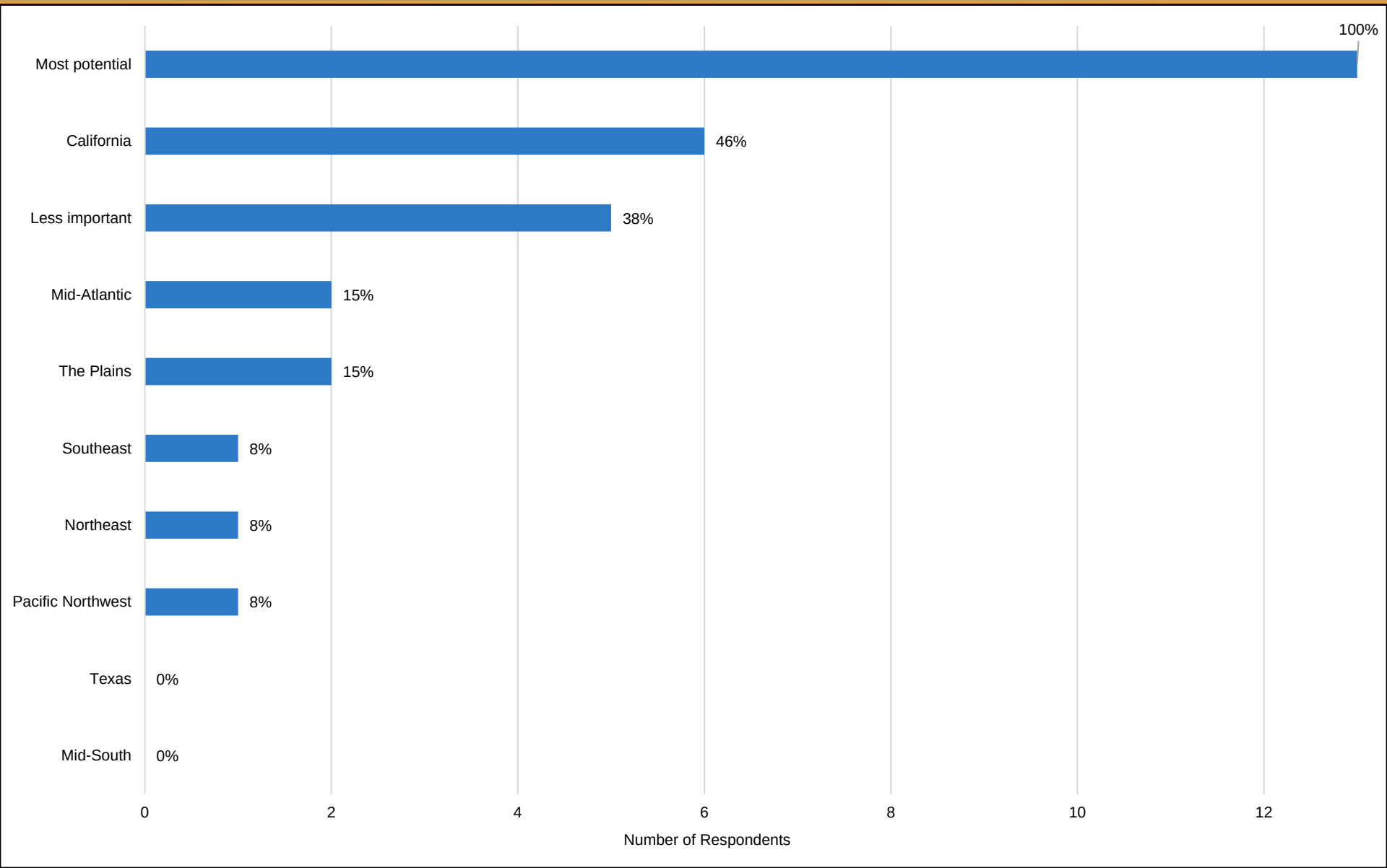
Background: Nitrogen Management Project Protocol (NMPP)

- Developed with the support of a stakeholder workgroup and a Science Advisory Committee (SAC); First adopted in June 2012
- Current version (v1.1) released in January 2013
  - Scoped a potential expansion in 2013/2014, which was not pursued
- Applicable only to nitrogen rate (N-rate) reductions on corn crops in the North Central Region (NCR)
- Uses a modified version of the MSU-EPRI empirical emission factor-based Tier 2 methodology for N-rate reductions
- Developed with the intention to be expanded in a modular fashion adding new quantification methodologies (QMs) for new regions, crops, and practices as sufficient data become available
- No projects have been registered to date
- Currently: Launching a significant NMPP revision and expansion with the generous support of the USDA NRCS, under the Conservation Innovation Grant (CIG) program (part of the EDF-led Nitrogen CIG)

Stakeholder Survey

- Issued in Fall 2016 to gain feedback and recommendations for the NMPP expansion
- Asked which regions, crops, nutrient management practices, and QMs stakeholders felt were the highest priority for inclusion
- Participants could select ***ALL*** answers and were encouraged to provide explanations, whenever possible
- Respondents included:
  - project developers
  - aggregators
  - methodology developers
  - government
  - members of the NMPP Workgroup
  - members of the NMPP SAC
  - agricultural science professionals
  - other interested stakeholders

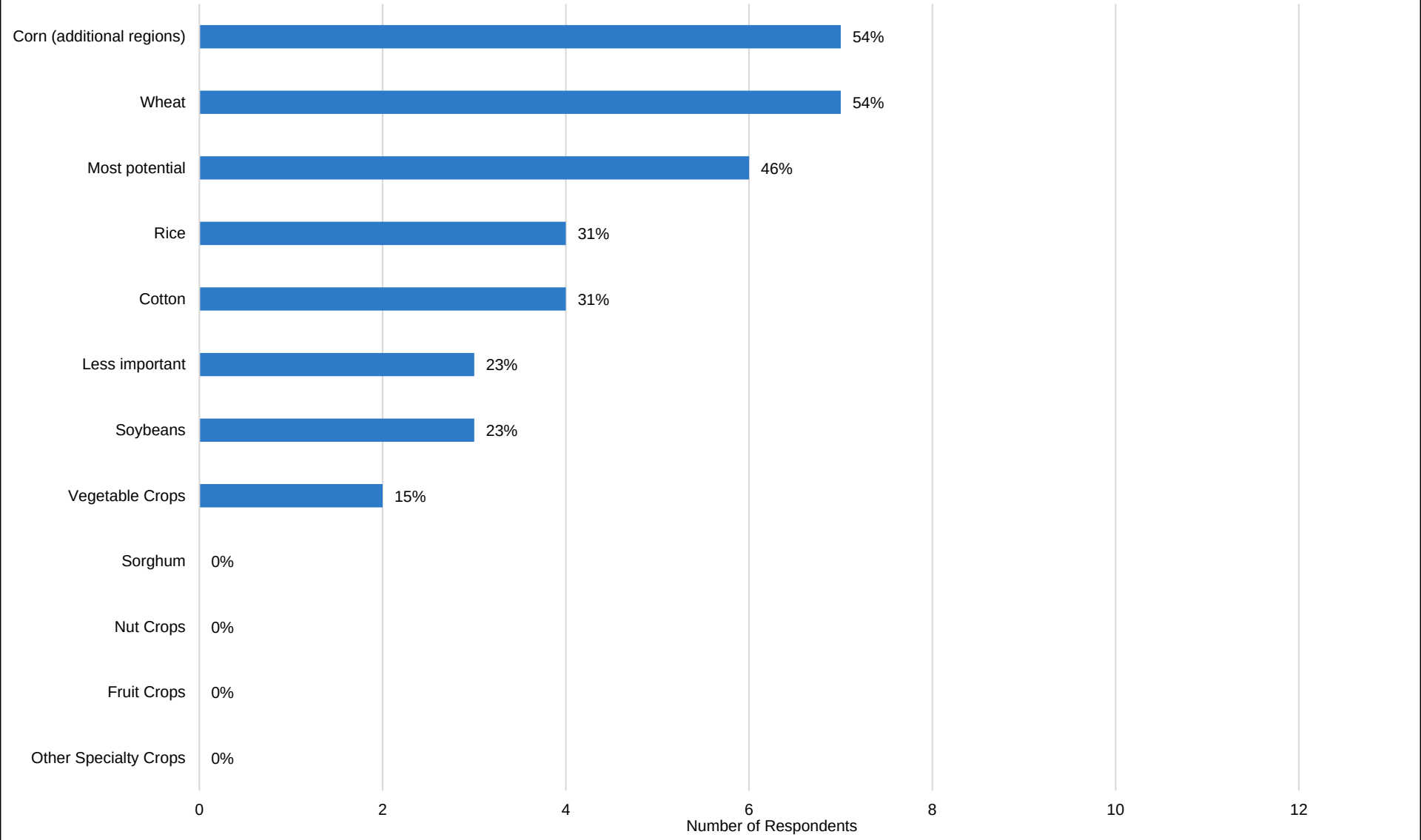
Regions: Which regions do you feel are important for the Reserve to prioritize for inclusion in our next update?



Regions (summary results)

- Expand to regions based on where there is the most potential for emission reductions
- Additional regional interest in California
  - ARB adoption
  - New available data
- Region is less important than crops & practices
  - Region is only important to the extent that climate and soil texture may vary between regions
- Protocol focus on the Midwest (to-date) was not challenged

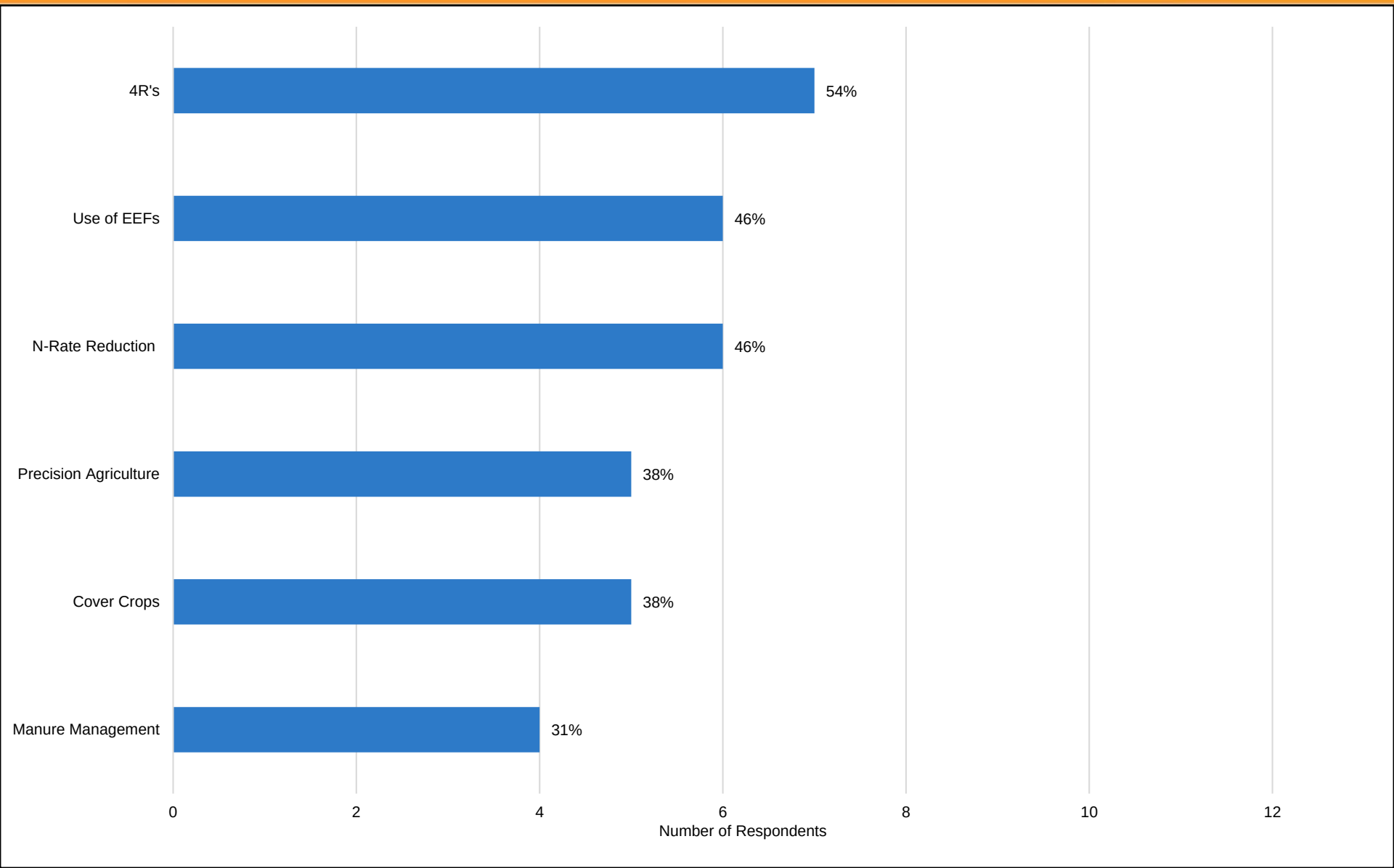
Crops: Which crops do you feel are important for the Reserve to prioritize for inclusion in our next update?



Crops (summary results)

- Expand based on which crops have the most potential for emission reductions
- Preference for Corn (from additional regions) and Wheat, and other major field crops like Cotton
- Soybeans - Crop rotations/systems
- Vegetable Crops - Applicability to California
- Rice - ARB's Rice Cultivation Projects COP
- Crop is less important than regions & practices
  - Emissions are more closely associated with systems and rotations than individual crops

Nutrient Management Practices: Which practice do you feel is the highest priority for the Reserve to include in our next update?



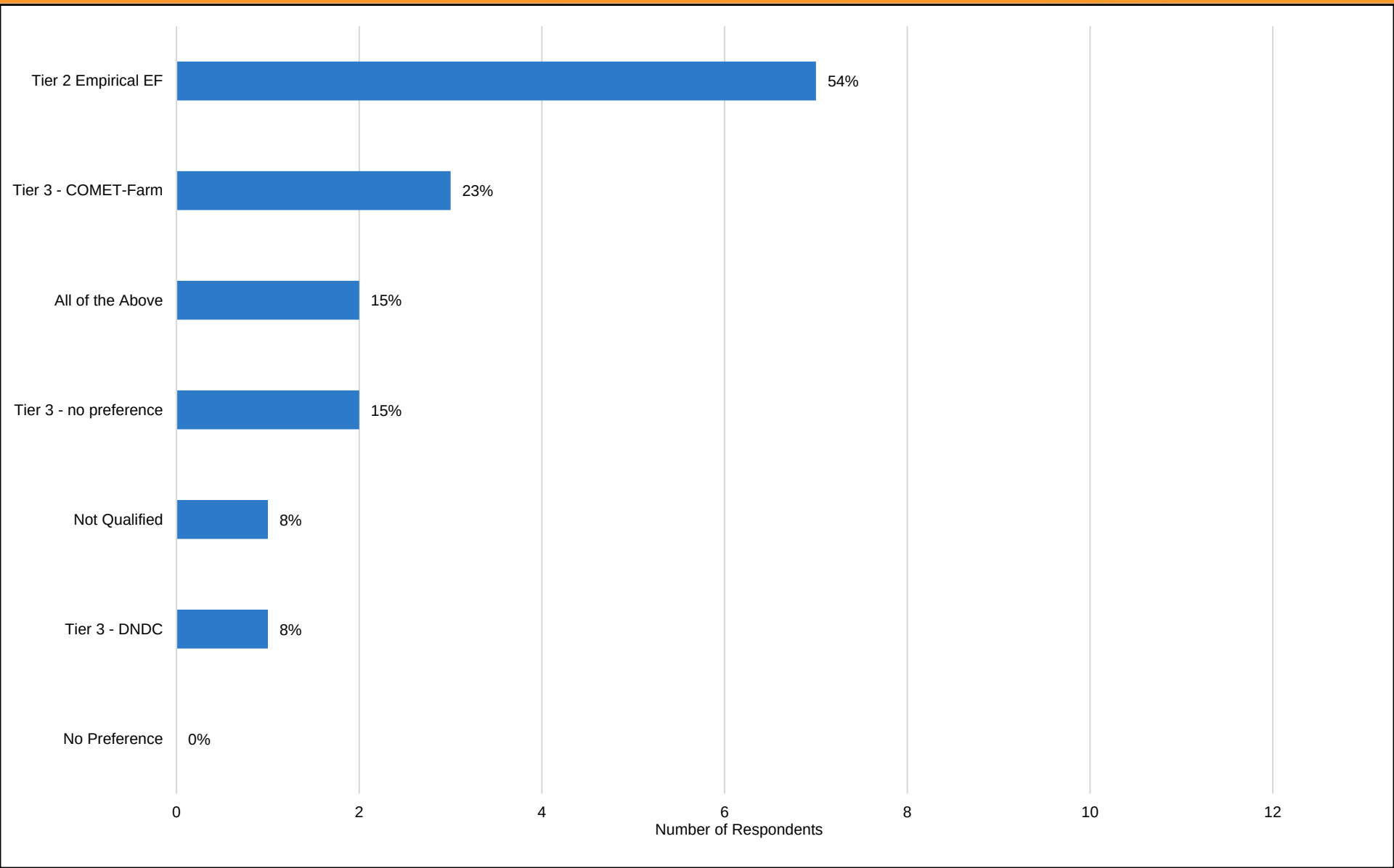
Nutrient Management Practices (summary results)

- 4R's (right source, right rate, right time, right place)
  - Recent scientific research has suggested that source, timing, and placement may play a larger role than rate
- Enhanced efficiency fertilizers (EEFs)
  - Growing data and evidence
- N-rate reduction (for additional crops & regions)
  - Recommended extending the work already done
  - "Don't reinvent the wheel"
  - In light of lack of project uptake to date, also recommended focusing elsewhere

Nutrient Management Practices (summary results)

- Precision Agriculture
  - Associated reductions may already be accounted for as a function of the N-rate reduction practice
- Cover Crops
  - Stakeholders would like to see it included, but in reality, there are inconclusive effects, plus added challenge of distinguishing between different types of cover crops
- Manure Management
  - Difficult to determine emissions resulting strictly from manure when synthetic fertilizer also applied
- Combination of Practices (i.e. more than one)
  - Important to grower uptake of protocol
  - Quantification may be particularly challenging

Quantification Methodologies: Which of the following would you prefer the NMPP include as a quantification methodology?



Quantification Methodologies (summary results)

- Preference for Tier 2 emission factor-based modules:
  - Simpler and easier to implement than Tier 3
  - Requires empirical data to develop; May be less flexible
  - Requires significantly less data to apply
- Interest in COMET-Farm (Tier 3), particularly newest updates and improvements
  - Increasingly reliable and user-friendly with forthcoming updates
  - Warrants further consideration
- Other Tier 3 models less preferred
  - Very data heavy (both to calibrate/validate and to apply)
  - High-level of expertise required
- Some interest in a combination Tier 2-Tier 3 approach
- Some interest in a model-neutral QM

Biggest Takeaways

1. California needs to be a priority for inclusion
2. Maintain flexibility when prioritizing crops
   - Base decision on other factors under consideration
3. N-Rate, 4R's & EEFs seem to be the priority practices
   - Body of scientific literature continues to grow
4. When it comes to quantification, simple and easy-to-use models are critical
   - Clear preference for Tier 2 methodologies over Tier 3, but COMET-Farm recognized for its own merit

Next Steps

- Ongoing QM Scoping and evaluation of COMET-Farm, upon completion of latest updates (now through June/July)
  - Includes assessment of which tools have been validated and calibrated for which regions, cropping systems and practices
  - Release an RFP to hire contractor for assistance with QM section of protocol
- Ongoing literature and database review to inform selection of practices included:
  - Assessment of directional certainty (consistent N2O reductions)
  - Assessment of additionality of practice (e.g. what is current adoption rate? Demonstrate not currently common practice)
- Formally reconvene Workgroup (June/July timeframe)

Conclusion

- Vision for NMPP Expansion:

  A user-friendly protocol with distinct modules incorporating N-rate reductions (and possibly other practices) for different crops in different regions, starting with the NCR, California, and possibly extending to others.

- Ultimate Goal:

  To develop a simple and workable protocol that maintains a high-level of scientific credibility, incentivizes improved nitrogen management and N2O emission reductions, and succeeds in getting projects implemented

QUESTIONS?

Contact Information

Trevor Anderson, Policy Associate

tanderson@climateactionreserve.org

213-891-6927

Teresa Lang, Senior Policy Manager

tlang@climateactionreserve.org

213-891-6932