

## Soil Enrichment Protocol V2.0 Update Taskforce Meeting Notes and Takeaways

**Workgroup Meeting Date:** 9/3/2024

**Workgroup Members in attendance:**

Name	Organization	Present (P)/Absent (A)
Margaret Kosmala	CIBO	P
Jocelyn Lavallee	Environmental Defense Fund (EDF)	P
Emily Oldfield (alternate)	Environmental Defense Fund (EDF)	A
Sarah Coffman	Grassroots Carbon LLC	P
Ben Chen	HabiTerre	A
Missy Motew	Indigo Ag	P
Kevin Tu	Kateri	P
David Schurman	Perennial	P
Beth Ziniti	Regrow Ag	P
Jason Ackerson	Soil Health Institute (SHI)	A
Negar Tafti	The Nature Conservancy (TNC)	P
Brian McConkey	Viresco Solutions	P

**Agenda:**

- **Overview of Sections 3.1 – 3.2**
  - o **Declaring Practice Categories & Project Domain**
- **Section 3.3 Gather Data to Validate Model Performance & Uncertainty**
  - o **Requirement 1: Generalized Dataset Attributes**
  - o **Requirement 2: Specific Dataset Requirements to Validate Model**
  - o **Specific Rules for Practice Categories**
- **Section 3.4 Assessment of Bias for each PC/CFG/ES Combination**
  - o **Allowed deviations – PC X CFG x ES combinations**
- **Future topics & Next steps**

**Main Points of Discussion in Meeting:**

- **Overview of Sections 3.1 – 3.2: Practice Categories & Practice Domain**
  - o Overviews for defining practice categories and project domains were provided to the task force. This outlined the requirements laid out in the model cal/val guidance document that projects and model developers must follow when reporting on project parameters and validation datasets used in validating models.
  - o For crop functional groups, a question was raised whether there was any consideration for changing the term "crop functional group" to be more inclusive for grazing contexts where plants grown in pasture are also represented. It was noted that while this terminology may remain the same, the term crop functional group still applies to plants grown in pasture, with models still needing to be validated for each plant functional group represented (for example perennial grasses) in the pasture context for a grazing project.
- **Section 3.3 Data to Validate Model Performance and Uncertainty**
  - o Discussions in this section covered the list of requirements for datasets being used in model validation, highlighting certain requirements where deviations are often required.
  - o One requirement discussed was that measured datasets must be drawn from peer-reviewed and published experimental datasets. The question was raised on how the timing of publication may affect when it can be applied in the model validation. Task force members expressed support for allowing the use of a dataset that was in the process of peer-reviewed publication, with the caveat that this should be contingent on data not changing during the review process. Ideas for how this contingency could be enforced included creating an attestation that the model developers would sign declaring which datasets used in the model validation were in the process of publication and attesting that developers would update the model validation if changes to a dataset were made during the publication process. Additionally, an appendix could be provided in the model validation report containing the specific data that was inputted into the model from the unpublished datasets to ensure transparency of data that was not yet available through publication. There was also support for having a decentralized database to securely store data and ensure that no data manipulation occurred.
  - o Another requirement states that for model validation of SOC, newer methods for SOC stock monitoring may be used if there is peer-reviewed support or independent expert support approved by the Reserve for its use in SOC monitoring and if the methods demonstrate accurate measurement of multi-year impacts on SOC stock changes. An example was provided for eddy covariance flux tower data and whether

that would be an appropriate use for SOC stock estimation in the short term to supplement direct SOC measurement. There was support for allowing use of eddy covariance flux data as long as those measurements were combined with direct SOC stock measurements and that flux data was shown in published papers to improve predictions of SOC.

- A point was also raised that any new method should be compared against the standard methods in terms of uncertainty. For the example of eddy covariance flux data, concern was raised that this data introduced additional uncertainties, such as in addressing inversion issues and corresponding soil depth, and these uncertainties would also need to be accounted for in the model somehow. Because of this, members expressed support for having a third-party model expert evaluate the use of these newer methods and confirm that these issues had been appropriately addressed by the model developers.
- There was also some follow-up discussion around how uncertainty can be compared between different quantification methods. Points were raised that highlighted that being able to quantify uncertainty for any method can be challenging, and assessing how model developer's account for uncertainty of methods often requires applying professional judgement.
- There was discussion around the section "Requirement 2: Specific Dataset Requirements to Validate Models", and specifically the rules around number of LRRs needed for each PC/CFG/ES combination. It was noted that the guidance also states that if available data fails to meet these requirements, a case may be made for an exception to this requirement. Several model validations have sought and been granted these exceptions.
- A preference was raised for formally allowing grouping like what has been allowed for previous model deviations, given that members felt it was likely this would keep being a deviation that would be needed and that meeting these requirements for each combination may not be necessary for model performance anyways.
- However, concern was also raised that given the way the LRR requirement is phrased, for very large projects that encompass a large number of LRRs, there could be situations where LRRs are represented in the project but not in the validation dataset. It was proposed that language be added in this section to ensure that every LRR in a project is represented by at least one data point in the validation dataset.
- Another point built on this stipulation that in some cases it may not be possible to have a data point for every LRR for large projects, but that this may not be a concern if the project data is not heavily concentrated in those areas. However, if a project is heavily concentrated in a geographic area with little representation from the validation dataset, then that would create a problem. It was proposed that to address this a threshold approach could be used to create a guardrail for ensuring projects aren't heavily represented in under-studied locations.
- There was also concern voiced that in some cases where deviations were granted, there may have been available publications that were overlooked by the model developers. It was proposed that this be protected against by including a stipulation in the requirements that ensures model developers have done sufficient due diligence in finding appropriate studies for their model validation.
- A point was also raised as to the intention behind using the LRRs – mainly that LRRs represent unique combinations of climate and biophysical attributes of an area, and that this combination allows for greater confidence in model representation for similar areas. Grouping by just IPCC climate zones however is broader, so this would be less informative for model application, and so it was also noted that in allowing a mix

of national and international datasets, ensuring that climate zones alone are not only used for validating combinations.

- Under the section for special rules for practice categories, it was raised that for pasture systems, the current wording around the special rule for pasture may still be too narrow, and that more diverse pasture systems are seen that are more than just mixes of perennial grasses or legumes. Because of this more language is needed to define how pasture areas may be validated for specific plant functional groups.

- **Section 3.4 Assessment of Bias for each PC/CFG/ES Combination**

- This discussion provided an overview of the requirements for assessing bias for each PC/CFG/ES combination being validated in a model, and how this is then reported in the model validation reports. Discussion also highlighted the options for model validation reports, with three types outlined in the guidance: Type 1 Project-specific, Type 2 Generalized, and Type 3 Project-specific and referencing an existing model validation report.
- Discussion highlighted feedback that the Reserve has received on improving the guidelines around Type 2 Generalized reports to ensure that they are appropriately applied to projects and are held to the same standard as Type 1 project-specific reports. A note was made that the original intent of the Type 3 report was to have this report be required in the case where a project wanted to use a model that was previously validated under a Type 2 report. However, it was also noted that this is not clearly written in the guidance document, and the current wording provides confusion as to what additional information would be provided in the Type 3 report that was not already covered in a Type 2 report. The Reserve notes that more clarity is needed on the intent of the Type 3 report and when it should be applied.
- Further discussion covered differing opinions on what model validation types need to be completed before a project can apply a model. Specifically discussing whether a Type 2 report would be sufficient and what evaluation criteria may be applied if more information is needed than is provided in the Type 2 report. Concern was also raised that for Type 2 reports where a model has been validated in a more generalized way, then those models should only be applied to projects that cover a similarly broad domain and aren't overly concentrated in a few specific PC/CFG/ES combinations. Specifically, there was concern that for models that are validated generally, the uncertainty associated with those models may not be the same level of uncertainty associated with a project that applies that model under a more narrow domain set. There were also questions on how a Type 2 report would be matched to a project and how a project would be defined as "general" for assessing the suitability of applying the Type 2 report to a project.
- Further questions highlighted potentially a need for more guidance on assessing the suitability for the number of studies and quality of studies that are applied in the model validation process.
- There was also a suggestion to limit grouping of domains during the validation process to not allow grouping across emission sources or practice categories to create greater guardrails around how Type 2 reports may be conducted. It was also noted however that models that are validated across wider biophysical conditions and practices have shown to do well, so any guardrail around limiting grouping of validation domains shouldn't be so specific as to overly limit the model validation. It was raised that as long as the report includes enough details on the performance of each combination this may be sufficient to provide confidence in project's application of a Type 2 mode validation.
- A point was also raised that to support standardization of reporting across different

models, it may be useful to have a centralized list of validation datasets so that models that cover similar domains are also using the same validation data. Or at the very least the model reviewers should be checking these lists to ensure a model has not excluded a dataset that other models have included.

**Action Items for the Reserve:**

- Incorporate feedback from the task force and draft language for potential changes to Section 3.3 requirements
- Review Section 3.6 addressing model validation report types and draft language clarifying the requirements and purpose of each report.
- Create agenda for next meeting topics.
- Compile feedback from members and present to group for review.