

## **Commenter B**

Nitrogen Management Project Protocol  
Minimum Data Standard Public Comment Period

### **Reserve MDS Package Public Comment 1, D.1.1 Methodologies and Priorities for Future Protocol Expansion:**

[“...higher order...”] What is meant with “order” here?

### **Reserve MDS Package, D.1.2 Process for Future Expansion:**

I feel this paragraph could be structured better or could benefit from extra text explaining the process of future protocol expansion.

Most of this paragraph only covers the minimum data standard, which is only the first step of protocol expansion. Perhaps add some introductory sentences saying “the first step to expand a protocol is having data that meets the minimum data standard”, so it’s clear from the beginning how everything fits together.

The process is basically having reference data -> quantification methodology -> proposed protocol expansion with extra considerations outlined below. Right? If so, it would be good to state this more explicitly.

I also feel that reference datasets may be used more broadly than simply protocol expansion; they could also be used to verify or quantify the uncertainty of existing **[text missing]**.

### **Reserve MDS Package, D.1.2 Process for Future Expansion:**

[Second paragraph, “...meeting minimum requirements does not guarantee the Reserve will be able to use a data set.”] Use for what? For future protocol expansion? For better uncertainty assessment of existing protocol quantification methods?

### **Reserve MDS Package, D.1.2 Process for Future Expansion:**

[Fourth paragraph, “...before a management practice can be included...”] Only management practice? What about new regions or new crops?

### **Reserve MDS Package, D.2 Minimum Data Standards for Field Experiments:**

[“...minimum data standards...”] Was capitalized previously. Capitalize consistently or not.

[“...including both statistical models...”] Just a detail, I feel that “empirical” is a better word here.

[“...the results which have been published.”] The first time I read this sentence I assumed that “the results of which have been published” related to both new and previously completed experiments, and so I assumed that ALL data should be published. Reading your comment, this is not the case. Maybe rephrase to “new data that may not have been published yet and previously completed experiments, the results of which have been published; in either case, the data must comply with the minimum data standards.”

To respond to the question in the comment: I think both published and unpublished data should be allowed as long as the minimum data standard is complied with. I feel that very little additional value is added from having gone through peer-review if it comes to the source data. (Obviously peer review is still hugely important for analysis and discussion of the data.) Peer review will check similar things as minimum data standard: minimum reps, timing of measurement, etc.

I feel that if you restrict to published results, you are postponing data to come into the protocol with up to 2-3 years. You want new data fast and immediately. That way, research projects can also include a CAR submission in their research proposal and start working on CAR approval and publication at the same time.

#### **Reserve MDS Package Public Comment 4, D.2.1 Method of Data Collection:**

I think it's great that you're broadening the protocols, I am not sufficiently familiar with each of these protocols to judge whether they are sufficiently robust.

#### **Reserve MDS Package, D.2.2.1 Spatial Frequency and Scale of Data Collection:**

["...reference data can be divided into separate calibration and validation data sets."] Yes, I feel very strongly about this.

#### **Reserve MDS Package Public Comment 5, D.2.2.1 Spatial Frequency and Scale of Data Collection:**

My feeling is that you want to standardize region and keep it to USDA regional definitions. Otherwise, things can get so arbitrary. I feel that the USDA did a great job with defining resource regions, so the protocol can benefit from that end will end up more standardized. Otherwise you will have to use a shapefile for every protocol to check its geographic eligibility.

#### **Reserve MDS Package Public Comment 7, D.2.2.1 Spatial Frequency and Scale of Data Collection:**

(1) No, 2 chambers per functional location is better. Especially for banding and tractor furrows. That is the only way you can then use an average weighed by the estimated area of that functional location to get a robust total. This is less important for less binary functional locations.

(2) More is better, obviously, but 2 is fine.

(3) I think 2 is the absolute minimum number regardless of the size; otherwise you have no replication even with 1 huge chamber.

#### **Reserve MDS Package Public Comment 8, D.2.2.1 Spatial Frequency and Scale of Data Collection:**

(a) Very tough question. Depends on the standard deviation of the measurements. To calculate a standard deviation, you need at least 3 measurements. But 3 measurements are probably too costly for many experiments.

(b) Yes, at least 2 in very different soils/climates. Otherwise the potential for over/underestimating is very high. You would basically be using 1 field to represent a large

region spanning a whole state, and that just seems inaccurate to me, unless different experiments are available within the same region.

#### **Reserve MDS Package Public Comment 9, D.2.2.1 Spatial Frequency and Scale of Data Collection:**

[“...one chamber per functional location...”] As said before, I would vote for 2 chambers at minimum here for tractor furrows and nitrogen banding. You may want to explicitly refer to these locations.

(b) I am not familiar with this approach. How do you decide which ones get 3 and which one gets 1. Presence of functional locations? But then a lot depends on the definition of a functional location. Seems arbitrary without extra guidance. Maybe explicitly indicate “if fertilizer is spread in bands, you have to have at least [2] chambers there; same for tractor furrows.” Maybe less important for other functional locations.

#### **Reserve MDS Package Public Comment 10, D.2.2.1 Spatial Frequency and Scale of Data Collection:**

[“...recommends that submitters conduct a power analysis...”] Which alpha and beta values are recommended to be used during a power analysis?

(b) This does not seem realistic. Usually, there are only funds to measure a select number of seasons and you'll want to measure consistently from the beginning of the season to maximize value of your funds.

#### **Reserve MDS Package, D.2.2.2 Temporal Frequency and Scale of Data Collection:**

[Best Practice, 1) Flux measurement frequency, “...daily flux measurements...”] That seems a lot, but maybe right.

#### **Reserve MDS Package Public Comment 11, D.2.2.2 Temporal Frequency and Scale of Data Collection:**

(a) Yes.

#### **Reserve MDS Package Public Comment 12, D.2.2.2 Temporal Frequency and Scale of Data Collection:**

[T12: “...the Reserve is concerned...”] Rightfully so!

(a) Maybe relax the once-a-week frequency outside of growing season to once every 2/3 weeks, and even 4/5 weeks with frost, but again more frequently during thawing?

(b) I don't think so. 2 is better as a minimum. There's been so few typical years, lately.

(c) Seems fraught with problems. An average temperature can mask issues like crop damage due to cool nights, or peak temperatures.

#### **Reserve MDS Package Public Comment 13, D.2.3 Outliers and Analysis:**

No, this seems fine.

### **Reserve MDS Package, D.3 Applying Understanding from Field Experiments to Regions**

[Requirements, 1) "...asked to propose and justify..."] What about the approach of using a biogeochemical process model to study the variation of emissions across a region and subsequently define a region as where the emissions do not change too much but then still use measured data to come up with the average?

### **Reserve MDS Package Public Comment 15, D.3 Applying Understanding from Field Experiments to Regions**

This is why using USDA's Land Resource Regions is advantageous; it has already delineated areas according to temperature and precipitation.

### **Reserve MDS Package Public Comment 16, D.3 Applying Understanding from Field Experiments to Regions**

Soil compaction/ bulk density. You don't want to extrapolate from a study site that has overly compacted soil to a whole region. Also, slope?