Action item:

* How does manure calculation work? Dave & Sarah -
* Software engineer/specialist – how is it designed, packaged, and marketed? One thing that can do everything, or smaller tools?
* Follow up with Haleigh about
* Create generalized goal statements for the enhancements
  + Continue to demystify ACPF and FiNRT
* Read chapter in C document that Dave & John co-authored (Lisa’s C team initiative)
* Set up a meeting to keep C + ACPF conversation alive (Dave, Emily, John, and Haleigh)

Outcomes:

Look at Emily’s dissertation, Emma’s thesis, Ellen Audia

1. **Existing Ecosystem Services (nutrient, soil fertility/structure, wildlife, GHG, storage)**
   1. Estimate Field Requirements (input)

Optional: manure amendments, is the field coincident with feedlot? Type of manure?

Optional: manure supplyshed, estimate land applied

Would this (manure) be good as its own tool? Applications outside of FiNRT –

User friendliness, decision support tools, how to manage, support, decision points, longevity,

How to involve users and trainers in the tool development process. “User-centered decision support design” – John has some papers on this

Optional: fuel costs

Could create a production tool to estimate costs

Looking at biofuel systems – variable yields, biomass product and costs to get it there; transportation and handling and storage (potential question: is 10 mile OK supplyshed? Where is centralized storage? Do we need it?)

\*Bill is working on an “impact analysis” with jobs, incomes and multiplier effects (Dave Swenson’s tasks). “Production function”…IMPlan to calculate this production function and ripple effects in economy. We feed into it via enterprise budgets for new/interest cropping systems. Potentially modeling our scenarios + others – WQ emphasis scenario, wildlife habitat scenario, IA NRS scenario

Haleigh was talking to a prof about fuel costs and modeling this; works at the field-scale; tool to help you find the most efficient way to farm a field; how does this vary for a crop system – perennial, annual, etc. What are his inputs? Machine learning opportunity? Talk to prof and Jarad about this

Optional: Annual water consumption – livestock, traditional farming, corn, soybean, wheat…crop planted and ET rates when cash crop is planted dictates some of the potential conservation practices

John has a paper on cover crops and water quantity

Potential input layers: feedlots, roads, land use, fuel costs (fuels costs inherent in perennial practices, indirect fuel costs and cash crop fuel costs, additional fuel costs part of biomass transportation), nutrients, existing wildlife habitat available in watershed (WMA, CP, easements, etc.), slope, field boundaries.

* 1. Estimate field outputs

N – loading/runoff, stored in the field potential

Nutrient credit – baseline conditions could be on the lit review of nutrient credit going into spring based on rotation and tillage.

P – loading/runoff, stored in the field potential

Sediment (erosion rate or sediment load) – surface parameters

Carbon (bank and outputs)

Richard is working on this with APSIM aggregated fields to watershed-scale

Sebastian taking the field measurements for SOC (Fernando)

COMET – current data source for C

This research will be farmed out to other research teams, opportunities to collaborate/cross pollinate

Lisa convened C team and output was large document…rules for where conservation practices should go based on resource concern. What are the rules for C management? This is a co-product of other conservation practices. Dave & Emily looking at what data layers can be used.

Yield expectations

Matt N. is working on yield variability across the different feedstock systems

Water storage (volume of storage currently accessible) – soil provide, impoundments, seasonality, when will you get the most runoff?

Existing conservation practices – query of BMP sitings that already exist?

* 1. Existing wildlife habitat (riparian area)

Mostly qualitative at this point.

PEWI is a potential route. Has a biodiversity index (need to figure out how it works), function of the total diversity of land covers, size of individual patches, proximity of patches, and deliberate connectivity (corridors? Move across the landscape with cover). Game habitat index as well. Carrie has good documentation for sections of explaining PEWI under-the-hood. Research in riparian buffer zones has a lot of good data.

Pollinator forage indices. MSU Dub Landis (s/p?). Determine where the good pollinator locations, proximity to hives, size,

What species are taken into consideration? Indicator species and what are they proxy for?

Stream ecology and IBI

1. **Bioeconomic Analysis**

Michelle Soupir lab’s research, found that e.coli moves in the same way sediment moves across the landscape. P, sediment and *e. coli*. have similarities in ways to manage/control. Recent research in prairie strips.

* 1. Nutrient removal wetlands

Instructions: edit the polygon boundaries, be cognizant about the variable storage impoundment height, select a handful or run all (need examples of how to edit these).

Potential Benefits = wildlife, water quality, maybe GHG (placement, seasonality), water quantity

* 1. Farm ponds

Notes: siting conditions in tool may need to be updated/improved

Potential benefits

* 1. Reconstructed wetlands

Potential benefits: wildlife, water quality, maybe GHG, water quantity

* 1. Contour buffer strips

Notes: prairie vs. cool-season grasses

* 1. Grass waterway
  2. Bioreactor
  3. Drainage water management
  4. Saturated buffers

Notes: riparian catchments and stream ecology uplift

* 1. Riparian buffers

Notes: look at function and width to determine reduction benefits

* 1. Land use changes

Notes: less equipment passes maybe less emissions, less released

Practices: N inhibition, Extended rotation, Living mulch, Cover crops – seed mixes, Prairie cropping, Kernza