**Properties Sub-Team meeting**

**9/13/22**

Participants:

1. Dylan Beaudette –
2. Colby Brungard – absent
3. Chad Ferguson – absent
4. Suzann Kienast-Brown –
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman – absent
9. Jim Thompson –
10. Dave White –
11. Charlotte Tierney – absent

* GCP
  + ID field week – getting SSOs going in the project environment will be a good test
* 100m properties update from Travis
  + AWC, sand, silt, clay tested with Amanda’s PM and drainage class layers and without data reduction – results look good
  + VMs working well and speeding up predictions significantly – should be able to do all 22 properties in 1-2 weeks
* ID field week – happening next week
* Part 648 – major updates out for review within the next month
* DSM FT meeting – agenda to come at beginning of Oct
* DSM/GSM workshop
  + Can submit abstract without paying registration or approval to attend
  + Topics should incorporate NRCS-SPSD priorities

**8/9/22**

Participants:

1. Dylan Beaudette –
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown –
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson –
10. Dave White –
11. Charlotte Tierney –

* GCP
  + Optimizing workflows so we don’t use more resources than necessary
  + Setting up workflows for different types of projects
  + Training/tutorials
* 100m property maps
  + Incorporate a parent material layer (from GSP) and drainage class layers – Stephen provide PM layer
  + Redo maps prior to internal review
  + Travis run some comparisons w/Amanda’s PM layer
  + Minimum mappable unit – people can provide example for the group (Dylan, Zamir)

**7/12/22**

Participants:

1. Dylan Beaudette –
2. Colby Brungard – absent
3. Chad Ferguson – absent
4. Suzann Kienast-Brown –
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson –
10. Rob Vaughan – (Zach Werner) – absent
11. Claire Simpson – absent
12. Dave White – absent
13. Charlotte Tierney –

* GCP
  + App
    - Previewed to Drew and got answers to questions re: logos, disclaimers (Suz – reach out to Tammy)
    - NSSC meeting the week of July 18 – demo opportunity
    - Suggestions
      * Info popup for RPI
      * Try to match color ramps and breaks to people’s intuitive knowledge
      * Dylan and Stephen send suggestions for each property
      * Edge or Chrome for viewing
      * Decide how to deal with feedback and who should be involved (SBS, Standards)
* WCSS slides – Suz work with Colby
* Meeting with MX National Atlas crew (email 6/17)
  1. soil data collection, systematization, and analysis,
  2. use of the DSM for the cartographic representation of soil properties,
  3. interaction of thematic and geomatic teams for the cartographic representation of the natural and anthropogenic processes of the soil, and,
  4. roadmap for getting a national information system in the medium term.
  5. Can you indicate a date for our meeting between August or September before the Congress? (Suz send follow up email)

**6/23/22**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson – absent
4. Suzann Kienast-Brown –
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson –
10. Rob Vaughan – (Zach Werner) – absent
11. Claire Simpson – absent
12. Dave White –
13. Charlotte Tierney –

* Updates from team
* Google Cloud Platform
  + Travis, Dave, Stephen working on different ways to use VMs and R
  + Travis – 100m map viewing and review app nearly complete
    - Suz check with Drew on disclaimers, logos, public facing app guidelines, access for publication reviewers, link to disclaimer info, etc

**5/26/22**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard –
3. Chad Ferguson –
4. Suzann Kienast-Brown –
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson –
10. Rob Vaughan – (Zach Werner) – absent
11. Claire Simpson – absent
12. Dave White –
13. Charlotte Tierney –

* Updates
  + Colby
    - Iran – soils2026 paper – what it takes to set up a national DSM infrastructure
      * Presentation – work with Jess/Jim
    - WA – forest industry presentation
    - Working on DEM derivative workflow into GCP
      * Scaled all derivatives to integer – considerable reduction in file size
  + Charlotte
    - NM DSM project – 30m continuous properties
  + DEM derivative paper – please contribute to your sections if you haven’t already
  + Zamir
    - Working on TWI paper and comparison to soil moisture sensors
  + Jim
    - DSS projects starting in 3 NPS projects in NE region
    - Looking for post-doc
* Google Cloud Platform
  + New agreement – possibility for user interface development
  + CCE certification
    - Chad working with OCIO for Colab and overall issues
  + Travis
    - Working pipeline for getting assets into GEE – focusing on 100m maps
    - Review app in progress
    - Setting up VMs to run with R – jupyter notebook
    - Establish basic functionality w/in agency, then bump it up
* NCSS powerpoint

**4/28/22**

Participants:

1. Dylan Beaudette –
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown –
5. Zamir Libohova – absent
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman – absent
9. Jim Thompson –
10. Rob Vaughan – (Zach Werner) – absent
11. Claire Simpson – absent
12. Dave White –
13. Charlotte Tierney –

* Google Cloud Platform
  + - CCE certification – Chad and Dave met; Chad will test and develop understanding of GCP
      * Chad will figure out who to work with in OCIO for certification
      * Include Chad in biweekly meetings – Suz
    - S2026
      * Git repo for terrain and spectral derivatives – will be a start for SPSD scripts
      * Training for RGIS – can include others as needed
  + NCSS submissions – north central, west region
  + RSS – Dylan and Andrew working on Web Coverage Service via Soil Web
    - Need to decide on NoData and bit depth issues for Part 648

**4/12/22**

Participants:

1. Dylan Beaudette –
2. Colby Brungard – absent
3. Chad Ferguson – absent
4. Suzann Kienast-Brown –
5. Zamir Libohova – absent
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson –
10. Rob Vaughan – (Zach Werner) – absent
11. Claire Simpson – absent
12. Dave White – absent
13. Charlotte Tierney – absent

* Google Cloud Platform
  + - 100m maps
      * Units?
        + pH, EC, SAR, etc (about half of properties)
        + percentages, etc in an 8 bit integer – do it
        + others (pH, etc) store in smallest float format
        + storage and computation won’t be such an issue in the future
        + go to original units – decision made
      * need to figure out Jupyter notebooks/vertex/colab
  + review process
    - min scale, mapping unit, intended uses
  + soil property product name – SOLUS is the vote (followed by resolution 100m, 30m, etc – SOLUS100
* Iran presentation – Colby (table for next meeting or email exchange)

**3/24/22**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown –
5. Zamir Libohova – absent
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson –
10. Rob Vaughan – (Zach Werner) – absent
11. Claire Simpson – absent
12. Dave White –
13. Charlotte Tierney –

* Google Cloud Platform
* 100m property layer naming convention and format
  + - * Float, integer – will depend on property (clay vs pH)
      * Original units
        + Yes – Travis will work on conversion in the cloud
      * Naming convention
        + Keep as close as possible to SDA/SSURGO naming convention for properties
        + Use \_r which indicates RV or use something else like \_p for predicted?

Decision is \_p

* + - * Metadata – Travis and Stephen will work together to make sure standards are met
* Google Colab for CEC certification – Chad will work with Dave and OCIO to request
* Script organization
* Stephen, Dave, Travis meet and discuss – update group at next meeting
* Jupyter notebook setup for 100m maps
  + STED30 paper update – next meeting
  + Mexico DSM technical support – Travis, Dave, Jess, Stephen
  + NCSS meetings
    - Properties team presentation presented at each regional conversation
      * WCSS abstract – Suz submit (oral)

**3/9/22**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson – absent
4. Suzann Kienast-Brown –
5. Zamir Libohova – absent
6. Jessica Philippe – absent
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson –
10. Rob Vaughan – (Zach Werner) – absent
11. Claire Simpson – absent
12. Dave White –
13. Charlotte Tierney –

* Google Cloud Platform
* Bi-weekly meetings with Google
* Google docs
* Dataset list – suz will start
* Project description
* Script organization
* Stephen, Dave, Travis meet and discuss – update group at next meeting
* Jupyter notebook setup for 100m maps
* STED30 – get update at next meeting
* Rob V – cold air drainage models
* SAGA
* Wetness index
* Normalized height

**2/24/22**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard –
3. Chad Ferguson –
4. Suzann Kienast-Brown –
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson –
10. Rob Vaughan – (Zach Werner) – absent
11. Claire Simpson – absent
12. Dave White –
13. Charlotte Tierney –

* Google Cloud Platform
  + Jim account
  + Meeting week of Feb 28 – Travis, Colby, Stephen, Dave
  + Script organization
    - Stephen and Dave meet and discuss – update group at next meeting
* STED30 paper
  + Progress
  + Commitment – let Colby know
* USFS histosol project – data update
  + Stephen working on it
* USFS point data
  + Dave – Olivia Fraser offered to help properties team
* 100m property maps in GCP bucket
  + Everyone should have permissions to the project now
  + Travis/Dave – figure out a way to visualize data in GCP – report back to group
  + Webinar/weekly – get word out when we are ready
  + Solicit feedback – spatially specific
    - Earth engine explorer
* WCSS
  + GSM symposia
* New members to team?
  + Kabindra, Matt Levi, Colby’s post-doc
  + Consider and discuss at next meeting
* Iranian soil scientist request
  + New law to protect soils
  + Interest from institutions there to use DSM to map country
  + Colby giving presentation on DSM this spring
* Travis – DSM field week

**2/8/22**

Participants:

1. Dylan Beaudette –
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown –
5. Zamir Libohova –
6. Jessica Philippe – absent
7. Stephen Roecker – absent
8. Travis Nauman –
9. Jim Thompson –
10. Rob Vaughan – (Zach Werner) – absent
11. Claire Simpson – absent
12. Dave White – absent
13. Charlotte Tierney – absent

* STED30 paper
  + Dylan can contribute as of March 1
  + Travis, Jess, Jim, Suz – yes
  + Ask Colby to clarify what exactly he wants
* USFS meeting – scope of project and format of data
* Google Cloud Platform
  + Jim’s .edu account managed through google
  + Colby’s account – needs to set up separate account
  + Script organization
  + Set up regular agenda item for discussion in this bi-weekly meeting
* 100m property maps in GCP bucket
  + Everyone please review
  + Suz give permissions

**1/27/22**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard –
3. Chad Ferguson –
4. Suzann Kienast-Brown –
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson –
10. Rob Vaughan – (Zach Werner)
11. Claire Simpson – absent
12. Dave White – absent
13. Charlotte Tierney – absent

* Histosol pedon data for USFS project
  + Ask Drew about permissions issues – Suz
  + Set up meeting to know more about the project – Suz
    - Travis
    - Stephen
    - Colby
* 30m covariates – public access
  + FTP – no progress
    - HUCs
  + GEE
    - Colby is uploading new mosaics
    - Navigate public asset
    - Could do a quick and dirty metadata and explore other options for public release
    - Loop Travis into what Dave is doing with AK IFSAR so he can do the same with 100m property maps
  + Send Google Drive link for Landsat data to Colby – Suz
  + Paper – everyone contribute to their sections
* GEE
  + Access/permissions – is anyone having trouble?
  + What are people working on?
  + Ask about sharing access/data with USFS – Suz
* 100m work
  + Maps
    - Texture (including all sand fractions)
    - Rock fragment content
    - SAR
    - EC
    - pH
  + Covariates
    - On GEE
  + Papers in progress – will share for review
* Tom Hengl
  + Compilation of 100m covariates
  + Updating great group map of the world
  + Travis is providing KSSL snapshot trimmed down to specific fields and after 2000
  + Travis will keep Stephen and Suzann in the loop

**12/14/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard –
3. Chad Ferguson – absent
4. Suzann Kienast-Brown –
5. Zamir Libohova –
6. Jessica Philippe – absent
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson –
10. Rob Vaughan – absent
11. Claire Simpson – absent
12. Dave White –
13. Charlotte Tierney –

* Google Cloud Platform update
  + Working through permissions for users
    - Will have to request for folder/project creation
    - Will provide documentation for the process
  + Colby, Travis, Jim recommended to create a unique gmail account for the NRCS GCP work
* Update on 30m covariates
  + Colby showed some examples of CONUS mosaics from across the country
    - Mosaic datasets are 5.6TB
  + Covariate paper shared on ncss-tech Team – dsm-focus channel
    - Each person assigned to a couple covariates
    - Follow structure outlined in paper
  + Have some progress by Jan 11th
* Update on 100m properties
  + Overview of new workflow using gRPI for initial data selection step
  + Streamlined RFE (min n of covariates above 30)
  + True CV metric is between standard CV and spatial CV – use CV with RPI closest to gRPI
  + Predictions are currently running – finish w/new workflow with gRPI

**11/9/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown –
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman –
9. Jim Thompson – absent
10. Rob Vaughan – absent
11. Claire Simpson – absent
12. Dave White – absent
13. Charlotte Tierney –

* 100m property flow chart
  + gRPI for each tier of data to evaluate data weighting scheme – will require reworking workflow
* terrain derivative paper template coming soon – Colby has a draft
* Stephen is working on coarse fragment data – almost done

**10/28/21**

Participants:

* + Dylan Beaudette – absent
  + Colby Brungard – absent
  + Chad Ferguson – absent
  + Suzann Kienast-Brown – absent
  + Zamir Libohova – absent
  + Jessica Philippe –
  + Stephen Roecker –
  + Travis Nauman –
  + Jim Thompson – absent
  + Rob Vaughan – absent
  + Claire Simpson – absent
  + Dave White –
  + Charlotte Tierney – absent
  + Zack Werner – absent

Updates:

Stephen:

* Most visual estimates in KSSL are consistent with texture modifiers (>90%). He will send list of pedons to use to Travis in near future.
* Dylan and Stephen are recommending using the visual estimates due to discrepancies in the lab data on rock frags.
* This may be due to the >3" data that is weighed in field not making it into the KSSL database.

Travis:

* Took a break from 100m stuff, but will be starting up again.
* I'm thinking about publishing a paper focused on a complete suite of particle size fraction maps (sand, silt, clay, sand fractions, various rock size fractions). This would document the methods and be a nice expansion of data that would be useful to many users. Will still continue other properties, but maybe release in different paper or venue. Need more input from group on this approach.
* I'm hoping to start writing up 100m paper in December
* Colby is done with the terrain covariates, maybe couple loose end watersheds.

Jess

* Noted that the Google accounts are getting set up and that Suz would be admin and doing an intro workshop for group soon?
* Asked about access to download the terrain data. We discussed and Colby does have an ftp option that we have used for grabbing the data for NM, but the best route is probably a direct upload to the Google cloud platform

Dave

* Has a GEE script for developing DEM, Landsat, and Sentinel covariates for AOIs as part of the 2026 efforts. These scripts could be very useful to the props team as they should be pretty seamless with the google platform. COOL STUFF!
* Soils2026 efforts:
  + Still should push to get 100m maps out soon to have some tools to supplement 2026 as this was one of the original auspices of the props team
  + It has been hard to get DSM workflows moving at the field offices, still much work to be done on that front
  + Alaska efforts. Most unmapped land up there. Dave might be asking some folks for help on that working group.

**10/12/21**

Participants:

* 1. Dylan Beaudette – absent
  2. Colby Brungard –
  3. Chad Ferguson – absent
  4. Suzann Kienast-Brown
  5. Zamir Libohova – absent
  6. Jessica Philippe – absent
  7. Stephen Roecker –
  8. Travis Nauman – absent
  9. Jim Thompson – absent
  10. Rob Vaughan – absent
  11. Claire Simpson – absent
  12. Dave White – absent
  13. Charlotte Tierney –
  + Zack Werner – absent
* Terrain derivative paper
  + Team members contribute
    - Each person take one or more derivative to explain
    - Provide template so task is efficient for everyone
    - Send email to group w/template and sign-up sheet – mid Nov
* Google contract
  + Moving forward with account setup
* Coarse fragment data
  + Will check in at next meeting since so few people in attendance

**9/23/21**

Participants:

1. Dylan Beaudette –
2. Colby Brungard –
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova – absent
6. Jessica Philippe –
7. Stephen Roecker –
8. Travis Nauman – absent
9. Jim Thompson – absent
10. Rob Vaughan – absent
11. Claire Simpson – absent
12. Dave White – absent
13. Charlotte Tierney –
14. Zack Werner – absent

* Google contract finalized – Suz will inform of next steps
* Coarse fragment data
  + Stephen made some progress and an R function
  + 90% of horizons matched the modifier
  + Stephen and Dylan will coordinate to finish dataset
* Dylan shared ETa/ETp 800m map – will provide to Colby
  + Submit properties abstract for WCSS – use a version of the big picture abstract Suz submitted for SSSA – Suz provide to Colby

**9/14/21**

Participants:

1. Dylan Beaudette –
2. Colby Brungard –
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova – absent
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum – absent
9. Travis Nauman –
10. Jim Thompson – absent
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White –
14. Charlotte Tierney –
15. Zack Werner – absent

* 30m covariates
  + Watersheds are done
    - 6TB for watersheds
  + Mosaics require >64GB of RAM – will test in GDAL on a smaller set to check for edge effects
    - total size with mosaics will be approx. 13TB
  + Data sharing
    - NMSU ftp site
    - Google – first as an asset for this group, then public
      * Requires specific documentation for public assets
  + Spectral data should be added to whatever repository we decide on for terrain data
* 100m predictions
  + Texture <2mm fractions are done – S, Si, C, S fractions
  + NAs for rock fragments in KSSL data – fill with zeros?
    - Stick with field estimates in NASIS data rather than relying on variability of KSSL data
    - Coarse frag data is already in spc in NASIS snapshot
    - Use data checks in aqp to fill in gaps in texture, modifiers
      * Stephen/Dylan run check and gap fill
  + Using older snapshot of KSSL data from properties folder on Box
    - Move forward with rest of 100m properties and new KSSL snapshot
    - Don’t backtrack on fine earth texture fractions right now; maybe circle back eventually and possibly on Google platform

Action items:

* Prepare coarse fragment data from NASIS snapshot (in spc) using aqp data checks to fix texture, modifier data (Stephen/Dylan)

**8/10/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum –
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White – absent
14. Charlotte Tierney –
15. Zack Werner – absent

* Paper on spatial cross-validation – will share for next meeting
  + In chat and calendar invite
* Data for Tom
  + NASIS pedons
    - Not QC’d
    - Can share spatial matching pedons via R object with corresponding SSURGO metadata (on NASIS webpage)
      * Share appropriate metadata links/reports for table and columns
      * Provide R objects (Travis)
  + RACA, lab data is more straightforward
* Meeting with Tom re: methods in Africa paper
  + Questions regarding spatial cross validation
* Google contract update

**7/22/21**

Participants:

1. Dylan Beaudette –
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova – absent
6. Jessica Philippe –
7. Stephen Roecker – absent
8. Alex Stum –
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White – absent
14. Charlotte Tierney –
15. Zack Werner – absent

* 100m work
  + KSSL data snapshot/RaCA data connection
    - Pedlabsampnum
    - Labsampnum
    - Natural\_key
  + RaCA data in SQLite and available in SDA
  + Possibly use RaCA as evaluation dataset

Action items:

* Suz email Tom data sharing agreement and ask about discussion on Africa paper
  + Travis provide summary of discussion points/questions for email
  + Suz cc Travis
* Dylan talk to Skye about what morphological data is available for RaCA that was measured in the lab and central vs. satellite pits and how to connect the datasets

**7/13/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova – absent
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum – absent
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White – absent
14. Charlotte Tierney –
15. Zack Werner – absent

* 30m covariates are nearly finished – stream power index needs to be re-run and some large watersheds
* SSSA abstracts
* 100m work
  + Incorporating coordinates into predictions
    - Travis tried distance to points instead of oblique coordinates (seams created in Moller package) but it didn’t make much difference in prediction
  + MLR package trainer didn’t seem to improve results either
    - MLR is a machine learning package – can compare to caret – but strength is ensembling learners
  + Using post-2000 lab data for validation is showing promise
  + Use ranger for 100m work with training data weighting and spatial cross-validation

Considerations for our work moving forward:

* Multi-scale prediction combinations (1km, 100m, 30m)
* Test model performance and variable importance on GEE as a pre-modeling step
* 2.5D vs 3D (include depth as a covariate or not)
* Include oblique coordinates as a covariate

Action items:

* Suz check with Drew on data sharing agreement
* Suz start word document on Teams for questions/discussion points with Tom – send email link
* Travis will set up a time for the group to talk to Tom

**6/30/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova – absent
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum – absent
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White – absent
14. Charlotte Tierney – absent
15. Zack Werner – absent
16. Amanda Ramcharan – absent

* Hengl – collaboration
* Multi-scale prediction methods [African soil properties and nutrients mapped at 30 m spatial resolution using two-scale ensemble machine learning | Scientific Reports (nature.com)](https://www.nature.com/articles/s41598-021-85639-y#Sec8)
  + Considerations for our work
    - Multi-scale prediction combinations (1km, 100m, 30m)
    - Test model performance and variable importance on GEE as a pre-modeling step
    - 2.5D vs 3D (include depth as a covariate or not)
    - Include oblique coordinates as a covariate
* Compile specific questions; read paper and tutorial again; discuss with group; set up discussion with Tom
  + What does #5 in methods mean?
    - How are models being fitted for each property for each block size?
    - How is block size determined for each property (30-100km)?
    - How does the spatial block fitting relate to the spatial block cross-validation?
  + How is relative covariate importance calculated?
  + How are coordinates being used in model building? (seems like oblique coordinates are used but not listed in relative covariate importance plot)
* Spatial random forests paper [Random forest as a generic framework for predictive modeling of spatial and spatio-temporal variables [PeerJ]](https://peerj.com/articles/5518/)
* Oblique coordinates paper [SOIL - Oblique geographic coordinates as covariates for digital soil mapping (copernicus.org)](https://soil.copernicus.org/articles/6/269/2020/)

**5/27/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum – absent
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White – absent
14. Charlotte Tierney –
15. Zack Werner –
16. Amanda Ramcharan – absent

* Colby – 30m covariates 90% done (running for 3 weeks or more)
  + HUC2 watershed – subfolders for each HUC8 assigned as a job on HPC (running on 96 cores/15-20hrs)
  + 10 jobs running at one time in parallel
  + Colby will send out shapefile of watershed and team members review data for a specific watershed
  + Cleaning USFS NRM pedon data – pH, soil depth, rock fragment content, clay
    - Location information needs to be evaluated
  + Potential for other USFS data – FIA and experimental
  + Metadata for parameters and covariate use
* 100m property work
  + FS, SOC, clay
  + Travis review workflow
  + Discussion on validation methods
  + Training data
    - Include RaCa
    - Weights
      * What do we want to go with?
    - Which field in NASIS/KSSL has coordinates?
      * Geocode field – not consistent
      * Use NASIS coordinate field
      * Some coordinates live in NASIS and not KSSL
      * Where do we draw the line?
        + Use all data with coordinates but make note of uncertainty in data
* Everyone read Hengl’s Africa paper and discuss as a group

**5/10/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson – absent
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum – absent
9. Travis Nauman –
10. Jim Thompson – absent
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White – absent
14. Charlotte Tierney –
15. Zack Werner – absent
16. Amanda Ramcharan – absent

* Action items from 4/21/22
  + For 100m training data
    - Travis will try 1, 10, 100k for spatial density weighting – done
    - Stephen will try covariate/feature space weighting
      * Travis took weighting scheme and incorporated R function into workflow
  + Dave/Travis will test a model without pedon rankings/groupings and one with for comparison (see below from Travis’s review of workflow)
  + Travis/Stephen update outline in Teams – email group
    - Everyone review before next meeting – we’ll make a decision on the training data weighting for 100m properties at that time
  + Github – Travis will get feedback from Colby before merging back to master ncss-tech/dsm-properties repo
    - Done; Travis has done more homework and proposed merging forked repo back into main ncss-tech dsmprops repo
      * Travis, Stephen, Suz will merge
* Travis review workflow/weights/CV
  + Moving forward with
    - Include one reference model w/out weighting (all training data) and w/simple 10f CV
    - Look at variability between folds
    - Generate spatial predictions for a subset of representative properties for qualitative evaluation
      * Fine sand, clay, soc, ec, pH, coarse fragments
    - Consider including qualitative assessment of variable importance

**4/22/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum – absent
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White – absent
14. Charlotte Tierney –
15. Zack Werner – absent
16. Amanda Ramcharan – absent

* 30m covariates are 50% done (update from Colby)
* 100m properties
  + Dave working on new weighting scheme (KSSL at top – level 1; spatial matching criteria)
  + Travis updated weighting equation in outline
  + Updates to Github repo
  + Progress w/code (Travis)
    - Incorporated
      * spatial density grid and spatial cross validation (planning to turn into Ranger R function)
      * SQLite database
* Action items
  + For 100m training data
    - Travis will try 1, 10, 100k for spatial density weighting
    - Stephen will try covariate/feature space weighting
  + Dave/Travis will test a model without pedon rankings/groupings and one with for comparison
  + Travis/Stephen update outline in Teams – email group
    - Everyone review before next meeting – we’ll make a decision on the training data weighting for 100m properties at that time
  + Github – Travis will get feedback from Colby before merging back to master ncss-tech/dsm-properties repo

**4/13/21**

Participants:

1. Dylan Beaudette –
2. Colby Brungard –
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum –
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White –
14. Charlotte Tierney –
15. Zack Werner – absent
16. Amanda Ramcharan –

* Action items from 3/25/21
  + For 100m training data
    - Travis will try 1, 10, 100k for spatial density weighting
    - Stephen will try covariate/feature space weighting
  + Stephen working on export of new pedon dataset considering sensitive data and pedons missing horizon data (should be done this afternoon) – done
  + Dave/Travis will test a model without pedon rankings/groupings and one with for comparison
* Weighting of training data
  + Quality
  + Geographic space
  + Feature space
  + Do we want/need to do all three?
  + Would we apply to entire training set prior to modeling or for each prop/depth?
  + Stephen will work with code a little bit more and we’ll discuss at next meeting
* How to organize code?
  + Ncss-tech/dsm-properties – folders
    - Covariate prep
    - 100m predictions
    - 30m predictions
    - Table of contents in the readme w/links
* 30m covariates ¼ to ½ done – progress!
* Data moving to SQLite so we’ll incorporate into this workflow
* Travis/Stephen update outline in Teams – email group
  + Everyone review before next meeting – we’ll make a decision on the training data weighting for 100m properties at that time

**3/25/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Chad Ferguson – absent
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum –
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson –
13. Dave White –
14. Charlotte Tierney –
15. Zack Werner –

* Action items from 3/9/21
  + Travis will continue to refine outline of workflow for 100m properties
  + Stephen working on export of new pedon dataset considering sensitive data and pedons missing horizon data
  + Dave/Travis will test a model without pedon rankings/groupings and one with for comparison
  + Dave/Colby will have 30m covariates cranking away very soon
* 30m covariates will start running today
* Outline and workflow diagram for 100m work
  + Discussion on training data prep weighting for spatial and feature space distribution
* Travis reached out to Amanda Ramcharan to add as an author on the resulting paper for the 100m work
* Action items
  + For 100m training data
    - Travis will try 1, 10, 100k for spatial density weighting
    - Stephen will try covariate/feature space weighting
  + Stephen working on export of new pedon dataset considering sensitive data and pedons missing horizon data (should be done this afternoon)
  + Dave/Travis will test a model without pedon rankings/groupings and one with for comparison

**3/9/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard –
3. Chad Ferguson – absent
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum – absent
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White –
14. Charlotte Tierney –
15. Zack Werner – absent

* 100m properties
  + Flow chart of options for 100m properties (Travis)
    - Testing process
      * Combination of both NASIS and KSSL data improved model performance based on cross-validation and analysis of KSSL residuals (R2 0.65)
    - Utilize all pedons and utilize weighting schemes for training Ranger QRF
    - Case weights for pedons still needs to be determined
    - How much tuning/data reduction do we want to do for 100m work?
  + Updating NASIS data with taxon names/data sensitivity issues
    - Do not distribute points – leave out until we hear from pedon database team (Dave W is trying to get involved in their teams)
    - Exporting data with only taxon names (missing horizon data)
    - Stephen is exporting new pedon data set with these criteria in mind
  + Weighting for data quality
    - Dave presented possible ranking based on location data and then combination of location data and quality (KSSL, NASIS)
    - Could test a model without ranking/groupings, then one with rankings/groupings and evaluate residuals/error (Dave, Travis)
  + Go with publicly available KSSL vs new SQLite version?
    - Move forward with current KSSL version and integrate SQLite when it’s available
* 30m covariates
  + New 30m USGS DEM
  + gNATSGO for snap raster
  + Currently pit filling HUCs using TauDEM; masks out water bodies
  + Colby will take it from there and start the processing
  + Compression in LZW
* Action items
  + Travis will continue to refine outline of workflow for 100m properties
  + Stephen working on export of new pedon dataset considering sensitive data and pedons missing horizon data
  + Dave/Travis will test a model without pedon rankings/groupings and one with for comparison
  + Dave/Colby will have 30m covariates cranking away very soon

**2/25/21**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard -
3. Chad Ferguson –
4. Suzann Kienast-Brown - absent
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker –
8. Alex Stum –
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White -
14. Charlotte Tierney –
15. Zack Werner –

* Spatial extraction
* 200,000 training points from NASIS side
* Simple comparisons done for clay and sand
* Seems like some data is missing from earlier snapshots, which mutes variability
* Any pedons with Do Not Distribute flags were excluded
* Maybe didn’t catch all user groups
* Next steps:
* Finalize pedon data we’re using (Stephen will look into query discrepancies)
* Decide on case/class weighting for pedons…and how to use them
* What are our concerns with this data and how to deal with them? Case clustering may be more problematic than actual data issues
  + Data approach – solve in data prior to modeling
  + Modeling approach – put safeguards in model
  + Need global model that is locally weighted to some degree
  + Need to deal with/maintain variability
  + Data quality
  + Database team’s concerns coincide with ours re: completeness but they haven’t put much into location
  + Dave will create location-based hierarchy based on what’s in nasis
  + Horizon level data – how to use it?
  + Specific path forward needed: perhaps a flowchart (Travis will draft and circulate)
  + Balance data distribution
  + Create a first model

**1/28/21**

Participants:

* + Dylan Beaudette – absent
  + Colby Brungard
  + Chad Ferguson –
  + Suzann Kienast-Brown
  + Zamir Libohova – absent
  + Jessica Philippe –
  + Stephen Roecker – absent
  + Alex Stum –
  + Travis Nauman –
  + Jim Thompson –
  + Rob Vaughan – absent
  + Claire Simpson – absent
  + Dave White
  + Charlotte Tierney –
* CONUS 30m covariate update
  + Literal pit filled dem used for hydrologic derivatives (TauDEM – very conservative pit fill algorithm)
  + Route pit filled dem for morphometric derivatives
  + Make available on ftp site; HUC and CONUS mosaic
  + Keep script in bash; parameters well documented
  + Could be turned into a job aid at some point
  + Slide set here
  + Colby will start running these soon
* Progress – Action items
  + Create new function in soilDB for spatial matching workflow – Travis work with Stephen
    - Travis is making progress on component spatial matching
    - Next question: how to weed out pedons – what criteria are we going to use?
      * Agenda item for next meeting – decide criteria
  + Need to incorporate lab data in SQLite form in code (Travis has 2018 snapshot)
    - Suz talk to Stephen – can we use same lab data code for data science workbench pilot and 100m properties team; and include NASIS pedons
    - Check in on SDW pilot at next properties meeting
  + Github project repos for 100m, 30m in ncss-tech – Stephen create 100m one for now – done
  + Combine datasets and assign weights – Travis, Dylan, Stephen
    - Travis will download datasets from Box and start experimenting
  + Cleaning up data/categorize for depth estimates – Stephen, Dylan, Colby
  + Target properties for 100m dataset
    - GSM core properties plus salinity
    - Agenda item for next meeting
* Questions of validation need to be considered

**12/8/20**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker
8. Alex Stum –
9. Travis Nauman –
10. Jim Thompson – absent
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White
14. Charlotte Tierney – absent

* Data prep action items from last meeting
  + Spatial matching – Travis
    - Code updated and ready to rumble when pedons are ready
  + Cleaning up data/categorize for depth estimates – Stephen, Dylan, Colby
    - Some progress has been made by Stephen
    - Still ongoing
* Action items
  + Create new function in soilDB for spatial matching workflow – Travis work with Stephen
  + Github project repos for 100m, 30m in ncss-tech – Stephen create 100m one for now
  + Combine datasets and assign weights – Travis, Dylan, Stephen
    - Travis will download datasets from Box and start experimenting
  + Cleaning up data/categorize for depth estimates – Stephen, Dylan, Colby
  + Box desktop app can be used to batch download via Sync functionality (100m data)
  + Script work will be next…
* Update on 30m covariates
  + Colby will try MRVBF and others using various parameters (such as neighborhood size) which could be useful for different landscapes
  + We can further investigate usefulness as we move forward with modeling
* Computing system update
  + EDAPT data science workbench pilot (FPAC-BC) – Stephen/Suz will use methodology pt depth workflow and properties for 100m covariates
  + Travis – possibility to get partner accounts on USGS computing systems
  + Google Cloud agreement in limbo right now but potentially still a possibility

**Properties Sub-Team meeting**

**12/8/20**

Participants:

1. Dylan Beaudette –
2. Colby Brungard
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker
8. Alex Stum –
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson –
13. Dave White
14. Charlotte Tierney

* Action items – from last meeting
  + Snapshot KSSL data base (available) (Dylan)(38k)
    - Dylan will put in Box folder
  + Grab all pedons with component/pedon link (Dylan/Stephen)(92k)
    - Dylan will put in Box folder
    - Identify criteria for filtering data
  + Spatial matching (taxa match) (Travis)
    - Travis can do for CONUS
    - Stephen will put NASIS pedons in Box folder
  + Cluster analysis after covariates are extracted (Alex)
    - Travis will do extraction
  + 100m covariate stack somewhere (Suz)
    - Box folder for project (Suz)
    - Alex will send script for downloading
* Comparison of training sets with different mixes of pedons
* Validation
  + Spatial cross-validation
  + Possibly use SSURGO for qualitative comparison
  + How much better are the DSM results than what we currently have?
* Three tiers of NASIS data (KSSL, component pedons, NASIS pedons)
* Methodology
  + Pt depth was voted in
    - Depth intervals
      * GSM end points
        + 5cm increments at shallow depths (incorporate later)
        + 0, 5, 15, 30, 60, 100, 150
      * Only go to 150cm
      * Try to model depth by coding pedons w/depth indicator using probabilistic approach and use results to mask depth interval predictions and assign NA to pixels below that threshold
        + Effective soil depth vs depth to bedrock

Predict restrictive layer and R, Cr, Cd

Both are part of GSM standards

* + Multi-response learners (sand, silt, clay for example) – incorporate later
    - Decide which properties can be grouped
    - Evaluate covariance structure from standard approach to decide which properties to model together
* Data prep action items
  + Spatial matching – Travis
  + Combine datasets and assign weights – Travis, Dylan, Stephen
  + Cleaning up data/categorize for depth estimates – Stephen, Dylan, Colby
* Script work will be next…
* Update Tues meetings for one hour later 12 CST
* 3pm CST 12/15 for methodology

**Properties Sub-Team meeting**

**10/22/20**

Participants:

1. Dylan Beaudette –
2. Colby Brungard
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe –
7. Stephen Roecker
8. Alex Stum –
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White – absent

* Interpretations – SVI and HSG are done; working with NRCS staff on fuzzy interps
  + How to incorporate uncertainty into interps
* Property maps w/100m covariates
  + Colby – not until Dec
  + Travis – wants to incorporate NASIS pedons in v1
    - Pedon quality is variable – how could we quickly screen them?
      * Taxa match – if they don’t match, flag them
      * Post-2005 data only – to mark when GPS units were being widely used
      * Next step: just use NASIS pedons linked to components
      * Weighting scheme for pedon data quality (example)
        + Lab data (10)
        + Linked pedons and components (5)
        + Taxa match (1)

Test what other ones we exclude from this bunch based on date or otherwise

How does it affect model performance/results?

* + - * How to impute missing data in pedons
  + Action items – will check on progress at next meeting
    - Snapshot KSSL data base (available) (Dylan)
    - Grab all pedons with component/pedon link (Dylan/Stephen)
      * Pedons w/out link
      * Identify criteria for filtering data
    - Spatial matching (taxa match) (Travis)
    - Cluster analysis after covariates are extracted (Alex)
      * Travis will do extraction
    - 100m covariate stack somewhere (Suz)
    - Box folder for project (Suz)

**Properties Sub-Team meeting**

**9/24/20**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Chad Ferguson –
4. Suzann Kienast-Brown
5. Zamir Libohova –
6. Jessica Philippe – absent
7. Stephen Roecker
8. Alex Stum –
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson –
13. Dave White

* Interpretations project
  + SVI, HSG working in R with raster data (mixed with SSURGO where property grids aren’t available)
  + Oct 19th meeting to demonstrate progress and solicit help with NASIS deep dive
  + WEI – not matching parity with NASIS
  + Fuzzy ratings – need NASIS expertise with rules
* CONUS elevation data
  + Dave working on stepping through process of filling the sinks; should be done by next week
  + All tools in ArcPro
  + Colby will generate derivatives by Dec
* Methodology project
  + Use results pt-depth/spline
* CONUS properties
  + Travis wants to update code with newer methods for prediction
    - Multi-task learners (RF, CNN)
  + KSSL training data vs incorporating SSURGO data
  + Potentially could use 100m covariates to generate preliminary properties
* Google cloud
  + Agreement moving forward – Suz will keep group posted
  + GTAC training in progress
* GSP
  + Maps almost complete
    - CONUS used DSM method
    - OCONUS used SSURGO/STATSGO
* Ideas for practitioner’s calls
  + Please submit ideas to Suz or Jess
  + Oct 6th – ArcSIE functionality to R – Tyson Hart

**Properties Sub-Team meeting**

**8/10/20**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Chad Ferguson – absent
4. Suzann Kienast-Brown
5. Zamir Libohova – absent
6. Jessica Philippe
7. Stephen Roecker
8. Alex Stum –
9. Travis Nauman –
10. Jim Thompson –
11. Rob Vaughan – absent
12. Claire Simpson – absent
13. Dave White

* Interpretations project update
  + WEI – good comparison to NASIS – 80-90%
    - Troubleshooting code for either code errors or NASIS population errors
  + Soil erodibility index in progress
  + Standardize all scripts as R data tree object
  + Almost ready to start testing raster data
* CONUS elevation derivatives
  + EDNA – data issues and old
  + NHDPlus v2 – 2012
  + Colby has a more recent snapshot (which he used to begin with)
  + SAGA tools for hydro correction w/out fill – sink drainage route detection has threshold so it won’t spill over into adjacent drainage
  + Subdivide to HUC8 to fill and create derivatives
  + Look at SAGA fill algorithms and decide which would be helpful and how to dynamically set thresholds or pick one that works for all areas
    - EDNA dataset comes with sink layer – could that be used for setting thresholds?
    - NHD flowline feature
  + Dave will help
  + A couple months to process derivatives
* Properties timeline
  + Incorporate MLRA into covariate stack in lieu of regional models for first iteration
  + Multi-task RF vs multi-task NN (recent paper by Ruholla – geoderma)
    - Predict multiple response variables at the same time
    - Consider covariance between response variables (ex. texture fractions)
* GEE training
  + Colby plus one or two students
  + Travis plus one or two students
  + Jess
  + Alex
  + Dave
  + Stephen
  + Jim
  + R interface for GEE
  + Azure, Amazon, Google to meet computing challenges for NCSS

**Properties Sub-Team meeting**

**7/14/20**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Chad Ferguson – absent
4. Suzann Kienast-Brown
5. Zamir Libohova – absent
6. Jessica Philippe
7. Stephen Roecker
8. Alex Stum – absent
9. Travis Nauman – absent
10. Jim Thompson – absent
11. Rob Vaughan – absent
12. Skye Wills – absent
13. Claire Simpson – absent
14. Dave White

* New team member
* CONUS covariates
  + Nodata in EDNA – could use NED to fill or focal stat – NED is preference
  + Stephen and Alex will look at script for conversion of grid to tif
* Sharing of lab data/covariates with others
  + Ming’s request – provide link to KSSL snapshot

**Properties Sub-Team meeting**

**6/9/20**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Chad Ferguson – absent
4. Suzann Kienast-Brown
5. Zamir Libohova
6. Jessica Philippe
7. Stephen Roecker
8. Alex Stum
9. Travis Nauman
10. Jim Thompson
11. Rob Vaughan – absent
12. Skye Wills – absent
13. Claire Simpson – absent

* Interpretations project update
  + Have all information for HSG, SVI, WEI
  + Joe is working on WEI
  + Focus of the project is to develop code in R to mimic NASIS
  + Once there is parity then start swapping out input variables – exchanging NASIS data for raster data (ie slope)
* CONUS covariate status
  + Recreate all derivatives from USGS NHD Plus (hydrologically corrected dataset) CONUS
  + Use Travis’s rescaling script for converting from 32 bit float to 16 bit integer where appropriate
  + Approximately a month’s time for computing

**Properties Sub-Team meeting**

**5/27/20**

Participants:

1. Dylan Beaudette
2. Colby Brungard
3. Chad Ferguson
4. Suzann Kienast-Brown
5. Zamir Libohova – absent
6. Jessica Philippe
7. Stephen Roecker
8. Alex Stum
9. Travis Nauman
10. Jim Thompson
11. Rob Vaughan – absent
12. Skye Wills – absent
13. Claire Simpson

* Update on interpretations project
  + Joe is working on WEI in R – goal is to make sure the R script will mimic the results from NASIS using gNATSGO
  + Have data for calculations together before the end of this week
* Update on methodology
  + Meeting weekly and making good progress
  + Submitted SSSA abstract
* CONUS covariate status
  + Tom doesn’t have originals for relative ht, relative position, relative ht
  + Colby has been investigating and data that is still 16 bit seems to be ok; 8 bit may be the issue
    - Still need to decide how we want to scale things
  + We will need to recreate relative position, etc layers
  + Claire has updated Landsat – will share with group
* Modeling rock fragment content
  + To round or not to round – probably best just to take the values as is and make adjustments to predictions if needed

**Properties Sub-Team meeting**

**5/11/20**

Participants:

1. Dylan Beaudette
2. Colby Brungard
3. Chad Ferguson – absent
4. Suzann Kienast-Brown
5. Zamir Libohova
6. Jessica Philippe
7. Stephen Roecker
8. Alex Stum
9. Travis Nauman
10. Jim Thompson
11. Rob Vaughan – absent
12. Skye Wills – absent
13. Claire Simpson

* Update on research assistant and interpretations project
  + Joe started last week
  + Technical meeting to catch him up and connect to others
  + Categorizing interpretations into calculations (SVG, WEI, HSG) and interpretations (dwellings with basements/coccidiosis)
  + Once built, will compare output from interpretations engine and NASIS to ensure parity
  + Determine which soil properties have the most influence on the interpretations with sensitivity analysis
* CONUS covariates
  + DEM derivative issues
    - Ask Jennifer Sweet about hard drive – Suz
    - Evaluate covariates – Colby
    - Travis has a function for converting and scaling in R
      * Colby willing to run on NMSU HPC cluster
    - Ask Tom about relative ht/position layers
  + Landsat data – Claire and Suz will work on this
* GSP – Global salt affected soils map
  + ~~Travis suggests using Amanda’s 100m covariates or 250m (world grid)~~
    - ~~Travis has 100m covariates for CONUS~~
    - ~~250m for AK or STATSGO – find out what is acceptable~~
    - ~~Most likely need full NASIS pedon data for EC prediction~~
  + ~~Get workflow and computing options in place could be a benefit~~
    - ~~Prepping the training sets for 30m work~~
  + ~~Don’t really have the resources in place to do the work~~
  + Mario Antonio Guevara Santamaria – Mexico – Suz will contact him
  + Will move forward with gNATSGO option

**Properties Sub-Team meeting**

**4/14/20**

Participants:

1. Dylan Beaudette
2. Colby Brungard
3. Chad Ferguson – absent
4. Suzann Kienast-Brown
5. Zamir Libohova
6. Jessica Philippe
7. Stephen Roecker
8. Alex Stum
9. Travis Nauman
10. Jim Thompson
11. Rob Vaughan – absent
12. Skye Wills – absent
13. Claire Simpson – absent

* Update on research assistant hire
  + Final interview today
  + May 1
* Progress on point data preparation for CONUS properties (including O horizon handling)
  + Cleaning data
    - Mainly USFS; particularly O horizons
      * NRM – natural resource inventory and monitoring
      * Martin Ferwada(?) – Colby’s contact
      * No documentation
      * 50,000 points have valid location
      * Most have sand, clay, pH
      * Some with textural class only could potentially be used as informal validation
      * Could weight points based on accuracy of underlying data
    - KSSL data requires some cleaning
      * Should be coordination with Dylan so we can fix the source data not just the local copy
      * Not every lab sample is a full characterization, so there will be missing data
    - Maybe add some functionality to aqp to help with cleaning
    - NASIS pedon data will require much more scrutiny
    - Flag pedons with issues for people to fix
    - Provide a list of checks for QC
    - Develop detailed proposal and process for QC that SSOs could follow to streamline work; maybe it goes through NSSC research team
    - Encourage cooperators to participate in local/regional/national meetings to bring focus to pedon data quality (include USFS in discussion)
  + Put together methods for building database from multiple sources
  + Weighting of datasets will become important
  + O horizons
    - Start soil at air/ground interface – follows existing GSM standards (currently under review)
    - Not all O horizons have been documented consistently
    - This issue could be a good candidate for a data check in aqp
    - Oe and Oa only; Oi can be transient?
      * Maybe examine data a little more closely
    - Document issues on Github and open the discussion to a wider community
    - For now, move forward with air/ground interface as 0; BUT keep discussion and investigation going which may lead to a change of method in the future
* Propose NRCS details for focused work on specific tasks
* Update on methodology comparison project
* Field weeks – Suzann will send out Doodle
  + July 27th Salmon-Challis
  + Sept 20, 27, Oct 18 for Maine
  + All approved by NHQ
  + Will ask for cooperator travel after availability is determined

**Properties Sub-Team meeting**

**3/10/20**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Chad Ferguson – absent
4. Suzann Kienast-Brown
5. Zamir Libohova
6. Jessica Philippe
7. Stephen Roecker – absent
8. Alex Stum
9. Travis Nauman
10. Jim Thompson
11. Rob Vaughan – absent
12. Skye Wills – absent
13. Claire Simpson

* Follow-up discussion and summary of Focus Team meeting
  + Travis will send comments
  + Colby added to partner training action item
  + University Intro course – July 2021 on action items
* Update on interpretations project – research assistant and scope of project
  + Colby working with NMSU to hire Joe Brehem – hoping for mid-April
  + Interpretations project
    - Demonstrate the ability to make raster interpretations but not have a finished interpretation engine
    - How do you make an interpretation and evaluate it
      * Methodological detail
    - Joe will do most of the script building
    - Colby will set up a call to discuss project roles and goals
* Discussion of Colby’s workflow outlined on Github <https://github.com/ColbyBrungard/Continuous-Soil-Properties>
  + Point data
    - AWC – included in KSSL point data
    - Travis will share process for matching NASIS pedons with components/component level data
    - Colby will move to DSM focus team repo
    - Other point data is a worthy future goal but for now move forward with easily accessible
    - Include case weight on point data – research topic
    - Output from data cleaning will be site and horizon tables
  + Depth harmonization
    - Point vs interval
    - What are the appropriate depths – related to interpretations/users
    - What depths work best for predictive mapping
  + Training matrix structure
    - Depends on methodology
  + How to model covariance structure at each point to account for vertical relationships
    - Serious research question
  + Modeling domains/regions
    - MLRA
  + Data splitting vs cross validation
    - Depends on methodology
  + Short term goals – action items
    - Choose data sources
      * NASIS point data
      * KSSL (including RaCA)
      * FS NRM data will be ready soon
      * Colby is working on this
    - How are we representing depth?
      * Regroup on methodology paper – March 24 or 25

**Properties Sub-Team meeting**

**2/11/20**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Chad Ferguson – absent
4. Suzann Kienast-Brown
5. Zamir Libohova
6. Jessica Philippe
7. Stephen Roecker – absent
8. Alex Stum
9. Travis Nauman – absent
10. Jim Thompson – absent
11. Rob Vaughan – absent
12. Skye Wills – absent
13. Claire Simpson – absent

* Colby – workflow on Github
  + Trying to get a starting point in lieu of a post-doc starting
  + Pedon data cleanup
    - Maybe Stephen can help with the NRCS point data
    - Colby working on FS data
    - Put together a checklist for working through the points – Colby rough out what he’s doing for the FS data and we’ll work together to refine it
    - Determine data structure we need in R – table structure and data elements – discuss with group
  + Potential research
    - Varying spatial resolution in covariates at a regional scale
    - Buffer points for extraction of covariates
    - SSURGO as a geomorphic/landform map
  + We will dedicate 3/10/20 meeting to detailed discussion of the workflow as outlined in Github
* DSM FT meeting agenda
  + Send comments to Suzann

**Properties Sub-Team meeting**

**1/23/20**

Participants:

1. Dylan Beaudette
2. Colby Brungard
3. Chad Ferguson
4. Suzann Kienast-Brown
5. Zamir Libohova
6. Jessica Philippe
7. Stephen Roecker
8. Alex Stum
9. Travis Nauman
10. Jim Thompson – absent
11. Rob Vaughan – absent
12. Skye Wills
13. Claire Simpson

* Post-doc update; interpretations position
  + Ruholla declined the position
  + 3 applicants for the interpretations position; one may be qualified to fill both
    - Joe Brehm – Moab
    - Hannah Rubin – Dartmouth
    - Emily Peterson – no R experience but other scripting
  + Pursue group workshop time with this group
    - If we build the code and infrastructure for each MLRA and generate preliminary models
    - Get together and evaluate preliminary models and refine as needed
  + Possibly combine the two projects into a PhD
  + Quickest way forward would be to consider Joe
  + Review applications by COB 1/24/20
* Computing
  + USGS HPC systems – could be an option initially
  + WVU HPC and data depot system – may be able to setup guest accounts
  + End goal is to determine requirements for generating these products internally w/NRCS
* Covariate stack delivery/hosting options
  + Box account with direct download options in Data Gateway
  + AWS
* Methodology comparison paper update (for rest of group)
  + Data/scripts/current query of lab data all available
  + Just need to do some testing now
* DSM Focus Team meeting in Feb
  + Colby – might make it
  + Chad – can make it
  + Draft agenda by the next meeting
  + This is what we need; this is a game plan to move forward
  + We need to layout priorities and vision
  + DSM properties “field” weeks
* DSM training and field week
  + OK Intro to DSM delivered – 45 people attended
  + FL field week Feb 2-8; project in the Big Cypress Natural Preserve
* Gov delivery topic: Digital Soil Mapping and Raster Products
  + Current list transferred; others can sign up through focus team website

**12/16/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello – absent
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman – absent
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills
14. Claire Simpson – absent

Agenda:

* Post-doc updates
  + Everything from NMSU is done…all Ruholla has to do is go to the embassy and apply for a visa
* Alex – RF in ArcPro – generally positive, drawback with classes: can’t get probability if you do classification, can do 90% prediction interval for continuous predictions. Good for field people in the future?
  + Is it too easy to use? If user is happy with prediction but never actually tests it, it could be an issue.
    - This was a concern with Arc in the 90s
    - Could be a positive for people taking ownership
* Dynamic Soil Survey update
  + Hubbard Brook Experimental Forest and Coweeta Hydrologic Lab are the two pilot/focus areas (both LTER sites
    - Decades of data to be sifted through; physical samples going to Lincoln for MIR analysis
    - 10m class map for each location – Jess will work on HB, Tiffany Allen will work on Coweeta
    - Continuous properties data is of interest to HB and Coweeta, and they can provide feedback on the product and interpretations
    - Colby is doing basically the same thing for the Jornada
    - Data may be in EDI (LTER system) on a project-by-project basis, requires a lot of cleaning/harmonization etc.
    - Current data approach (by DSP team) is to put anything received/usable from the LTERs into a common data frame in R so they can be ready to go into a DSP database structure when it’s ready
    - USFS seem very interested in further collaboration; there are 87 experimental forests so lots of potential
* Methodology comparison
  + Paper – who/what roles?
    - Jess – button pushing
    - Zamir – compiling results/summary/write-up
    - Suzann – lead coordination, make it happen; button pushing
    - Stephen – whatever is needed
    - Alex - maybe
    - Point-depth and splining probably have good scripts ready to use; slice and slab is all in AQP (go through aqp tutorial and it’s there) – reach out to Dylan for a script(?) and he may have already done some work
    - We have upper CO river basin data to use but should we at least test some of the CONUS data?
      * Stick with low-hanging fruit/smaller area to keep things moving as fast as possible
      * Stephen is working on making it faster to pull together pedon data for CONUS
        + Need to see about code for cleaning up the data (from Travis?)
    - Suzann will pull the small group together this week (Thursday?) to figure out timeline, roles, etc.
* Colby – developments on regional modeling
  + Upper CO River Basin dataset – split the point dataset by MLRA ecoregion and broad landform classification
    - Model of soil depth classes for every region
    - Compared accuracy/uncertainty of regional results to global results
      * Global results kind of average the results of regional models
      * After ensembling, extracting best predictions from each model
        + 66 🡪 88% average accuracy
        + User’s accuracy for each depth class were all over 87%, most in 90s
      * Need to test with other properties, continuous properties with same approach

**Properties Sub-Team meeting**

**11/22/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello – absent
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman
11. Jim Thompson – absent
12. Rob Vaughan – absent
13. Skye Wills – absent
14. Claire Simpson

Agenda

* Post-doc update
  + Making progress, but slow going with navigation of visa
  + Timeframe – hoping for January or February
  + Perhaps have Ruholla join in meetings – Germany is 7 hours ahead
* Additional team members
  + Number of people interested – see this as the future and want to be part of it
  + Jason Ackerson
  + Chris Osterlow
  + Possibly in a review team capability – using publications to provide discussion sections
  + Highlight issues we don’t have time to tackle and ask for assistance
    - Could be opportunity for publications on methodology or other meaningful concepts
  + Regionalize it – having core group but have regional sub-teams to focus on regional model domains
  + Make sure infrastructure is set up for collaborators; share covariates and point data
  + Meetings on a smaller scale; then bring the larger group together
  + Structure meetings at regional NCSS meeting on project
    - Jim, Colby
    - West, south (AK), northeast, central (Missouri)
  + Welcome to join but let us get the data together; some specific task
  + Suz reach out to potential collaborators – ask for recruiting help to begin with
* Spectral data update
  + Group to review
  + Individual bands, NDVI IQR, NDVI look awesome
  + SATVI, SATVI IQR will require maybe a little more work; play with timeframes (seasonal and archive); or IQR range – Claire will work on data as she can
* Covariate storage
  + Suz follow up with Dylan
  + Also something the post-doc can work on asap
  + Zenodo could be an option, but maybe not the best – more of a repository for finished product or data connected to publication
* Methodology decision (point depth vs. point interval)
  + Travis’s comparison – preliminary but does show some interesting relationships
  + Colby – slice and slab in aqp vs spline
  + Paper idea – point based, spline based, slice and slab based
    - Pick 3 or 4 properties (carbon, pH, texture (sand, silt, clay, or one))
  + Zamir will dig out what he previously did for pH
  + Skim literature to make sure someone didn’t already do this
  + Potentially predict properties at 5 or 10cm depth slices that could be useful for NCSS users and will also hit GSM standard depths
* Action items
  + Paper needs to have a lead – who wants to participate and what role do you want to have
  + Next meeting Dec 16 11am central

**Properties Sub-Team meeting**

**10/24/19**

Participants:

1. Dylan Beaudette –
2. Colby Brungard – absent
3. Tom D’Avello
4. Chad Ferguson –
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe
8. Stephen Roecker – absent
9. Alex Stum –
10. Travis Nauman
11. Jim Thompson –
12. Rob Vaughan – absent
13. Skye Wills
14. Claire Simpson

* Methodology
  + Choices of covariates – making progress
  + Choice of statistical function or method of prediction
    - Random forests – smooths out extremes
    - Cubist – resampled cubist
    - Deep learning
    - Geostatistical inference pulled into lab/NASIS pedon data
    - Random forest version of cubist – take cubist and introduce random selection of covariates – doesn’t exist yet but would be cool
    - Model averaging/ensembling
    - Evaluate behavior in scalability and sensitivity
    - All on board with RF; model averaging approaches are of interest
  + Most effective way to deal with depth – point depth/depth interval predictions
    - Predicting property at depth as a point and as an average over the interval
    - Zamir
      * It doesn’t matter how you slice it, there is a pattern in the error
      * Splines or weighted average
      * What error can we live with; what can we compromise
    - Different sources of error
      * Just by re-binning depths you introduce error up to 0.4 pH units
      * Point depth prediction – if you have a horizon sample that includes the depth you use it as training data
    - Integrate depth into the prediction
    - Predict each interval or point depth separately or prediction to restrictive feature
      * Don’t predict below bedrock or post process
      * Predict properties then truncate by soil depth
    - Send out survey for people to vote for starting methodology
  + Integrating SSURGO component into training data
    - Query soil property estimate from nearest correlated component to add to training data
    - Significant increase in training data
    - Sample size is the biggest constraint on uncertainty and validation
    - Working with regional and MLRA offices for QA/QC
    - Not using NASIS point property estimates; it’s couched within components
    - All are on board with trying this
  + Regional vs. global models
    - Still not totally decided
    - Don’t want hard seams with regional – there needs to be overlapping area
    - Memberships dictate model weighting for model averaging
    - Stratification options
      * EPA ecoregions – hierarchy of scale
      * MLRAs
      * USFS hierarchy
      * Coarser scale geology maps
  + Uncertainty and validation
    - Will be discussed at future meeting
  + Conflicts with schedule Nov meetings; will meet on Fri Nov 22 instead

**Properties Sub-Team meeting**

**10/8/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe
8. Stephen Roecker – absent
9. Alex Stum – absent
10. Travis Nauman
11. Jim Thompson – absent
12. Rob Vaughan – absent
13. Skye Wills
14. Claire Simpson

* Post-doc update – will check in with Colby
* Spectral data meeting summary
  + Pan band? Let’s hold off for now
  + Priority will be NDVI and SATVI and accompanying stats, and individual bands
  + Additional indices will come in the future
* Mark Kimsey (University of ID)
  + Analyses
    - Forest cooperative – R/D for forest health and productivity in west/northwest
    - All boils down to water
      * Anything related to water and water movement across the landscape is most important
      * Volcanic ash is huge; changes everything related to water
      * Taxonomy to find ashy soils
  + Quantify properties
  + What kind of products can we collaborate on
  + Define properties by regions
  + Soil indices that are directly tied to forest health – can we then prioritize those in our work?
  + USFS soil quality index
    - Rasterize for soil quality across the US
  + Opportunity for collaboration – especially interpretations
  + Can offer review or data for validation
* Interpretations working meeting 10/9
  + An update on the first meeting will be provided at the next properties mtg
* Field week update
  + Approval from NHQ; just getting firm commitments from participants now
* Prep for methodology discussion 10/24
  + Main agenda item for next meeting
  + Please check out papers and add any you wish
* Raster mastery emails – starting this month
  + Tidbits on all things DSM from projects to tasks, etc
  + Updates on DSM focus team activities when appropriate

**Properties Sub-Team meeting**

**9/26/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker – absent
9. Alex Stum – absent
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills
14. Claire Simpson

* Post-doc update
  + Kabindra has declined the position
  + Second candidate is still interested – Ruholla
    - Colby will circulate CV to group – two days to comment - done
  + Seeking other potential candidates – but might require more $$
* Focus team meeting – questions?
* Interpretations working meeting
  + Set up another phone call to plan for this
  + Video conference with Bob to build the momentum
  + Colby, Travis, Dylan, Suz, Jess, Jim, Bob, Skye, Stephen (?) – Suz will coordinate
* Continuous soil properties – actual methodology
  + Take a regional approach – takes the seams out
    - Potentially incorporate fuzzy membership for blending models
  + Would it also be useful to set it up for model tweaking by region?
    - Tool or set of scripts to modify with different covariates
  + Schedule some dedicated time for methodology at next meeting
* Spectral data update – any comments on Claire’s new data?
  + Striping in CV
  + NDVI mosaic without burn looks good
  + Claire can start anytime
  + Have a separate meeting to set goals with additional covariates; Travis, Colby, Suz, Alex, Stephen (?), Jim, Claire
* Covariate storage update
  + 10m covariate status
  + Amazon, Google solutions exist as well
  + Shiny app
* FL field week – Feb 2-8
  1. Jess
  2. Chance
  3. Jim
  4. Travis
  5. Colby
  6. Chad
  7. Dave W
  8. Nick Klein-Baer
  9. Suz
  10. Betsy Schug
  11. Craig
  12. Martin
  13. Samuel Rios
  14. Abdiel Santana
  15. Alison Steglich
  16. Cooper Nichols
  17. Joxelle Velazquez
  18. Ecological site specialist (?)
  19. Joe Norris
* SSSA meeting

**Properties Sub-Team meeting**

**8/22/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker – absent
9. Alex Stum
10. Travis Nauman – absent
11. Jim Thompson – absent
12. Rob Vaughan – absent
13. Skye Wills
14. Claire Simpson

* Spectral data update – Claire
  + Full NDVI coverage without NoData holes – will send out for review
  + CV made with de-fringing in SW US – will send out after meeting for review
    - If not acceptable, try percentile approach – 90th and 10th and then difference?
    - Or try non-parametric approach…what are some ideas?
  + LandTrendR assets layer uploaded to GEE
* FL DSM field week
  + Chad can reach out to Debbie if needed
  + Ecological site person involved
* Dynamic Soil Survey
  + Potential collaboration with research team at NSSC
* Check with Linda on NMSU grant status – done 9/3/19
* SWCS meeting summary – next meeting
* SSSA meeting – next meeting

**Properties Sub-Team meeting**

**7/25/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum – absent
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills
14. Claire Simpson

* Post-doc and new funding update (Colby)
  + Kabindra will start Oct 1
    1. Compile all covariate data and write up data article
    2. Add him to the teleconferences asap
  + New grant – 2-year agreement (may need additional person to work on this – discuss and share)
    1. Interpretations engine
       1. Raster soil prop and uncertainty
       2. Pedon data – generate interps from pedon data and then use as training data to predict interps
    2. Regional modeling and how to join them back together
* Review and discussion of spectral data
  + NDVI – almost complete for CONUS
  + Coefficient of variation has some artifacts; working on a cleaner product now
    1. Will also try a non-parametric approach for an area with artifacts; test first and then apply CONUS if successful
  + Limitation of disturbance free imagery – take the earliest segment that’s disturbance free so often calculated on very little data from the archive
  + Large continuous boundary burn areas will show as NoData holes
    1. Current solution: use segments from with at least two years disturbance free to fill in large holes; small holes use focal statistic (mean)
    2. Will have both products to review
* Univ of WA/WA-DNR project technical review
  + Travis, Colby, Jess, Suz
* 2019/2020 DSM Field Weeks (Suz)
  + Will update group on FL and PR projects in Aug

**Properties Sub-Team meeting**

**6/27/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman
11. Jim Thompson – absent
12. Rob Vaughan
13. Skye Wills – absent
14. Claire Simpson – absent

* Post-doc update – Colby in the field so nothing to report
* Spectral data
  + Claire in the field; processes running; will check in at July meeting
* Follow up from NCSS meeting
* Diverse set of focuses
  + DSM is gaining momentum but not engrained yet in NCSS
* Raster isn’t a dirty word anymore 😊
* Leadership should be consulting us on DSM initiatives
  + - we need to be proactive about reaching out to them too
* Technology committee – disconnect on how things will actually happen
* Need innovative solutions – open source
* DSM groups will need to come forward with proposals for solutions to leadership
  + Many challenges and opportunities for DSM
* Dynamic Soil Survey update
  + Everyone saw Lindbo’s presentation in RI; group can discuss
* Sampling discussion
  + Innovative approaches (similarity index, clustering, etc) and potential improvements
  + Need guide for field on sampling (pros/cons, dos/don’ts, workarounds)
  + Colby, Tom, Jess, Suz, Dave White, Travis, Alex, Dylan
* 2019 DSM Field Week
  + Tentative date of Dec 1-7
  + Fort Myers, FL SSO – project in the Big Cypress National Preserve – it’s a swamp
  + Let Suz know if you’re interested in participating
* Update from initial and update mapping sub-team meeting
  + Proposing mentoring program for DSM projects
    - List of mentors and expertise
    - Form for SSOs to submit; review by team; assign mentor(s) matching the needs of the project
    - Proposal will be presented to leadership (Lindbo, then RDs)
    - Will request 10-25% of mentor’s time
* July 9th meeting will be cancelled (Suz on leave); next meeting July 25th

**Properties Sub-Team meeting**

**5/30/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello – absent
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker – absent
9. Alex Stum
10. Travis Nauman – absent
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills
14. Claire Simpson – absent
15. Derek Olson (GTAC)

* Post-doc update
  + Waiting for paperwork to go through NMSU; verbal acceptance from top candidate; start date of Aug 1 discussed
* Spectral data
  + Will discuss June 27 meeting with more of the team present and some examples to evaluate from Claire
* Dynamic Soil Survey update
  + Will discuss more on June 27 with more of the team present
* NCSS poster
  + Focus team poster almost done – Jim and Suz are working on it
* SSSA abstract
  + Submitting same abstract as for DSM/GSM for the Digital Pedology session

**Properties Sub-Team meeting**

**4/25/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills – absent
14. Claire Simpson
15. Derek Olson (GTAC)

* Derek Olson (GTAC)
  + Disturbance removed imagery
    - LandTrendr – disturbance removed imagery
      * Beginning, end, duration, and magnitude of disturbance
      * Magnitude used to remove disturbance from composite images
      * Fire, harvest, insects, and disease
      * Possible application for evaluating recovery time, potential, etc.
    - Different Landsat sensors – 5 to 8
      * Harmonization techniques included in compositing process
      * Landsat 7 – switch to include or not after evaluating output
        + Might be useful for shorter time series
        + Left out for LandTrendr analysis
    - Potentially remove disturbance in some parts of the country and not in others (mid-west) to create mosaic
    - Compositing
      * Use medoid as reducer – centroid that chooses an actual pixel value vs calculated median but is trying to replicate median
    - Need to think about how disturbance removed imagery could impact prediction of soil properties
  + Leaf-off imagery
    - Use percentiles of something like NDVI and chooses pixels closest to a chosen threshold (i.e. 20th percentile); so pixels in different bands could come from different dates but will share common characteristic of threshold
    - Harmonics can also be used – gets more at phenology
      * Peak green vs least green
      * Threshold needed – could be regionally
      * 3-5 years of imagery
      * May run into issues with adequate imagery in cloudy/snowy areas
  + How to difficult to create at CONUS scales?
    - Not technically difficult – time intensive
  + How to get products out of GEE?
    - 3-4 days to download
    - Get tiles into Google drive, download, mosaic
  + GTAC collaboration seems fairly open – but Rob isn’t on to confirm
  + Covariates to start with and evaluate
    - Disturbance removed NDVI
    - Variation of NDVI – standard deviation or coefficient of variation
    - Disturbance – capture magnitude during time series
      * 90th percentile perhaps
    - Follow up with GTAC to share before next meeting
* Post-doc
  + Applications in review
  + Interviews in next couple of weeks
* NCSS conference
  + Jim, Jess, Travis, Alex, Stephen, Suzann
* Dynamic Soil Survey meeting in Lincoln
* Cancel May 14th meeting; plan to connect on May 30th

**Properties Sub-Team meeting**

**4/9/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan
13. Skye Wills – absent

* Post-doc update
  + 9 applicants – 1 highly qualified, 2 more or less, the others not so much
    - Colby has been talking to Kabindra – expects him to apply
  + Extended until April 15
  + More than one candidate required for interviews
* CONUS Landsat data
  + Leaf-off imagery – still waiting for feedback from GTAC
    - Hoping for a way to dynamically do it – capture pixels after drop in NDVI
    - Maybe use AVHRR or NDVI for senescence date
    - Will save this for later
  + Long term composite images
    - Disturbance can be removed – should we do that?
    - Remove snow, clouds
      * Snow field, glaciers can be put back in – how important is it?
      * Can make a separate snow field/glacier image
      * Look at it from ecological zone – modeling domains
      * Another covariate may be correlated with snow presence
      * Use snow, ice, water mask
    - Focus first on growing-season images for now using filtering processes in place
    - Develop standard data set then add regional data based on modeling domains as needed
    - Veg, ndvi, variance in ndvi, minerology ratios
    - Moisture – early vs. late season TC wetness difference
    - Entire Landsat archive included?
      * Trade-off between capture of temporal variability and a little bit of fuzziness in data
      * Long term composites pretty much eliminate scan line issue with L7
    - How to capture variability
      * Standard deviation
    - Mean, median, medoid composites can be created
      * All options exist
      * Imputed value or real cell value?
    - Can provide example to evaluate
      * Where should example come from?
  + Principle components vs. spectral data layers
    - If we’re trying to build a standard dataset, use spectral layers vs. PCs since PCs are scene-specific
    - Removed PCs from list
  + Ratios vs. spectral bands – keep both?
    - Bands would be handy to have for other applications
  + Panchromatic band – can be useful to detect variability within pixels – maybe for evaluation/inspection of uncertainty
  + Sentinel data may be an option for the future as more scene coverage is available
  + SMAP data – any interest?
    - Coarse spatial resolution – 4km
    - Maybe temporal application?
    - Look at areas of high variability
    - Applications for ag and fire
    - Rob will investigate and see what can be done
* Terrain derivatives
  + Tom has calculated additional derivatives
    - Relative elevation and height data
    - Will provide to Colby
    - 30 total derivatives
* Southern Appalachian Properties project – bagged
  + Suggestion to move forward with CONUS
  + Group voted to set this aside for now and focus on CONUS work – this is what we’re really after 😊
* For next meeting – April 25th
  + Rob will invite GTAC person who can answer specific questions
    - Focus on NDVI and derivatives for evaluation at next meeting
    - Can distribute GEE code
  + Suz will clean up Google doc

**Properties Sub-Team meeting**

**3/28/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum – absent
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills

* Post-doc update
  + Will close on April 1
  + Announced at DSM/GSM in Chile – Kabindra Adhikari may be interested
* Summary of DSM/GSM meeting
  + Next meeting possibly in Dec 2020, Jan 2021 in India
  + Global representation
  + Advances, challenges, overall plan for GSM and DSM working groups
  + Main take-aways
    - Global vs regional models
    - 2D vs 3D models for depth predictions
    - Users don’t know what to do with uncertainties and aren’t using them when provided
      * How should we communicate uncertainty?
      * Turn uncertainties into measure of risk – people can interpret risk
      * Travis – uncertainty is abstract and needs to be interpretable; relative prediction interval
      * Skye – people internally (NRCS) thinking about how to use uncertainty in conservation planning
    - France, Australia, Netherlands – all facing similar institutional challenges in adoption of DSM and raster products in national soil survey programs
    - Incorporation of pedological knowledge into (or back into) DSM
      * Need to "open the black boxes" of Deep Learning and Machine Learning
  + Other thoughts/ideas
    - Focus on user needs – move beyond the process of making the map
      * Why do some people "fear" DSM methods, DSM products
      * Communication with end-users...collaboration with end-users
      * Connecting with policy-makers on a personal basis...connect soil information to conceptual models
    - How to harmonize models/products between countries? Is it necessary?
    - Global validation of GSM
    - Capacity building for both soil science in general and DSM specifically
      * Integration of DSM into soil survey institutions (operationalize; develop workflows)
    - Focus on soil security and capitol value of soils to add value to GSM products
      * Focus more on digital soil assessment
    - Annual user symposium for GSM
    - How to incorporate DSP
    - Collecting “fresh” data
    - Soil sensing data in DSM
    - Data privacy – not all countries have public data
    - Critical examination of available covariates: how used, minimum resolution
      * Are new covariates needed (e.g., soil age)?
      * When is a covariate not accurate enough? When is it not relevant?
    - New additions to GSM – India, China, Netherlands
    - Align GSM with pillar 4 of GSP
  + Skye – SPSD leadership meeting
    - Should do, have to do, not going to do – priorities
    - Raster products in the “have to”
* Update on CONUS covariates
  + Spectral data – GTAC – yes
    - What derivatives do we want?
      * Circulate list of derivatives – Travis will dig out field week list to circulate
      * Google drive for circulation
      * Two weeks to get to Rob – by next meeting
* Communication/visibility at meetings
  + SWCS > NCSS > SSSA > DSM > Pedometrics
  + NCSS
    - Submitted
  + SWCS
    - Submitted – Jim is presenting author
  + FLAG
    - People loved the talk; thanks Travis for slides
    - AK needs a lot of help
    - 30m properties data to be included in Next Generation Soil Survey
      * Possible meeting May 6 – DSM focus team at the table
* 2019 field weeks
  + Lindbo would like a proposal for a non-NEDC training so field weeks can be annual
  + AK – planning a 2-week field week for FY20
* Southern Appalachian Soil Properties Project – tabled for next meeting – re-orient between now and then and discuss next steps
  + All data now on WVU FTP
  + What’s next?

**Properties Sub-Team meeting**

**2/28/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello –
4. Chad Ferguson –
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe
8. Stephen Roecker – absent
9. Alex Stum
10. Travis Nauman – absent
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills – absent

Agenda:

* Agreement update
  + Colby sent announcement
  + Where should we post
    - SSSA job board – Jim will post
    - DSM FB group
    - University contacts
    - Send to RDs
* Southern Appalachian Soil Properties Project – tabled for next meeting
  + All data now on WVU FTP
  + What’s next?
* Update on CONUS covariates
  + Spectral data – GTAC – yes
* Update on computing in Fort Worth
  + Workflows – submit
    - Suz will email
* Communication/visibility at meetings
  + SWCS > NCSS > SSSA > DSM > Pedometrics
  + NCSS
    - Submitting abstract Friday
    - Are people ok with “DSM Focus Team”?
    - Send to group
  + SWCS
    - Suz submit by March 6
  + SSSA – Nov
  + DSM
    - Outline sent to group
    - Focus on scale of project, limited resources, relying on methodology
    - What happens when the rubber hits the road – not reinventing the wheel, making a new wheel
  + FLAG
* Leadership teleconference – three-tiered approach to soils2026
* Cancel March 12 – regroup on March 28
* 2019 field weeks – ask Lindbo about the status

**Properties Sub-Team meeting**

**2/12/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello – absent
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe
8. Stephen Roecker – absent
9. Alex Stum
10. Travis Nauman – absent
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills

Agenda:

* Research group at NSSC – making 10yr plan; precision conservation planning in new farm bill
  + Skye or Drew to make contact for conversation with research team
  + DSM team is part of some of the efforts in the research team proposal
* Agreement update
  + Ready to advertise – Colby will send out to group to pass on/post/etc.
    - NMSU hiring website
    - DSM working group – pedometrics list serve
    - Pedometrics.org
    - SSSA, ESA, GSA? Definitely a fee?
      * Colby will investigate
  + Colby has $ he needs to spend from an existing NRCS agreement – quantitative prediction of LRUs
    - Extend post-doc position to 2 years and have them work on both projects
    - Harmonized landform and parent material maps for CONUS
    - LRUs as soil systems
    - Group agreed to this idea
* Southern Appalachian Soil Properties Project – tabled for next meeting
  + All data now on WVU FTP
  + What’s next?
* Update on CONUS covariates
  + Spectral data – GTAC?
  + Geomorphons – Alex working on region-specific dataset
    - Potential to update Dylan’s CONUS product with regional data
  + Data reduction via integer and pixel depth
    - Group agreed
* Update on computing in Fort Worth
  + Workflows – submit
    - Suz will email
* Communication/visibility at meetings
  + SWCS > NCSS > SSSA > DSM > Pedometrics
  + SWCS
    - Jim, Tom, Suz work on abstract for SWCS – week of Feb 25 – submit by March 6
  + SSSA – Nov
    - Big Pedology – focus on data
    - Get on S5 – pedology group email
  + DSM
    - Abstract accepted
    - Oral presentation – 12 min/3 for questions
  + FLAG
    - DSM and Value-Added Products
      * Focus on continuous properties project
      * Incorporating DSP
      * Interpretations
    - Submit any ideas for inclusion – doesn’t all have to be about the continuous properties
* Leadership teleconference – three-tiered approach to soils2026

**Properties Sub-Team meeting**

**1/24/19**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello – absent
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker – absent
9. Alex Stum – absent
10. Travis Nauman – absent
11. Jim Thompson
12. Rob Vaughan
13. Skye Wills
14. Claire Simpson

Agenda:

* Agreement update
  + Position description in HR right now – should be ready by next week
  + Advertise
    - NMSU hiring website
    - DSM working group – pedometrics list serve
    - Pedometrics.org
    - SSSA, ESA, GSA? Definitely a fee?
      * Colby will investigate
* Southern Appalachian Soil Properties Project
  + All data now on WVU FTP
  + What’s next? Will wait for larger group participation to discuss
* Update on CONUS covariates
* Update on computing options in Fort Worth
  + Regular bi-weekly meetings scheduled
  + Drives from Colby on their way to Fort Worth
* Communication/visibility at meetings
  + SWCS > NCSS > SSSA > DSM > Pedometrics
  + NCSS June 9-13
    - Skye, Jim, Jess
    - Poster for sub-team as well as DSM team as a whole
  + Stephen, Chad, and Skye will be at SWCS – can present poster if we submit
    - July 28-31, Pittsburg
    - Poster abstract submission: March 6
    - Tie to conservation
    - Jim, Tom, Suz work on abstract for SWCS
    - Same poster as for NCSS in June
  + SSSA – Nov
    - Big Pedology – focus on data
    - Emails to vote on session topic ideas
    - Get on S5 – pedology group email
  + DSM
    - Abstract submitted – waiting for acceptance confirmation
    - Jim, Suz (?), Colby to attend
* March 28 for whole DSM team to come together
  + Allow for Initial sub-team to have a couple sessions and for structure of Initial and Update teams and discussions to develop
  + Report on meeting in Chile
  + Progress on post-doc
* SPSD leadership
  + Ideas for how we can communicate our progress
  + Timeline and FTEs
    - Jim, Tom, Suz have plan from 2016
    - Dig out and revamp
    - Visibility

**Properties Sub-Team meeting**

**1/9/19**

Participants:

1. Dylan Beaudette –
2. Colby Brungard –
3. Tom D’Avello – absent
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe – absent
8. Stephen Roecker –
9. Alex Stum – absent
10. Travis Nauman – absent
11. Jim Thompson –
12. Rob Vaughan – absent
13. Skye Wills
14. Jay Skovlin – database focus team
15. Kyle Stephens – database focus team

We had an informal meeting with focus team members present at the SSSA meetings in San Diego.

Agenda:

* Pedon data
  + Another product that could be updated and provided annually
  + DSM and Database focus teams to justify the release of pedon data and connection to conservation, property maps, etc.
  + Kyle discussed the potential sub-team for the Database team focused on NASIS pedon data
    - QA/QC methods
    - Incremental release of reviewed data
    - Regional review of data to be released
    - Justification needed for QA/QC – such as acres
  + Kyle will keep us in the loop as things develop and DSM team will support the effort as needed
* Communication/visibility at meetings
  + Discussed having a skin similar to Coastal Zone Mapping team to display at meetings – Jim will check into this with the Communications team
  + Discussed having a product line to present at meetings
    - NCSS
    - SWCS – this one will be key to making inroads with conservation folks
    - SSSA
  + Develop 3-5 talking points that can be included in every presentation/display/handout etc so we have consistent and recognizable message – Jim, Suzann, Tom to work on this
  + Propose soils data session for SSSA 2019 in Nov focused on what data is out there and what you can do with it

**Properties Sub-Team meeting**

**12/11/18**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello – absent
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova –
7. Jessica Philippe
8. Stephen Roecker – absent
9. Alex Stum – absent
10. Travis Nauman
11. Jim Thompson –
12. Rob Vaughan – absent
13. Skye Wills

Agenda:

* Agreement update
  + Announcement out mid-Dec and interviews at SSSA in Jan?
  + Issue at WVU with subcontract – paperwork moving now
  + Have PD in place
    - Add verbiage for preference to candidates with knowledge of ESDs
  + May have opportunity to combine funding from USGS to extend the term of the position
    - BLM agreements – focus on ecological sites – applicant would need this expertise
    - Additional funding from BLM a possibility for other areas around the west; similar to Upper Colorado River Basin project
    - Eco-site development is also a priority for NRCS
    - USGS/NMSU/WVU/SKB discuss – Travis will initiate
* DSM/GSM meeting abstract – due 12/15
  + Regional/global model comparison for Upper CO River Basin – technical
  + Or emphasize overall approach of Soils 2026 properties project – structural/administrative effort within NCSS to create the continuous property products
    - Suz and Jim will work on abstract – TH to Travis
* SSSA
  + Jim, Skye, Travis, Colby, Dylan
  + Informal interviews – need to find out how it’s handled
  + 3-5pm AQP workshop
* Southern Appalachian Soil Properties Project
  + WVU FTP site is full; looking into what else is available at WVU for storage
    - Download only option; edit option requires courtesy appointments for sub-team members
* Meeting with Ft Worth – 12/20
* Github repo organization has been updated

**Properties Sub-Team meeting**

**11/13/18**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard –
3. Tom D’Avello –
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe
8. Stephen Roecker –
9. Alex Stum –
10. Travis Nauman
11. Jim Thompson – absent
12. Rob Vaughan
13. Skye Wills

Agenda:

* Agreement update
  + Announcement out by mid-Dec
  + Planning to advertise/interview at SSSA in Jan
  + Advertise various DSM list serves
  + Hoping to hire in Feb
* DSM/GSM meeting in Chile – March 13-16 – abstracts due Dec 15
  + 3 days so far
    - One day on GSM/one on digital soil mapping/one day on FAO partnership
    - Potential field trip for fourth day
  + Suz will investigate abstract submission info and get a small group to work on an abstract
    - Suz, Colby, Travis, Alex, Skye (edit and review)
* Raster delivery wish list – Suz will email group for ideas
* Field week project – Southern Appalachian Soil Properties Project – Phase 1 of the CONUS Properties Initiative
  + DEM data
    - 30m dem covariates are done and Tom is uploading to FTP site
    - Tom has added some additional climatic variables
  + Landsat
    - Leaf-off and leaf-on median composite of Landsat 8 2013-2018 archive; surface reflectance
    - Data processing from GEE is done
    - They are on Google drive; need to get on FTP site – Tom
    - Need to create band ratios and other covariates
      * Will research for the 10m data and add to Google doc
    - ~~Rob will share GEE script for developing Landsat covariates with group~~
  + Create a Google doc for all covariates; people add to it as they wish and volunteer for processing data – Suz
    - Tom will send link to FTP for 10m data covariates for everyone to view and to start the list
  + Data sharing via WVU FTP for now; need to pursue other options in the future
    - Trial projects for analysis on the WVU cluster
    - GEE is an option but limited as far as prediction/analysis methods
      * Operational work as an organization is an issue; research work ok
    - NMSU is not an option for analysis for the properties sub-team
      * But will have to be the resting place for all the data so the post-doc can access
        + Post-doc can be the point person; this will be the priority
      * FTP option either WVU/NMSU for everyone to be able to access
        + Have an FTP resting place where data can be hosted; Github repo for scripts; include FTP pull in scripts

Pulling from Box in scripts works

* + - Need to find repository for the CONUS data
      * Colby will put on Box for now for this group
      * ~~Suz and Tom will follow up with Ft Worth~~
      * Travis may have options for big data release through USGS
* Colby
  + Processing for CONUS nearly done
  + 25 DEM covariates by HUC 6 watershed
  + Albers projection
  + EDNA elevation derivatives for national application
  + 30m resolution
  + 10m resolution data is coming
  + Data hosted at UC Boulder – local cluster
  + Compressed size under 2TB for all 25 30m covariates
  + Processing by HUC 2 units – 20 in the US
  + Written in DOS with SAGA and GDAL to batch covariates
* February for meeting with entire Focus Team

**Properties Sub-Team meeting**

**10/25/18**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello –
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum – absent
10. Travis Nauman – absent
11. Jim Thompson – absent
12. Rob Vaughan – absent
13. Skye Wills
14. Dave Zimmerman – absent

Agenda:

* Steering team presentation
  + Focus team wish list for delivery of raster products
  + Abbreviated version of Intro to DSM for leadership
  + 1-2 bulleted items to include in performance
    - Skye and Suzann will coordinate (DSP and DSM – both requested to do this)
* Meetings
  + DSM focus team meeting – Nov 13 (will try for Dec 11 instead)
  + As it stands only 1 meeting in Nov and one in Dec
* Field week project
  + Tom – some exploration took place during the week, but not too much. Focus was on local project.
  + Will wait for rest of field week team
* Tom – project and data management for digital soil mapping guide book
  + Target audience – SSOs, SDQDs, GIS specialists
  + Focus on defining project extent and scope
  + Title – soil survey project and data management in the digital age
  + Separate document for correlating raster soil surveys
* Training inventory for DSM courses
  + Suzann will ask Shawn for report from AgLearn (email sent 11/9/18)

**Properties Sub-Team meeting**

**10/9/18**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello – absent
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills
14. Dave Zimmerman – absent

Agenda:

* Field week
  + Overview on Monday
  + Rest of the week group split between data collection and data prep, initial modeling for soil depth, parent material, soil classes – series, particle size class
  + Learned some lessons for next time
    - More data prep and script vignettes so everyone had access on their own computer
    - Mass movement, update of map unit concepts – less focus on collecting field data, more on answering a specific question, field day to connect the dots between field and computation
    - Change format for how to plan field time
      1. Show and tell; NASIS data/scripts/covariates
      2. Field day to think about what data means in the field
      3. Do something new with the data
      4. Revisit field
      5. Wrap up
    - Travis has well developed work flow for RF; Dave for cLHS/covariates
    - Training, infuse data, develop DSM products
  + Tom is doing write up for the week; everyone will contribute; publish in SPSD Weekly
  + Dave doing some work with cLHS and 10m covariates
  + We will provide preliminary models for soil depth, parent material, soil classes; provide script plus covariates
  + 10m models need some refinement, results were mixed; parent material and soil depth
  + Alex will work with 3m Lidar data
    - Provide with guidance for producing landform covariates for key in on landslide potential
  + We will finish off 10m modeling and provide guidance for Lidar exploration
    - Make this the priority to finish up before we turn to 30m extent
  + Data on FTP and possible space on WVU computing center
  + Scripts on Github site
  + Ideal lead time for field week
    - 2-3 months after approval for covariate support and general logistics
  + Demonstrate that SSO has covariates and point data ready – then we go to the office that’s most prepared
    - Office prepare point data with outline of requirements
    - We support covariate development
    - Minimum training required – Intro to DSM
  + Non-formal request for field week proposals
    - Training and work beforehand
    - Activities with team during the week
    - Follow up activities after team leaves
* 30m extent project
  + Data processing done for Landsat
  + Check for the 30m covariates
  + Once Travis has all covariates there we can start playing with NASIS data set that Stephen pulled
* Point data clean up needs to be addressed nationally with leadership, etc.
  + Check with Database team
  + Watershed conservation projects may provide avenue for work to be done
* Organize overall DSM team discussion time – decide on frequency and piggy back onto recurring properties meeting
* DSM team attendance at NCSS meetings and focus on “hot topics”
* Provide slides for DSM team to Travis for webinar

**Properties Sub-Team meeting**

**9/27/18**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills – absent
14. Dave Zimmerman

Agenda:

* Update on properties initiative agreement (Jim)
  + Email from Amanda – she has taken a full-time job and no longer available
  + Colby and Jim will draft a position description and circulate to group for comment
    - Will advertise ASAP
  + The agreement has been signed by NRCS – on to WVU
* Data sharing options
  + Dropbox not an option for NRCS
  + Cloudvault – 8G limit; and issues with files reaching the limit
  + Box – not sure of file size limit; restricted to agency employees; Chad will check into that
  + Google drive
  + WVU ftp; only Tom can put stuff there; 2TB limit
    - Jim will investigate options at WVU for both short-term and long-term storage/sharing options
  + Storage/format
    - Scale to integer (landsat x10000; 16 bit signed integer); compress LZW
    - Alex has script for scaling data in/out of HDF5 format that can handle multiple rasters in one file for moving data around – doesn’t store nodata pixels in every layer so good for irregular project areas
    - For larger properties project – properties, interpretations, covariates NET-CDF format might be an option
  + Interim file sharing solution
    - WVU peeps can download stuff from cloud services and load to ftp for everyone else to access
  + Elevated privileges – Chad will check this out and get back to Suzann
* Field week project
  + Discussion moved to field week call immediately following

**Properties Sub-Team meeting**

**9/11/18**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills – absent
14. Dave Zimmerman – absent

Agenda:

* Update on properties initiative agreement (Jim)
  + Agreement has been signed by NRCS grant management specialist – funding date 9/24/18
  + Colby will touch base with Amanda to let her know the status
* Computing options
  + WVU – HPC – free access
    - Update on testing (Tom)
    - GRASS is on the system and ready to use
    - Anyone can get access to system – may want to pursue for this group but will wait until Tom is done with testing
  + Citrix VDI modeling group
    - Active directory group created – all USDA employees on this team
    - Software list provided to build profile on the Citrix system
    - Next step is for Suzann and Tom to meet with Paul Fukahara and Jennifer Sweet on processing options
    - More storage in the future; approx. 60TB or so available now
    - Provide Citrix tutorial to group – Suzann
  + Colby – NMSU HPC
    - SAGA script to derive 10m and 30m covariates for US
    - Possibly host products on Data Gateway
    - Run with default parameters although unique parameters would be ideal; others can tweak for their own purposes
    - Provide script/info on derivatives and any particular parameters, etc. to this group – Colby
* Interpretations update
  + Data to Bob Dobos – Travis will follow up
* Set specific short-term project to rally around
  + Update on field week
    - MLRA 130B for extent
      * Using HUC 12 for covariate processing – would HUC 8 or 10 be better?
        + Stephen suggests you don’t need to stratify by HUCs; just need enough overlap for mosaic
        + Colby – watershed important for flow accumulation

HUC 12 boundaries seem arbitrary

* + - * + Tom – process with a larger buffer then clip down
        + Travis – buffer out 4km for terrain indices

Are HUC 12s too arbitrary?

Are we going to end up with boundary artifacts when we predict in adjacent MLRAs?

Do we need to expand processing extent?

Stephen – compare results between different processing approaches; parameters

Travis – we need to focus on project at hand and decide on processing extent

Select intersecting HUC 12s with MLRA 130B; dissolve into one polygon; buffer out 4km for processing; clip back for modeling

10m vs 30m

30m with goals of properties group in mind

Expand extent with 30m data beyond MLRA 130B

Building models on an overlapping area and predict centrally

Predict on target MLRA and all surrounding MLRAs – mosaic target MLRA predictions

Pedologically-based stratifications

Colby – early testing indicates modeling by MLRA produces vastly different validation results and variable importance; he is testing predictions over multiple MLRAs to compare results

MLRA as a predictor doesn’t seem to have impact on results but provides insight and model interpretability

* + - * + Broad goal for field week

Predicting MLRA 130B 30m soil properties that are part of GSM suite of properties

10m for frigid zone project – buffered out by HUC boundaries

30m data for MLRA 130B continuous properties – buffered out by HUC boundaries

30m NLCD for snap raster for processing; 10m NLCD

Test MLRA model overlap – is this a goal of the 2018 field week? YES

Try MLRA 130B only and collection of MLRAs and compare

Tom/Jim select MLRAs and then Travis select HUC 12s that intersect, buffer 4km; becomes processing extent

Suzann/Tom clip 30m dem from Rob to project extent using NLCD snap raster; provide to group over google drive

Travis will acquire 30m spectral data snapped to NLCD; provide to group

* Update on CONUS 30m covariates (Rob)
  + On Google drive – sent to group

**Properties Sub-Team meeting**

**8/23/18 – cancelled**

**Properties Sub-Team meeting**

**8/7/18**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard – absent
3. Tom D’Avello
4. Chad Ferguson – absent
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe – absent
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan
13. Skye Wills
14. Dave Zimmerman – absent

Agenda:

* Update on properties initiative agreement (Jim)
  + Paperwork submitted to NRCS in Lincoln
  + Been through WVU and NMSU
  + 150k, 94k to NMSU (post-doc salary) one year of funding for salary
  + 2 years of funding; if recurring funds are available, up to 1 year can be added (can go up to 3 years total)
  + Next step is to hire post-doc position; discuss with Amanda
  + USGS in Moab may have extra funds to channel to NMSU to help fund project past one year of salary to guarantee 2 years
* Update on field week
  + In process with NRCS leadership to request participation from NRCS employees
  + Availability will be the main hurdle
    - Set a date now before we request people’s participation – first week of Oct: 9/30-10/6 (Sun-Sat)
      * Tom will check with Tiffany
  + Check in with other NRCS participants
  + Send most recent copies to Travis
* Interpretations
  + Have approval for Bob Dobos to work on it, just need to get him data (currently out of office)
* Update on CONUS 30m covariates (Rob)
  + 30m NED product for CONUS; simple hydro correction in Arc; 10m fill
  + On Google drive – will send to group
  + HUC 10 boundaries
  + Floating point for AK, CONUS, CA, MX
  + Floating point for CONUS by watershed
  + Integer product as well
  + Not sure how the “best available data” from USGS will impact performance; issues from LiDAR data
  + National covariate stack – citrix
    - Can be used internally and externally eventually
* Stratification options
  + Use centroid of each polygon for prediction to create overlap between physiographic regions
  + MLRA (227) – used to label field points
    - Being updated in FY19
    - Use some sort of DSM process to update MLRA
  + EPA ecoregions (85) (water focused), ecological provinces, USFS subsections (being updated currently; expected in FY19)
  + May not even really matter – mainly need enough points and good covariate stack to capture variability, and process to stitch model results seamlessly together
* Coding and computing
  + Develop flexible code to switch out strata and test them all
  + Develop a workflow
  + Coding in R – several options for parallel processing
    - Tensorflow package in R – use of GPU
  + Possibly interface between R and python when needed
  + Keep all options open as we work through projects; share code on Github
  + Computing options
    - USGS Astro Sciences computing system (Travis)
    - WVU – HPC – free access
      * Jim could request guest account remote access for collaborators
      * Could use GRU funds to purchase disk space if needed
      * Tom is testing development of derivatives – wait for this for next step
      * This seems like best option for collaborative work while still pursuing NRCS in-house solution
    - Long term goal is for in-house (NRCS) solution – may be Citrix
* Set specific project goals to rally around
  + Example: make property maps for field week MLRA
  + Come to next meeting with ideas for specific project to work toward and decide on one to move forward
    - Benefit short term project and longer term overall goals

**Properties Sub-Team meeting**

**7/26/18**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe – absent
8. Stephen Roecker – absent
9. Alex Stum – absent
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills
14. Dave Zimmerman – absent

Agenda:

* Update on properties initiative agreement – any new developments? (Jim)
  + Sub-award with NMSU to have post-doc housed there; facilitate collaboration with people in the SW region
  + Start date 9/25/18 – 2 year agreement with one year extension possible
  + Do we want to pursue any of the stratification ideas with the SoilGrids100 data prior to the post-doc starting?
    - Would be wise to get something started; start date is for $ not necessarily the person (they will likely start later)
    - Move forward and provide foundation for post-doc to step into
    - Have a working plan laid out, which can be flexible
      * Start with stratification testing with soilgrids100 data
      * MLRAs – approx. 200 across US
      * EPA/FS ecoregions – nested coarser and finer scale stratification
      * Before the next meeting – everyone
        + Explore options; post data or links to Github
        + Discuss options and decide which stratification to start with at next meeting
      * Colby will test MLRA stratification in upper CO River basin on his prediction of soil depth project
* Update on field week
  + Leadership reviewed; RDs were next
  + Not sure when this will get attention due to recent upheaval in agency chaos, but Suzann will follow-up hopefully within the next week
* Interpretations
  + Follow up with Bob Dobos
    - Travis’ dataset with a specific request for Valley Fever interpretation
    - Travis, Skye, Chad, Suzann
    - Cc Maxine on email request; ask to prioritize after she returns
  + Interpretations staff
  + Volunteers to focus on this?
* Update on CONUS 30m covariates (Rob)
  + 30m hydrologically corrected DEM
  + Landsat composite imagery
    - Disturbance-free imagery?
  + Data access
    - Chat with Rob and come up with a solution
* Webinar – Travis: Applied Digital Soil Mapping
  + Others to join him?
  + Date – Sept or Oct
  + Email Shawn and cc Travis
* gPROP name – is this really it?
  + Solicited group for a product name
    - A few suggestions submitted; will wait for more before voting
* Properties sub-team website
  + Other sub-teams will have open meetings; thoughts on that?
    - Not at this time
  + Link to Github?
    - yes
* Calendar items for meetings – everyone got it?
  + yes

**Properties Sub-Team meeting**

**7/10/18**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe – absent
8. Stephen Roecker – absent
9. Alex Stum – absent
10. Travis Nauman – absent
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills – absent
14. Dave Zimmerman – absent

Agenda:

* Follow-up from Northeast/South Region NCSS meeting (Jim, Tom)
  + DSM discussion period – Jim, Tom, Matt Levi on panel
  + Some of the standard questions, but some stood out
    - Product versioning – What does it mean? Change in soils? Change in knowledge? Not a temporal change – we need to be clear
    - Dynamic soil properties – particularly in the surface layers – how can we capture these? Future meeting
* Update on properties initiative agreement (Jim)
  + Conversation with Hoover and Kinney/Travis and Amanda (noted in last meeting minutes)
  + Jim working on logistics of hiring, etc. with WVU/remote location
    - Research Assistant Professor vs. Post-Doc
    - 18-24 months of funding combining existing funds with new funds
  + Pursue both position to focus on project and group workshops
  + NRCS travel cannot be supported with initiative money – cooperator travel can
  + Draft deliverables in CESU to capture transfer of expertise/technology (raster datasets, scripts, process document, etc.), expectation of interaction with the DSM Focus Team, and other items identified by properties sub-team
  + Do we want to pursue any of the stratification ideas with the SoilGrids100 data prior to the post-doc starting? Future meeting
* Update on field week (Tom)
  + Conversation with Lindbo – very receptive and supportive
  + Proposal to NHQ this week
    - Great Smoky’s NP – 7 field crew
    - 5 DSM Focus Team soil scientists – 3 NRCS, 2 cooperators
  + Ratio of local crew to DSM Focus Team members for future field weeks will be project dependent
  + Lindbo suggested two field weeks for FY19 field season – one western (Bob Marshall Wilderness or Cascades); one eastern (White Mtn NF)
  + Work with field crew prior to field week for sampling design and other prep work for modeling
* gPROP name – is this really it?
  + Solicit group with a product name and vote
* Github – everyone accessing ok? Send url again
* Raster products weekly article 6/29/18

Agenda items tabled until next meeting:

* Interpretations
  + Follow up with Bob Dobos
  + Interpretations staff
  + Volunteers to focus on this?
* Update on CONUS 30m covariates (Rob)
* Webinar – Travis: Applied Digital Soil Mapping
  + Others to join him?
  + Date – Sept or Oct
* Calendar items for meetings – everyone got it?
* Properties sub-team website
  + Other sub-teams will have open meetings; thoughts on that?
  + Link to Github?

**Properties Sub-Team meeting**

**6/18/18**

Participants:

1. Dylan Beaudette – absent
2. Colby Brungard
3. Tom D’Avello
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe – absent
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman – absent
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills
14. Dave Zimmerman

Agenda:

* Update on WVU agreement details – Jim
  + Soils2026 raster continuous soil properties project
  + Conversation with Hoover, Kinney
    - Explained focus team vision for these products
    - Supportive of approach and products
      * Not using SSURGO or STATSGO for input data – derived from point data using statistical/machine learning methods
    - What is the delivery mechanism and how does that influence what we produce?
  + 150k over 2 years
    - Opportunity to add funding after 2 years
    - Extension for 3 years available if needed
  + Post-doc
    - Conversation with Amanda and Travis
      * She is interested
    - Preference is for post-doc to be in Morgantown, but not imperative
      * Location not as important as getting the right person and getting the work done
      * Could sub-contract with Colby at NMSU
      * Main goal is get this done; continuous soil property rasters for US asap
    - Create momentum and push goals of focus team forward
  + Kinney requested proposal by July 15
    - Contract to start before Sept 30 to obligate FY18 funds; to begin spending on Oct 1
  + Improvements to previous efforts
    - Covariates – better input data
      * For example: parent materials – Skye and others working on this
      * Rob is also working on 30m covariates (elevation, imagery)
    - More input point data
    - Stratification of the modeling domains
  + What role does the focus team play?
    - Post-doc becomes a member of the sub-team
    - Collaborates with sub-team who provides direction, discussion, oversight
      * Sub-team actively engaged with post-doc
    - Engage with SSD staff; incorporate property products into yearly workloads
      * Share your ideas on how to make this succeed
        + Ownership of update process to improve product
        + Connect to acre goals
        + Connect to DSM projects that SSOs are already doing in their local areas
        + Replicate node idea of GSM structure with each SSD Region serving as a node
    - Goal is to integrate work of post-doc and sub-team into agency so NRCS/NCSS has ownership over methods and products
* 2018 field week proposal – Tom
  + Proposal emailed to group
    - Dates have not been decided; will wait for proposal to move forward and determine how many people can be supported to attend
  + Training via an in-progress project (update or initial)
  + Cross pollinate between DSM focus team and field crew
  + Achieve objective of project
  + Develop a network of SSD staff
  + Feeds into goals of DSM sub-teams (initial, update, properties)
  + Structure weeks to integrate both field and modeling activities
* Interpretations update – info from Maxine – Suzann will send email
  + Approved as SSRA priority; not funded
    - Have the ability to adjust soil properties from site specific locations and generate on the fly interpretations (from ready-to-use interpretations) for desktop and mobile applications.
    - Have the ability for users to create new interpretations outside of the transactional NASIS database.
    - Have the ability to use geospatial layers from many formats to integrate into the soils data for developing more spatially explicit interpretations.
  + Dylan will summarize work that he and Jason started
  + Set up meeting with interpretations staff to discuss what we envision
    - Subset of people who want to focus on this?
* Github – dsm-properties-subteam under ncss-tech
  + Stephen – done
  + Add members and meeting info and other supporting documentation

**Properties Sub-Team meeting**

**6/6/18**

Participants:

1. Dylan Beaudette
2. Colby Brungard
3. Tom D’Avello
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova
7. Jessica Philippe – absent
8. Stephen Roecker
9. Alex Stum
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan – absent
13. Skye Wills
14. Dave Zimmerman

Agenda:

* Follow-up from West Region NCSS meeting (Suzann, Travis, Colby)
  + Raster interpretations
    - Raster interpretations generator project (gSSURGO)
      * Drew Kinney and Dave Hoover both talked about this project at the conference
      * Upon further clarification – the project has been approved but not funded; received information from Maxine Levin and passed on to Dylan to compare to what he and Jason had worked on previously
      * Suzann will follow up with interpretations staff and set up a meeting to discuss our goals of developing interpretations from continuous properties
    - Bob Dobos – sub-team to provide example dataset to start exploration of interpretations from continuous property data
      * Travis has a dataset from the upper CO River basin that has continuous properties predicted in depth intervals; data structure is similar to what we are pursuing
      * Perhaps Bob can focus on Valley Fever interpretation for this test dataset
      * Suzann will follow up with Bob and propose the CO River basin dataset for testing; perhaps set up a meeting with him
      * Skye and Zamir can follow up with Bob if needed
  + Soils2026 continuous properties project funded
    - Funds channeled through WVU; Jim will expand on this to the group
      * Jim awaiting details of agreement from Hoover; he hopes to have details at our next sub-team meeting
    - Discuss best use of funds
      * Personnel – hire a post-doc
        + Focus on specific tasks such as ranking/weighting of point data, stratification for modeling domains, etc
        + Person needs to be fully integrated with NRCS/NCSS and this sub-team for this to be successful
        + Amanda Ramcharan was suggested; Travis will inquire about her situation
      * Working sessions – bring everyone together in workshop setting for a week at a time since time is everyone’s limiting factor
        + Funds from agreement could be used for non-NRCS personnel travel; we can submit a proposal to HQ to fund NRCS personnel for working sessions
    - Ideally, we would do both – hire task oriented post-doc and hold working sessions
  + Other items from the meeting?
    - None
* Group discussion
  + As we move forward, it is imperative we demonstrate the application of these raster products
  + Appeal to those inside and outside NCSS with application for specific concerns
    - Link to conservation planning; farm bill programs
    - Wetlands
    - Ecological site development
    - Dust
  + Discussion initiated about 30m scale – need to determine scale that will help manage expectations – what’s possible vs. what’s reasonable – will table discussion for future meeting
* Next steps
  + Test some ideas on SoilGrids100 covariate data
    - Use this data to test some of the most pertinent questions as we are working toward preparing other covariate data
    - Prioritize testing
      * Stratification of modeling domains
        + Perhaps start with MLRAs to stratify and compare results to SoilGrids100
        + Parallelization of workflow should be evaluated
      * Ksat, AWC, depth to restrictive layer, and thickness were key to hydrologists needs (from TX meeting)
  + Continue work with Rob and Colby
    - Development of 30m covariates
  + Others?
* Other items
  + gPROP for name of continuous property products – chime in if you have other ideas
  + Suzann is working with Kyle Stephens from the database focus team on a short article for the SSD weekly outlining the gridded products and how they are related, or not
  + The DSM focus team has presented five NSSC webinars in the past six months and would like to continue the series with one every month or so; please volunteer if you have interesting DSM projects that could fit into a one-hour webinar
    - Travis has a couple projects he could present
    - Dave White from Las Cruces SSO has also agreed to present his update work

Next meeting: June 18 @12:30pm CST

**Properties Sub-Team meeting**

**5/16/18**

Participants:

1. Dylan Beaudette
2. Colby Brungard
3. Tom D’Avello
4. Chad Ferguson
5. Suzann Kienast-Brown
6. Zamir Libohova – absent
7. Jessica Philippe
8. Stephen Roecker – absent
9. Alex Stum
10. Travis Nauman
11. Jim Thompson
12. Rob Vaughan
13. Skye Wills
14. Dave Zimmerman

Agenda:

* Focus team update
  + Vision
    - Nationwide continuous property stack
    - Follow GlobalSoilMap specifications as a starting point
      * Recognize the flexibility to adapt as needed
        + Add more properties, change depth intervals, etc.
        + Add properties to some parts of the country, not others (e.g. EC)
    - Properties predicting using pedon point data for training
    - Discussion of the need to consider horizons vs. depth intervals (local vs. national scale product)
  + Soils2026
    - National coverage continuous soil property data is Tier 3 of the Soils2026 effort
    - Question yet to be answered: when is the national coverage property data considered full-coverage soils information for meeting the Soils2026 goal?
      * We will need to produce something to demonstrate utility before this question is considered
  + Ground work – Rob and Colby
    - Discussions between Suzann, Rob, and Colby have led to some developments in testing and exploring options
    - Rob is heading up an effort to create a thinner set of covariates (compared to Soilgrids) and use resources at USFS GTAC to test capabilities with GEE and Tensorflow to predict properties
      * Option to keep covariates on GEE as assets, but not necessarily create there, especially hydrologically based derivatives
      * Process available from GTAC to develop spectral data from Landsat archive that removes disturbances in imagery
        + May impact dynamic soil properties effected by land use changes; will need to consider
      * Desire to leverage GEE resources without getting too tied into Google; definitely no plan to use GEE as final data repository or require users to interact with GEE in any way
    - Colby is entering agreement with USFS to provide property data for the Cascades region
      * Focus team members already looped into project: Jim, Suzann, Travis
      * Project can serve as test area for ideas/methods to apply to larger effort
      * Will focus on Mt. Hood area initially, then expand to greater Cascades region
      * Exploring discrete entities to stratify the area for modeling; Noller – geomorphic environments; LRUs
* Group discussion
  + Data processing options
    - GEE
    - HPC options; Univ of Illinois, WVU, USGS
    - Citrix-based virtual desktop system at NRCS Ft. Worth center; can customize to meet processing needs; only available to those with a LincPass
  + Discrete units in modeling
    - MLRAs; LRUs; what is appropriate?
    - Option to use discrete elements as modeling domains and develop local models
    - Option to develop global model with more sophisticated algorithm and incorporate discrete elements as a covariate
    - Leave location our cross-validation methods could be explored
    - Balance model interpretability with prediction accuracy
    - Comparison of local vs global results
      * Set goal posts early in process
      * Use some sort of matrix for comparison
      * Do the models have pedogenic interpretation? Does it matter?
* Group – these items will be requested by email
  + Vision
  + Expertise or interests
  + Involvement
* Next steps
  + Test some ideas on soilgrids 100 covariate data
    - Use this data to test some of the most pertinent questions as we are working toward preparing other covariate data
    - Will discuss this further and prioritize testing at next meeting
  + Continue work with Rob and Colby
  + Others?
* Decide on meeting frequency and set next meeting
  + Minimum of once a month – more frequent is better for building and maintaining momentum
  + Next meeting scheduled for Wed June 6 @1pm CST