**ES Sub-Team meeting**

**11/15/23**

Participants:

1. Jamin Johanson –
2. Suzann Kienast-Brown
3. Jon Maynard – absent
4. Suzanne Mayne – absent
5. Travis Nauman –
6. Jess Philippe – absent
7. Greg Schmidt –
8. Nathan Roe –
9. Shawn Salley –
10. Stephanie Shoemaker – absent
11. Jim Thompson –
12. Dave White – absent
13. Francine Lheritier – absent

* Overview of ES National Instruction
  + This sub-team is highlighted as a contributor to ES work
* Paper discussion
  + Chambers, et al – resilience and resistance in sagebrush biome
    - FIA and AIM data were used for this study and our group is interested but access can be difficult
    - Soil properties noted as “exceptions” are primary drivers for RST and RSL (in CO Plateau)
    - Current condition vs potential for classification of training data
    - Grouping of ecological sites – have experts in the area do the grouping themselves
    - Many criticisms of the work in general but the big question is…what can a land manager do with the resulting information?
      * Resistance and resilience are good concepts but would be more useful if the threats/disturbances were discretely considered
  + Styc and Lagacherie – inference trajectory for mapping soil function
    - Soil function in consideration was AWC
    - Map first, model (PTF)
    - Model first (PTF), map
    - Conclusion – single value per soil profile (model), then map
  + For consideration: Model components and combine or model combined concept
  + Predicting soil function
    - Seybold et al 1997 – quantification of soil quality – has a very nice summary of indicators, functions that determine soil quality

**10/18/23**

Participants:

1. Jamin Johanson –
2. Suzann Kienast-Brown
3. Jon Maynard –
4. Suzanne Mayne
5. Travis Nauman –
6. Jess Philippe –
7. Greg Schmidt –
8. Nathan Roe – absent
9. Shawn Salley –
10. Stephanie Shoemaker –
11. Jim Thompson –
12. Dave White –
13. Francine Lheritier

* What we did FY23
  + Started the sub-team!
  + Raster Ecological Survey (RES) draft standards in Part 648
  + Exploration of modeling approaches
* Goals for FY24
  + Streamline ESG development and create workflows for MLRA scale mapping – guidance
  + Create repository for ES code and approaches – cleanup Github repo – Suz, Shawn, Dave
  + Support ES research, ES-DSM training
  + Refine and produce “associated raster ecology products”
    - Eco state mapping (veg species, community phase, STMs)
    - Support for field data validation (site, community phase, vegetation)
    - Outreach to MLRA offices starting new projects
    - Use of MLRA eco site keys
* Part 648
  + New section: 648.2 Raster Ecological Survey (RES)
  + Defines raster ecology survey projects, procedures, data development, responsibilities
  + Types of raster products
    - Prediction of ecological state (reference, current)
    - Prediction of indicator species
    - Other products that relate soil variability to phenology, disturbance, or restoration
    - Soil geomorphic units or similar?
* Paper discussion – will try to have at least one paper monthly
* Other ideas
  + Resistance and resilience groups concepts/framework

**7/26/23**

Participants:

1. Jamin Johanson –
2. Suzann Kienast-Brown
3. Jon Maynard –
4. Suzanne Mayne
5. Travis Nauman – absent
6. Jess Philippe –
7. Greg Schmidt –
8. Nathan Roe – absent
9. Shawn Salley –
10. Stephanie Shoemaker –
11. Jim Thompson – absent
12. Dave White – absent

* Update from standards sub-committee
  + Built on existing Part 648
    - 648.2 Raster Ecological Survey
      * MLRA update and eco site group
      * Initial project mapping
      * Associated raster ecology products (species distribution, state mapping)
* Modeling dataset and clustering algorithm discussion for IBM work – Shawn
  + Jon, Nathan, and Shawn are going to work on refining approach
    - Test regions (MLRA, Ecoregions)
    - Update point data set possibly using the SOLUS approach – Shawn will connect with Travis
  + Ecosite workshops led by OSU to define ecosite groupings for MLRAs will be starting FY24

**4/18/23**

Participants:

1. Jamin Johanson – absent
2. Suzann Kienast-Brown
3. Jon Maynard –
4. Suzanne Mayne
5. Travis Nauman – absent
6. Jess Philippe – absent
7. Greg Schmidt – absent
8. Nathan Roe – absent
9. Shawn Salley –
10. Stephanie Shoemaker – absent
11. Jim Thompson –
12. Zach Van Abbema –
13. Dave White –

* Review last meeting’s minutes
* Update on standards sub-committee
* Quarterly meeting April 27th
* Pedometrics 2024
  + Workshops
  + Submissions coming soon
* Pedogenon paper discussion
  + How to test with ideas of condition and potential
    - pH as an indicator of condition
  + Genoform
    - ES concept
    - Soil taxon (series)
  + Phenoform
    - Subdivision of genoform based on changes in DSPs, management, disturbance
    - ES reference state as one phenoform of genoform
  + Getting at pre-management baseline considering soil properties
  + Mapping of ES
    - Delineate where ES are – largely driven by static soil properties
    - State – changes in dynamic soil properties
  + What about the unsupervised classification approach for defining bigger picture concepts of ES?
    - Drohan papers on PA clustering of ES would be useful to check out
  + Final thoughts
    - IBM dataset would be ideal set to test this type of approach
      * Scale and climate was difficult
      * Include redundancy analysis
      * Could be used for national mapping
      * Constrained k-means
    - Options
      * Multi-stage clustering
    - Existing point data
    - Covariates
    - Benchmark ES concepts
  + Next meeting: focused discussion on IBM work and how we can expand that for national mapping
  + Action item
    - Set up project on GCP for this group
      * Shawn, Jon

**3/15/23**

Participants:

1. Jamin Johanson – absent
2. Suzann Kienast-Brown
3. Jon Maynard –
4. Suzanne Mayne
5. Travis Nauman – absent
6. Jess Philippe
7. Greg Schmidt
8. Nathan Roe
9. Shawn Salley –
10. Stephanie Shoemaker
11. Jim Thompson –
12. Zach Van Abbema – absent
13. Dave White – absent

* Review last meeting’s minutes
* Announcement: Pedometrics meeting in Las Cruces, NM in Feb 2024
  + SPSD encouraged to participate; details forthcoming
* Discussion: Shawn’s questions from last month re: Steff’s presentation
* Discussion regarding ES maps as separate entities from soil maps (email thread)
  + Greg shared grasslands project related to SDMs
  + Shawn shared Jornada transition sandbox [Ecosystem Transition Sandbox (nmsu.edu)](https://webapps.jornada.nmsu.edu/transition-sandbox/)
    - Need for national taxonomy for ecological sites
* Standards
  + Opportune time to start developing standards for ES products as GNP mapping moves through the QA process summer 2023
  + Committee
    - Volunteers: Shawn, Nathan, Steff
    - Suz will incorporate a couple people from Practitioner sub-team who have been involved with NSSH Part 648 handbook
* Adding external members to the team
  + Consider when clear goals defined for the ES sub-team; perhaps in a couple of months
* Action items
  + Pedogenon (AU) idea presented in France at DSM/GSM meeting [A modelling framework for pedogenon mapping - ScienceDirect](https://www.sciencedirect.com/science/article/pii/S0016706121000860)
    - Paper shared; read and then discuss in April (everyone)
  + Standards committee
    - Organize committee and meet for brainstorming session before April ES sub-team meeting (Suz)

**2/28/23**

Participants:

1. Jamin Johanson
2. Suzann Kienast-Brown
3. Jon Maynard – absent
4. Suzanne Mayne
5. Travis Nauman
6. Jess Philippe
7. Greg Schmidt
8. Nathan Roe
9. Shawn Salley – absent
10. Stephanie Shoemaker
11. Jim Thompson – absent
12. Zach Van Abbema
13. Dave White – absent

* Review last meeting’s minutes
* ES sub-team channel
* Skill inventory
* Meeting minutes
* Steph Shoemaker – GNP DSM project presentation
* Discussion
* What is the best way to report spatial uncertainty and class confusion from an ecological site perspective?  The ultimate goal of predicting the spatial location of an ecological site concept is to understand the spatial variability of ecosystem dynamics and how that specific pixel/landscape responds to disturbance and/or management.  To the group: how can we better incorporate the current ecological state (or even potential states and expected transitions) into the DSM predicted ES-class map?
* What role do property predictions have in this workflow? (and can we use them more!) For example, we have general rules based on the MLRA key that can also be used to group the landscape based on soil and geomorphology. Are there ways validate site concepts by those thresholds identified in the MLRA key?
* How scale-able are these methods, data, and workflows to near-by areas and far away areas? Do you think it will it always be as iterative or are we closer to a more specific workflow? (I am not implying ‘automation’, but that is the thrust of the question)
* A little more abstract here, assuming that the ES concept is like the soil series and the raster pixel is like a map unit component, Is there a substantial conceptual gap between the ES-concept and the actual pixel on the ground (akin to a component phase).
* These are sort of related to the general questions that came out of the special session on DSM-classed based soil mapping at last year’s SSSA meeting:

1. Are there scales or contexts (while thinking about the specificity, variance, error, users etc.) that either favor class concepts or continuous property data?
2. In traditional US soil survey, spatial precision is defined by intensity of observation and purity of map unit concepts (expressed by cartographic scale and minimum mapping unit). How do we communicate these concepts of spatial precision and model performance when pixel size is more arbitrarily set, often out of convenance? (ie. Landsat, modis, etc)
3. Soil class concepts are a fundamental tool used for soil management. How are continuous soil property predictions (with their own uncertainty) used to derive soil management knowledge? Are there hybrid approaches where continuous property predictions can be constrained by the known variation within soil class concepts?

* Discuss @ March meeting
  + Discussion points following Steph’s presentation (from Shawn; see above)
  + Standards and guidance
  + Adding external members to the team
  + Pedogenon (AU) idea presented in France at DSM/GSM meeting

**1/18/23**

Participants:

1. Colby Brungard
2. Jamin Johanson
3. Suzann Kienast-Brown
4. Jon Maynard
5. Suzanne Mayne
6. Travis Nauman
7. Jess Philippe
8. Greg Schmidt
9. Nathan Roe
10. Shawn Salley
11. Stephanie Shoemaker
12. Jim Thompson
13. Zach Van Abbema
14. Dave White

* Review last month minutes
* Update from other DSM focus team work
  + Quarterly FT meeting TH Jan 26th
* Inventory of member Interest and Skillsets
  + Please send to Suzann if you have not already done so
* Identify goals and timelines
  + Short-term items
    - Meeting frequency
      * Monthly but may adjust based on projects
    - What do members want to get out of each meeting? Discuss the meeting format (presentation, brainstorming, journal club, data review, etc)
      * All of the above
  + Long-term goals
    - Develop framework and workflows to deliver ES-DSM products consistently across special project area (PLU), soil survey area (MLRA), broad climate zones (region), and nationally
      * Institution requires standard scale for products with options for customization
      * Start national scale and resampling techniques to finer scales
      * Training data
        + Constrained by available point data at finer scales
        + Where should this data live? Need a central location
        + State modeling may benefit from site visits related to resource inventory done by FO staff
        + Tag partner data with ecological site
      * Class concepts
        + Groups for larger scales (MLRA, LRU, national)
        + STMs analogous to soil orders – very generalized

Invite folks working on generalized STMs to meeting to present their work – Travis

* + - * + ESGs are desirable for federal partners (BLM, USFS)
    - Create a DSM data covariate library most appropriate for DSM- Site and State mapping
      * On GCP
        + 30m DEM derivatives
        + 30m Landsat derivatives

Have GTAC Landsat disturbance removed but may want something different for this work

* + - * + Want to add Sentinel
    - Develop products that specifically feed decision support tools (CART, CD)
      * There is potential here…keep on the radar
    - Geomorphology/parent material
      * National level maps
      * Work is starting in ME
        + Once workflow is developed, can we apply nationally?
    - Species distribution maps
      * Species association w/in MLRA
      * SDM to ES and STM
      * Need association of species data
      * USGS inhabit model <https://gis.usgs.gov/inhabit/>
* For next meeting: Solicit presentations of current DSM-ES work in the group
  + Steph to present GNP project next month
* Action items
  + Meeting data/time for Feb
  + Steph to present in Feb
  + Quarterly FT meeting

**12/1/22**

Participants:

1. Colby Brungard
2. Jamin Johanson
3. Suzann Kienast-Brown
4. Jon Maynard
5. Suzanne Mayne
6. Travis Nauman
7. Jess Philippe
8. Greg Schmidt
9. Nathan Roe
10. Shawn Salley
11. Stephanie Shoemaker
12. Jim Thompson
13. Zach Van Abbema
14. Dave White – absent

* Introductions – all
  + Location
  + Brief history/interest
* Overview
  + DSM FT structure – Suzann
  + Team charges/DSS priorities – Suzann
  + Expectations – Suzann
  + Research – Jon/Travis
    - Will share papers on cloudvault
  + IBM work – Shawn
    - Unsupervised classification based on regional inputs
    - First cut for clustering ecological groups
* Discussion – all
  + Where we’re heading (long-term)
    - What concepts do you need for an ecological site pixel?
      * Capability/condition/available management per pixel – overarching DSS goal
      * State mapping
      * Start with broad classes within the first year
    - Dynamic vs static properties
    - National vs regional modeling
  + What is the path forward?
    - Look at other ecosystem types/areas besides the west to test some of the current approaches
    - Training data – where do we have it, how do we assemble it?
      * NASIS tables/reports can now accommodate this type of data
      * Provisional ecological sites – what’s next?
        + Enter observation data into NASIS
        + National instruction in progress
    - Generic attributes with veg phases to identify state – canopy height, density, total cover via remote sensing data
    - Minimum set of properties that apply to all veg types
    - Stratification of the country as a strategy for veg prediction
    - Use soils data to help parameterize the veg mapping
    - Predicting sites as fuzzy concepts with potential as goal?
    - How to use keys?
    - Raster Soil Survey approach with focus on local/regional mapping to create product to inform management
  + Potential products (short-term)
    - National geomorphic map
    - Standards
  + Next meeting discussion
    - Geomorphology/parent material
    - Species distribution mapping
* Determine regular meeting schedule – all
  + Will start with monthly frequency
  + Next meeting will focus on identifying initial goals and timeline
  + Inventory of skillsets/projects for team members

