outcomes – conservation practice (SOC most important; will do others later)

**Background Work**

**MIR Model Build library**

* 1. Ingest Data
     1. LDM with MIR scan
     2. NASIS
  2. Join by sample – morphology and lab info
  3. Build prediction model library (for each property)
     1. OPUS or R – Machine Learning (Random Forest, SVN, PLSR, Neural Networks etc.)
        1. Training and calibration set
        2. Build
        3. Test
        4. Determine rules (which model is used for a given situation)
           1. Predict property
           2. Error metrics

**SHAPE Curve library**

* 1. Ingest LDM and other existing data
  2. Spatial Join to relevant covariables
  3. Statistical Process (for each property)
     1. Test categorical grouping variables for peer groups
     2. Fit Bayesian logit model
  4. Produce rules for SHAPE curves (peer group and logit model)

**New Summary**

1. Ingest new data – single scan/property and location (lat, lon)

If MIR scan

1. Make prediction on New data
   1. Ingest New MIR scans and Data (from ‘outside’ instrument)
      1. NRCS
      2. Others?
   2. Spatial join to any needed covariables
   3. Select model from library (SOC and situation)
   4. Predict SOC and other properties

Property – start here or predict from MIR scan

1. Input property
   1. MIR predict
   2. LDM direct
   3. CIG-OF-SHDT
   4. Web interface
   5. other
2. Choose appropriate SHAPE curve from library
   1. Choose property
   2. Spatial join with relevant covariables
      1. PRISM – indiv layers
      2. SSURGO (or gNATSGO or similar)
         1. Query and reclassify attributes
   3. Use covariables to choose peer group
3. Assign SHAPE score
   1. Use SHAPE Curve library
      1. Select property and peer group
      2. Assign score

**For Individual output**

1. Produce Output
   1. For each sample input
   2. Score
   3. Visualization on curve

**For programmatic Outcome assessment**

1. Aggregate properties and score by practices
   1. Spatial and tabular join to information
      1. CIG categories
      2. Conservation Practices
      3. Administrative Unites
      4. Other covariable to ask soil questions
      5. DEM - LIDAR
         1. Derivatives (slope, TWI)
      6. SSURGO
         1. Attributes, polygons
   2. Conduct basic summary and statistical analysis
   3. Produce graphs, charts and other visualization
2. Product Output
   1. Summaries (initial properties and scores)
   2. Visualization
   3. Metadata (all models used in process)