# October 20, 2025 Joint Methods & CI Working Group Call

Attendees: David Durden, Jody Peters, Brittany Barker, Will Hammond, Gregor Siegmund, Mike O'Brien, Eli Horner, Chris Jones
Regrets: Josie Hughes

1. EFI2026 Conference in Toronto on August 4-7. Working groups and workshops will take place on August 4. More details to come.

2. Schedule for upcoming calls Nov 17 and Dec 8 - Josie brainstorming ideas for a spatial forecasting panel for the EFI2026; Brittany parallel processing in R presentation

3. stemflow python package shared by Juan Gallego-Zamorano on the October 8 European EFI chapter seminar; See Juan's description of AdaSTEM at time 12:21 in the seminar recording.
    a. stemflow is a toolkit for Adaptive Spatio-Temporal Exploratory Model (AdaSTEM). Typical usage is daily abundance estimation using eBird citizen science data (survey data). stemflow adopts a "split-apply-combine" philosophy. It
    b. Splits input data using Quadtree or Sphere Quadtree.
    c. Trains each spatiotemporal split (called stixel) separately.
    d. Aggregates the ensemble to make the prediction.
    e. The framework leverages the "adjacency" information of surroundings in space and time to model/predict the values of target spatiotemporal points. This framework ameliorates the long-distance/long-range prediction problem, and has a good spatiotemporal smoothing effect.

4. Spatial Forecast Connections
    a. Gregor Siegmunds forecasts for outcomes of post-fire seeding treatments
        i. Coming from the perspective of restoration ecology, and developing models for sagebrush and perennial grasses.
        ii. Goal is to develop forecasts for seeding outcomes using data from field surveys of seedings across fires and years in combination with various environmental data.
        iii. Spatiotemporal aspect has been tricky: predicting outcomes at new sites and in new years has been hard!
        iv. New article describing how forecasts could be incorporated into restoration: https://onlinelibrary.wiley.com/doi/10.1111/rec.70179.
        v. One motivation was to outline a vision for how agencies like the Bureau of Land Management could potentially use ecological forecasts in post-fire restoration.
        vi. Discussion from the call
            1. Decision support tool for land treatments such as thinning operations, green strips (seeding design for fuel breaks)
            2. Beta version forecasting model - if planning to seed - managers want to identify a location and ask what is the probability that it will be successful?
            3. Use NOAA long range forecast and soil/water balance model to make predictions.
                a. Starting with sage brush then thinking of expanding to other species

b. Perrennial plant recruitment - sage brush and other perennial plants
c. Seeding is widely used after disturbances like fires - happening in arid/semi-arid areas where plant recruitment is variable
d. Combining multiple sources of data about seeding outcomes - what seeds were used, timing of fire, timing of treatment, and survey at x time after seeding
e. Mainly for the Great Basin over the past 30 years
f. Combining the seeding data with climate/soils data layers and soil water balance model SOILWAT2
g. Forecasting species-level outcomes with stats or process-based models (for germination) to compliment stats models
h. Things that make it tough: large spatial gradients and temporal variability in number of seeding treatments
i. Trying to compare models with climatology with models with information about windows of time or annual anomalies
j. SMAP - soil moisture data from NASA is a useful data source that Brittany shared
k. Process models may be less prone to extrapolations
l. What is the metric used for the forecast
    i. Precent cover of the species of interest
    ii. Presence/absence of the species of interest - indicates if recruitment was successful
        1. Binomial models are harder to fit
    iii. Remote sensing has been used to look at the type of plant recruitment
m. Any effort to use remote sensing to get recruitment information
    i. Mostly what has been done is drone based imagery. Not as sure about satellite based assessment for shrublands
        1. Component data from ERAs for USGS.
            a. Shrub component is for sage brush, but not at species level
        2. NEON uses airborne platform which is teasing out some of the species level information
n. The forecast challenge - are the forecasts independent of the fires
    i. Would be up to the individual modeler.
    ii. This group focused on forecast for individual fires
    iii. Hypothetically someone could build a model to aggregate across spatial locations.
    iv. But scores are based on how well you did for an individual fire. Each pixel is scored as well so within a fire could score on how well you did
    v. Thinking about manger who wants to allocate resources between fires - lots of work within a gradient of an individual fire
    vi. The goal of the cyberinfrastructure was to set up the structure - with lots of room for expansion.
        1. There was interest at the EFI2025 conference to apply the infrastructure to things like HABS

        2. Could also be done with multiple fires
        3. Lots of interest in the building block of the challenge
   b. We didn't get to this during the call: Spatial Forecast Workshop for the EFI2025 Conference next steps
   c. How did it go to do the final updates?
      i. LAI scaling factor and the move to Google Earth, and using the native resolution instead of upscaling go?
   d. Workshop tutorial material is at: https://github.com/eco4cast/modis-lai-forecast/tree/main/tutorials
   e. The rendered html is at: https://htmlpreview.github.io/?https://github.com/eco4cast/modis-lai-forecast/blob/main/tutorials/efi_2025_workshop.html
   f. Component for a future online tutorial
      i. CI:
         1. Creating buckets, path naming decisions, and permissions.
         2. Pulling from buckets, auto-scoring forecasts coming into the buckets, and data storage.
         3. Necessary steps from 1 and 2 to create a new spatial forecasting competition for another topic.
      ii. Data Acquisition:
         1. Pulling fire data, pulling MODIS LAI data, pulling other driver data.
      iii. Model Building:
         1. Types of spatial models (overview of how one can build models in different ways for spatial data).
         2. No-spatial interaction models
         3. Spatial interaction models

5. Results from the survey to gauge interest in Stats/CI activities to guide future working group calls.
   a. Survey: https://forms.gle/c6q837dDyyp2Mpi7A
   b. Topics mentioned on the August call
   c. CI as a service - containerized workflows for forecasting. Lots of expertise in EFI. Would there be interest in partnering? Expect there are privately funded entities interested in backing CI to service
   d. AI-ready infrastructure hasn't been discussed on the calls, but is a topic of interest to the group
   e. Connecting with Agencies and managers - what are the urgent needs. Connecting with managers to hear needs to tailor forecast challenges to be used
   f. Learning more about stats methods, spatial modeling, and building resources
   g. Incorporating qualitative and quantitative input into modeling
   h. Session for spatial forecasting at the EFI2026 Conference - brainstorming people who could attend. Suggestions for topics people are grappling with.
      i. 5-6 speakers and panel discussion
         1. Nov 17
   i. Brittany's presentation on parallel processing demo in R