August 19, 2024 Joint Methods & CI Working Group Call

Attendees: Quinn Thomas, Brittany Barker, Saeed Shafiei Sabet, David Durden, Jody Peters, John Smith

Agenda/Notes:

1. Poll to schedule monthly calls for September to December. Mark your general availability and make sure your timezone is selected.

2. Please submit nominations for EFI2025 Conference session topics and potential speakers by Aug 30.
   a. You do not need to lead any sessions that you propose
   b. Conference dates: May 19-22, 2025
   c. One topic that came up was invasive species - terrestrial and underwater invasive species
      i. This fits well with NEON - lots of data on biodiversity and abundance
   d. Goal is to make space for discussion
   e. Would be good to have a talk at the EFI 2025 Conference about extending forecast challenge to spatially explicit situations

3. FYI - Jake Zwart submitted an abstract for AGU to provide a recap from the CI workshop held in April in New Hampshire

4. Thoughts about Funding
   a. Check in with John Smith - CDS&E/EAGER/EPSCoR NSF grants
      i. John wasn't going to have time to really get started on this until September, but we can check in to see if there are any updates.
      ii. Montana State can only submit 4 EPSCoRs per year so there is an internal process that John would need to go through first - met with person at ORD.
         1. There is internal application process. Will be due in December for internal application
         2. Limitations - John is allowed to fund 1 grad student and himself, but no one else
         3. Need a partner institution, but it would not include funds for the partner institution - John needs to explore this further
            a. NEON can be a free partner and can provide letter of support and up to 80 hours for user support - requires that some NEON resources (data, code)
               i. Is there a NEON site that has a burn in it?
                  1. Saddle site and Great Smokey site - in area of burns or AOP of burns

    ii. Invasives - there are beetle kills in several sites. We have talked about extending the spatial forecast to look at recovery from insects

  iii. For John, the EPSCoR would be better. But if the group is not applying for other funding then the CDS&E would be able to fund more people on the project

  iv. EPSCoR is looking for projects with ML models - John has a
    1. He would work on CI development for the models

 b. Check in with Brittany Barker - NASA

  i. Terrestrial Ecology call is not coming out this year. Note from NASA:
    "NOTICE: Amended July 24, 2024. This program element is no longer solicited in ROSES-2024. We anticipate that it will be solicited in ROSES-2025."

    1. Interested in doing this or the Wildfire with collaboration with other people in the group

    2. Brittany will look at the Terrestrial Ecology call previously funded projects to see how the

  ii. Oregon Dept of Forestry - working on forecasting resilience from fires - forecasting forest health in Oregon. Incorporating drought, pest outbreaks, heat, and other factors that influence

    1. Gilcrist State Forest - have a lot of data

    2. ODF has some funding toward pilot project.

    3. Will be using estimates of biomass with LIDAR for project with ODF

    4. This work could overlap with the CI/Methods spatial forecast and the pilot might be useful for to set up for the NASA grants

  iii. Need to come up with ideas for the foundation for a grant

  iv. Goal of NASA Wildfires draft material was focused on management

5. What is the status of the current Spatial Forecast?

 a. Looking at the Spatial Forecast github the Targets are working, but the forecast is failing.

 b. It isn't the code that is failing, but probably the docker needs to be worked on

 c. Check with Carl to see if he can identify what needs to be done

 d. Brittany can help - but needs to know how to help

  i. Read through the QMD document or code on GitHub

  ii. Would any of the USGS datasets we have talked about be helpful?

  iii. Looking at issues on GitHub #15 - additional polygon of sites

  iv. Submission validation process

 e. A prototype would be a couple of sites with different burn severity where we showcase the 2 baseline models and the submission process

  i. A couple of images of what the scores would look like through time

  ii. Then say here is the platform and the people can work on developing the models for spatial forecasts for the types of models that people are already using

        iii. Having the submission portal in place as the focus for submitting models and improve forecasts for this particularly spatial forecast - once we have this then it opens the door for future grants

        iv. Have 2 sites, but have only tested 1, the August Complex Fire
1. August Complex Fire in Sierra's - conifers
2. Second site was also forested. Dave will get the info. East Troublesome Fire in CO
3. Do we know the fire history of these sites going back a few decades?
   a. Don't have past fire history
   b. But could use the USGS sites which has lots of history of fires that could be used to develop hypotheses of forecastability of recovery

        v. For a lot of fires - the downside of MODIS is that it is too coarse for analyzing recovery. Used because MODIS is easy to access, but it is going away
1. MODIS is 500m resolution - it isn't bad
2. August Complex is the biggest fire and there is only 15 MODIS pixels that cover the fire

        vi. GitHub issue to start looking at a different project - or could be used for a proposal

6. Dave's AGU talk - has spatial tone, but more directly connected to flux products. Using ML frameworks to extrapolate flux measurements with other driver products
   a. Used functions from this project with the EDDIE4R module
      i. Bounding box with KMLs of different NEON sites and CHEESEHEAD sites
      ii. This function for grabbing bounding box for NEON sites will be useful to align with AOP grid
      iii. Also has functionality to grab for lat, long and using the padding degree to determine how big box should be
      iv. Still grabbing data from microsoft planetary data but hopes to use Google as well
      v. This will go in the next release which happens at the of the year and Dave will share the release with the group

7. Next time -
   a. Think about how to get the protocol working to put into a grant
      i. Will Hammond, who is working with John at Montana is interested in helping to get the challenge running.
      ii. John will have Will go through the GitHub issues to identify if there are things he wants to work on or needs further guidance about.
   b. Think about an option for replacing MODIS to get another LAI products is TERRA.

      i.   Spatial resolution
      ii.   Pro and cons
      iii.   Ideal would be something from LandSat or Sentinel - not sure about API to access locations and not sure if algorithms to convert to LAI are as good as MODIS
      iv.   Planet products could be an option
  c. Brittany will look into options for additional fire sites and their histories to help inform hypotheses to test with the challenge

8. Forecasting Wildfire Recovery Using MODIS Leaf Area Index (LAI) Forecast Challenge
  a. Any updates?
      i.   David, any update about presenting at AGU? Abstract deadline is July 31
      ii.   From the last call, David mentioned using functions from the spatial challenge and adapting them to grab data for NEON sites and adding them to the eddy4R package. David can you share that package or more details?
          1. See note above.

9. Update from Jake Zwart about CI Workshop. Jake added the following notes after the July call, so want to make sure the group sees them
  a. Background
      i.   EFI and Melissa Kenney in particular hosted U.S. Interagency Forecasting Meetings from 2020-2022 to identify priorities for generating more ecological forecasts in federal agencies.
      ii.   And out of these series of meetings, the group identified that the barrier to generating more ecological forecasts is that we can't model these systems, or that we don't have enough data on these systems, but *that forecast production and delivery to stakeholders is the main barrier to producing more near-term ecological and water forecasts.* In other words, the cyberinfrastructure to support these forecasts and stakeholder engagement is a major barrier to producing more forecasts.
  b. CI Workshop
      i.   In response to the U.S. Interagency meetings, EFI felt most poised to address the cyberinfrastructure problem first, so we hosted an ecological forecast cyberinfrastructure workshop in April of 2024 which brought together a community of experts from a bunch of agencies, academia, NGOs, and private industry to work towards community-developed forecast cyberinfrastructure.
      ii.   At this workshop we discussed
          1. applying design justice principles to forecast CI
          2. identified best practices for CI
          3. synthesized barriers and challenges for creating CI

          4. how to implement CI design across a variety of organizations
- iii. More detailed summary here
  https://projects.ecoforecast.org/efi-ci-workshop-2024/summary.html
- iv. So far, we collated some of the notes and outcomes from this workshop in a living document hosted through github
  https://projects.ecoforecast.org/efi-ci-workshop-2024/brief.html , and we welcome more community input to these ideas, so please contribute / comment on these ideas here
  https://github.com/eco4cast/efi-ci-workshop-2024
- v. We will also solicit more targeted feedback on specific topics. More on that to come…

10. Spatial Forecast Info for Reference - doesn't need to be discussed during the call
  - a. Background of the project - the goal is to develop a spatially explicit forecast that could be used with the NEON Forecast Challenge cyberinfrastructure. This project was started at the EFI Unconference (summer 2023).
    - i. GitHub repo: https://github.com/eco4cast/modis-lai-forecast/
    - ii. This is a prototype for working with spatial data and for managing large datasets in geotiff format instead of the csv/netcdf format that had already been developed for the Forecast Challenge
    - iii. Here is the example of the standard Forecast Challenge CI: https://github.com/eco4cast/neon4cast-ci wanted to replicate this and apply to a spatial example for this project. This repo has workflows with GitHub actions that do tasks automatically - it gives a modular way to see what actions need to take place which we can use to check off what is done for the modis-lai spatial forecast example
    - iv. We are using the STAC framework - spatial temporal assets catalog - this allows for the Challenges to be discoverable
    - v. TERN example to use as reference: https://projects.ecoforecast.org/tern4cast/
  - b. For reference here is the list of Tasks to set up GitHub Action Workflow
    https://github.com/eco4cast/modis-lai-forecast/issues/10
    - i. Targets generation
    - ii. Benchmark forecast generation
    - iii. Scores
    - iv. Submissions/validation
      1. Jody is leaving in a placeholder that Brittany is willing to look at the fire dataset from Justin Welty to find other fires to add to the targets
    - v. Generate Dashboard/visualizations
    - vi. Generate STAC collections for forecasts, targets, scores tifs