WSU FY23 Annual Work Plan

For the NW-AIRQUEST Consortium

On-going Tasks

Ongoing Tasks
1. Provide daily forecasts of air quality for the three-state region that can be used as guidance in daily air quality management.
2. Provide near real-time verification statistics of the current AIRPACT system accuracy by pollutant and month, as well as provide for user access to AIRPACT results and monitoring data for user-defined periods for download and analysis.
3. Track and continue to improve model performance so that model predictions provide useful guidance for air quality forecasting.
4. Maintain ambient air monitoring data streams from AIRNow.
5. Maintain satellite retrievals that are still functioning (except for MODIS and OMI products which will remain inoperable).
6. Continue improvements and requested additions to web graphical display.
7. Maintain the "Change Log" that is hosted at GitHub: https://github.com/wsular/airpact/blob/main/CHANGELOGs/AIRPACT5/CHANGELOG_AIRPACT5.md.
8. Archive daily model output of the first 24 hours of forecast for each day and provide access to same upon requests from users. Web-based graphical displays for each day's first 24 hours of forecast should be available for the most recent 5 years. Gridded model output files should remain accessible for up to three years.
9. Modify AIRPACT as needed to respond to changes in fire emissions produced by other organizations.
10. Modeling infrastructure maintenance and updates: Replace failed hardware components, maintain software subscriptions, and incrementally update (purchase new replacements for) as many as possible of the outdated and out-of-warranty components (e.g., nodes, cores, cables, disks, memory, etc, as needed) of the WSU Linux cluster used to run the AIRPACT system. The updates should be optimized to maintain or improve the reliability of the system, and to enable reliable performance and, if possible, earlier delivery of the daily products.

Carry-Over Tasks (2022 to 2023)

| SFY 2022 TASKS CARRIED FORWARD TO 2022-2023 (SFY 2023)		
SFY 2022 Tasks	**Status from SFY 2022**	**Timeline**
1. Implement the new AIRPACT6 forecasting framework as a Singularity container for use on HPC systems.	The container has been created and the necessary programs for AIRPACT6 have been uploaded. We are working on compiling the latest versions of CMAQ and MEGAN.	Aug 2022
2. Validate AIRPACT6 by running it concurrently with AIRPACT5 for six months (Sep 2022 – Feb 2023).	Pending AIRPACT6 operations	Feb 2023
3. Run validation case studies for ozone and PM2.5 for events using both AIRPACT5 and AIRPACT6 (previous events for evaluation and study).	Pending AIRPACT6 operations	Dec 2022
4. Extend the AIRPACT forecast period from 48 h (2 days) to 72 h (3 days), in AIRPACT6.	Pending AIRPACT6 operations	Sep 2022
5. Continued improvement of Machine Learning forecast system for ozone and PM2.5.	Work continues by WSU Ph.D. student, Ana Carla Fernandez-Valdes, on incorporating new sensor networks (e.g., PurpleAir) and improving interpolation across the AIRPACT domain.	June 2023
6. Experimental drone flights of opportunity to study wintertime inversion conditions (e.g., Pinehurst, ID).	On hold due to COVID-19 pandemic	As needed

New Tasks for FY2023

2023 NEW TASKS	
Tasks	**Timeline**
Collaborate with Ecology to develop internal website to extend long-term 3- to 5-day ensemble forecasts that cover ID and OR.	To be started in July 2022 and completed by November 2022.

Proposed Deliverables

2023 Deliverables

Tasks	Status
Validated AIRPACT6 modeling framework.	Container is being developed. Work to validate the new AIRPACT6 forecasting system will be completed in SFY 2023.
Improved Machine Learning forecast system for ozone and PM2.5	Work is continuing by new WSU PhD student, Ana Carla Fernandez-Valdes
Extension of AIRPACT and ML forecasts beyond 2 days.	To be implemented along with new AIRPACT6 and improved ML modeling systems.
Final Report	Deliver in June 2023

One more idea…

QGIS displaying LAR ML results
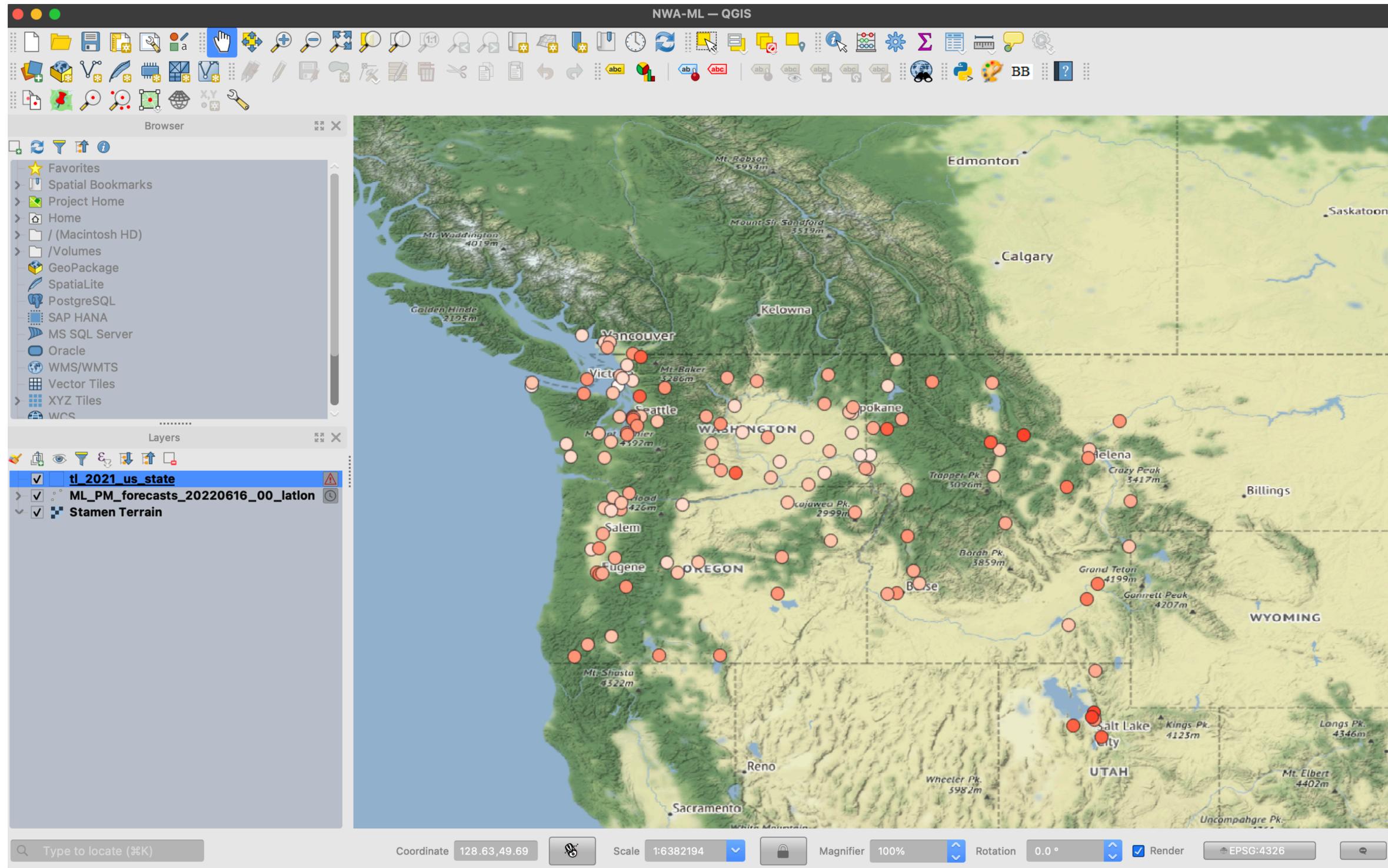
Serve AIRPACT and ML data products as GIS data

- WMS and/or WCS could be made available.

- This would allow users to directly import AIRPACT and ML data into their own GIS for their custom work flow.

- **Would this be useful to users?**

Thank You!!

Questions?