2020 MARAMA Air Quality Monitoring Training Committee

Virtual Workshop
December 8 – 10, 2020

Overview of Briefing

- Key AirNow take-aways for 2020 fire season
- FY 2020 accomplishments
- AirNow analytics
- AirNow apps
- Sensor Pilot
- Questions/discussion

Key AirNow Take-Aways for 2020 Fire Season (so far)

- The current fire event in west is larger and of longer duration than the Camp Fire event of November 2018
- The cloud.gov infrastructure is incredibly resilient; it did not crash and did not slow down
- The Sensor Pilot provides useful and much appreciated information for the public
- We learned more and have more to do

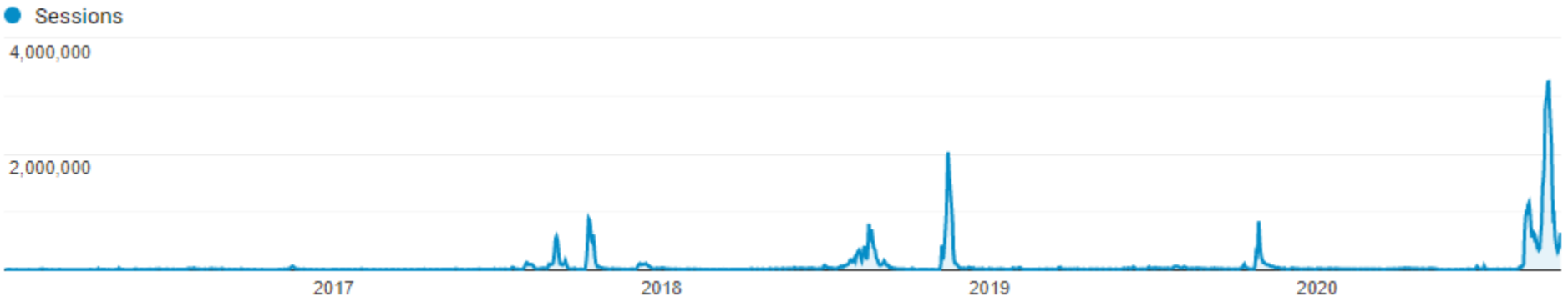
2020: A huge year for the program

- The AirNow Vision guided:
  - Implementing the AirNow Advisory Board
  - Moving to cloud.gov infrastructure and successful re-releasing of the new site (April)
  - A new version of the apps (June)
  - Publicly releasing the AirNow sensor pilot (August)
  - Transitioned a 22-year-old Data Management System to a new environment and new contractor

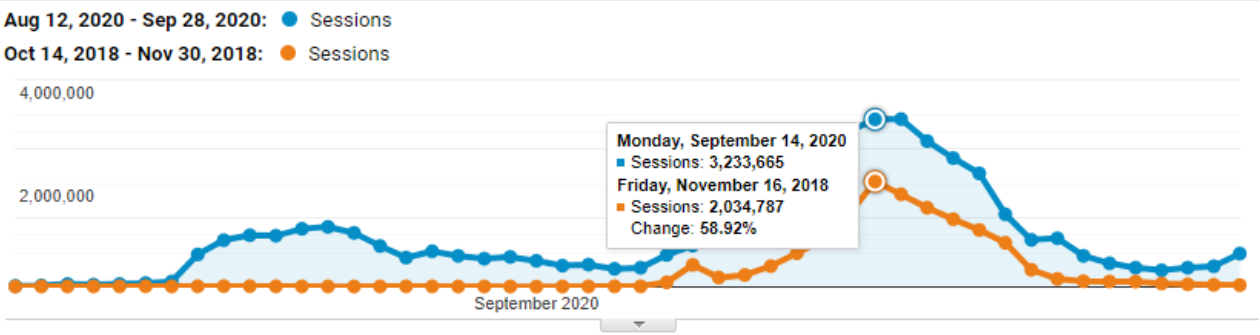
AirNow Advisory Board

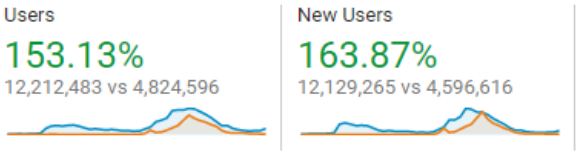
- Goal: Better communication, prioritization and decision making by OAQPS offices on issues impacting AirNow
- Comprised of OAQPS Division Directors and one additional representative
- Meets monthly, agenda with updates, key issues for discussion and input related to AirNow
- Guided the program this year on:
  - AirNow relaunch
  - Agile app development process
  - Sensor Pilot

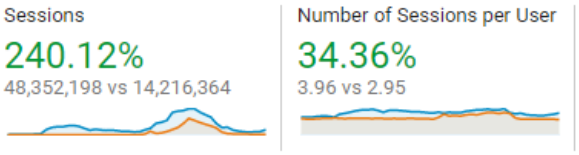
Fires Are Increasingly Driving Traffic

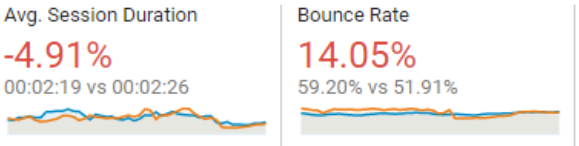


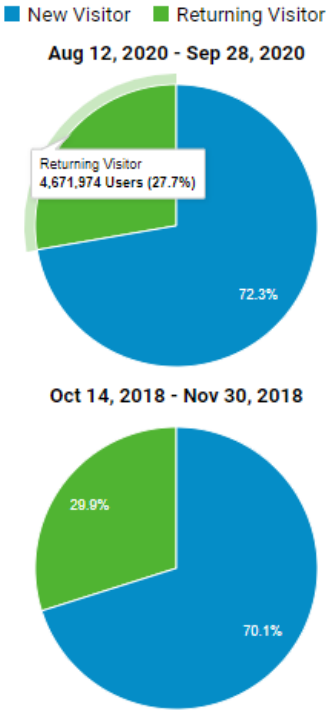
Our hard work paid off



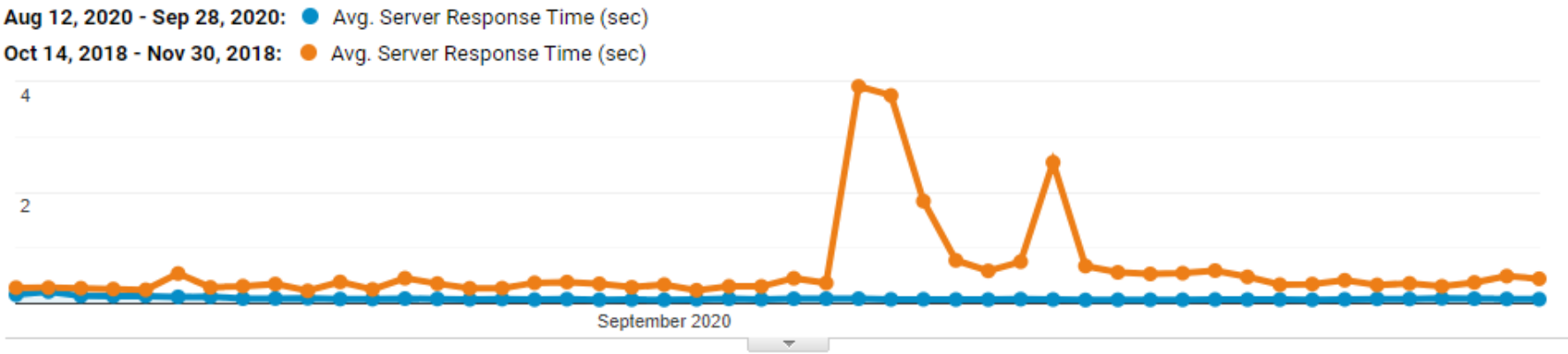








Cloud.gov impressed us!



722,010 of pageviews sent page load sample

Avg. Page Load Time (sec)
-39.30%
2.71 vs 4.47

Avg. Redirection Time (sec)
-26.18%
0.06 vs 0.09

Avg. Domain Lookup Time (sec)
-20.07%
0.03 vs 0.04

Avg. Server Connection Time (sec)
-74.92%
0.08 vs 0.30

Avg. Server Response Time (sec)
-91.52%
0.08 vs 0.89

Avg. Page Download Time (sec)
-73.26%
0.11 vs 0.39

Web Site Analytics: only *part* of the story

- Google Analytics provides *only* stats for airnow.gov
- This fire season, we had ***new apps*** for iPhone and Android. The two platforms accounted for an additional 300,000 sessions on our peak days.
  - 415,000 people have downloaded the app since 2007, but 300,000 of those were ***in the last 30 days***
  - Providing the public with data on AirNow apps helps manage load on website and provides public with portable data that is easily accessible to help manage their safety and well being
- Mobile website usage was trending around 70% during peak usage, indicating that the new site provides a much better experience on mobile devices.
- Key take-away– more and more people are accessing AirNow via mobile devices, not their computers.

More on AirNow Analytics

- AirNow pages were ALL of the Top 10 most accessed EPA web pages
- AirNow Social Media
  - Second-highest in EPA FaceBook reach
  - Fourth-highest Twitter impressions
- Analytics.usa.gov, a site that tracks all federal websites, showed AirNow consistently near the top of all federal sites, even eclipsing USPS for one day
- Staff responded to 1000 direct emails from airnow.gov since Aug 1

AirNow Sensor Data Pilot Development

- Joint partnership with US Forest Service working well
- Considerable involvement with SLTs prior to release
  - Passworded website for them to preview, over 200 comments received
  - 6 webinars prior to release, hundreds of attendees

AirNow Sensor Data Pilot rollout

- Soft launch on August 14th, no significant media outreach
- Release coincided with large number of fires in the West
- Since release, over seven million pageviews of the sensor fire map, a peak of nearly 400 thousand one day, currently between 30 and 40 thousand per day
- Lots of press mention, locally and nationally

Partnership with ORD

- **Collaborative work with EPA's Office of Research and Development (ORD)**
  - ORD Correction Equation work allows to compare data from PA sensors with regulatory monitors
  - Sensor Pilot provides data for further validation/adjustment of PA correction equation
- **Inclusion of other sensors**
  - Requests are coming in from manufacturers for the inclusion of their sensor
  - Sensor pilot data will help OAQPS and ORD to develop criteria to help identify potential candidates to be included

Feedback on Sensor Data Pilot Rollout

- Numerous comments from public and government agencies welcoming the new information
  - Lots of suggestions for improvements or clarifications coming in
  - Consistent with an Agile design, some corrections and improvements have already occurred
- One of the biggest set of comments coming in, including from Regional offices and SLT partners, is the need to explain the differences between the NowCast AQI and the PurpleAir sensor data.
  - Two discussions thus far with AirNow Advisory Board, assessing options to meet this challenge

More Challenges to Come

- Easy access to multiple air quality data sources (AirNow, weather app, Purple Air, etc.) How is AirNow different and how can we improve it?

- Temporal differences
  - AirNow uses NowCast, a three-hour average during rapidly changing conditions
  - Small sensors have 1-minute updates
  - Can we move towards faster reporting, while still maintaining our scientific integrity?

- Spatial differences
  - Some sites use air quality models to provide gridded AQ levels
  - The AirNow dial reports the highest monitor in an area
    - Can over-report if the user is far from the monitor
    - Some areas only have ozone or PM10 monitors

More on the Temporal Challenge

- The issue: The current NowCast allows a minimum of a three-hour average. Conditions can change drastically, and those changes are reflected more quickly in both the hourly monitoring data and in sensors.
- AirNow was built on one-hour data processing. While going to sub-hourly would present a system-wide challenge, we could consider using less than a three-hour averaging window.
- As we consider lower averaging times, the gap between NowCast AQI and the actual health research widens

Next Steps

- Continue the Sensor Pilot
  - Incorporate any temporal or spatial improvements
    - New NowCast formulation?
    - Use the dial interface in some way?
  - ORD will have excellent real-life smoke measurements to evaluate and improve their correction equation
  - Through the AirNow Steering Committee and the National Air Quality Conference, continue to evaluate and use SLTs real-world experiences, especially what they heard from the public
- Expand the features of the app
  - Determine how to best add Interactive and Fire and Smoke maps
  - Begin design of notification capability to replace EnviroFlash email system
  - Incorporate improvements out of the work done on spatial and temporal issues
- Design a gridded data product for AirNow
  - The “third leg” of the AirNow vision
  - Will be more comparable to other air quality vendors
  - Report more localized conditions
  - Solves many of the issues with “highest monitor” reporting

Questions and Discussion