

California Health & Human Services Agency

**Missing Link Found:**

# CalHHS All-Hazards Dashboard

*Situational awareness & decision-making tools that helps CalHHS quickly identify priorities during emergencies and streamline the logistics of moving people and equipment to safety.*

**Start:** July 2020  
**Implementation:** July 2021

**Contact:** Kattya Trinh,  
All Hazards Dashboard Product Owner  
kattya.trinh@chhs.ca.gov, 916-215-9436

Data Management, Analytics & Visualization  
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## EXECUTIVE SUMMARY

California is the country's most populous state with varied geography and hazards unlike any other, from flooding and wildfires to earthquakes and Public Safety Power Shutoffs (PSPS). California's large population and increasingly unpredictable hazards require decision-makers to have a comprehensive picture of community impacts to provide fast emergency response. The California Health and Human Services Agency (CalHHS) used manual processes to identify facilities in the path of hazards and safely move residents/patients to alternate sites to continue necessary care. With over 78,000 licensed facilities and the growing severity, frequency, and complexity of events, individual department efforts were not enough. The manual processes delayed decisions and required significant staffing. Additionally, data streams originated from different sources, including departments and other state and federal agencies. Data was siloed and communication was lacking across departments,, resulting in inconsistencies when bringing the data together into a cohesive picture. CalHHS identified a critical need to combine data pipelines into a visual dashboard so decision-makers could quickly assess and act to keep vulnerable Californians safe.

"The California Shelter Status and Inventory (CaSSI) and related tools have streamlined and automated workflows, saving valuable staff time during emergencies."

*Jeremy Horan  
Program Manager II  
CDSS*

CalHHS needed a situational awareness and decision-making tool that took a holistic approach to emergency management, combined CalHHS' data investments into a single, integrated data system designed for ease of use, and was built with future change in mind. CalHHS partnered with departments across the Agency to develop the All-Hazards Dashboard (AHD), a cloud-based tool that helps CalHHS quickly visualize facilities, identify priorities during emergencies, and handle the logistics of moving people and equipment to keep them safe during incidents. The initiative enhanced situational awareness, inter-departmental coordination and response, and management of critical programs as part of a larger effort to coordinate emergency management and natural disaster resilience functions that were spread across all CalHHS departments and offices.

The AHD provides CalHHS and Californians with:

- A state-of-the-art data visualization tool that provides one comprehensive place to view near-real time data from dozens of sources.
- The ability for CalHHS Leadership to make proactive decisions during a crisis where time is of the essence, improving emergency response times and speeding coordination efforts.
- A reduction in the hours-long manual processes to minutes, so staff can focus on response instead of hazard prediction.
- Breakdown of data silos and enhanced data accuracy and transparency across CalHHS departments, state agencies and other entities.
- Ability to identify community needs and projected impacts.
- Advanced collaboration and data sharing efforts across departments and agencies.
- Tool to archive and analyze historical data for future projections.

Given the increase in the frequency and scale of disasters across the country, every state can use a solution like the CalHHS All Hazards Dashboard to provide an integrated, comprehensive data visualization tool.



## PROBLEM

The ability to quickly protect vulnerable populations in the path of a disaster is critical to keeping people safe. With the largest population of any state, varied geography, and hazards unlike any other, from flooding and wildfires to earthquakes, and Public Safety Power Shutoffs (PSPS), California decision-makers need a comprehensive picture of community impacts, to provide fast emergency response. Until recently, the California Health and Human Services Agency (CalHHS) used manual processes to identify facilities in the path of hazards and safely move residents/patients to alternate sites to continue necessary care. With over 78,000 licensed facilities and the growing severity, frequency, and complexity of events, individual department efforts were not enough. The manual processes delayed decisions and required significant staffing. Additionally, data streams originated from different sources including departments and other state and federal agencies. Siloed data and insufficient communication across departments resulted in inconsistencies when bringing the data together into a cohesive picture. CalHHS identified a critical need to combine data pipelines into a visual dashboard so decision-makers could look through one lens to quickly make decisions to keep vulnerable Californians safe.

## THE AHD SOLUTION AND WHY IT MATTERS

CalHHS identified the need for a situational awareness and decision-making tool that takes a holistic approach to emergency management, combines CalHHS' data investments into a single, integrated data system designed for ease of use, and built with future change in mind. The CalHHS Center for Data Insights and Innovation (CDII) partnered with departments to develop the All-Hazards Dashboard



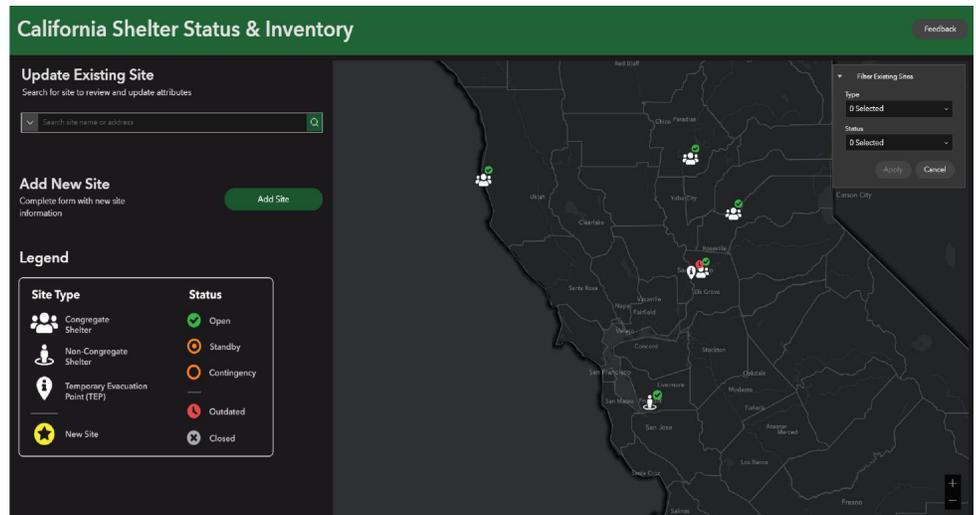
(AHD), a cloud-based tool that helps CalHHS quickly visualize facilities, identify priorities during emergencies, and handle the logistics of moving people and equipment to keep them safe. The initiative enhanced the overall situational awareness, interdepartmental coordination and response, and management of critical programs as part of a larger effort to coordinate emergency management and natural disaster resilience functions that were spread across all CalHHS departments and offices.

### The AHD is unique: It...

- Uses CDII's Data Hub, a secure, cloud-based data sharing ecosystem built on a modern, best-of-breed platform for managing data science and analytics collaboration.
- Includes data from within CalHHS, other agencies like the California Office of Emergency Services (CalOES) and the Public Utility Services in one automated pipeline. It currently has county evacuation data from 38 of 58 counties with more in progress.



- Has information about vulnerable populations by age or program (e.g., Supplemental Nutrition Assistance Program (SNAP), Women, Infants, and Children (WIC), In-Home Supportive Services (IHSS), and more).
- Combines 33 different jobs into a single, consistent stream of data that is viewable in near real time to provide situational awareness of natural or man-made hazards.
- Eliminates at least five manual processes for data collection and reporting by allowing employees to enter shelter information in a web application and use reporting tools through the California Shelter Status and Inventory (CaSSI) Application in the AHD. Built with Esri's Survey123, CaSSI allows staff to easily



update emergency mass care and sheltering information across the state into a central location. This information is stored in the Data Hub for integration, use and maintenance of historical data. The shelter-related tools have completely automated and digitized a previously manual effort, allowing staff to query the information using fit-for-purpose tools instead of Excel spreadsheets and documents.

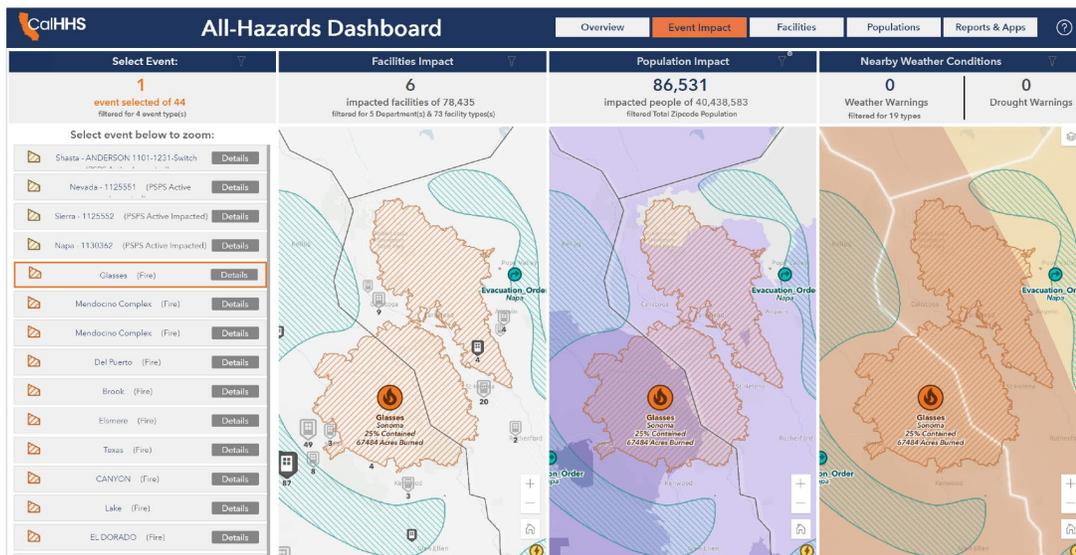
- Reduced time-consuming manual processes to send notifications to affected parties within minutes. Staff previously manually digitized wildfire and evacuation order polygons for upload into their notification system, Everbridge. Simple Python code enables the shapefile export, using the authoritative wildfire and evacuation order polygons contained within the AHD, which then outputs shapefiles to an ArcGIS Online group where staff download them for easy upload to Everbridge.
- Includes a Drought Intensity Report and Power Outage Dashboard that give executives insight into the impact of drought and power outages on CalHHS facilities.

The AHD and its related dashboards and applications exemplify several best practices and NASCIO priorities. The program modernizes a legacy system, improves data, and information management, and more effectively uses the CalHHS workforce by breaking through data silos and integrating data within cloud-based, auto-scaled data analytics and visualization platforms. Several departments and Agency processes that previously required hours of manual effort are now automated. Identity and access management to the AHD is handled through ArcGIS Online and its integrated OAuth 2.0 and SAML capabilities, which allows individual departments to create accounts for users in their own ArcGIS Online organizations. Some individual department ArcGIS Online organizations are also configured to use department Active Directory Federation Services (ADFS) for Single Sign-on (SSO). Lastly, the success of the AHD has hinged on close communication, collaboration, and buy-in from CalHHS departments and executives.



## IMPLEMENTATION

**Project Team and Collaborative Environment:** The AHD team consists of one full time state staff member (CalHHS Product Owner); four full time Hagerty Consulting staff, who provide business analysis and Agile project management support; three full time On-Target Computing staff, who develop the CDII Data Hub within the Databricks platform; and nine part time Esri staff, who configure the AHD and its related applications within Esri's ArcGIS Online platform. Beyond these four main organizations lie the 12 different CalHHS departments and 5 offices, other State and Federal governmental agencies and other entities who contribute data to the Dashboard, and with whom the team maintains close collaboration to properly transform the data as needed, and displays it accurately in the Dashboard. Some of these departments are also users of the dashboard. To achieve cohesive performance, the project used an Agile (Scrum) development process, with three-week sprints.



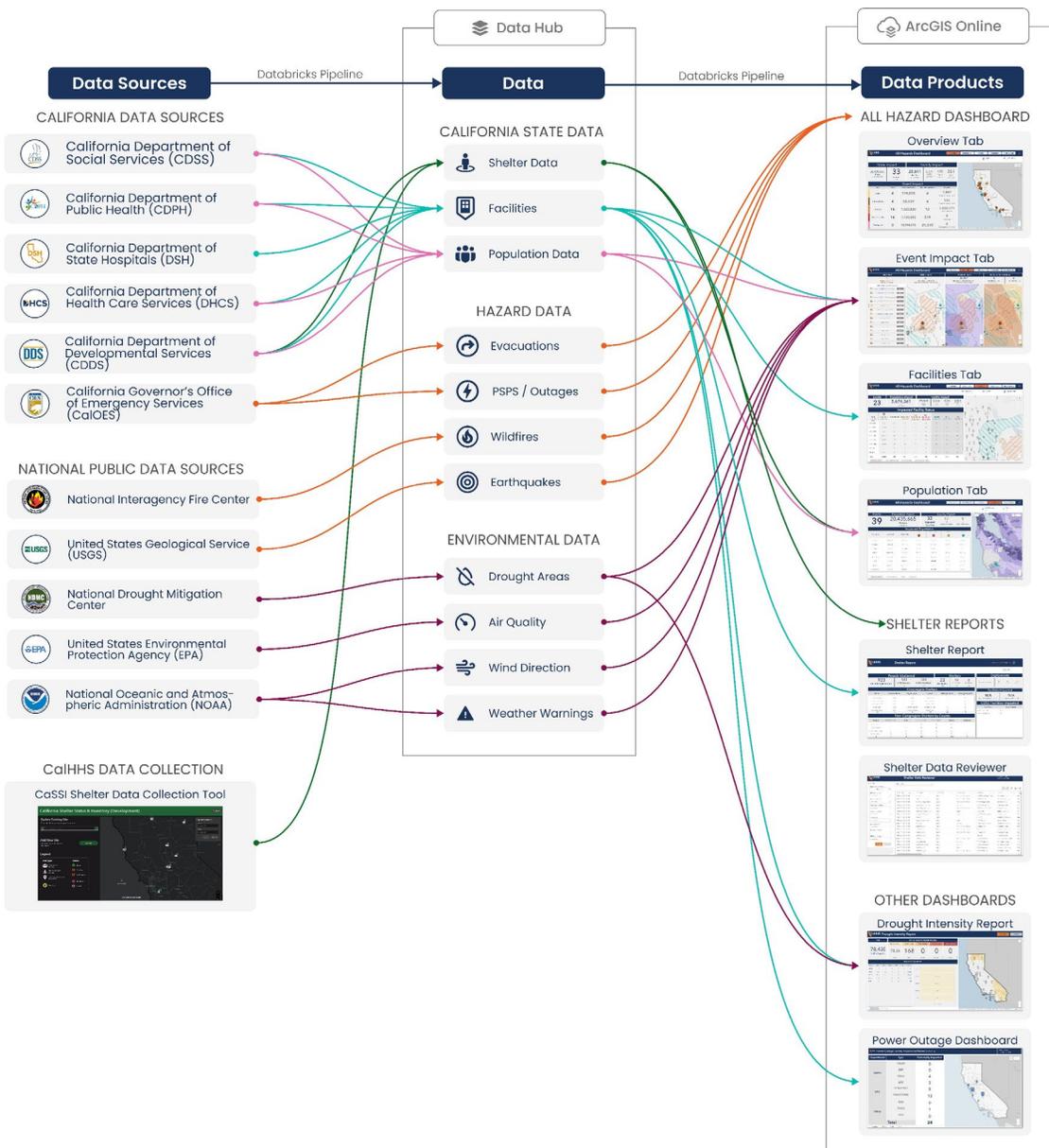
Iteration was critical because it took many attempts with the team and a trained cartographer to agree on the best way to present information. In addition, the team developed norms that helped achieve a high level of trust and communication: video cameras on

during meetings, bi-weekly design/working sessions where the entire team met to look at the most recent work (whether it be a Figma visual design, or a working dashboard), provide feedback, and make quick decisions. The result of these practices was a single, integrated, cross-functional team of people from different organizations, spread across the country.

**Timeline and Budget:** Development of the AHD began in late 2019; production began in July 2020, with continual evolution and improvement since. The original investment was \$4.5 million. Subsequent COVID staffing funds brought the budget close to \$6 million. Additional CalHHS funding of \$2 million in funding for years '22-'24 has been crucial to the success of this team.

**AHD Architecture:** The AHD technical architecture consists of two major pieces of technology, both cloud-based, with elastic underlying compute resources: 1) The Data Hub, built in Databricks on Amazon Web Services (AWS), provides a way to process and transform large amounts of data from various sources. It consists of a series of interconnected steps that move and manipulate the data, with each step forming a node in a pipeline. These pipelines are orchestrated and automated using Databricks Jobs, allowing for efficient and scalable data processing workflows, 2) ArcGIS Online, Esri's cloud-based Geographic Information Services (GIS) and data content platform. Additionally, GitHub Actions are used to automate the





deployment of the web maps, dashboards, and other artifacts that make up the AHD within the ArcGIS Online platform, thereby bringing the rigor of a CI/CD approach to the configuration and deployment of the Dashboard.

The AHD technical architecture runs 33 different jobs that collect data from several CalHHS departments, as well as from the United States Geological Survey (USGS), the Esri Living Atlas, and other external organizations, within the Data Hub, in a scalable, cloud-first fashion. This data is visualized in text, tabular and map-

based forms through configuration of low- and no-code tools within the ArcGIS Online platform (Web Maps, ArcGIS Dashboards, ArcGIS Experiences, etc.). Up-to-date shelter data is also provided by users into the Data Hub through a configuration of Esri's Survey123 tool.

This technical architecture, in combination with the Agile development process, allowed the team to quickly expand the scope of their work over the last two years. For example, the team stood up the Drought Intensity Report on an emergency basis (within a few days/weeks), which shows impacts to CalHHS facilities by drought, and the Power Outage Dashboard, which shows impacts to CalHHS facilities by power outages. The initiative enhanced the overall situational awareness, inter-departmental coordination and response, and management of critical programs as part of a larger effort to coordinate emergency management and natural disaster resilience functions that were spread across all CalHHS departments and offices.



## IMPACT

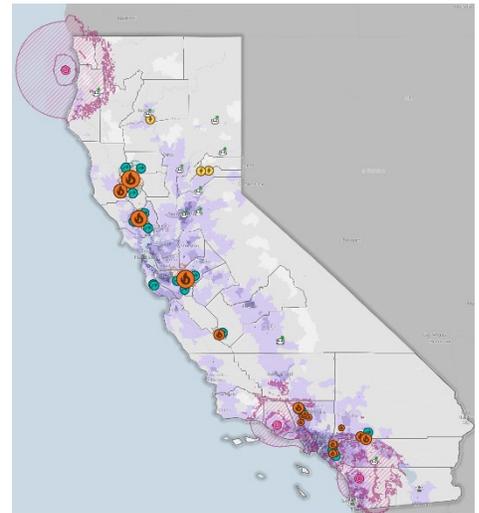
The AHD yielded the expected benefits of enhancing situational awareness, planning, and response during incidents, but it has yielded many more. AHD's impact, demonstrated through the 2020-2022 fire seasons and 2022-23 floods, includes:

- Creating a state-of-the-art data visualization tool that provides near-real time data from dozens of sources. AHD integrates several departments' facility and population data with government emergency event data and ArcGIS Online data sources within the Data Hub, to provide one, comprehensive data reference with near-real time situational awareness.
- Creating the California Shelter Status and Inventory (CaSSI) and its related Shelter Report and Shelter Data Viewer applications to update information quickly and centrally on mass care and sheltering across the state; drastically reducing manual work involved in tracking, reporting and sending notifications to people in the path of wildfires or affected by evacuations, reducing hours-long manual processes to minutes, and allowing staff to concentrate on response instead of hazard prediction. The AHD team also created a public layer to share data with CalOES, Google and Apple.
- Breaking down data silos while reducing coordination times and improving disaster response to the most vulnerable Californians while providing a single tool to visualize and react to natural and man-made hazard events. Using the Data Hub as a historical data store allows for learning and prediction during future events.
- Causing critical datasets to be cleaned up as part of the process to assemble AHD data pipelines. This included identifying critical datasets and data business owners, determining which datasets were authoritative, and resolving data quality issues.
- Improving communication and collaboration across CalHHS departments and critical external partners who are needed during incidents.

**Planned Enhancements:** The AHD team will continue to work to share data with other agencies such as CalOES and CalFire, bring in additional data sources, create reporting tools and improve data validation capabilities.

**Metrics for Success:** The AHD is expected to achieve the following metrics within the next 12-18 months:

- Increase user adoption by 30% through team and individual training, which highlights case studies of the possible use of AHD tools.
- Reduce manual process by 20% via data collection and digitized reporting tools.
- Within 12 months, use the AHD to coordinate inter-departmental training, hazard mitigation exercises and assist departments with creation of continuity plans.



Hazard events across the United States no longer have a “season” or a specific time; the AHD is the first of its kind, providing decision-makers with an integrated and comprehensive data tool to efficiently track events and impacts across departments during emergencies. As the AHD continues to grow, CalHHS will also make use of historical data in the Data Hub to embark on a journey of prevention, projection, and resilience.

*\*Disclaimer: Mock data used across all images to show full capability of the data tools*

