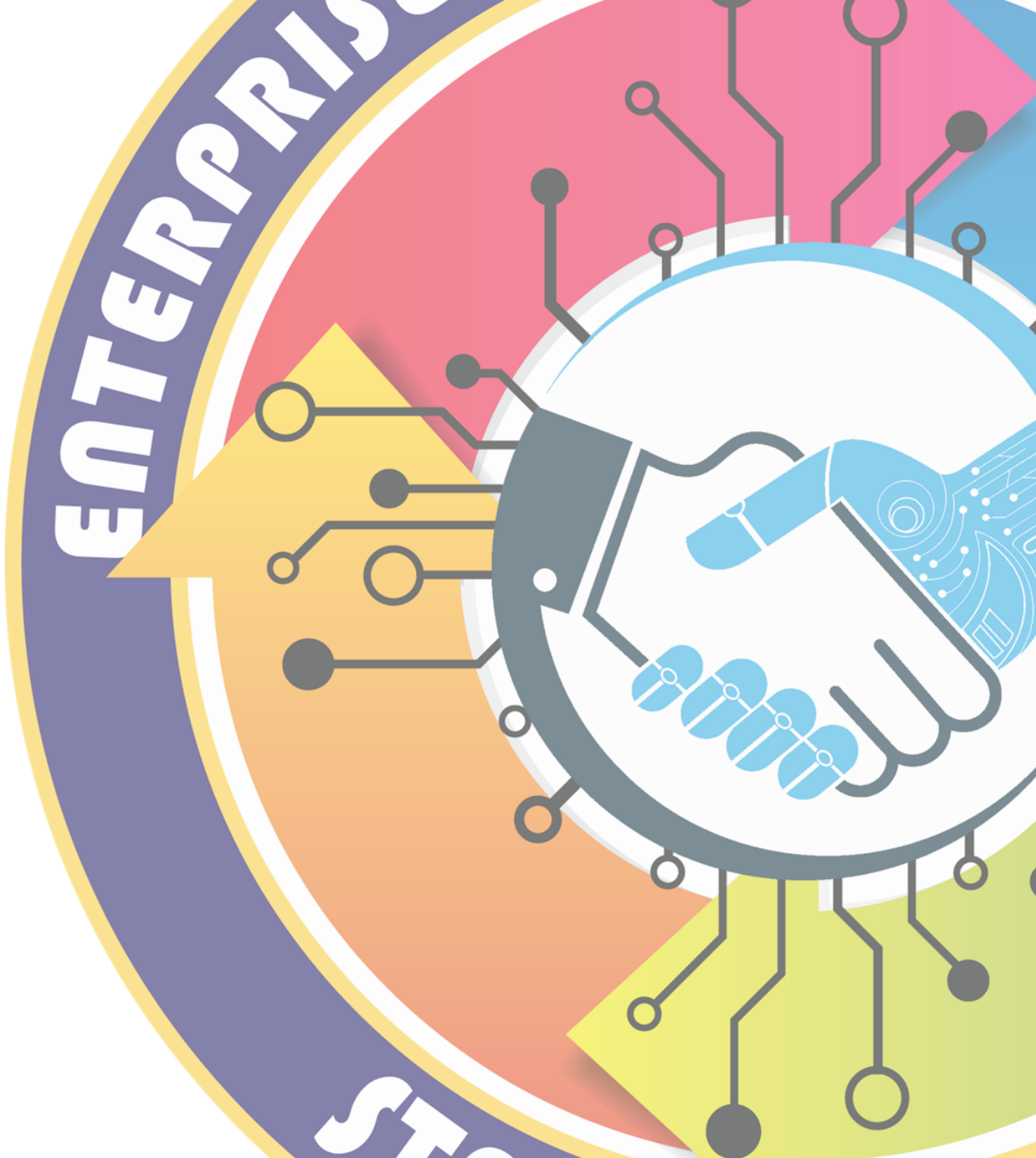
Success stories in Hawaii's Data + AI Journey



Hawaii Department of Agriculture Plant Quarantine Branch published ongoing response work for future planning and response using Esri ArcGIS Online and ArcPro

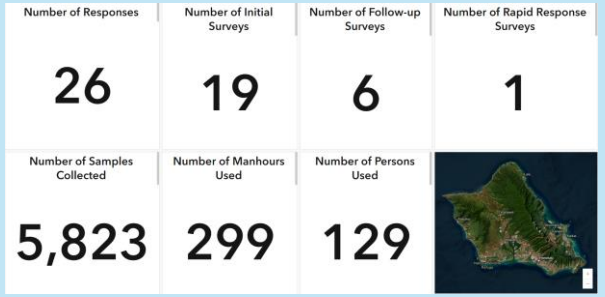
The problem, opportunity, or challenge:
The traditional paper-based method of collecting data for Little Fire Ant (LFA) response is slow, error-prone, and lacks essential geospatial elements crucial for tracking infestations effectively. Transitioning to digital data collection and reporting offers a solution by enhancing accuracy through digital forms and automatically recording locations, thereby providing real-time insights for decision-making during rapid response initiatives. This shift to digital data collection presents a pivotal opportunity to streamline LFA control efforts.

The scope of work:
To enhance the HDOA PQB's response to LFA infestations, this project presents a three-part strategy: field inspections targeting LFA areas, implementing a digital data collection system with ESRI applications for all PQB projects, and gathering crucial data for rapid response efforts. This approach aims to equip the HDOA PQB with the tools for more efficient and effective LFA control.

Department: Agriculture
Division: Plant Industry, Plant Quarantine Branch

The impact: 2024 LFA records
The importance of this initiative lies in its capability to accurately report and document LFA occurrences. By facilitating the monitoring of ongoing rapid response efforts, these real-time data become essential resources for shaping both ongoing and future planning and response strategies.

The Data and/or AI solutions
Field workers used ArcGIS Survey123 on smartphones and iPads to capture observations with pinpoint location accuracy. This "live" data streams to the cloud, empowering authorized users with real-time insights through interactive maps and dashboards, ultimately streamlining LFA response efforts.



Contact person: Donn Kansako
Contact email: donn.s.kansako@hawaii.gov

Department of Agriculture
STATE OF HAWAII

Hawaii Department of Agriculture Plant Quarantine Branch digitized data collection and reporting of Brown Tree Snake using ArcGIS Online and ArcPro

The problem, opportunity, or challenge:
Existing paper-based data collection methods pose obstacles to the effective management of Brown Tree Snake (BTS) prevention programs, characterized by slow, error-prone processes and a lack of geospatial data. This project offers an opportunity to shift towards digital data collection and reporting, potentially streamlining training procedures, enabling real-time project tracking on interactive maps, and facilitating improved decision-making based on accurate information.

The scope of work:
Establish digital data collection utilizing ESRI applications for all Brown Tree Snake (BTS) projects conducted by the HDOA PQB. This includes gathering data from all BTS training searches on Guam, BTS trap locations on Oahu, as well as BTS trap servicing and flight inspections, encompassing both regular and canine operations.

Department: Agriculture
Division: Plant Industry, Plant Quarantine Branch

The impact: 2023 Records
This project captured crucial BTS activity with digital tools. Training in Guam yielded 48 captured specimens from 9 searches, refining training methods. Over 1500 flight inspections (regular and canine-assisted) provided a real-time picture of BTS inspections on Oahu. 3,000 digital trap service records ensured efficient management, enabling the HDOA PQB to protect the State from BTS.

The Data and/or AI solutions
Field data collection is facilitated through smart phones and iPads utilizing a mobile survey application, ArcGIS Survey123. This application enables workers to input multiple inspection records, which are then compiled and linked to specific geolocated traps. Subsequently, the collected data is presented in real-time on interactive maps and synthesized in dashboards for authorized users. It serves various purposes, including manpower planning, equipment planning, budget allocation, and the generation of comprehensive year-end reports.

Contact person: Donn Kansako
Contact email: donn.s.kansako@hawaii.gov

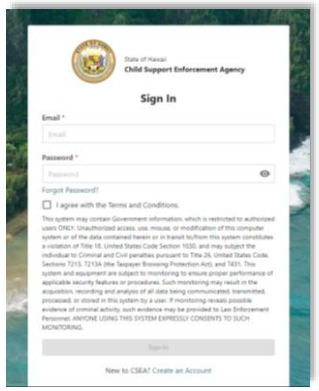
Department of Agriculture
STATE OF HAWAII

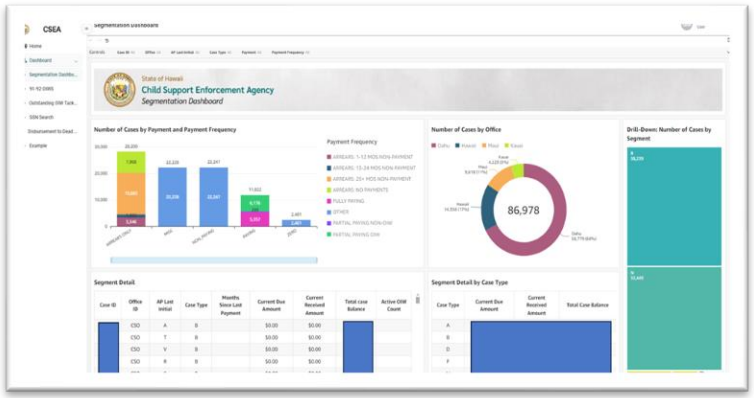
Child Support Enforcement Agency of Hawaii State Attorney General improved customer service excellence and agency responsiveness

The problem, opportunity, or challenge:
Child Support Enforcement Agency (CSEA) recognized an opportunity to leverage AWS for optimizing its operations. By migrating a secondary database to AWS, the agency gained access to a suite of AWS services that would enhance its operational capabilities and support various initiatives.

The impact:
The implementation of the customer portal enhances customer service excellence by offering convenient and accessible self-service access to case information.
The integration of AWS analytic services into the agency portal empowers leadership to gain actionable insights, facilitating informed decision-making and efficient management of daily business functions within the agency.

The data solutions:
Established a secure AWS GovCloud environment in adherence to best practice standards and design principles. This environment facilitates the replication and conversion of Child Support Enforcement data from the mainframe, creating a secondary database tailored to support new ancillary systems: customer portal and AWS analytic services. The process ensures the continuous and secure transfer of live data.





Department: Attorney General
Division: Child Support Enforcement Agency (CSEA)

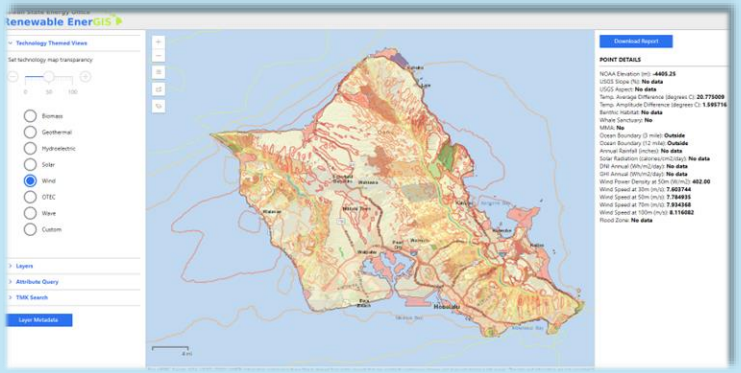
Contact person: Garret Murayama
Contact email: garret.t.murayama@hawaii.gov

Hawai'i State Energy Office launched a renewable EnerGIS application to empower informed decision-making

The problem:
There are substantial needs and opportunities for renewable energy in Hawai‘i, but there are significant information shortages standing as barriers to site selection.

The impact:
Provides site comparisons and overview for developer site location choices. In 2023, the HSEO site hosting EnerGIS was visited 5,300 times.

The scope of work:
To create a comprehensive online platform that houses crucial data, along with user-friendly tools to empower informed decision-making for a thriving renewable energy future in the islands.



The Data and/or AI solutions
The data solutions for the Renewable EnerGIS tool includes an integration of data from numerous sources such as renewable energy databases, climate databases, topographic data, zoning information, protected habitats, and other relevant datasets. Additionally, the tool features a parcel-level data search, ensuring that users can easily access and analyze the information they need for site assessments.

Department: Business Economic Development and Tourism
Division: Hawai‘i State Energy Office

Contact person: Maria Tome
Contact email: maria.l.tome@hawaii.gov

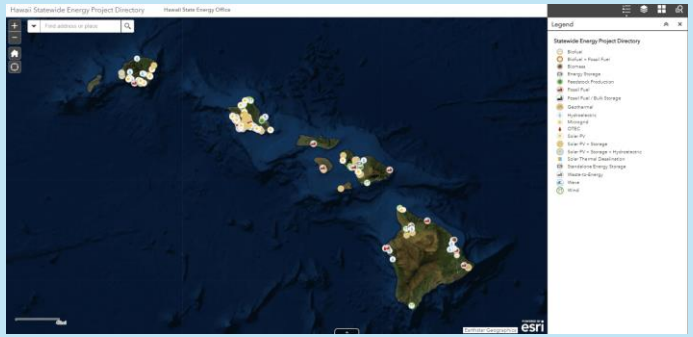
HAWAI‘I STATE ENERGY OFFICE

Hawaii State Energy Office is empowering energy decisions through a centralized information hub

The problem, opportunity, or challenge:
There was not a centralized hub of energy project-related information that was easy to view and understand. This created an opportunity to bring information from various sources together.

The impact:
Centralized information hub that allows the public, land-owners, and energy project developers to engage in data-informed decision-making. Currently, the site provides information on 185 projects (in operation, under development, and retired).

The scope of work:
It involves developing and maintaining a centralized information hub to house data on energy projects - empowering the public, landowners, and developers to make informed decisions through data exploration and visualization.



The Data and/or AI solutions
Collected data from developer websites, the Hawai‘i Public Utilities Commission, Hawaiian Electric, and Kauai Island Utility Cooperative. The information was then organized in an Excel spreadsheet where the information was formatted to be uploaded into ArcGIS. The resulting data visualization was then published to the Hawaii State Energy Office webpage.

Department: Business Economic Development and Tourism
Division: Hawai‘i State Energy Office

Contact person: Maria Tome
Contact email: maria.l.tome@hawaii.gov

HAWAI‘I STATE ENERGY OFFICE

Office of Planning and Sustainable Development increased public access to data and apps through a statewide GIS Program – Open Data Portal for Geospatial Data

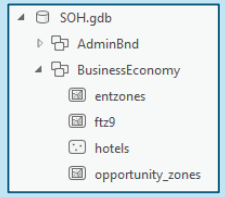
The problem, opportunity, or challenge:
Make the State's geospatial data accessible to the GIS professionals and to the public in an easy-to-use web site.

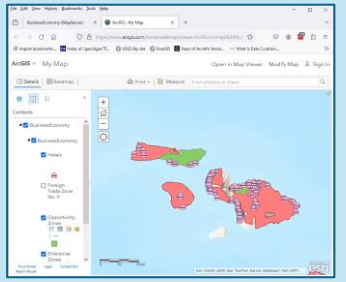
HAWAII STATEWIDE GIS PROGRAM
HAWAII STATE OFFICE OF PLANNING
Geospatial Data Portal

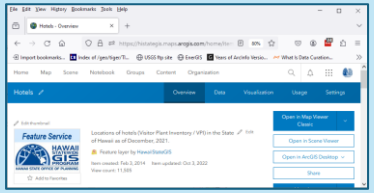
The impact:
- Increased public access to data and apps from various agencies allowing self-service queries, downloads, and visualizations.
- Average 8M Page Views, 2,200 Unique Visitors per month
- Increased access to Lidar downloads and Lidar products (DEMs and DTMs)

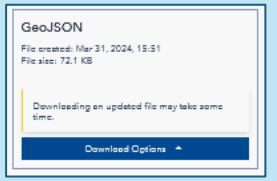
The scope of work:
- Browser-based app, incl. map visualization
- Intuitive user experience, searchable by keyword or map extent
- Easy-to-use and easy-to-maintain, compatible w/ existing platform, downloadable data in multiple formats

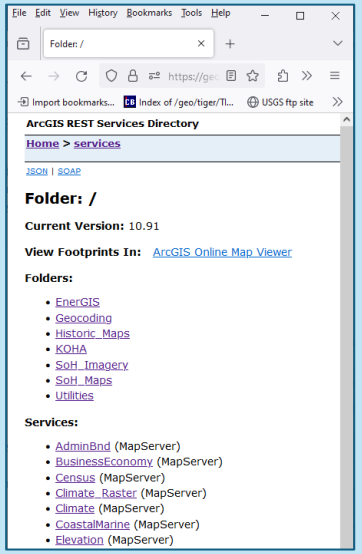
The Data and/or AI solutions
ArcGIS geodatabase
ArcGIS map and feature services
ArcGIS Hub
ArcGIS Open Data











Department: Business, Economic Development & Tourism
Division: Office of Planning and Sustainable Development, Statewide GIS Program

Contact person: Joan Delos Santos
Contact email: joan.m.delossantos@hawaii.gov

HAWAII STATEWIDE GIS PROGRAM

Hawai’i State Department of Education (HIDOE) partnered with the Hawai’i Statewide GIS Program to help support students attending six Maui schools impacted by the Maui Wildfires.

The problem, opportunity, or challenge:
Following the Maui Wildfires and the effect on families’ housing and income situations, HIDOE aimed to provide assistance by offering free meals to all students and staff in need at four Lahaina schools.

6 Maui schools eligible to offer free school meals to all students

08-Feb-2024

School meals will be free for all students for the remainder of the school year at six Maui schools.

SHARE THIS:

School meals will be free for all students for the remainder of the school year at six Maui schools that are now eligible for a federal food program aimed to serve students who attend schools in high-poverty areas.

The U.S. Department of Agriculture approved the Hawai'i State Department of Education (HIDOE) to qualify the schools for the Community Eligibility Provision (CEP) program, effective Feb. 1. The CEP program enables schools that predominantly serve low-income children to offer free, nutritious school meals to all students through the National School Lunch Program and the School Breakfast Program without collecting school meal applications and regardless of household income.

In the aftermath of the Maui wildfires and the impact on families' housing and income situations, the HIDOE requested and was approved to use a waiver to allow schools on Maui to elect mid-year CEP participation and recalculate the required formula to reflect the current school population.

The six schools are:

- King Kamehameha III Elementary
- Princess Nāhi'ena'ena Elementary
- Lāhainā Intermediate
- Lāhaināluna High
- Kīhei Elementary
- Kula Elementary

Prior to CEP eligibility, the Department had secured private philanthropic support to provide free school meals to all students, and staff in need, at the four Lāhainā schools.

In accordance with federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, this institution is prohibited from discriminating on the basis of race, color, national origin, sex (including gender identity and sexual orientation), disability, age, or reprisal or retaliation for prior civil rights activity.

The impact:
With data provided by the State GIS team, HIDOE’s request to qualify six Maui schools for the CEP program was approved by the US Dept. of Agriculture which provides free meals all students at these schools for the remainder of the school year.

The Data and/or AI solutions
Data Creation & Collection: Collaboration between HIDOE and the Hawaii Statewide GIS Program to gather data on households impacted by the Maui Wildfires

Data Cleansing & Transformation: Utilize Google Maps Platform to convert residential addresses to geocoded coordinates to load in ArcGIS.

Data Science & Analytics: Utilization of advanced data analysis techniques to interpret GIS data and pinpoint households impacted by the wildfires.

Department: Education & Office of Planning and Sustainable Development
Division: Data Governance & Analysis Branch & GIS

Contact person: Travis Santos (HIDOE), Arthur Buto (State GIS)
Contact email: travis.santos@k12.hi.us, arthur.j.buto@hawaii.gov

HAWAII STATEWIDE GIS PROGRAM
HAWAII STATE OFFICE OF PLANNING

Hawaii Green Growth increased transparency and accountability through data visualization with Aloha + Challenge Dashboard

The problem, opportunity, or challenge:

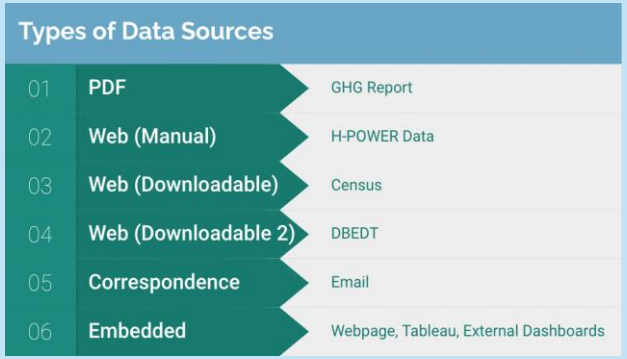
Hawaii Green Growth aimed to track and visualize progress towards achieving the 2030 sustainability goals outlined in the Aloha + Challenge. However, disparate data sources and lack of centralized information hindered effective monitoring and decision making.

The impact:

Empowering stakeholders with clear data visualization on the Statewide GIS platform fosters transparency and accountability. This drives informed decision-making and tracks Hawai'i's progress on critical initiatives, including the United Nations Voluntary Local Review.

The scope of work:

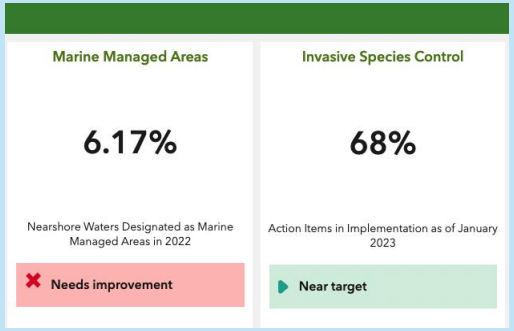
To develop a centralized data repository and visualization dashboard to track progress towards Hawaii Green Growth's Aloha+ Challenge goals by 2030. The interactive dashboard integrates data from various sources, showcase progress through clear visualizations, and allow for deeper analysis.



The Data and/or AI solutions

The Aloha+ Challenge Dashboard leveraged Esri's ArcGIS Hub. This system addressed the data challenges by:

- **Centralized Data**: ArcGIS Hub served as a central repository for data.
- **Data Standardization**: Analyzing and preparing data from various sources to ensure compatibility with ArcGIS Online, facilitating visualization and analysis.
- **Optimized Visualizations**: Data was analyzed to create optimal visualizations on the Aloha+ Dashboard, allowing users to easily understand progress towards sustainability goals.



Department: Hawai'i Green Growth Local2030 Hub

Contact person: Kaimana Walsh
Contact email: kaimana@hawaiigreengrowth.org

Department of Human Services worked with the Healthcare Association of Hawaii to reduce avoidable 30-day readmissions

The problem, opportunity, or challenge:
Hospitalizations are expensive and multiple hospitalizations, particularly frequent re-hospitalizations are associated with poor health outcomes.

The impact:
Sustained and marked decrease in 30-day readmissions statewide.

The scope of work:
As part of a hospital pay for performance program, DHS/Med-QUEST Division worked with the Healthcare Association of Hawaii to support a quality improvement initiative aimed at reducing the rate of avoidable re-admissions.

Technical assistance partners offered support to hospitals to leverage existing data to conduct a root cause analysis of re-admissions and to develop tailored solutions to reduce avoidable readmissions.

The Data and/or AI solutions
Provided analytic algorithms, technical assistance, and data extraction templates to support hospitals in extracting data in a standardized manner.

Provided analyses of extracted data to report back on findings and work with the hospital to contextualize root causes and proposed interventions.

Department: Human Services
Division: Med-QUEST

Contact person: Ranjani Starr, PhD, MPH
Contact email: rstarr@dhs.Hawaii.gov

Department of Land and Natural Resources boosts productivity and stakeholder engagement

The problem, opportunity, or challenge:

- Obstacles with reviewing projects in a timely manner.
- Communication issues between project proponents.
- Incomplete datasets and no online access to reports.

The impact:

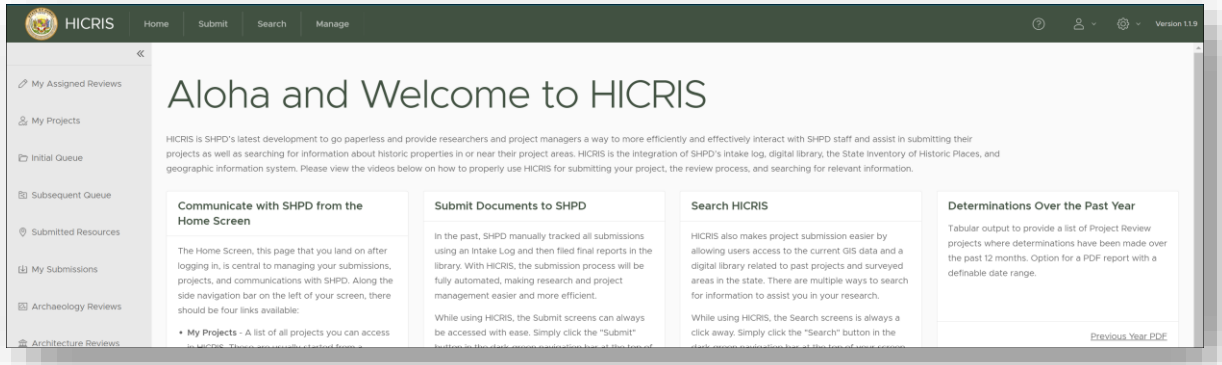
Since implementing HICRIS, SHPD has increased its productivity in reviewing projects and communicating with stakeholders by allowing users to submit information and do research all in one central location via the internet.

The scope of work:

To create an online platform that streamlines project reviews by facilitating information submission and communication between stakeholders with online access to reports.

The Data and/or AI solutions

- Data: Intake log, Library records, SHPD Cultural Resources Geodatabase, State Inventory of Historic Places (excel), TMK feature services hosted by the Statewide GIS Program
- Data solution: integration of GIS data with project areas, library resources, and intake log through an online environment using Microsoft Azure Cloud and Esri's ArcGIS Enterprise.
- Infrastructure consists of cloud servers hosting a production and test environment. Each environment has a Web/App Server, a Spatial Server, and a Data Repository Server.
- All items in HICRIS, including user credentials, require ArcGIS Enterprise account authorization and licensing.
- There are different levels of access to restricted data depending on various privileges that can be assigned to users.



Department: Land and Natural Resources
Division: Historic Preservation

Contact person: Michael Wahl, SHPD GIS Specialist
Contact email: michael.a.wahl@hawaii.gov

Department of Land and Natural Resources identified patterns in ungulate distributions across ecosystems and seasons, and potential species interaction among species

The problem, opportunity, or challenge:
Identify key areas of interest for conserving and protecting threatened native species and identify areas of high hunting potential for recreational hunting opportunities.

The scope of work:
- Development of distribution and abundance models for all introduced ungulate species currently extant on the island of Kauai.
- Survey locations using a random stratified sampling design across elevational gradients to ensure equivalent sampling effort (Risch et al. 2020).
- Rasterized Kauai into 500 by 500 m (25 ha) units using R packages ‘raster’ (Hijmans et al. 2017) and ‘rgdal’ (Bivand et al. 2018) to ensure resolution spatial heterogeneity (Risch et al. 2020). Then Masked to Forest Reserves.
- Array of 6 cameras (Bushnell Trophy Cams, Bushnell, Overland Park, KS) were distributed at regular 50m intervals (Risch et al. 2020) (rectangular array or linear array).
- Used AI machine learning model developed by Microsoft called MegaDetector to process photos gathered from cameras.

The impact:
- Study provides quantitative information regarding the biological requirements and habitat preferences of three introduced ungulate species on the island of Kauai. Considering the anticipated shifts due to climate change, recency of introduction, and their dynamic nature, deer may expand their range across Kauai, particularly in native dominated sensitive areas.
- We’ve made significant improvements on camera processing protocols over past projects. Essentially, an object detection model that identifies whether an animal is present or not. It has significantly reduced our processing time for photos and for Hawaii Island project eliminating the need to manually review over 850,000 false triggers. Additionally, there are species identification models that take it a step further and actually identify the species in the photos. So far testing seems great.

The Data and/or AI solutions
We've integrated Microsoft's MegaDetector AI model to process our camera photos, streamlining our protocols and saving significant time. This model efficiently detects animals, eliminating manual review of over 850,000 false triggers in our Hawai‘i Island project. We're also exploring species identification models, which seem promising in initial tests. We recommend considering similar AI solutions for photo processing if not already implemented, which could benefit DOFAW staff and operations.

Department: Land and Natural Resources
Division: Forestry and Wildlife

Contact person: Jason Omick
Contact email: jason.d.omick@hawaii.gov

Department of Transportation Highways enhanced workflow efficiency, public transparency, and accountability through geospatial data visualization

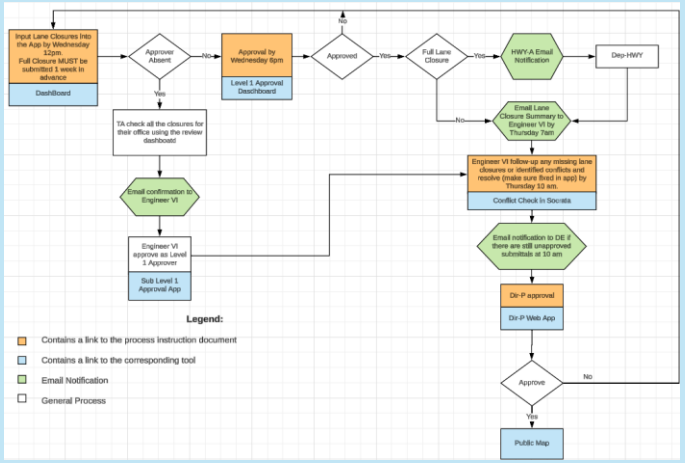
The problem, opportunity, or challenge:

By leveraging technology and implementing a centralized system, we can create a more efficient and transparent approach to lane closure management. This presents a unique opportunity to:

- Enhance Public Awareness: Provide readily accessible real-time lane closure information through a user-friendly platform
- Streamline Internal Processes: Develop a centralized system that automates data collection and dissemination

The scope of work:

Highway aimed to create an electronic system to collect, track, and view lane closure data in visualize maps for internal and public users.



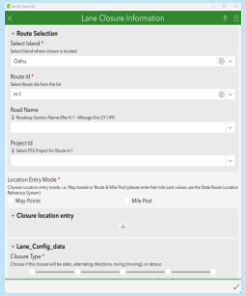
Department: Transportation
Division: Highways

The impact:

Increased workflow efficiency, public transparency, and accountability through visualization, utilizing the Statewide GIS platform. Various lane closures maps and reports are generated for public consumption.

The Data and/or AI solutions

The Lane Closures System utilizing Esri's Survey123 to collect and edit data. ArcGIS python script use the collected data to transfer point geometry to polygon geometry and generate a new feature layer. Multiple dashboards and maps are use for internal review and approval. All public front-facing content is displayed on the ArcGIS Story Map platform and hosted by ArcGIS Online.



Contact person: Zero Wu
Contact email: zero.wu@hawaii.gov

Office of Hawaiian Affairs provides digital access to data from multiple community archives and educational entities through the Papakilo Database and Kipuka Database

The problem, opportunity, or challenge:
The Office of Hawaiian Affairs' (OHA's) Papakilo and Kipuka Databases provide unique solutions to providing access to various data sources or collections that are stewarded by multiple community archives and educational entities.

The impact:
Papakilo Database 7/2010-6/2023 – approx. 5.5 million page views, 310,000+ unique visitors
Kipuka Database 7/2013-6/2022 – approx. 605,000 page views, 83,000+ unique visitors

The scope of work:
The Papakilo and Kipuka Databases provide searchable access of various historic documents, maps, images and other historic materials, made available to OHA's beneficiaries and the general public free of charge. These comprehensive databases serve as online resources that allow all users to search various collections and cross-references data sources for increased efficient and effective research. Utilizing open-source Greenstone Digital Library software and ArcGIS software, coupled with API queries and licenses, the OHA provides access to more than 1.5 million records from at least 70 collections from 20 partnering organizations.

The Data and/or AI solutions
The foundational success of the Papakilo and Kipuka Databases is built upon the following two methodologies:

1. Establishing collaborative relationships within the archiving community to assist and support community archive entities in building organizational capacity to better manage, store and disseminate their respective stewarded collections through MOA's, contracts, and purchasing non-exclusive perpetual dissemination licenses.
2. Building in API queries between the Papakilo Database and various online collections to allow for comprehensive search results and seamless accessibility between hosted sources.

Department: Office of Hawaiian Affairs
Division: Research & Evaluation Division

Contact person: Kale Hannahs
Contact email: kaleh@oha.org

OFFICE OF HAWAIIAN AFFAIRS

Department of Transportation Harbors improved customer service and support through implementation of Google AI Virtual Assistant

The problem, opportunity, or challenge:
Implementing an AI-powered frontline for customer service and employee support. Google AI Virtual Assistant offers the opportunity to revolutionize communication at Hawaii DOT Harbors. This resource would improve efficiency by handling routine inquiries, allowing staff to focus on more complex matters.

The impact:
Provides customer service and support of existing systems and procedures. Increased efficiency by reducing the number of hours spent responding to redundant staff and customer inquiries, allows workforce redevelopment training opportunities and exposure to emerging technologies.

The scope of work:
Utilize AI capabilities to create a virtual assistant tasked with retrieving answers to commonly asked questions by scanning source documents. This assistant is tailored to deliver prompt and precise responses across various topics, including:

- ArcGIS Online
- eBuilder PMSS
- Cityworks AMS
- Procurement Procedures
- Information within the Department Staff Manual

The Data and/or AI solutions
Leverages a Google Dialogflow Virtual Assistant empowered by Gen AI capabilities. We've configured the solution in-house.

Department: Transportation
Division: Harbors

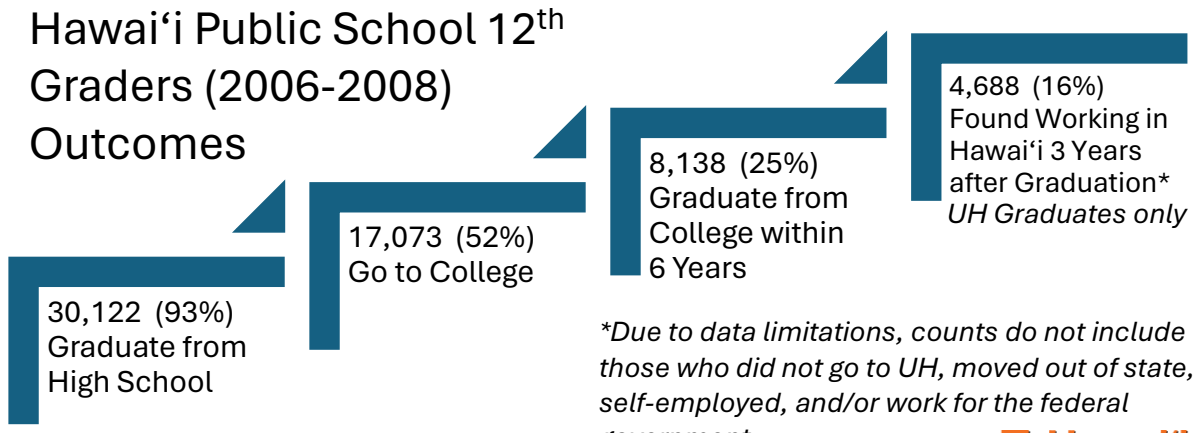
Contact person: Steve Dale
Contact email: steven.r.dale@hawaii.gov

Hawai‘i Data eXchange Partnership successfully enabled multi-agency data sharing to improve equitable outcomes across Hawaii

The problem, opportunity, or challenge:
Directly linking data between multiple agencies allows a better understand how different populations are served by the state as a whole. e.g., trends in how groups move from K-12, to UH, to Hawai‘i’s workforce.
The sharing of data needs to be strictly governed and protected to ensure individuals’ confidentiality and privacy. Departments needed to remain in control of their own data.

The impact:
Over 600 requests for data have been fulfilled through the DXP to support program evaluation, strategic planning, and improving equitable outcomes across Hawaii. These requests would have otherwise gone to each Partner individually to pull disconnected datasets or may not have been possible at all. Through Partner collaboration, strong governance policies were created to define what can/cannot be shared and how access to data takes place.

The data solutions:
The Hawai‘i Data eXchange Partnership (DXP) was formed to ensure that education-related data shared via the DXP were appropriated linked and protected. Hawai‘i P-20 Partnerships for Education (P-20) aligns records across Partner data to accurately represent the flow of populations as they move between state agencies (Department of Education, University of Hawai‘i, Department of Labor and Industrial Relations, Department of Health, and Department of Human Services).



Due to data limitations, counts do not include those who did not go to UH, moved out of state, are self-employed, and/or work for the federal government.

Department: University of Hawai‘i
Division: Hawai‘i P-20 Partnerships for Education

Contact person: Jean Osumi
Contact email: josumi@hawaii.edu
Website: https://www.hawaiidxp.org/

HAWAI‘I P-20 Partnerships for Education

Hawai‘i dxp Data eXchange Partnership

Department of Transportation inform planners and project manager on archaeological sites through an Archaeological Site Mapping System

The problem, opportunity, or challenge:
Create a map-based data system that spatially connects Hawaii Department of Transportation (HDOT) roadways with known archaeological sites. This innovative solution would empower planners and project managers to visualize potential project impacts on historic sites, enabling proactive decision-making and mitigation strategies to preserve cultural heritage.

The scope of work:
Phase 1:

- Collect a minimum of 250 archaeological documents from HDOT and SHPD situated within 200 ft of the Right-of-Way. Tasks include: 1) establishing a database of the documents, and 2) visually representing the sites on a GIS platform.

Subsequent phases:

- Continual data collection and entry

The impact:
Project is in a permanent maintenance phase.
Allows planners and project managers to easily do their due diligence by searching via TMK or mile marker.
Serves as tool in an agreement with SHPD regarding minor projects that will not have to go through SHPD review.

The Data and/or AI solutions:
Initially designed as a search tool, our platform evolved to include a dashboard developed in partnership with SHPD to monitor usage patterns and outcomes. However, inconsistencies between the actual workflow and tracking program led to sporadic usage and manual data manipulation. To overcome these hurdles, we are actively exploring enhancements. Our ultimate goal is to fully integrate the data tracking process in-house, ensuring a seamless and optimized experience that maximizes utility and informs data-driven decision-making.

Department: Transportation
Division: Planning

Contact person: Pua Aiu
Contact email: Pua.aiu@hawaii.gov

University of Hawaii's Early College Program Expansion improved student outcomes through effective and informed policy and practice

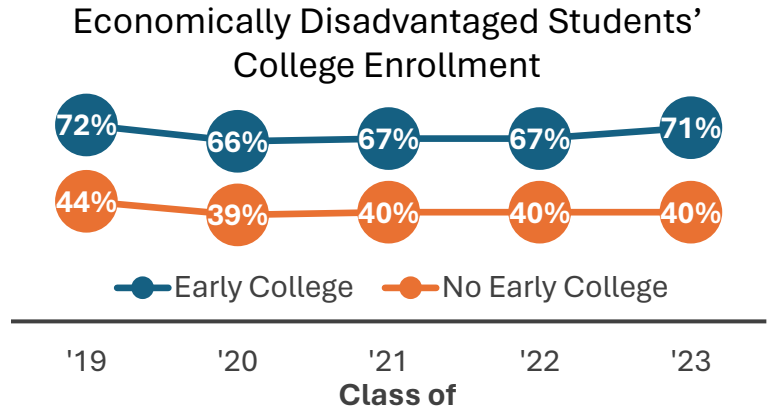
The problem, opportunity, or challenge:
In 2012 – 2017, the Early College pilot needed to demonstrate the effectiveness of the program to justify why sustained state funding was needed to expand to more public high schools.

Early College allows high school students to take "sheltered" college classes (only open to high schools) with their peers.

The impact:
Data was used to report on the effectiveness of the Early College and advocate for program expansion, which was funded by the state Legislature.
Both the Department of Education and the University of Hawai'i continued to use the linked data to improve student outcomes from looking for where additional students/staff supports are needed to how to better target underserved populations.

The data solutions:
Utilizing the Hawai'i Data eXchange Partnership, which matches education-related data between state agencies, data around who was enrolling/completing Early College courses and their later academic outcomes were gathered and analyzed.

Economically disadvantaged public high school graduates enroll into college the first fall after high school graduation at significantly higher rates than those who do not participate.



Department: University of Hawai'i
Division: Hawai'i P-20 Partnerships for Education

Contact person: Jean Osumi
Contact email: josumi@hawaii.edu

HAWAI'I P-20
Partnerships for Education

University of Hawaii department of geography and environmental science spatial data analysis and visualization lab detected invasive Species using AI technology

The problem, opportunity, or challenge:

Invasive plant species and pathogens are spreading across Hawai'i. Aerial imagery can be used for detection and monitoring, but image analysis by humans is slow and labor intensive. AI detection algorithms allow us to quickly detect and therefore respond to invasive species.

Example detection results for (L) Rapid 'Ōhi'a Death and (R) Miconia

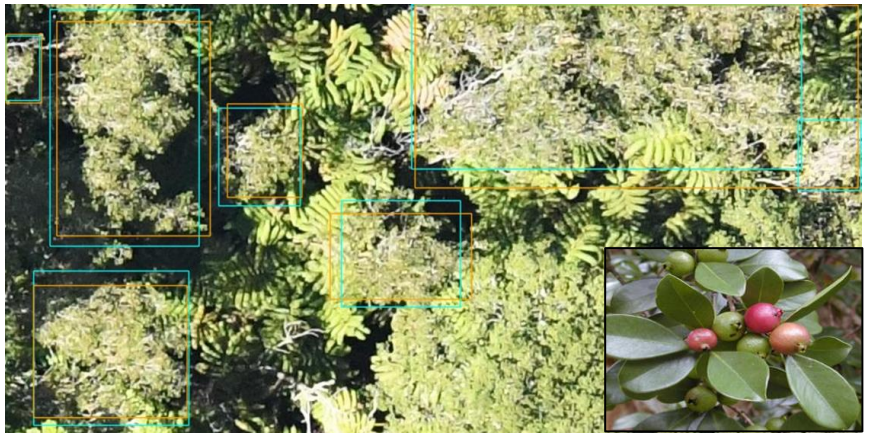
The scope of work:

The creation, testing, and operationalization of custom deep convolutional neural networks to automatically detect plant targets of interest using high-resolution remotely sensed imagery.

University of Hawai'i at Hilo, Department of Geography and Environmental Science Spatial Data Analysis and Visualization Lab

The impact:

These algorithms have been used to successfully detect a variety of species over 10,000s of acres across the state of Hawai'i and the Republic of the Marshall Islands. Species include 'Ōhi'a trees affected by Rapid 'Ōhi'a Death, miconia, strawberry guava, and more.



Example detection results for strawberry guava

The Data and/or AI solutions

Remote sensing platforms such as satellites, helicopters, and small unoccupied aerial systems (drones) collect imagery.
Deep convolution neural network models are trained and tested.
Dashboards allow the results and performance of each model to be tracked and measured and new datasets are added to improve model performance.

Contact person: Dr. Ryan Perroy
Contact email: rperroy@hawaii.edu

SDAV UH HILO

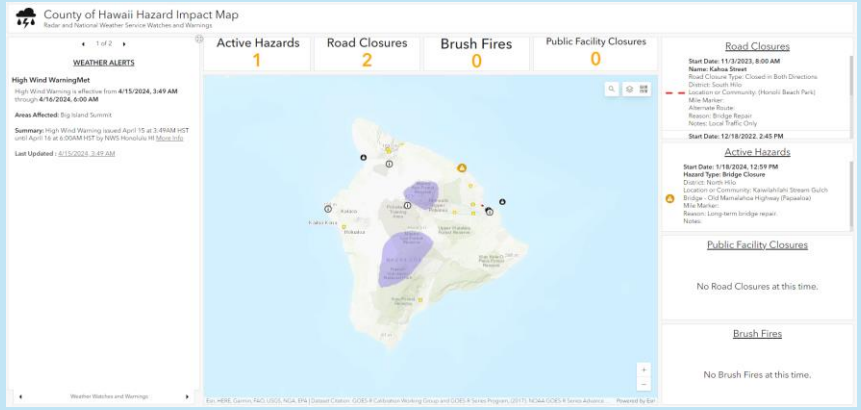
University of Hawai'i Hilo

Hawai‘i County empowers public awareness through the Hazard Impact Map

The problem, opportunity, or challenge:
Hawai‘i County Civil Defense Agency’s commitment to public safety and information dissemination includes providing the public with up-to-date information on hazards using various methods of communication (radio, phone, text, and email).

The impact:
The Hawai‘i County Hazard Impact Map is one of the many tools used to create a more informed public. It incorporates data visualization as a public information and warning platform.

The scope of work:
Involved designing, developing, and deploying a comprehensive Hawai‘i County Hazard Impact Map, integrating data visualization and public information and warning platforms to enhance public safety and awareness.



The Data and/or AI solutions:
The County of Hawai‘i Hazard Impact Map leverages Esri’s ArcGIS Online platform to display public facing content through ArcGIS Operations Dashboard. It utilizes a combination of internal data feature services (hazards, road closures, public facility closures, brush fires, etc.) and public weather alerts service feeds. Data is updated based on current conditions and information received from Public Safety.

Department: Hawai‘i County Civil Defense Agency

Contact person: Asia Wasser
Contact email: asia.wasser@hawaiicounty.gov

Honolulu Land Information Systems enhanced Oahu Parcel Data Accuracy

The problem, opportunity, or challenge:
Before the availability of high resolution ortho-imagery or survey-grade GPS, Honolulu's GIS parcel base layer was originally digitized from existing linen base maps. These maps were not spatially accurate across the entire island, and there was a need for an adjustment process to shift parcels into better alignment.

The scope of work:
The solution involved migrating the HoLIS parcel data to the Esri Parcel Fabric Solution. This allowed land survey measurements to be stored with the parcel boundary lines and provided Geodetic COGO tools for accurate creation and editing.

Department: Department of Planning and Permitting
Division: Honolulu Land Information Systems

The impact:
The improved edit environment allows the Oahu parcel data layers to be easily adjusted as new subdivisions are approved and old parcels are re-surveyed. This will also lead to improved accuracy of other map layers, produced by the entire GIS community. The benefits will extend to those who view their GIS map layers in conjunction with data from GPS or aerial imagery.

The Data and/or AI solutions
HoLIS is currently using the ESRI ArcPro editing environment to edit and manage parcels and easements in the parcel fabric helping to keep the different data layers coincident with each other and lessening the risk of overlap and issues with pukas in the data. We create 3 types of parcels that can be queried out of the dataset for specific uses: Regulatory for Permitting purposes, Tax for Tax purposes, and Tax and Regulatory where these two are in agreement, which is the vast majority. All parcels and easements in the fabric are connected together along with other data layers, such zoning. This will allow all map data layers to be shifted together as we implement our parcel adjustment.

Contact person: Bertha Yagi
Contact email: byagi@Honolulu.gov