



SECOORA

Overview & Introduction

Thursday, October 10, 9:15 - 9:45 AM

WebCOOS Overview

- **Webcam Coastal Observation System**
- **Goals:**
 - Engage webcam operators & end users
 - Automate processing of info from webcam imagery
 - Develop situational monitoring & reporting tool for info on beach activities & hazards
 - Operationalize national webcam data management network



Join the Community Web Camera Observation Network

Web cameras or webcams are a low-cost coastal observing platform transforming how community environmental monitoring is conducted. Webcams can address significant gaps in the nation's ability to monitor and accurately forecast various weather, ocean, ecological, and public health hazards.



WebCOOS webcam located in Folly Beach, SC installed by University of South Carolina.

Webcams for Coastal Observations and Operational Support (WebCOOS) is a community supported low-cost webcam coastal observing network, which provides valuable imagery and tools for scientists, communities, and local coastal managers to make decisions.

How can web camera data help your community?

Below are a few examples of how webcam data is transforming coastal monitoring.



Identify Rip Currents



Study Beach Erosion



Monitor Beach Usage



Flood Monitoring

Partnership Opportunity

There is strength in numbers! With more webcams, higher quality information can be provided to users. Communities can partner with SECOORA to either provide existing webcam streams or install a webcam in their chosen location and receive the imagery and data personalized for their needs.

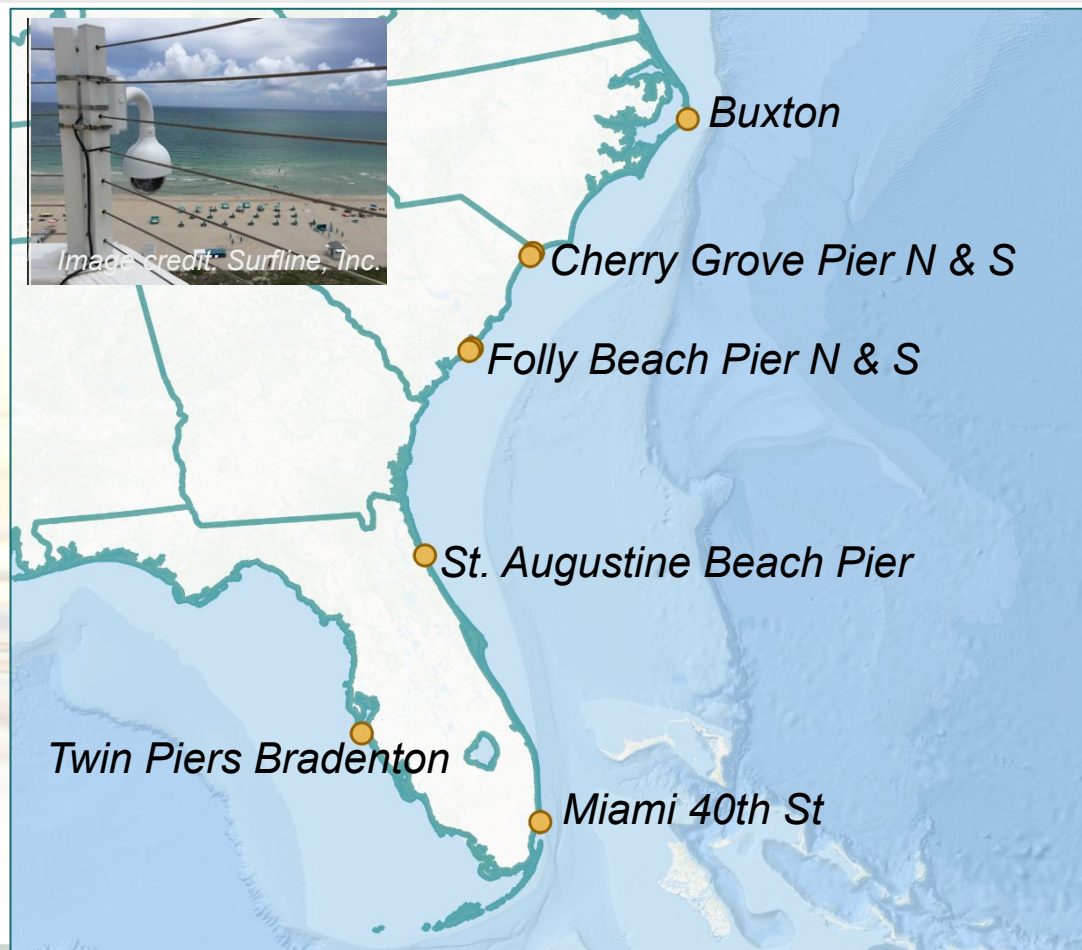
A team will work with each community to help access the data available already or to determine the appropriate webcams, locations and installation. Customized products can be created for those that want alerts of interest to the community.



History: WebCAT

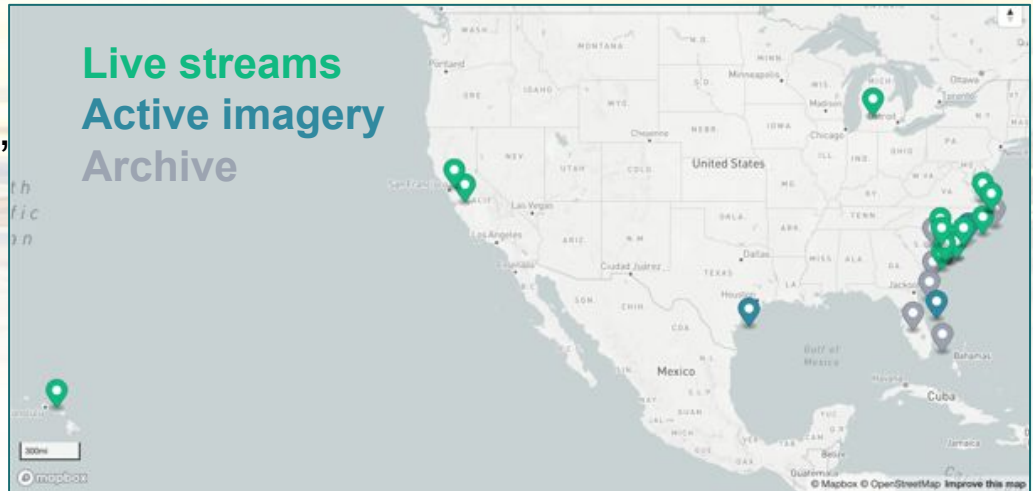
- Started in 2017, cameras operational until January 2021
- 8 cameras at 6 sites in southeast
- Publication: Dusek et al. 2019*

*[Dusek G, Hernandez D, Willis M, Brown JA, Long JW, Porter DE and Vance TC \(2019\) WebCAT: Piloting the Development of a Web Camera Coastal Observing Network for Diverse Applications. *Front. Mar. Sci.* 6:353. doi: 10.3389/fmars.2019.00353](#)

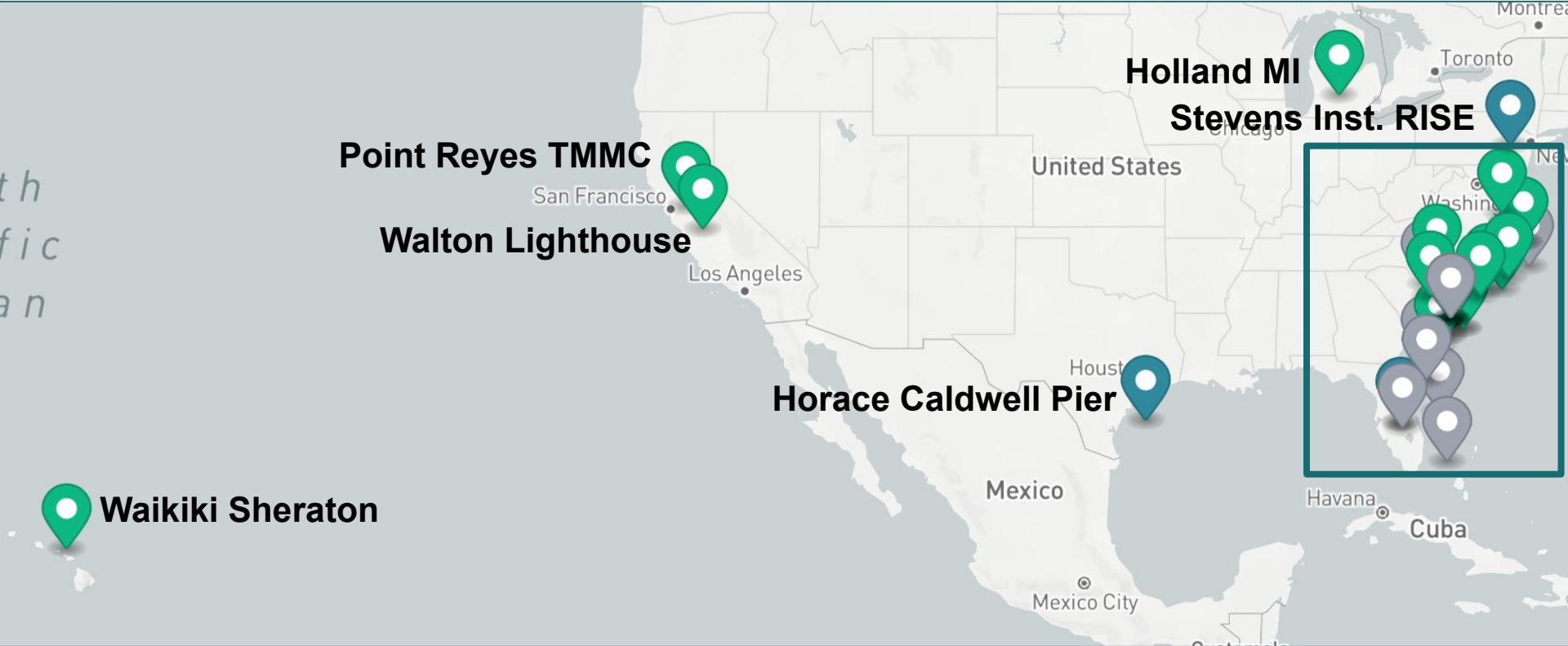


History: Launching WebCOOS

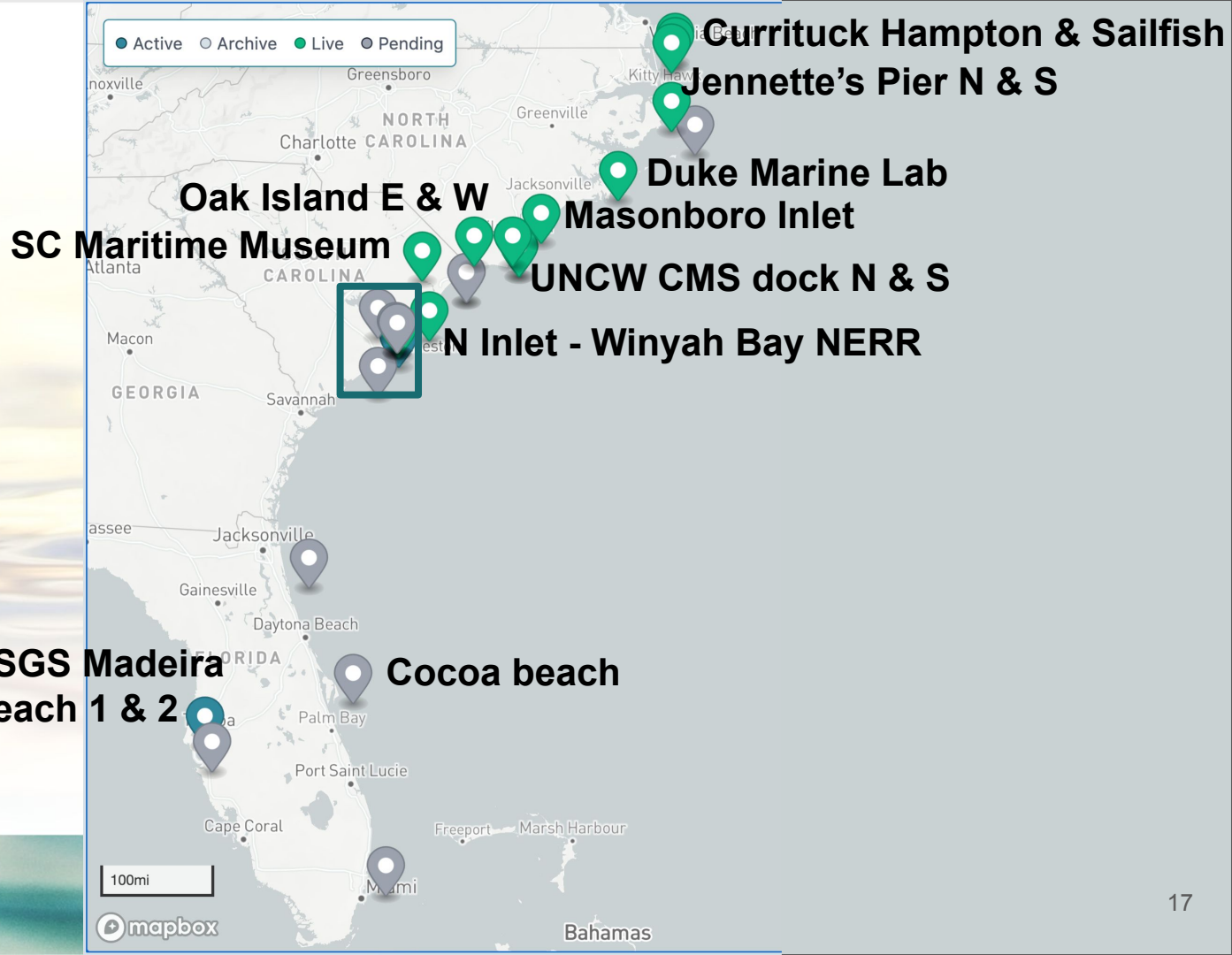
- Started in 2020, 19 active cameras
- Mainly in southeast, some in CA, HI, MI, TX
- Develop operational webcam coastal observing network
- Applications:
AI/ML, shoreline change,
flooding, beach usage,
rip currents
- 12.4M objects = >138
TB total



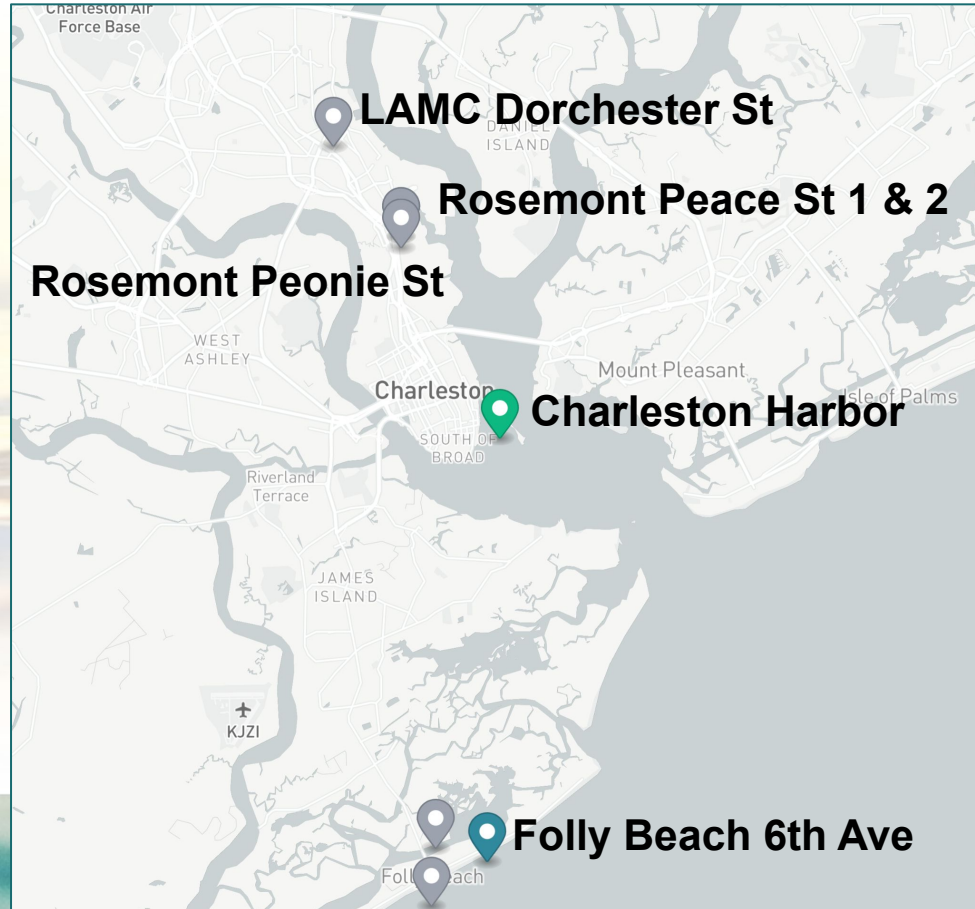
Map of WebCOOS locations (nationwide)



Map of WebCOOS locations (regional)



Map of WebCOOS locations (local)



Now: National WebCOOS

- Adding 6 cameras per IOOS RA over 3 years
- Installing webcams, and/or integrating Cameras Of Opportunity
- Applying relevant AI/ML algorithms to new webcams
- 2 planned workshops: **technical** & applications
- Refine install & operation procedures, data management SOPs, develop training materials



Future National WebCOOS sites?



Planned workshops

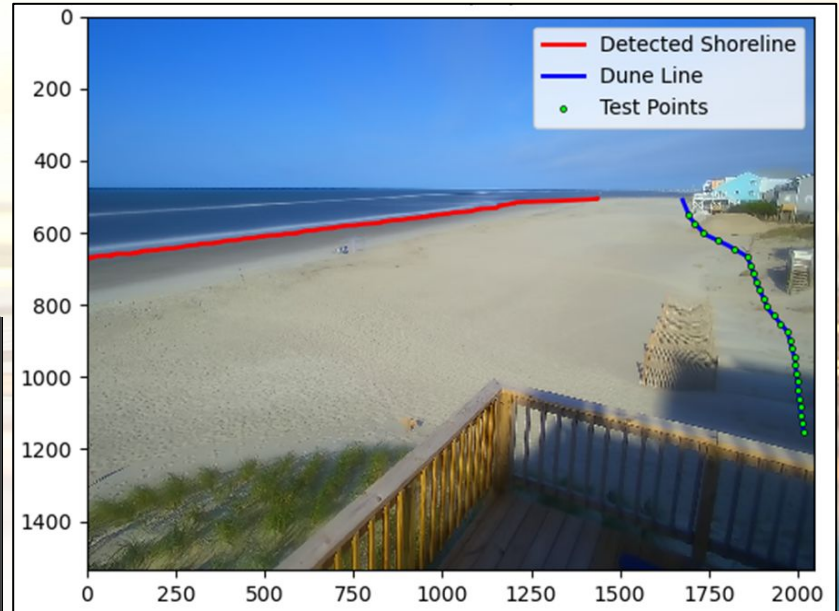
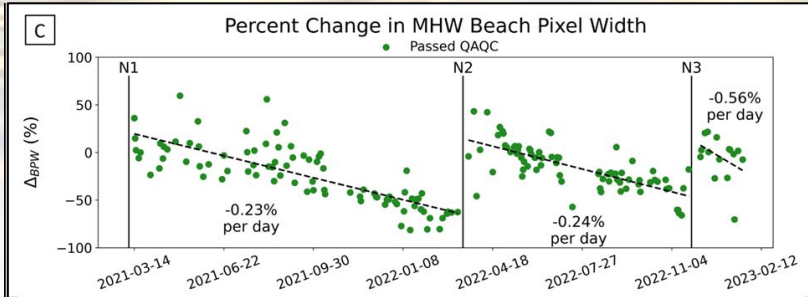
Year 1 (2024): technical workshop

- Focus on webcam installs, products, standards
- Build expertise in regions to support future installs & streamline data ingestion



Shoreline & coastal change

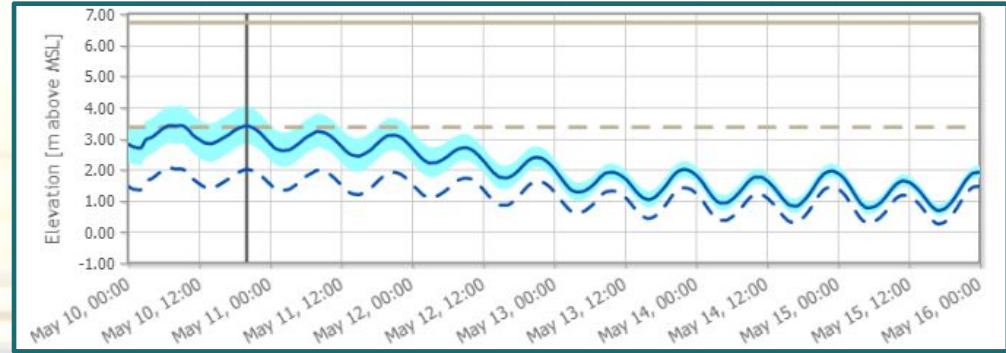
- Inter- and intra-annual trends in shoreline change.



Shoreline & coastal change

- Identify hourly shorelines to monitor storm impacts to dunes or infrastructure & validate operational national water level models

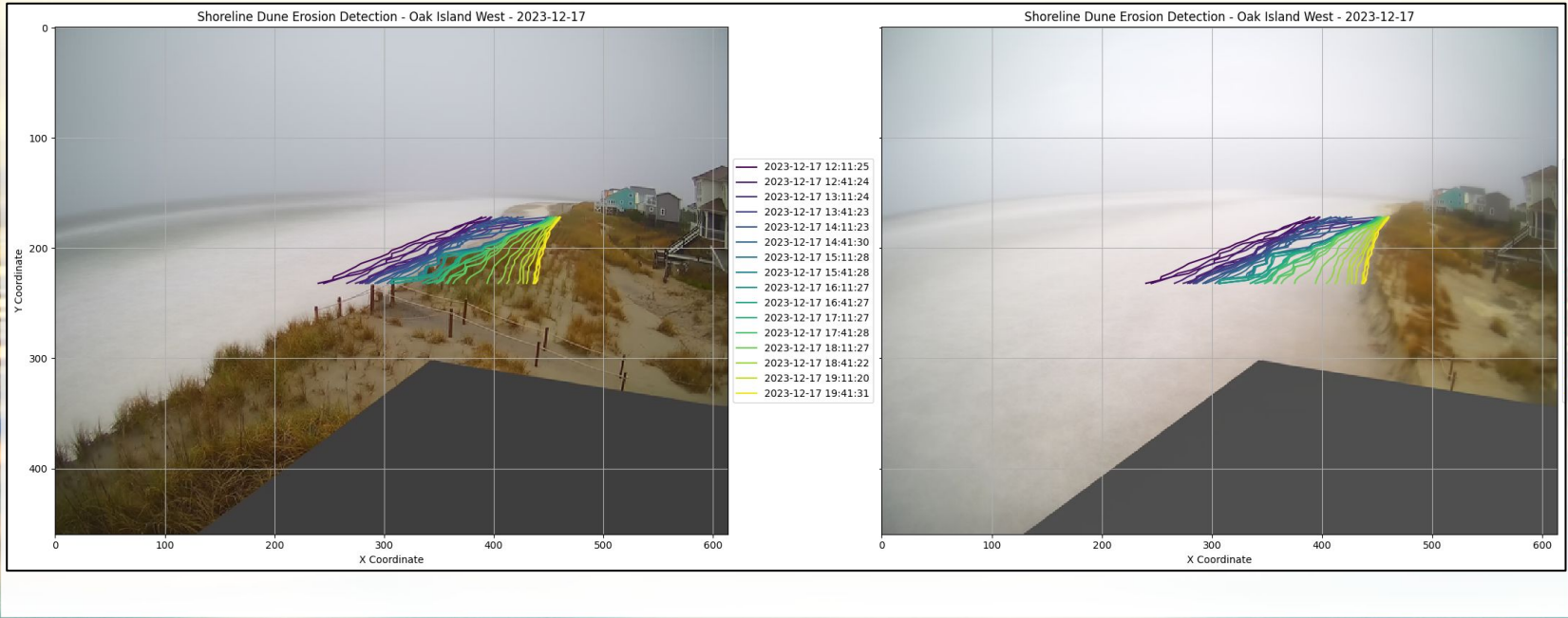
<https://coastal.er.usgs.gov/hurricanes/research/twlvviewer/>



Partners:



Shoreline & coastal change



Rip current detection methods

Flow Based Approach



Machine Learning Approach (Appearance)

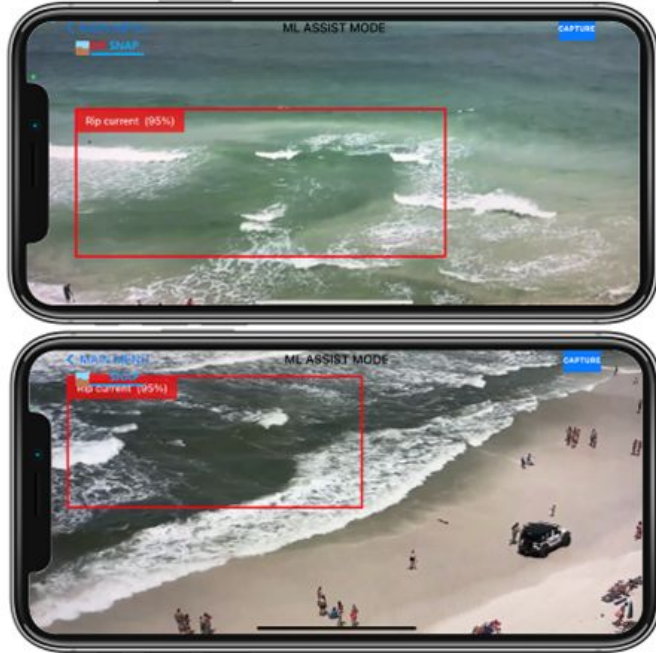


Machine Learning Approach (Behavior)

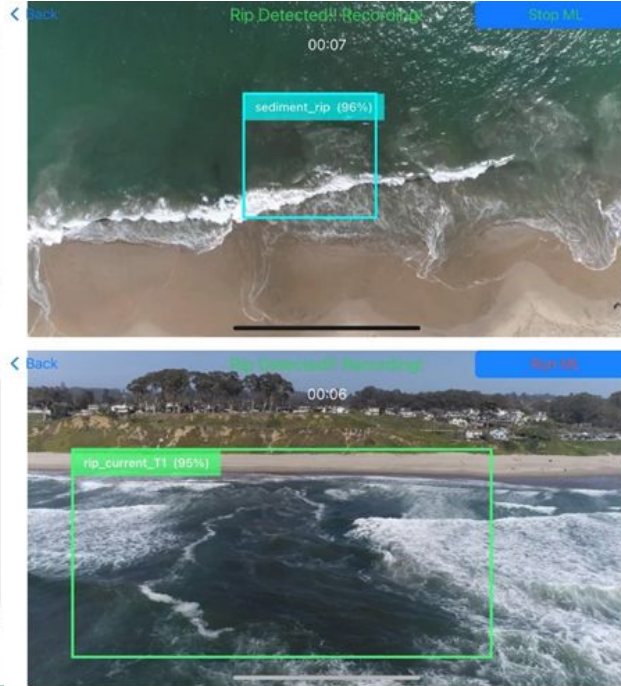


Related works

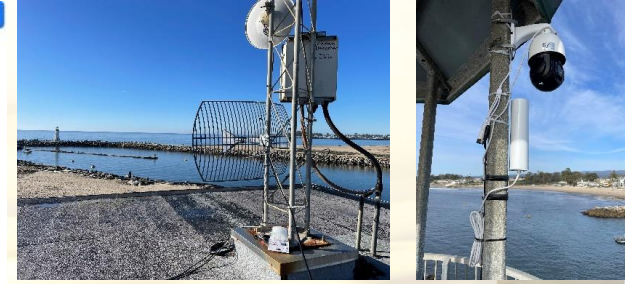
Rip Finder



Rip Scout



Walton Lighthouse



Seal Detection (MMRC)



Coastal flooding & impacts

- Charleston, SC & Beaufort, NC
- Co-located with NOAA NWLON stations

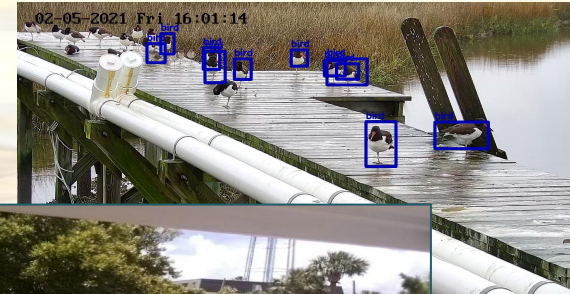
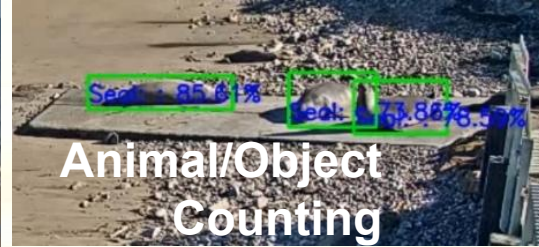


Coastal flooding & impacts



Situational awareness & reporting

Beach Usage Detection/Counting



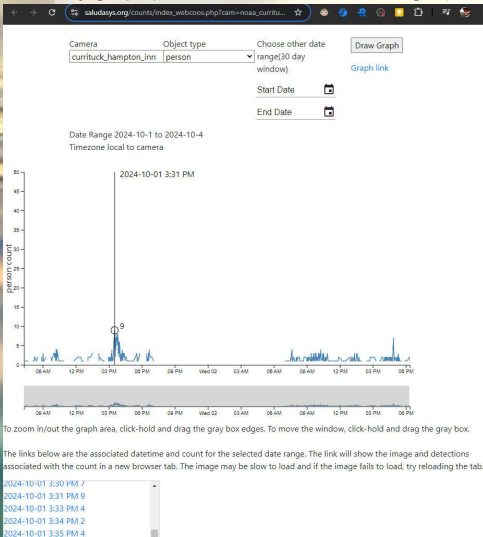
Situational awareness & reporting

Object Detection(person,...)



Hampton Inn

Activity graph(time vs counts, links to images)



Alert/notification thresholds

Alerts

Type	Location	Activate	Delete
person_count_gt_20	noaa_currinuck_hampton_inn	Activate	Delete
person_count_gt_20	noaa_currinuck_sailfish	Activate	Delete
person_count_gt_30	noaa_currinuck_sailfish	Mute	Delete
person_count_gt_5	noaa_currinuck_sailfish	Activate	Delete

Add Alert

Please choose alert type and location and click the 'Add' button to add the alert. Maximum of 8 alerts total. In the alert listing above, the 'Mute' button will deactivate the alert and can be toggled back on with the replaced 'Activate' button. The 'Delete' button will delete the alert.

Type: Location: Add

Alert Types

- Person count > 5, the detected count of people is greater than 5, alert resets after 16 hours
- Person count > 20, the detected count of people is greater than 15, alert resets after 3 hours
- Person count > 30, the detected count of people is greater than 20, alert resets after 1 hours

Locations

To review WebCOOS camera locations further:

- [Currinuck-Sailfish-Activity-Graph](#)
- [Currinuck-Sailfish-Camera](#)
- [Currinuck-Hampton-Inn-Activity-Graph](#)
- [Currinuck-Hampton-Inn-Camera](#)

Text/Email notification

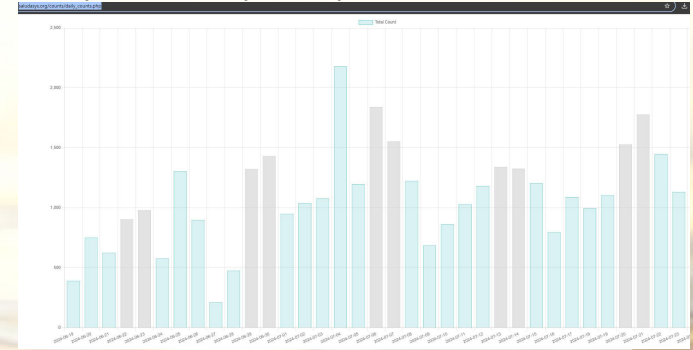
auto-alert: person count > 30 (at 34) at noaa_currinuck_sailfish

midnightreary7@gmail.com Sat, Aug 10, 2:51 PM

person count > 30 (at 34)
location noaa_currinuck_sailfish
count [https://saludaysys.org/counts/index_webcoos.php?cam=noaa_currinuck_sailfish](https://saludaysys.org/counts/detect_webcoos.php?filenname=curreinuck_sailfish-2024-08-10-1045432_log&obj_type=person&station=noaa_currinuck_sailfish&action=get_activity)
camera: https://webcoos.org/cameras/curreinuck_sailfish/

Notification settings: https://saludaysys.org/notifypage/login.php?app_type=webcoos

Daily status or activity summary

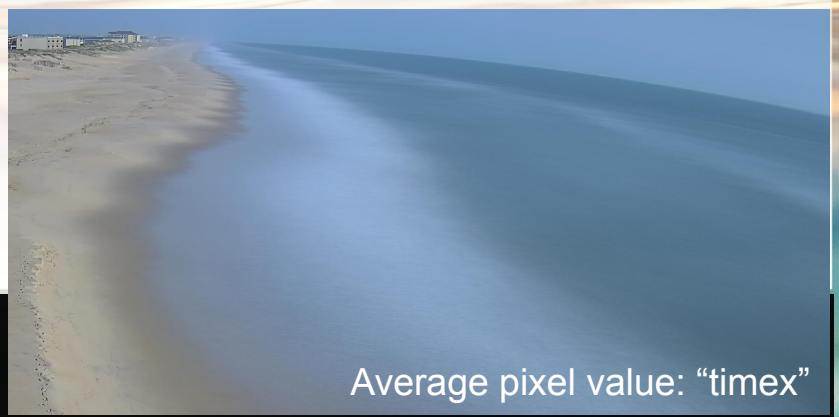
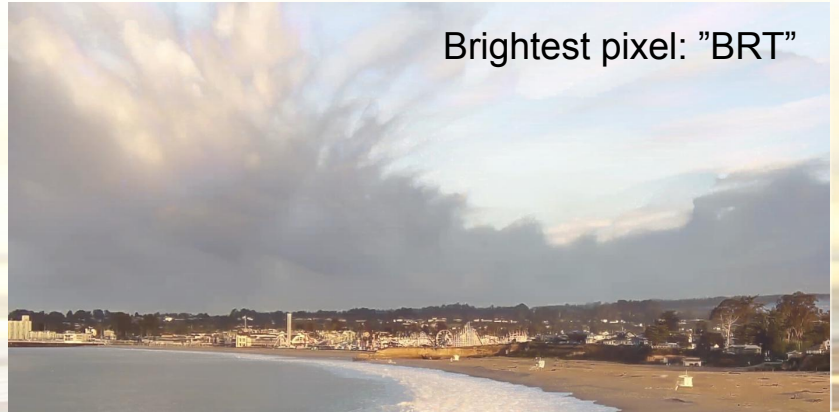


Hourly activity summary



Integrating AI/ML algorithms

- Scaling to multiple cameras in the cloud in near real time



Camera access: WebCOOS.org or API

Web Camera Observation Network

Web cameras are a low cost coastal observing platform transforming how environmental monitoring is conducted. Web camera data has demonstrated value to address significant gaps in the nation's ability to monitor and accurately forecast various weather, ocean, ecological and public health hazards. This project, webcam coastal observation system (webcoos), promotes low cost webcams to:



Identify rip currents



Study Beach erosion



Monitor Beach Usage



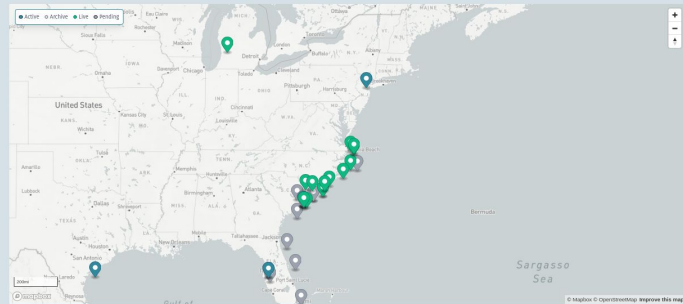
Flood Monitoring

JOIN OUR NETWORK

SEE HOW WEBCAM DATA ARE BEING USED



Cameras



News



webcoos

GET	/webcoos/api/v1/assets/	Assets (Cameras) API	webcoos_api_v1_assets_list
GET	/webcoos/api/v1/assets/{identifier}/	Assets (Cameras) API	webcoos_api_v1_assets_read
GET	/webcoos/api/v1/assets/{identifier}/elements/latest/image/		webcoos_api_v1_assets_elements_latest_elements_latest_image
GET	/webcoos/api/v1/assets/{identifier}/elements/latest/video/		webcoos_api_v1_assets_elements_latest_elements_latest_video
GET	/webcoos/api/v1/elements/	Elements (Files) API	webcoos_api_v1_elements_list
GET	/webcoos/api/v1/elements/{identifier}/	Elements (Files) API	webcoos_api_v1_elements_read
GET	/webcoos/api/v1/packages/		webcoos_api_v1_packages_list
GET	/webcoos/api/v1/packages/{identifier}/		webcoos_api_v1_packages_read
GET	/webcoos/api/v1/retention/stats/		webcoos_api_v1_retention_stats_list
GET	/webcoos/api/v1/services/	Service (Access Methods) API	webcoos_api_v1_services_list
GET	/webcoos/api/v1/services/{identifier}/	Service (Access Methods) API	webcoos_api_v1_services_read
GET	/webcoos/api/v1/services/{identifier}/elements/		webcoos_api_v1_services_elements
GET	/webcoos/api/v1/services/{identifier}/elements/latest/		webcoos_api_v1_services_elements_latest_read
GET	/webcoos/api/v1/services/{identifier}/elements/latest/redirect/		webcoos_api_v1_services_elements_latest_elements_latest_redirect
GET	/webcoos/api/v1/services/{identifier}/inventory/		webcoos_api_v1_services_inventory_read

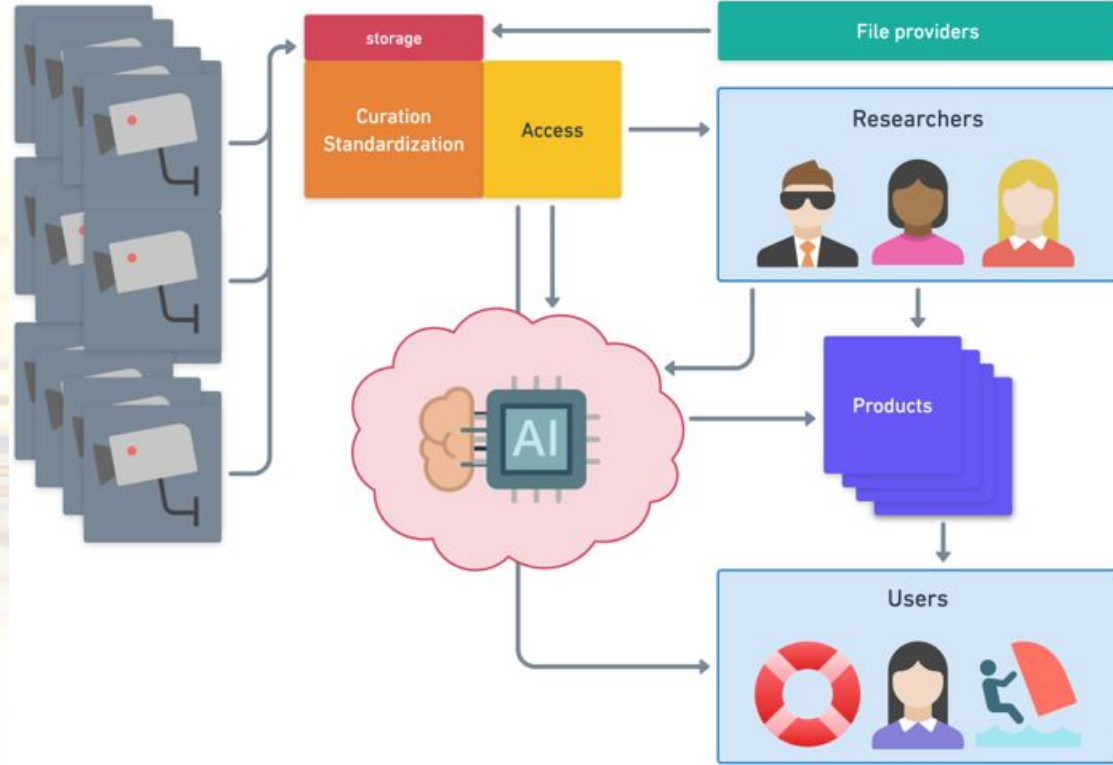


Axiom
DATA SCIENCE



Imagery → WebCOOS

- **Preferred:** Access to live RTSP feed.
- Option 2:
 1. Upload standardized video files regularly through API (S3, etc.).
 2. Access video footage files & download periodically (HTTP, S3, etc.).
 3. Upload files via a website.

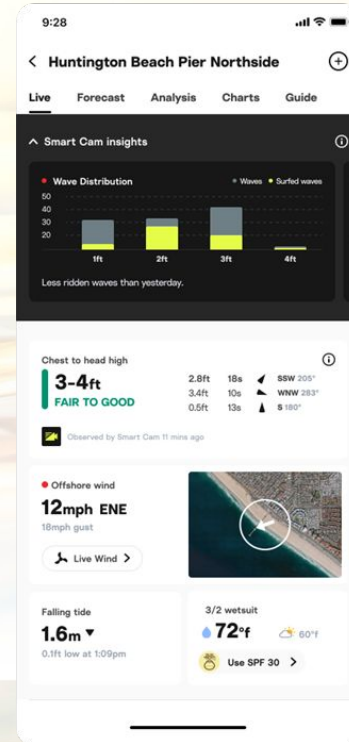
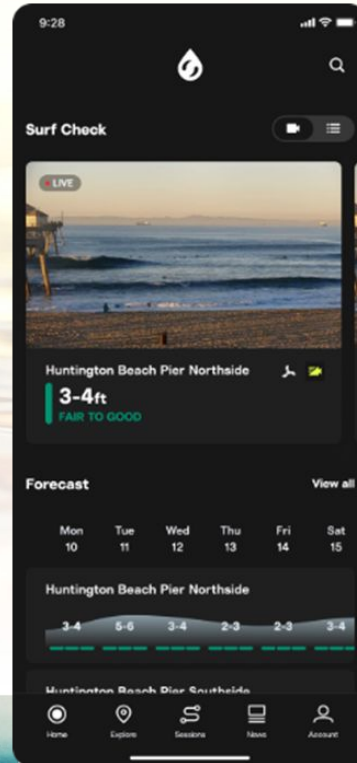


Installation contractor: Surfline



Serving The Surf Community For Over 35 Years

Founded in 1985, Surfline has become the nucleus of global surf culture by helping surfers find the right waves at the right times all around the world



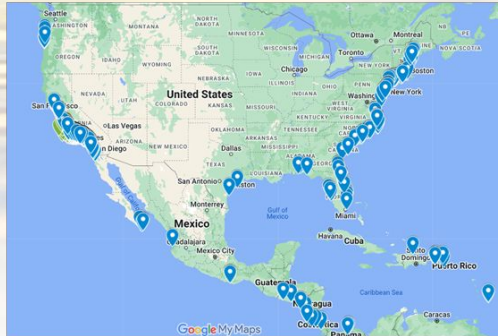
Surfline Technical Overview




Managed Network of >1.2k
Cameras Across the Globe

Proprietary Nearshore Wave
Models and 30 Years of
Observation Data


Extensive AI/ML Capabilities
Running Across our Global
Network of Cameras









 **Kurt Korte**
Last updated about 2 hours ago

Rideable swell mix today but conditions are textured and sideshore. Not great, but something to do.

The incoming tide push through the morning should offer a few small but rideable waves with NNE winds and semi clean, textured conditions. Better spots see surf in the knee-waist high range so you'll want a big, foasty board to try to make the most of the little surf we have. The dropping tide over the afternoon won't do us any favors but there should still be something to ride if you want to get in the water and that's your window...I'd just keep my expectations really low.

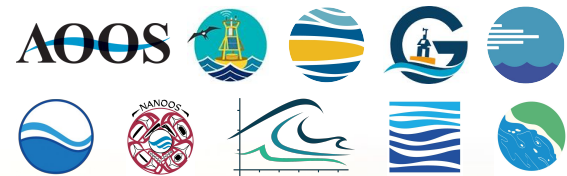
Surf Forecast 
LOTUS Model

Today	Tomorrow	Fri, 10/11	Sat, 10/12	Sun, 10/13	Mon, 10/14
1-2ft	2-3ft+	3-4ft+	2-3ft+	1-2ft	0-1ft
					



Collaborations & partnerships

- NOAA IOOS & NWS
- USGS [CoastCams](#)
- USACE ERDC [CorpsCam](#)
- Local lifeguarding, beach safety, public health, community development agencies & organizations
- Cultural resources: The Marine Mammal Center, NPS, SC Maritime Museum
- Camera hosts & operators



North Inlet - Winyah Bay
National Estuarine Research Reserve

