

# WebCOOS Workshop

## July 21-22, 2026

### La Jolla, CA



**SECOORA**  
S O U T H E A S T  
C O A S T A L O C E A N O B S E R V I N G  
R E G I O N A L A S S O C I A T I O N



# Thank you!

The logo for the IOOS Association. It features the letters "IOOS" in a large, bold, dark blue serif font. Below "IOOS" are three stylized, wavy lines in a teal color, representing ocean waves. Underneath the waves, the word "ASSOCIATION" is written in a smaller, dark blue, all-caps serif font.

**IOOS**  
ASSOCIATION



SOUTHERN CALIFORNIA  
**COASTAL OCEAN  
OBSERVING SYSTEM**



## Agenda: Day 1 (Morning)

|                            |                                                     |
|----------------------------|-----------------------------------------------------|
| <b>9:00 am - 9:45 am</b>   | <b>Welcome, Introduction &amp; Retrospective</b>    |
| <b>9:45 am -10:50 am</b>   | <b>Current Products (Presentations)</b>             |
| <b>10:50 am - 11:00 am</b> | <b>Break</b>                                        |
| <b>11:00 am - 12:00 pm</b> | <b>National Stakeholder Session (Presentations)</b> |
| <b>12:00 pm - 1:00 pm</b>  | <b>Lunch</b>                                        |

# Workshop Goals & Objectives

## Objectives:

- Discuss user needs for products
- Identify regional & national priorities
- Explore new webcam uses and applications
- Strategize development of new products

## Outcomes:

- Workshop summary/report
- List of priority products & projects and next steps for development







# **Retrospective: Where Do Things Stand?**

**Debra Hernandez, SECOORA**

# Project Management

## OTT WebCOOS Grant

- Start: Sept. 1, 2023
- End: Aug. 31, 2027
- Bulk of remaining funds:
  - Workshop
  - Additional camera installations

## IRA Topic 2: DAC funding

## SECOORA staff leads:

### Installation Management

- Jennifer Dorton
- Surfline & RA install coordination
- Environmental compliance

### Website & DMAC

- Debra
- Tetra Tech coordination

**New staff Sept. 1: David Wells**



# Progress

## *... and lessons learned*

### Achievements:

- **Built a network**
  - Transitioned from regional to national
  - Transitioned from development to quasi-operational
- **43 Cameras installed**
  - And more planned
- **63 Cameras live on the portal**
  - + 16 archived
- **Knowledge transfer**
  - Technical documentation

### Challenges:

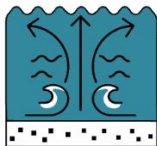
- **Finding sites / hosts**
  - Unfunded time & effort by RAs
- **Enabling fully operational products**
  - Still have humans in the loop





## 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

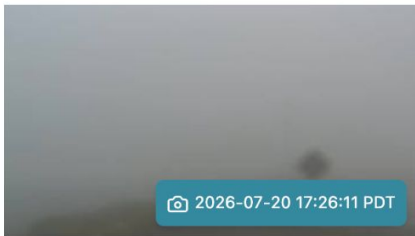
[JOIN OUR NETWORK!](#)[SEE HOW WEBCAM DATA ARE BEING USED](#)

ZOC



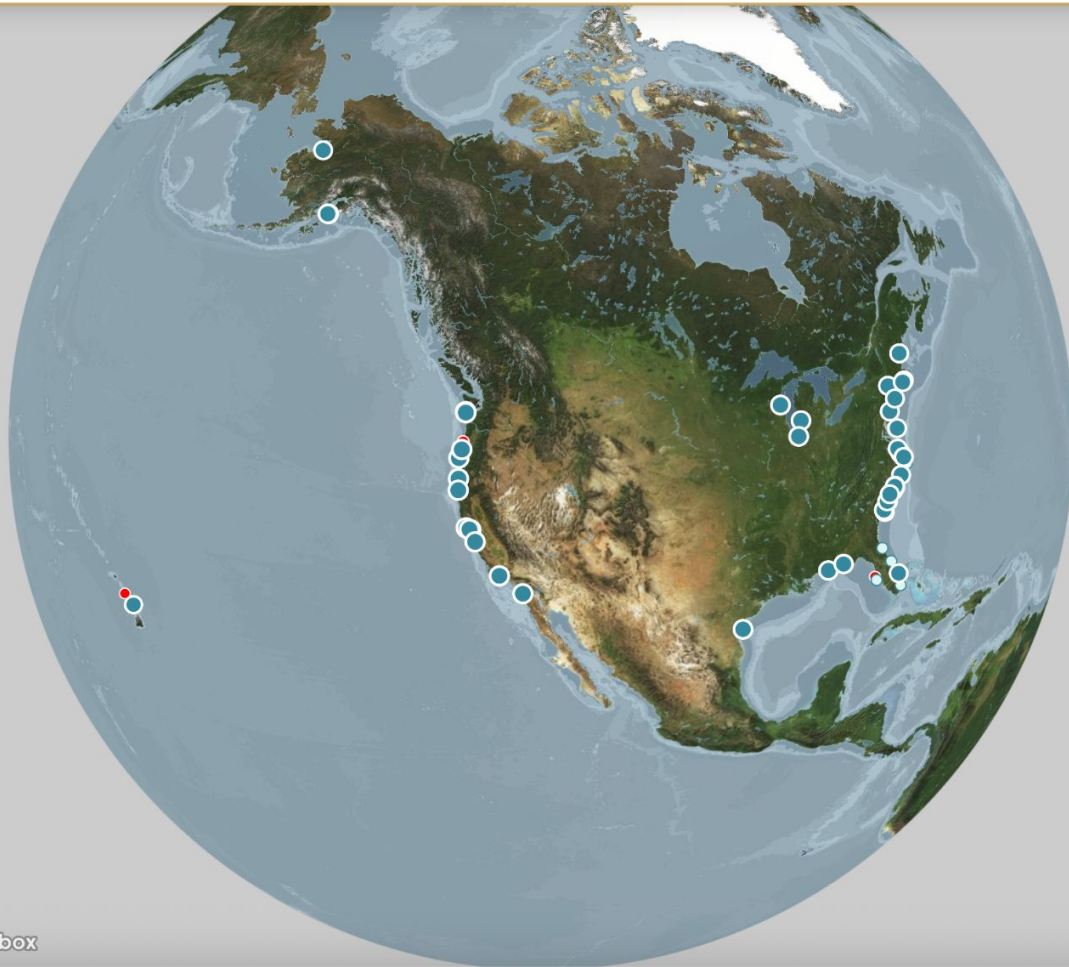
### Shilo Inns at Newport, OR

Down



### Siuslaw River mouth at North Jetty Beach

Up



# Applying the Video and Images

WebCOOS cameras are collecting video and images which can be used for general coastal observing purposes. For example, our [Point Reyes National Seashore camera](#) is being used to allow users to view rehabilitated patient releases from The Marine Mammal Center. The [camera at the South Carolina Maritime Museum in Georgetown, SC](#) is being used to monitor river use on the Sampit River, people traffic at events, and to remotely evaluate flooding impacts during storms.



Example time lapse video from the South Carolina Maritime Museum Annual Boat Show on Saturday, October 21, 2023.

For many cameras, the images and videos are also being further analyzed for uses such as identifying rip currents, monitoring beach usage, and studying beach erosion. The products of the analysis can be used by environmental resource managers, public safety and health officials, tourism officials, and local weather forecast offices. The links below provide details on how researchers in the Southeast are using algorithms, machine learning, and artificial intelligence to develop products specific to the uses below.



## Rip Current Detection

Used to inform public of rip current dangers and issue alerts to lifeguards.

2

[Read more →](#)



## Shoreline change

Used to identify potential dune erosion or overwash events, infrastructure risk, and limitations to beach access.

5

[Read more →](#)



## Automated Beach Usage Detection

Provides information to coastal managers on how busy a location is during different times of the day, season, or year for planning purposes.

7

[Read more →](#)



## Flood Monitoring

Helps to document flooding impacts and provide realtime alerts for local communities.

[Read more →](#)





9:45 am - 10:50 am

# Current Products

Fahim Khan, California Polytechnic State University, San Luis Obispo

Matthew Conlin, Ocean Associates, Inc. and NOAA CO-OPS

Jeremy Cothran, University of South Carolina

Joseph Long, University of North Carolina Wilmington

Jennifer Vreeland-Dawson, Ocean Associates, Inc. and NOAA CO-OPS



CAL POLY

UC SANTA CRUZ

WebCOOS Workshop 2026

# Rip Current Detection and Data Collection using Machine Learning Models

Fahim H Khan, PhD (Cal Poly, SLO)

Alex Pang, PhD (UC Santa Cruz)

# Main Idea for Rip Current Detection

Detect rip current based on appearance and/or behavior

Using state-of-the-art AI/ML object detection models





# Training an ML Model to Recognize Rip Currents

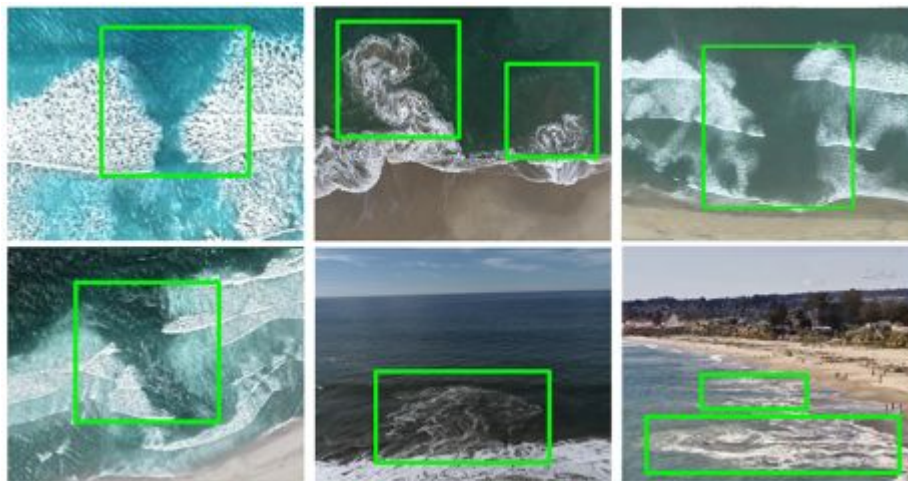
Requires a large number of labeled images containing rip currents

We collected training data from different sources

We trained multiple ML models

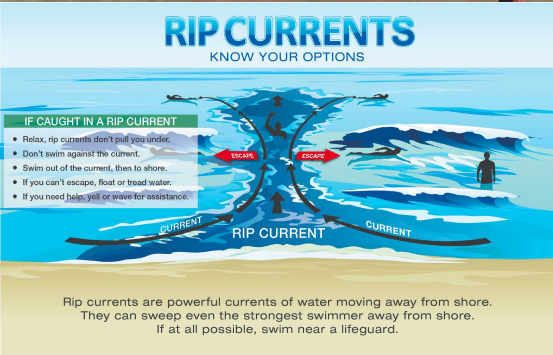
Current models are based on:

Faster R-CNN  
EfficientDet  
YOLOv8  
YOLO11  
YOLO26



# Dataset and Types of Rip Currents

## Bathymetry Rip

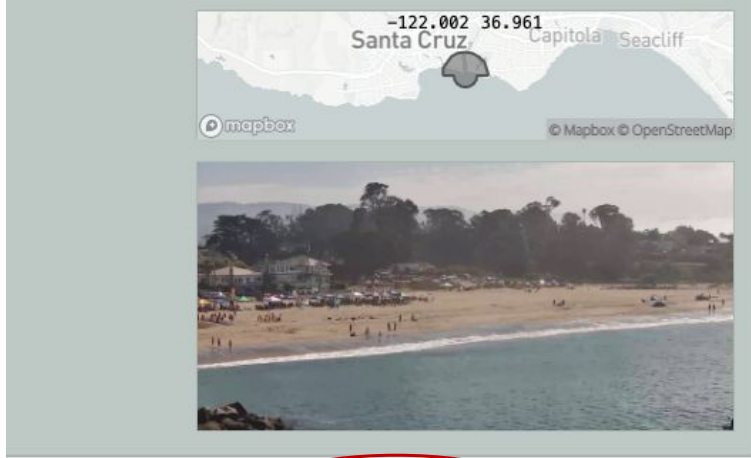


Training dataset:

- ☐ 12,686 images
- ☐ 19,051 rip current annotations
- ☐ Includes both rip-current and non-rip (negative) examples

Image Source: NOAA/ National Weather Service

# Rip Current Detection at Network Cameras (WebCOOS)



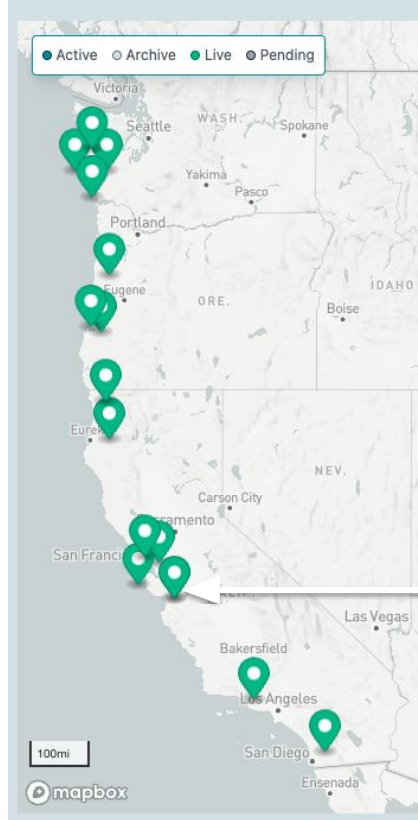
ONE-MINUTE-STILLS

ANNOTATED-IMAGE

VIDEO-ARCHIVE



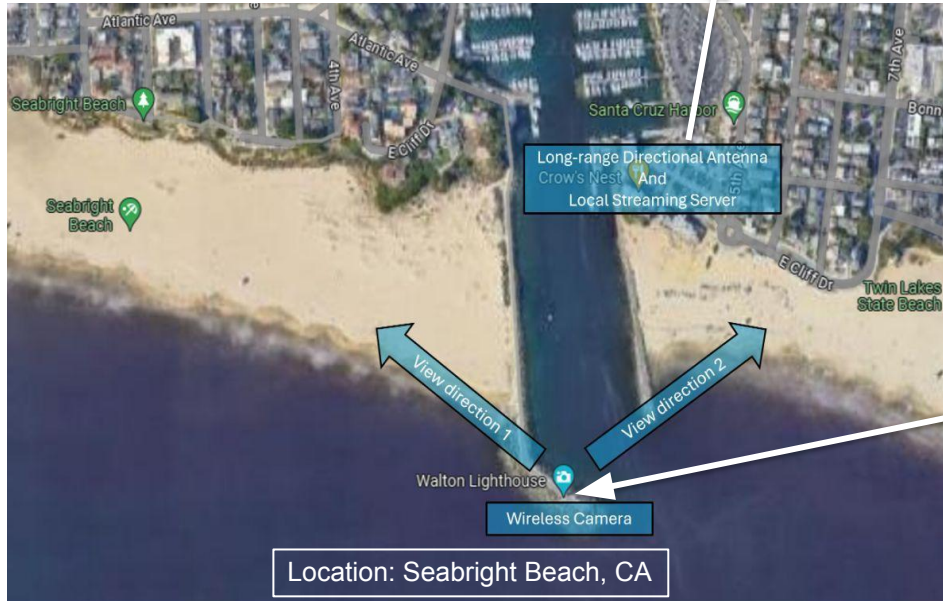
## Cameras





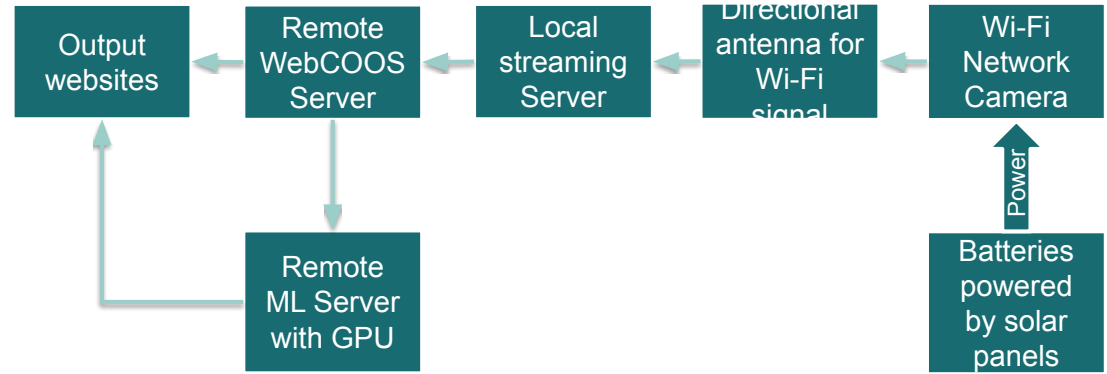
# Network Camera at Walton Lighthouse, Santa Cruz

- 
- 



# Network Camera at Walton Lighthouse, Santa Cruz

- Design and Implementation
- Challenges and Success

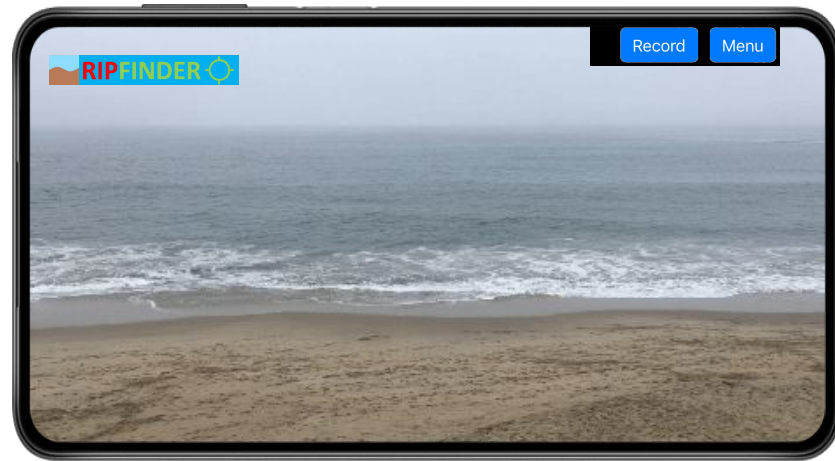
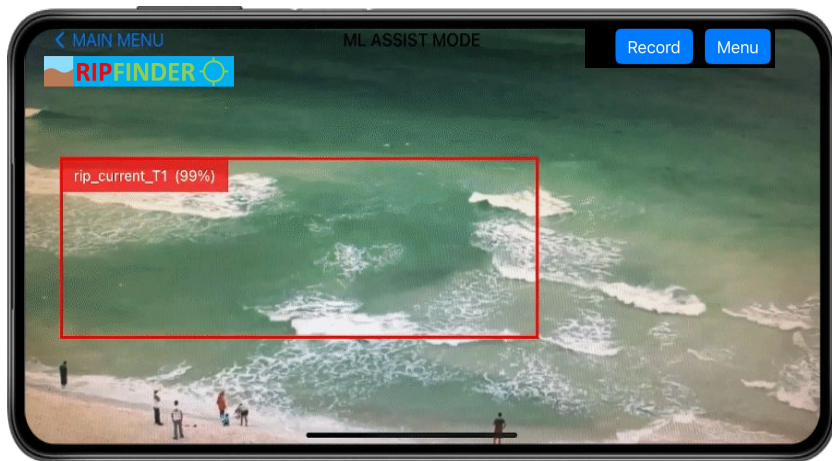


## Future considerations

- More data
- Newer improved models
- GPU server for real-time results

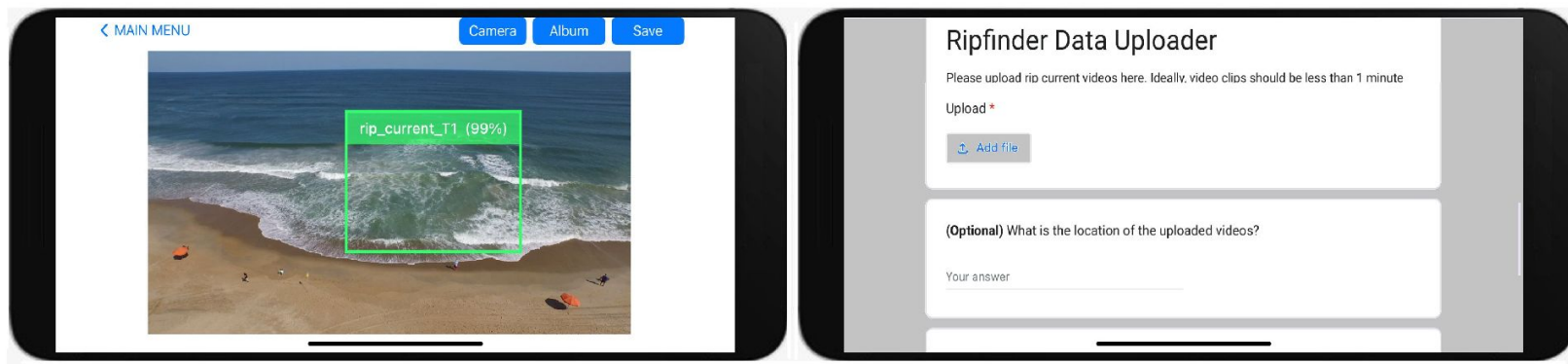
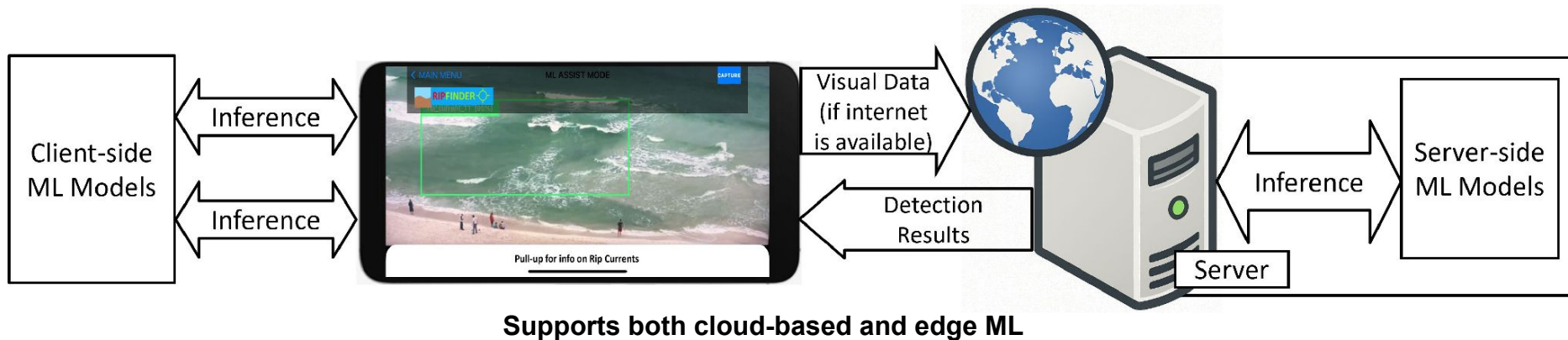


# RipFinder



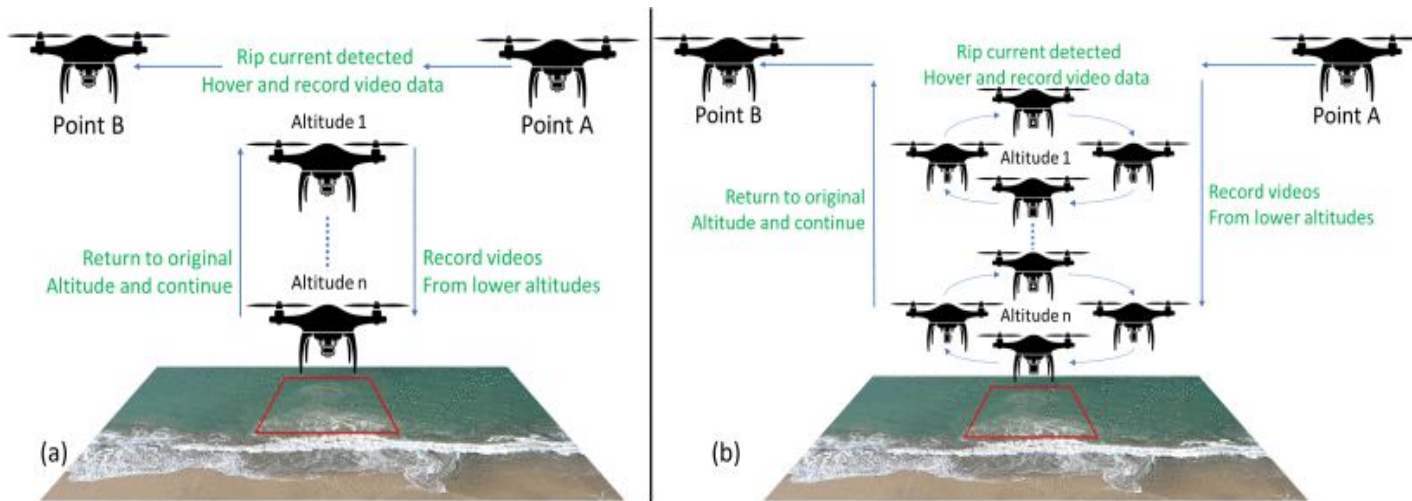


# RipFinder: Design Considerations

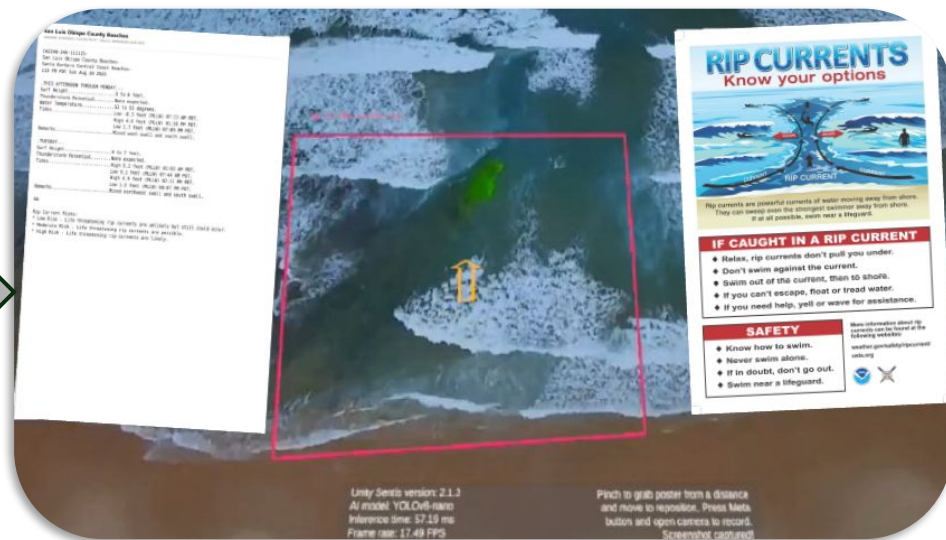


**Data Collection using Citizen Science**

# RipScout: Automated Data Collection



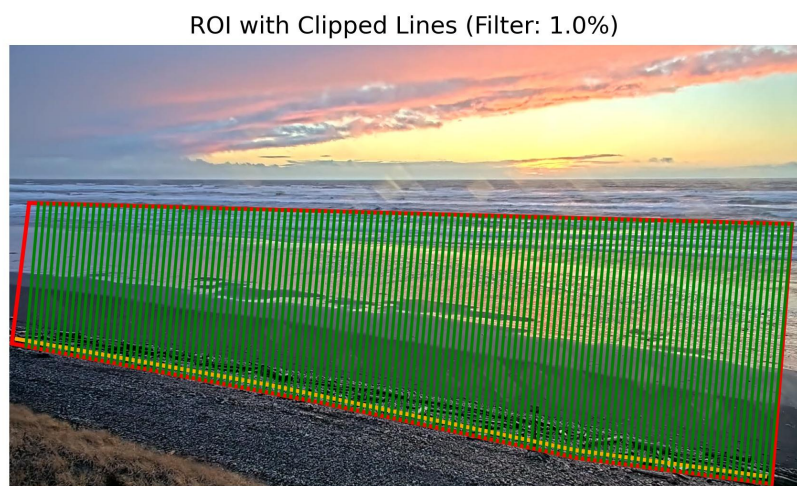
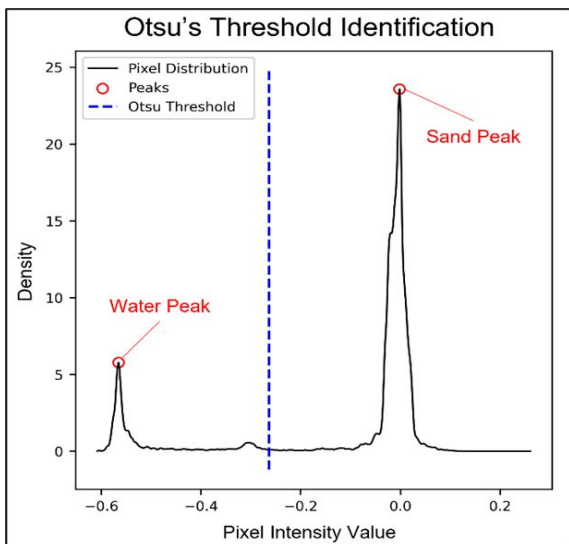
# Rip Current Detection in Extended Reality (XR)



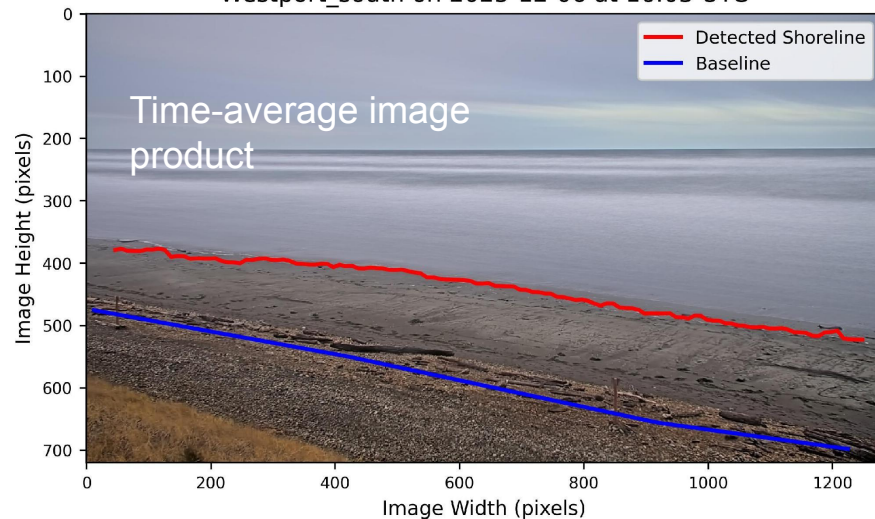


# Shoreline change

- Otsu's threshold to identify boundary between water and sand on cross-shore transects
- Each camera relies on a station configuration file
- UCSC workin on other ML-based methods

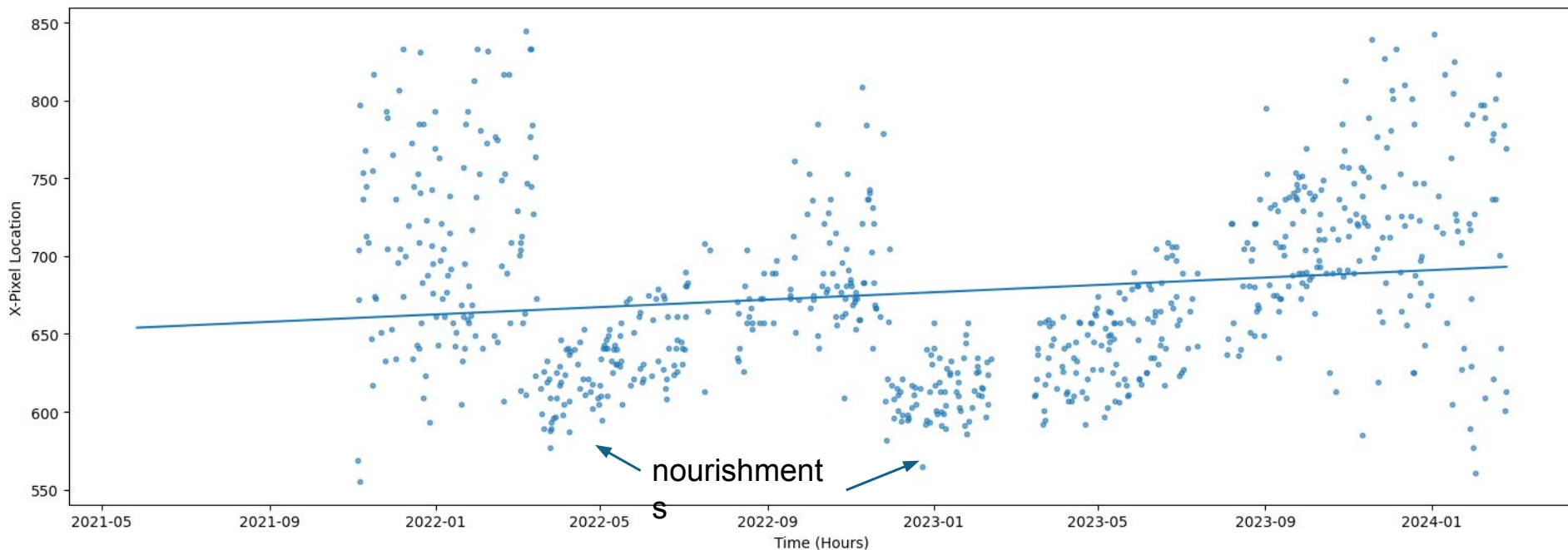


Transect Based Shoreline Detection (Time Averaged)  
Westport\_south on 2025-12-06 at 16:03 UTC

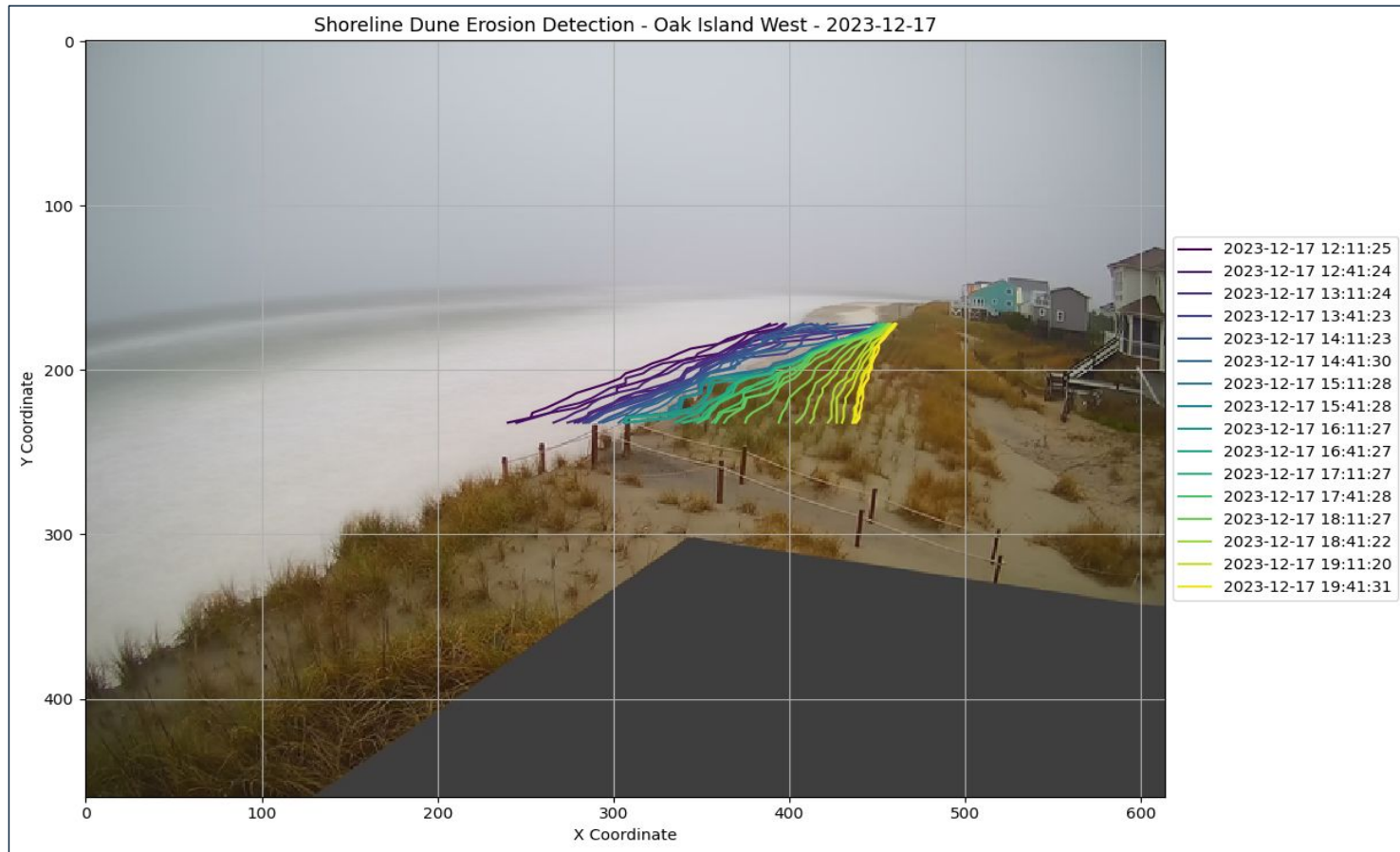


# Shoreline change: Trends

- Identify nourishments, seasonal changes, and persistent trends.
- PIXEL-Based measurements



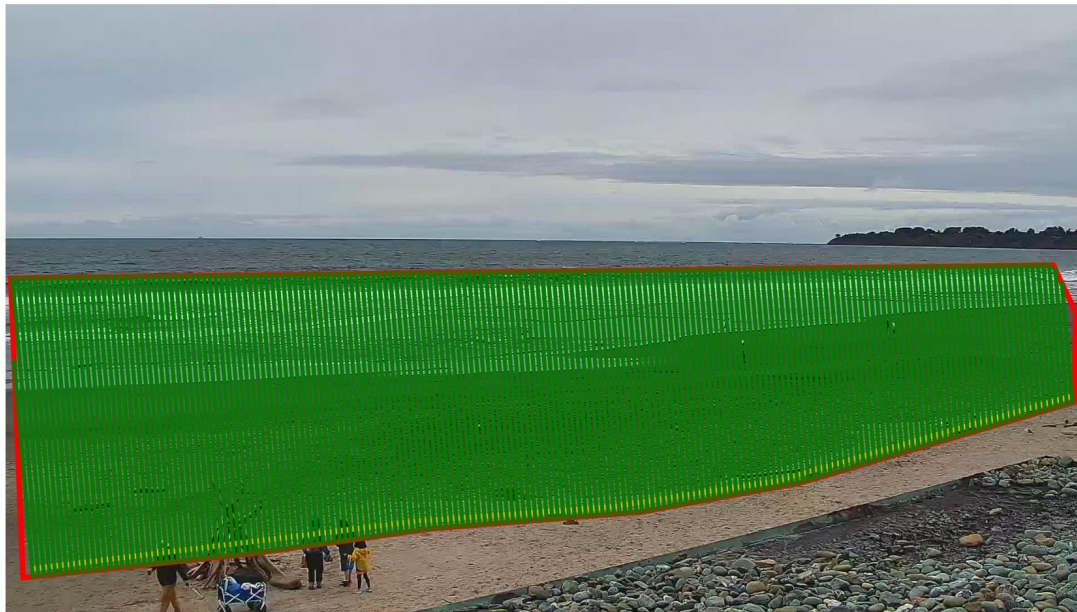
# Shoreline change: Events





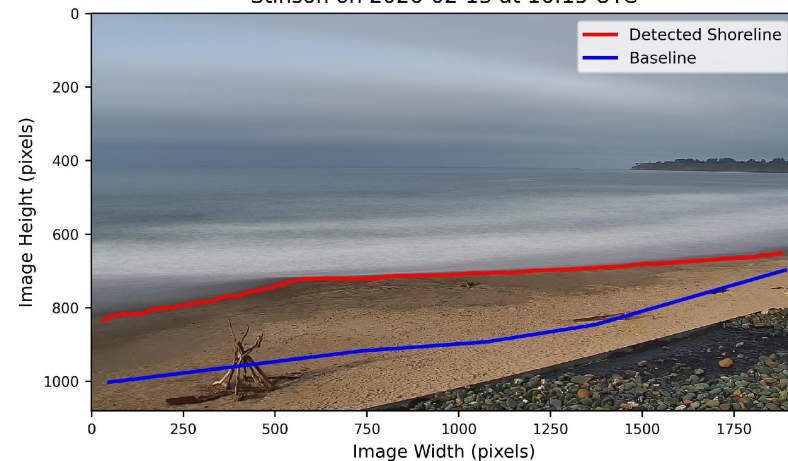
# Stinson, CA

ROI with Clipped Lines (Filter: 1.0%)

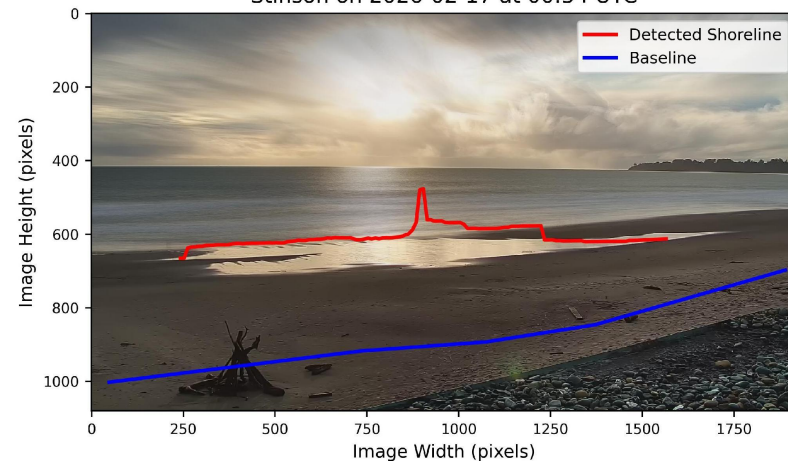


Configuration 1  
Low tide config with low and high tide time averaged stills  
Orientation: Forward  
Angle: 85 deg.  
Transect spacing: 10  
Valid from 02/12/2026 to 02/26/2026

Transect Based Shoreline Detection (Time Averaged)  
Stinson on 2026-02-13 at 16:15 UTC

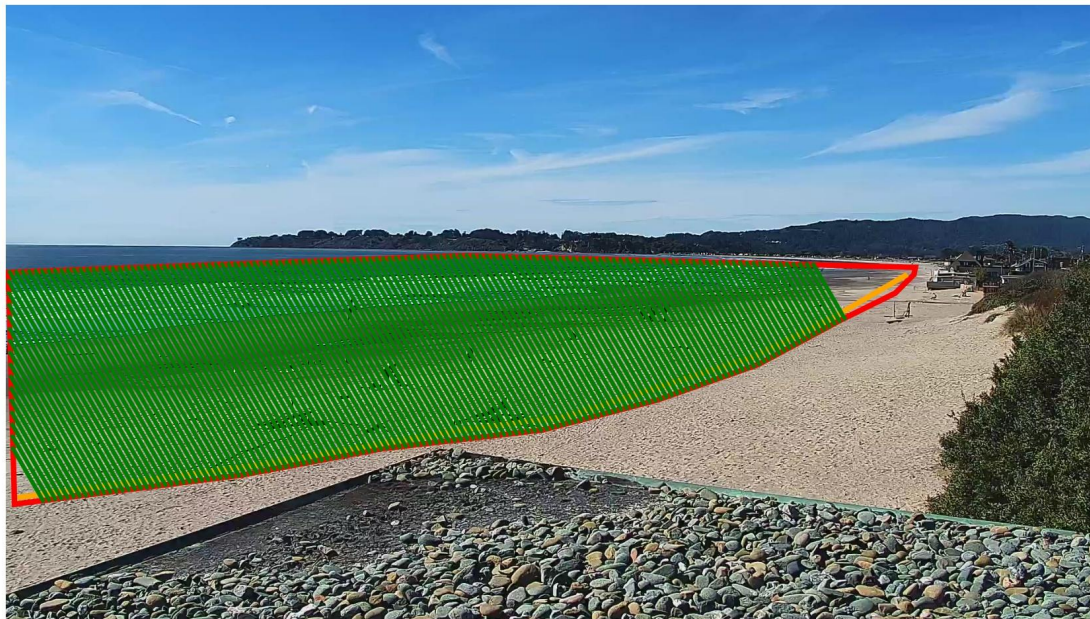


Transect Based Shoreline Detection (Time Averaged)  
Stinson on 2026-02-17 at 00:54 UTC



# Stinson, CA

ROI with Clipped Lines (Filter: 10.0%)



## Configuration 2

Low tide config with low and high tide time averaged stills

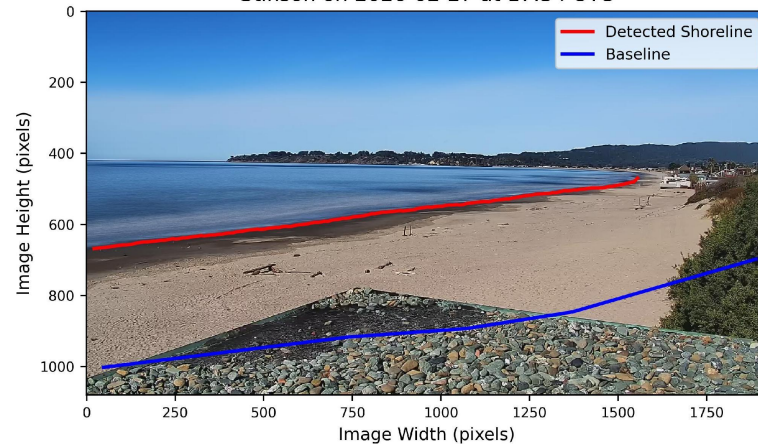
Orientation: Forward

Angle: 60 deg.

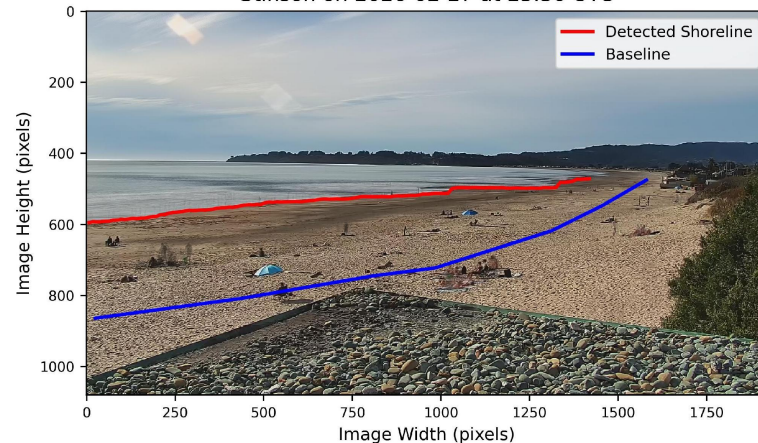
Transect spacing: 10

Valid starting 02/26/2026

Transect Based Shoreline Detection (Time Averaged)  
Stinson on 2026-02-27 at 17:34 UTC



Transect Based Shoreline Detection (Time Averaged)  
Stinson on 2026-02-27 at 23:30 UTC

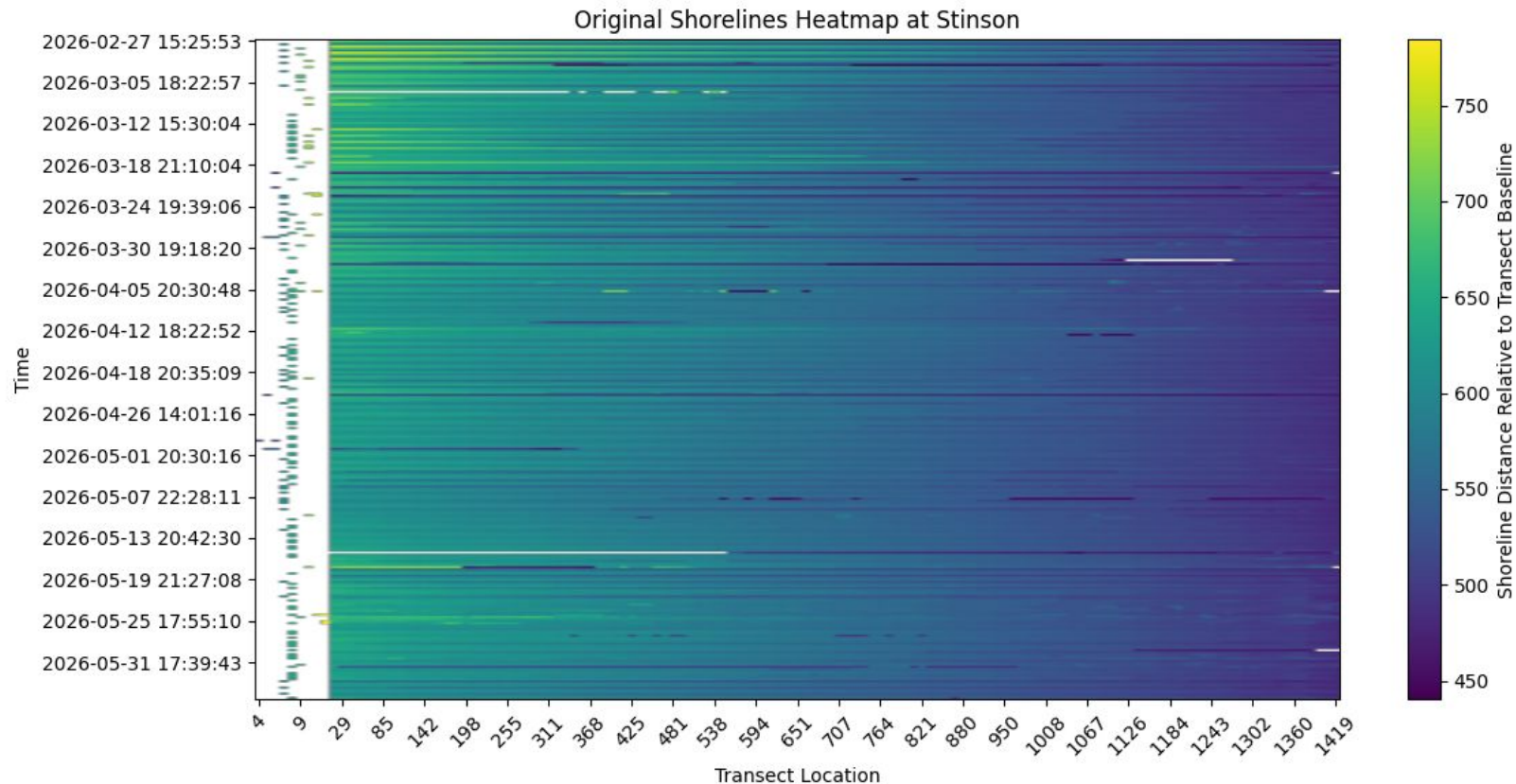




# Stinson, CA

Configuration 2

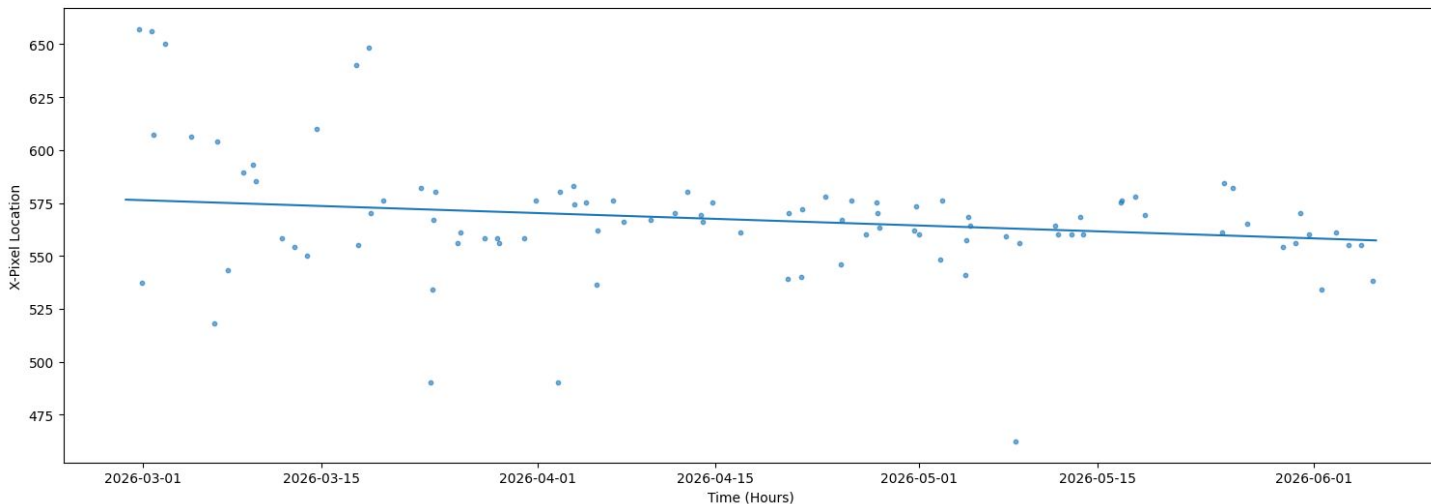
02/27/26 to 06/06/26



# Stinson, CA

Configuration 2  
02/27/26 to 06/06/26

Segmented Domain Shoreline Trend Models



Model Report

Date Range: 2026-02-27 to 2026-06-05  
Standard Deviation: 24.36  
Intercept ( $\beta_0$ ): 576.57  
Trend ( $\beta_1$ )(pixels/hour): -0.01  
Trend ( $\beta_1$ )(pixels/month): -5.88

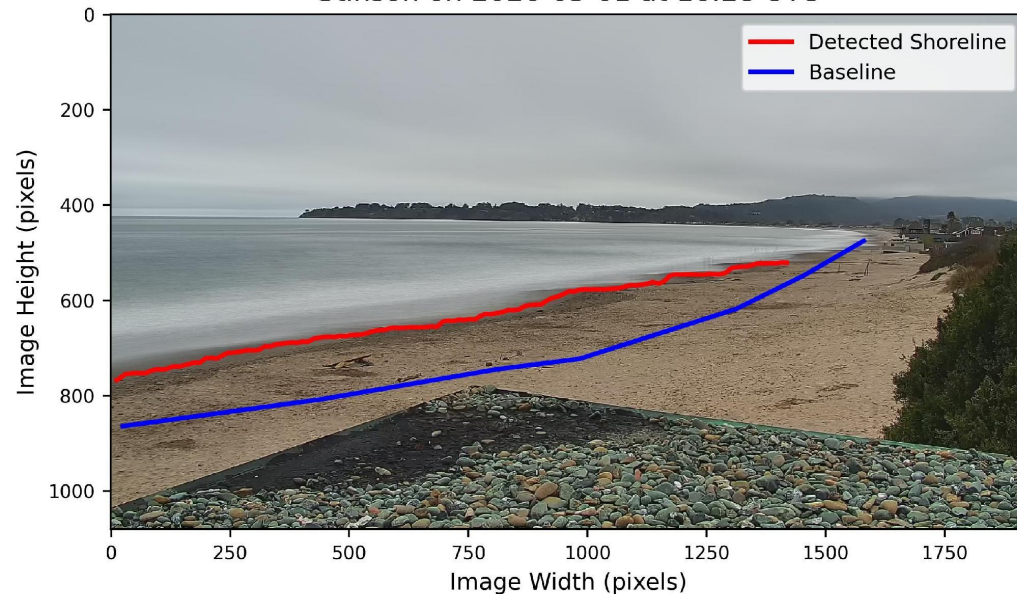


# Stinson, CA

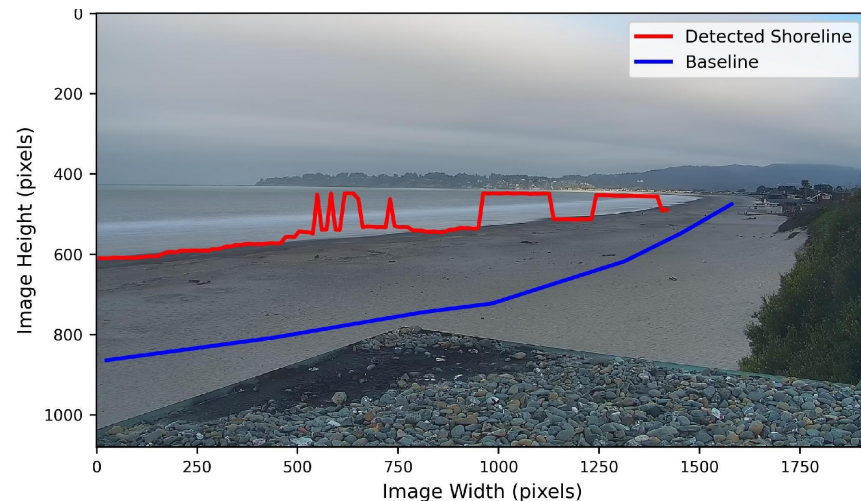
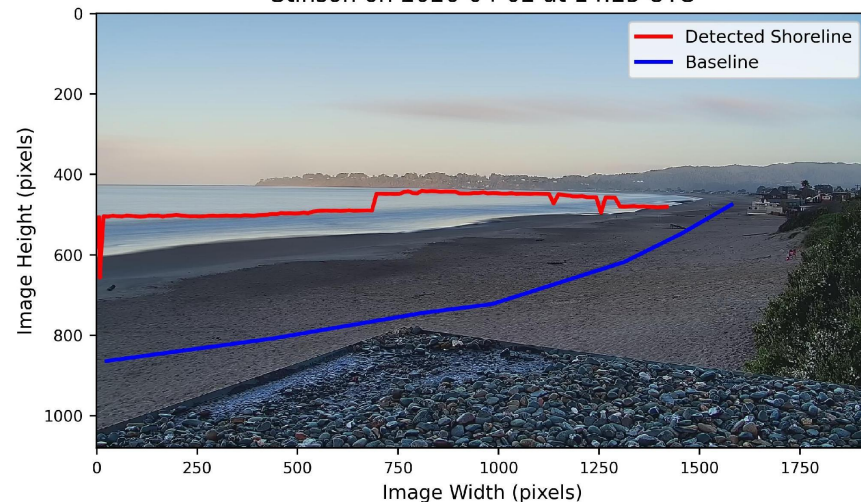
## Configuration 2

03/01/26, 04/02/26, 05/08/26

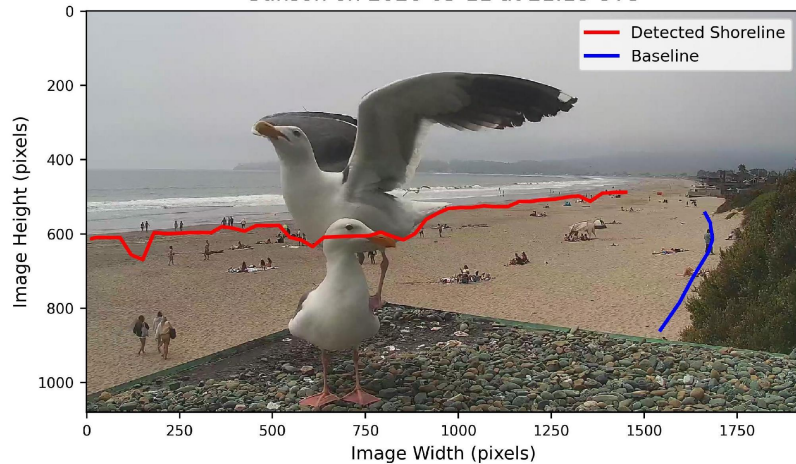
Transect Based Shoreline Detection (Time Averaged)  
Stinson on 2026-03-01 at 16:28 UTC



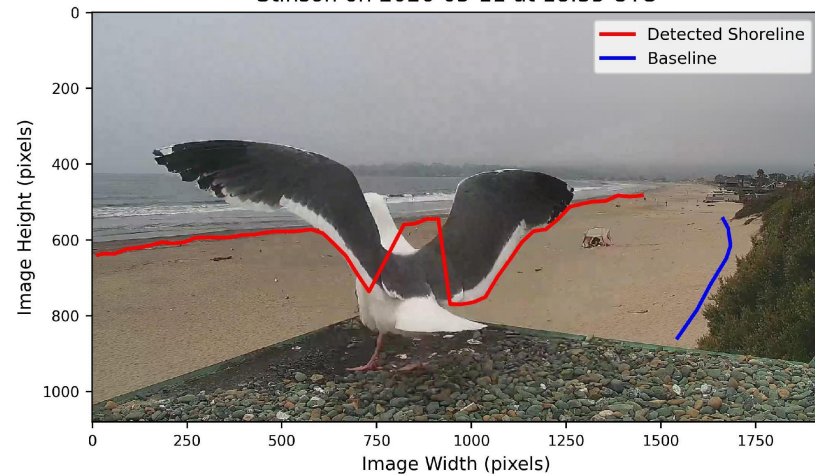
Transect Based Shoreline Detection (Time Averaged)  
Stinson on 2026-04-02 at 14:25 UTC



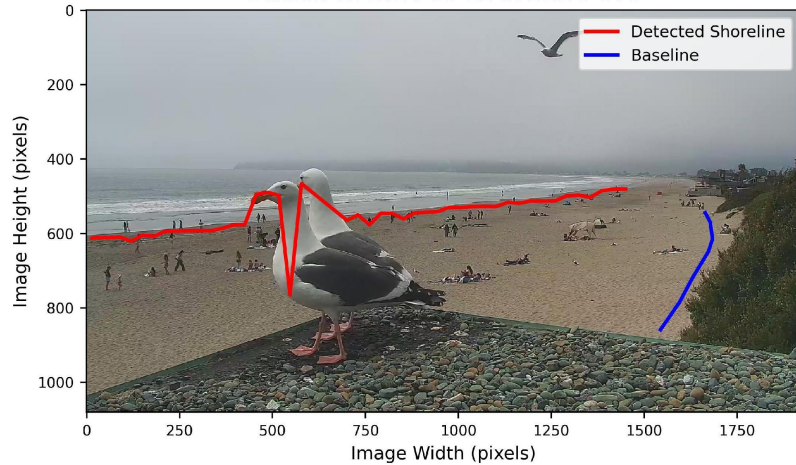
Transect Based Shoreline Detection (Time Averaged)  
Stinson on 2026-05-11 at 21:18 UTC



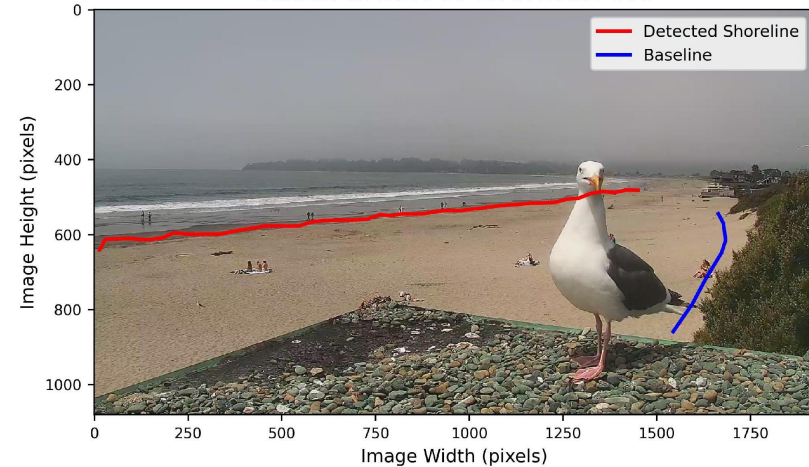
Transect Based Shoreline Detection (Time Averaged)  
Stinson on 2026-05-11 at 18:35 UTC



Transect Based Shoreline Detection (Time Averaged)  
Stinson on 2026-05-11 at 21:36 UTC



Transect Based Shoreline Detection (Time Averaged)  
Stinson on 2026-05-11 at 19:22 UTC

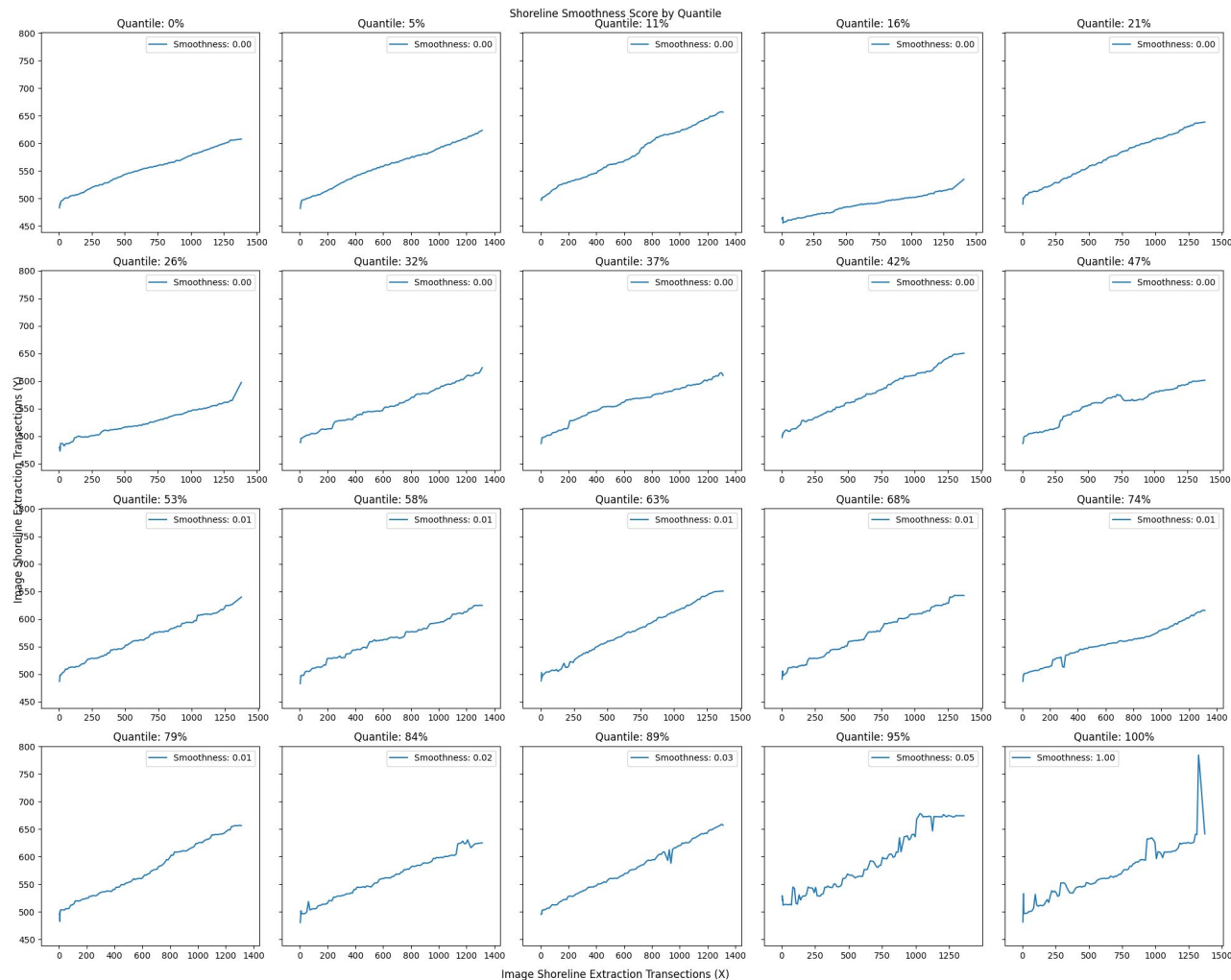


# Stinson, CA

Configuration 2  
02/27/26 to 06/06/26

Could filter analysis by:

- Tide level
- Time of day
- Shoreline smoothness





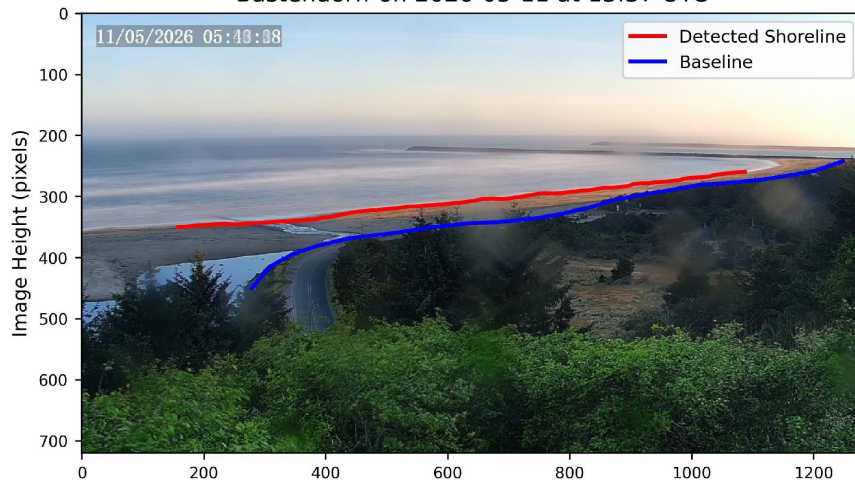
# Bastendorff, OR

ROI with Clipped Lines (Filter: 10.0%)

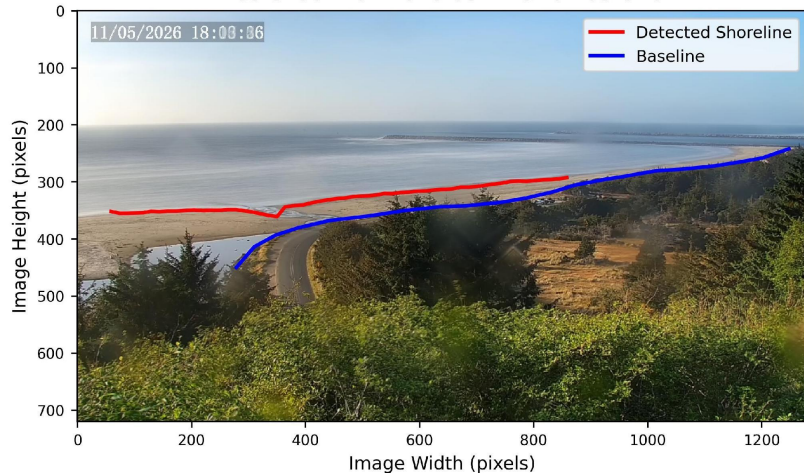


Configuration 1  
Low tide config with time averaged  
still  
Sunrise vs sunset

Transect Based Shoreline Detection (Time Averaged)  
Bastendorff on 2026-05-11 at 13:37 UTC

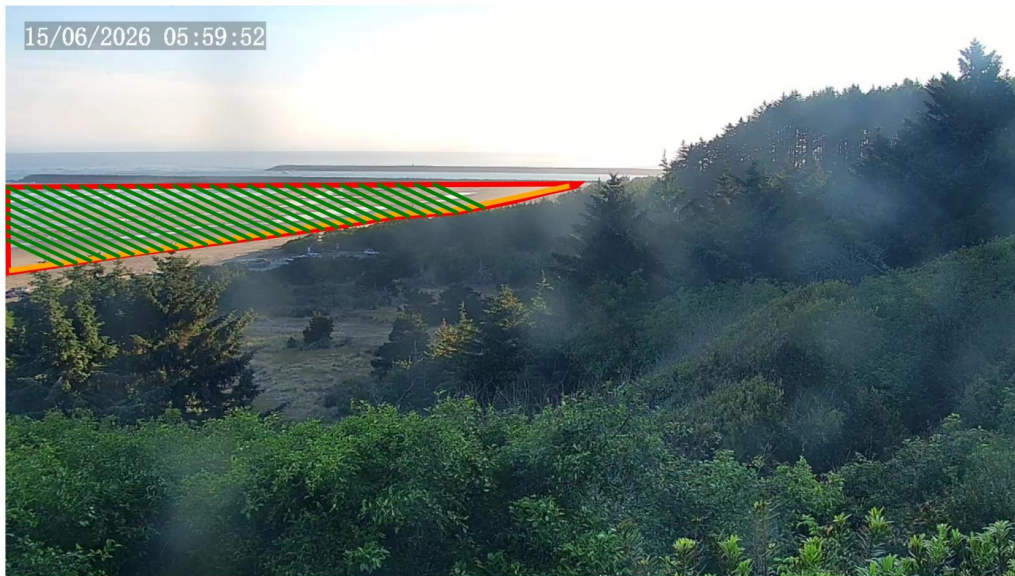


Transect Based Shoreline Detection (Time Averaged)  
Bastendorff on 2026-05-12 at 02:05 UTC



# Bastendorff, OR

ROI with Clipped Lines (Filter: 25.0%)



Configuration 2

Low tide config

Orientation: Forward

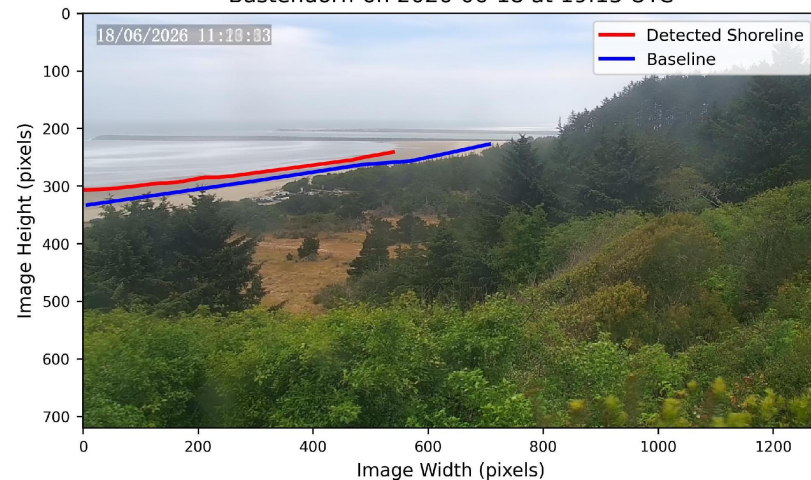
Angle: 40 deg.

Transect spacing: 10

Configuration valid after 06/13/26

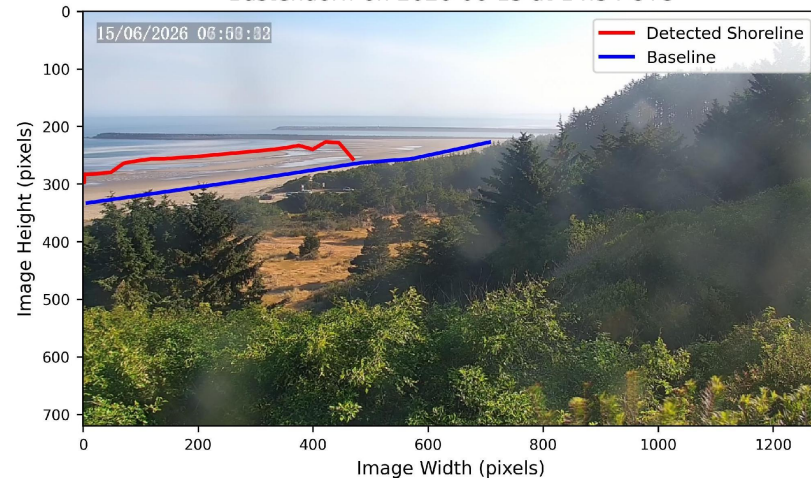
Transect Based Shoreline Detection (Time Averaged)

Bastendorff on 2026-06-18 at 19:15 UTC



Transect Based Shoreline Detection (Time Averaged)

Bastendorff on 2026-06-15 at 14:54 UTC

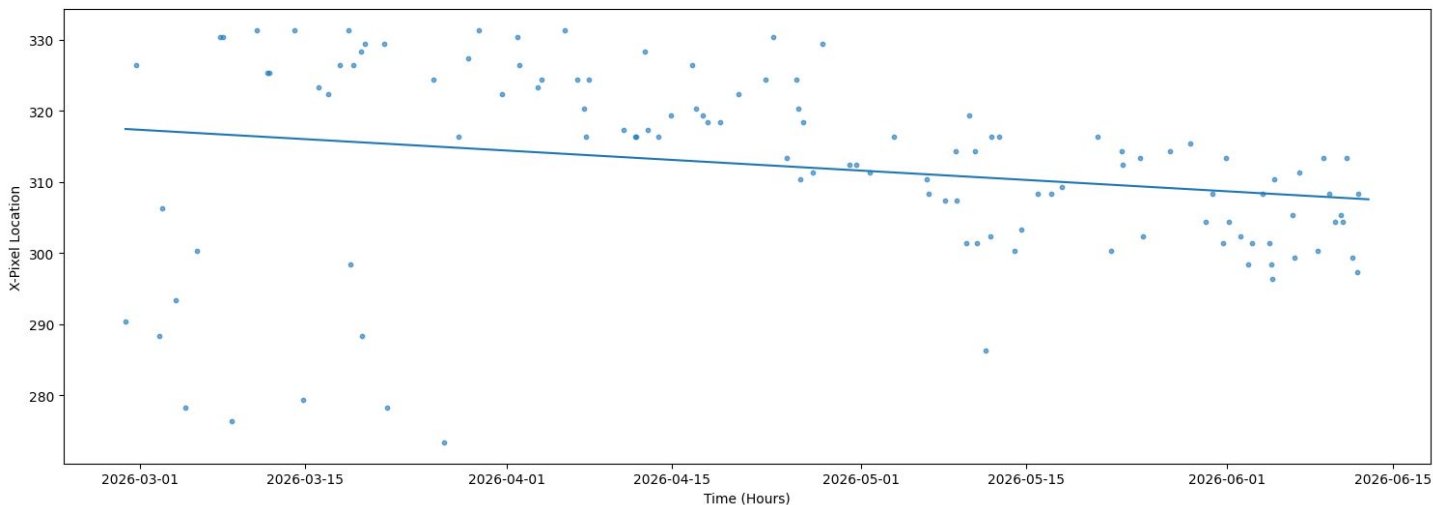




# Bastendorf, OR

Configuration 1  
02/27/2026 to  
06/12/2026

Segmented Domain Shoreline Trend Models



Model Report

Date Range: 2026-02-27 to 2026-06-12  
Standard Deviation: 12.75  
Intercept ( $\beta_0$ ): 317.43  
Trend ( $\beta_1$ )(pixels/hour): -0.00  
Trend ( $\beta_1$ )(pixels/month): -2.82

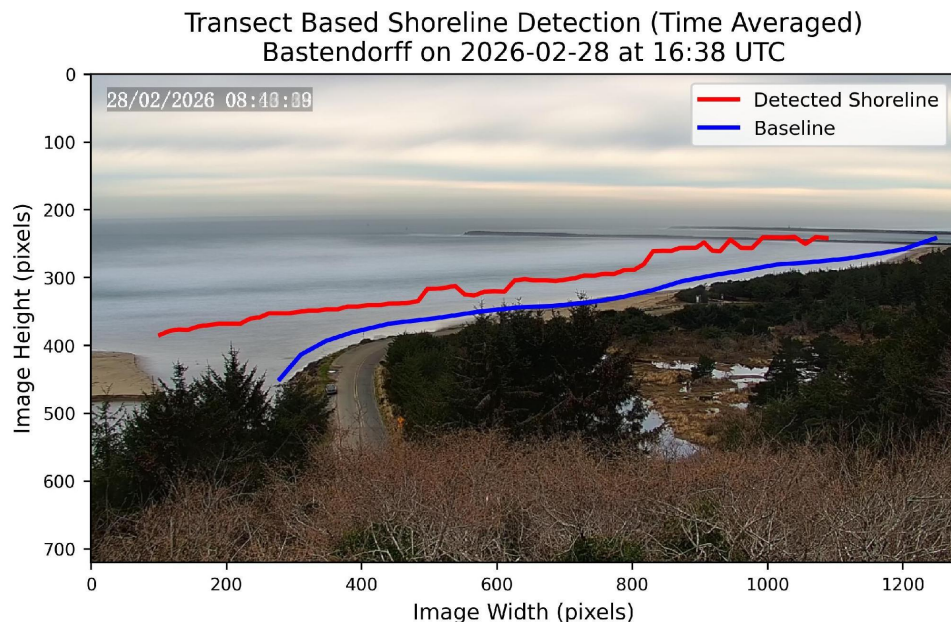
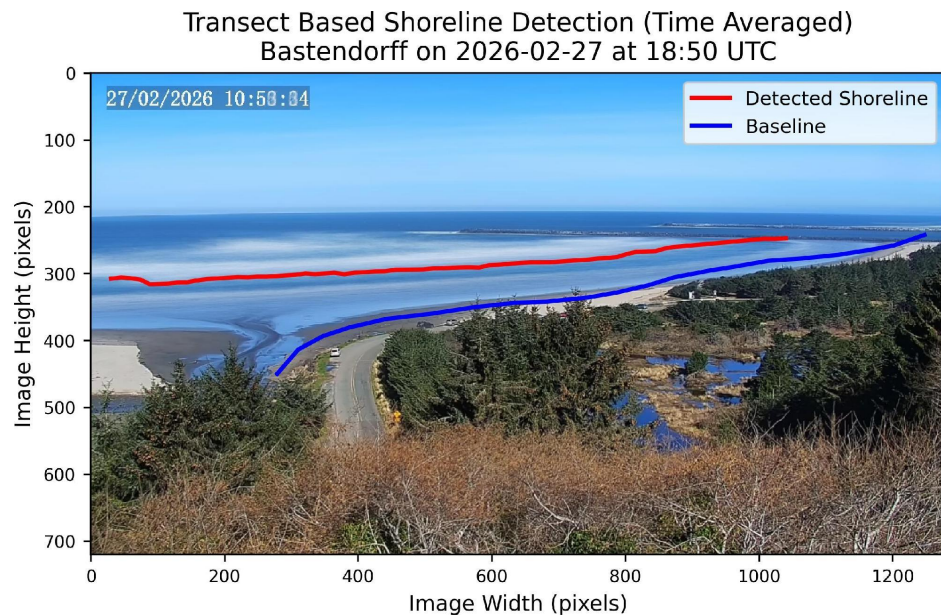


# Bastendorff, OR

## Configuration 1

02/27/2026 and 02/28/2026

Examples of outliers from beginning of trend plot

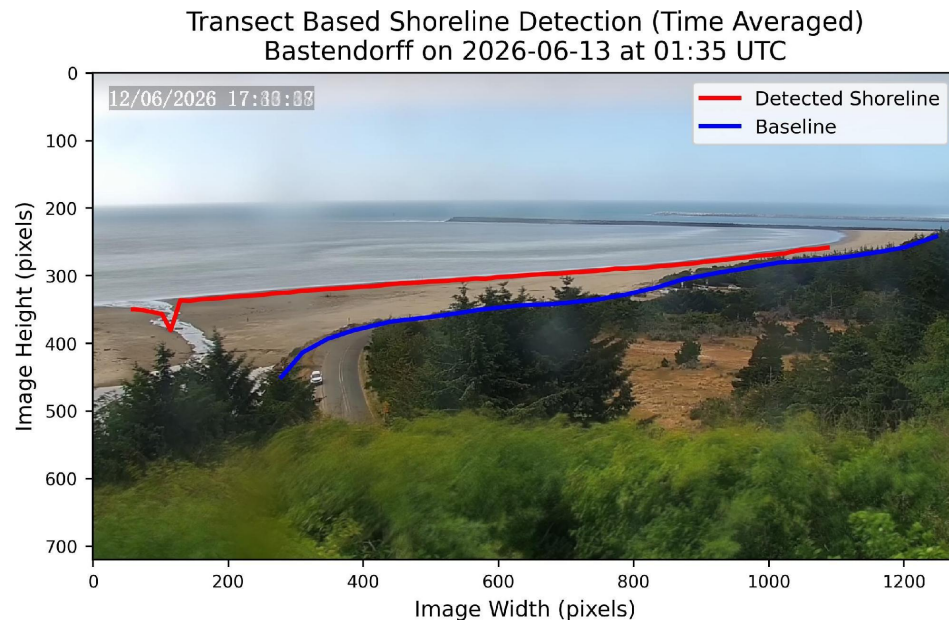
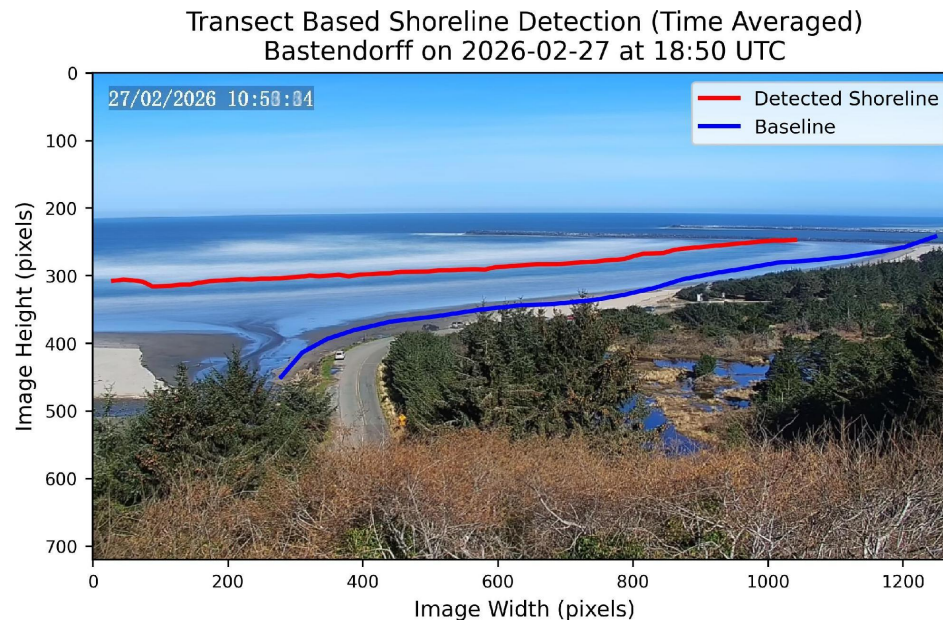


# Bastendorff, OR

## Configuration 1

02/27/2026 and 06/13/2026

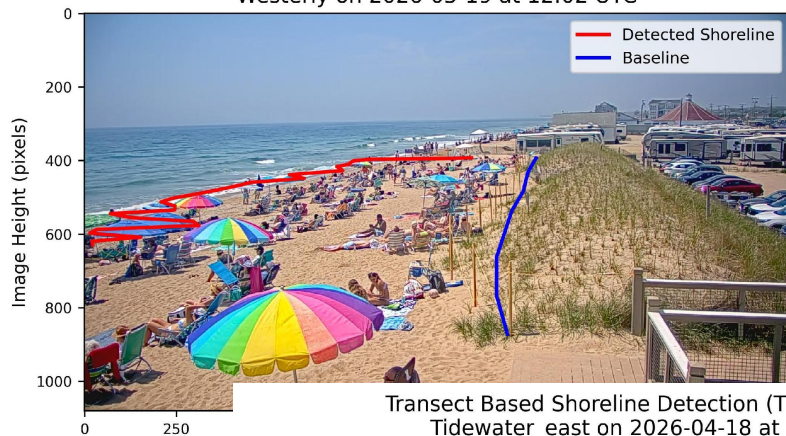
Beginning and end of configuration 1 time range



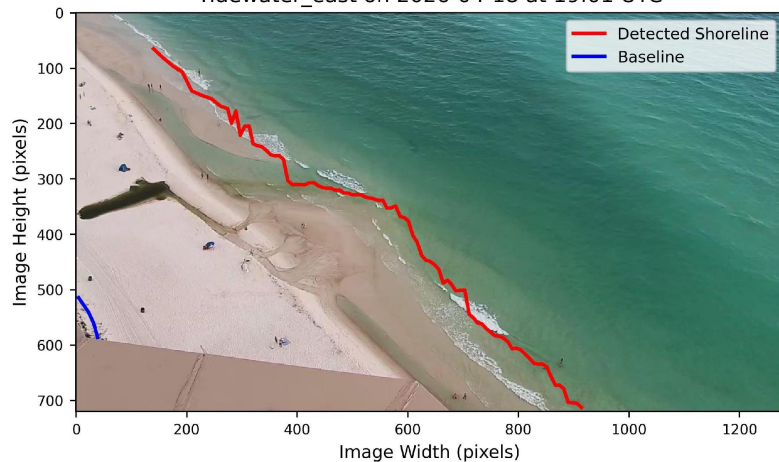


# Challenges of new sites

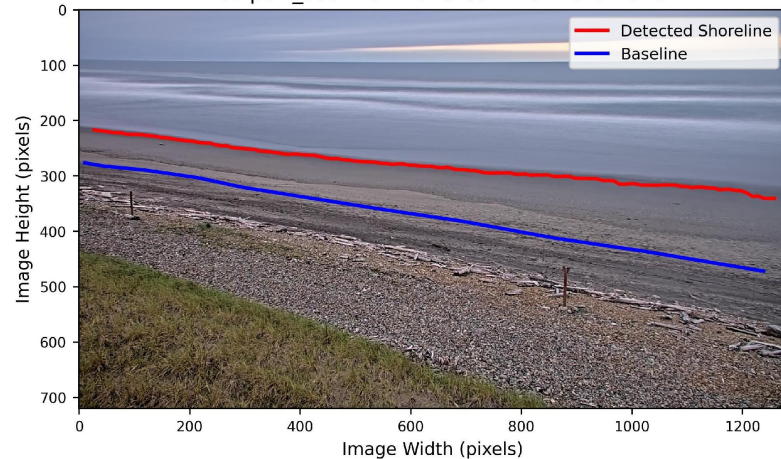
Transect Based Shoreline Detection (Time Averaged)  
Westerly on 2026-05-19 at 12:02 UTC



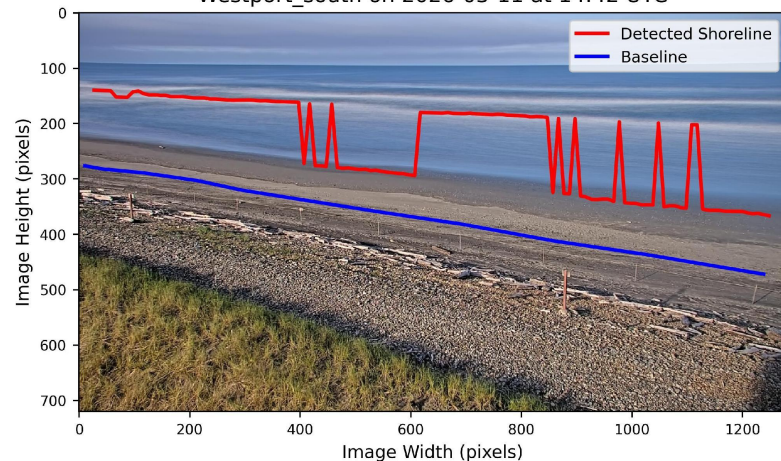
Transect Based Shoreline Detection (Time Averaged)  
Tidewater\_east on 2026-04-18 at 19:01 UTC



Transect Based Shoreline Detection (Time Averaged)  
Westport\_south on 2026-05-11 at 13:07 UTC



Transect Based Shoreline Detection (Time Averaged)  
Westport\_south on 2026-05-11 at 14:42 UTC







SECOORA

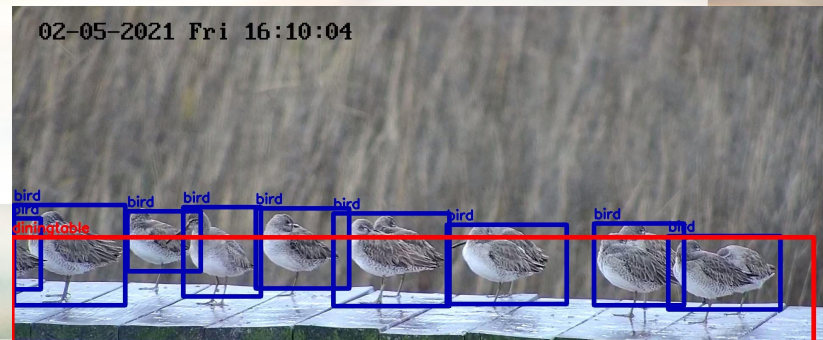
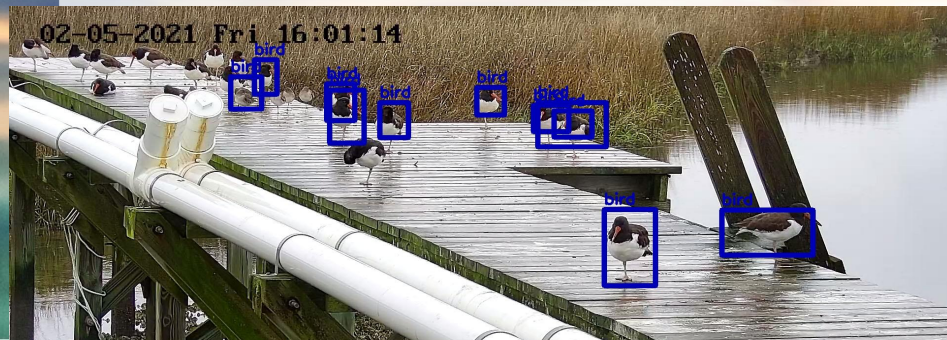
# **Situational awareness & Object detection**

**Jeremy Cothran, University of South Carolina**

Common Objects in Context  
cocodataset.org

## COCO Explorer

COCO 2017 train/val browser (123,287 images, 886,284 instances). Crowd labels not shown.



## Situational awareness/object detection

- YOLO (You Only Look Once)
- <https://docs.ultralytics.com/models/yolov8/>
- 'COCO' dataset (person, vehicle, etc)
- Lowered confidence threshold to 10%
- 10-30% missed or false detections, trends of more use than accuracy



Volusia County, FL  
Daytona beach



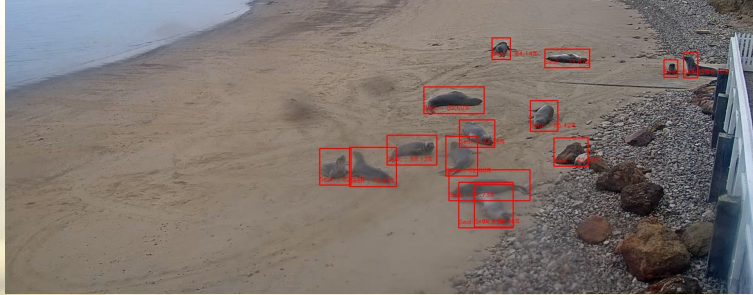
Worked with object detection, though classification and segmentation may be more appropriate depending on the use case





# Problem issues

Good detection(seals)



Missed detections due to lack of contrast(lighting) or change in distance or view angle



Missed detections with distance(less pixels/info)



False detections - shadow contrasts or artifacts?



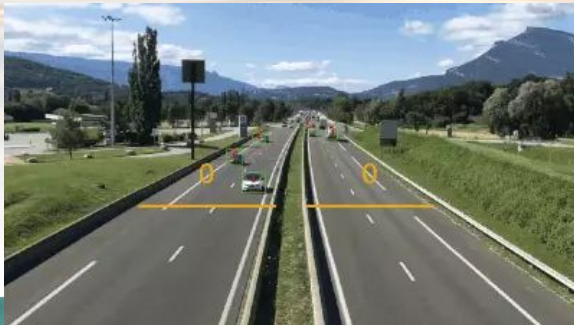
# Problem issues

Tried car detection/counting at Isle of Palms beach parking area (lot capacity), but poor results due to

- Low camera angle view
- Occluding vegetation
- Quickly curving road (object rotation)
- Changing lane conditions (available camera view) depending on activity



Optimal traffic view angle - from **bridge/post** above to lessen occlusion with minimal object visual rotation/variance



<https://github.com/nathanrooy/rpi-urban-mobility-tracker>

<https://nathanrooy.github.io/posts/2019-02-06/raspberry-pi-deep-learning-traffic-tracker>

Tried Amazon rekognition - object detection on Amazon Web Services cloud, but default results not as favorable as custom approach and custom detection (on Amazon) more expensive

<https://aws.amazon.com/rekognition>





## Additional approaches

- SAHI(Slicing Aided Hyper Inference) slices an image into a set of smaller overlapping images to help detect small objects in larger images
- Mosaic approach - break image into a zones/mosaic(near,far,...) applying different SAHI image size,confidence threshold,...
- Add/Update to imageset used for training
  - Add object classes to differentiate with visually similar objects (e.g. seal vs rock)
- Try other datasets/weight files

## Image segmentation(rip tides,flooding,...)

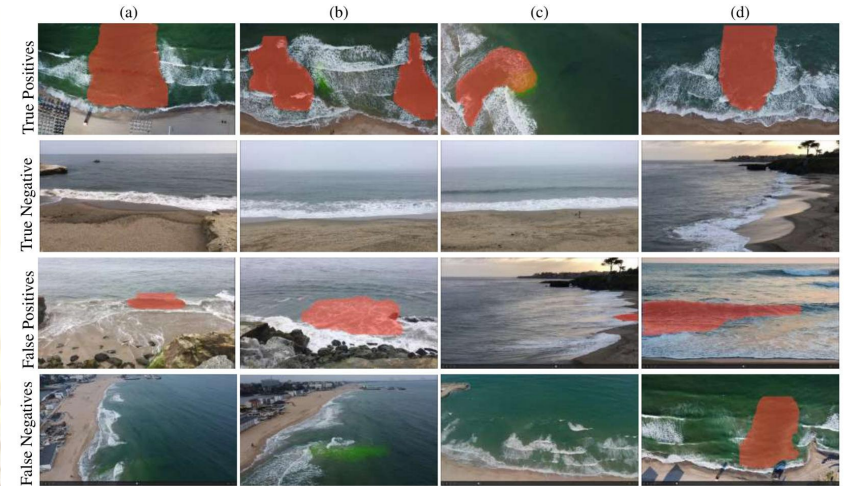


Figure 4. Example of results on testing dataset (using the nano model). On the first two rows we have the correct predictions, the true positives and the true negatives. On the last row we have the incorrect predictions, the false positives and the false negatives. Notice column (d) on the last row, where the model manages to correctly predict one rip current, but misses the second one.





## Try other datasets/weight files

Roboflow <https://universe.roboflow.com>

- Publicly available image datasets and models
- Online sample testing and APIs
- Free and paid tier pricing

### How to Use the Beach people Detection API

Use this pre-trained Beach people computer vision model to retrieve predictions with our hosted API or deploy to the edge. [Learn More About Roboflow Inference](#)

Switch Model:

v3 beach-people/3

Trained On: beach-people 187 Images View Version →

Model Type: yolov8s Model Upload

mAP 76.4%

Precision 75.2%

Recall 76.5%

View Model Graphs →

Samples from Test Set



View Test Set →

Upload Image or Video File

Drop file here or

Select File

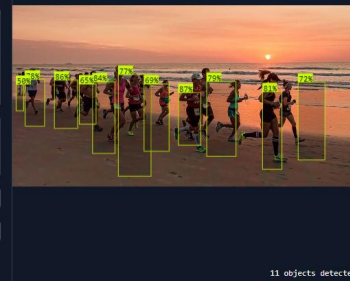
Paste YouTube or Image URL



Paste a link...

Try With Webcam

Try On My Machine



Confidence Threshold: 50%

0% 100%

Overlap Threshold: 50%

0% 100%

Label Display Mode:

Draw Confidence

```
{
  "predictions": [
    {
      "x": 413,
      "y": 264,
      "width": 52,
      "height": 122,
      "confidence": 0.874,
      "class": "person",
      "class_id": 0,
      "detection_id": "bf6c405"
    },
    {
      "x": 125,
      "y": 230,
      "width": 54,
      "height": 112,
      "confidence": 0.864,
      "class": "person",
      "class_id": 0,
      "detection_id": "bf6c405"
    }
  ]
}
```

Copy

### Roboflow Inference

Inference is Roboflow's open source deployment package for developer-friendly vision inference.

### How to Deploy the Beach people Detection API

Using Roboflow, you can deploy your object detection model to a range of environments, including:

- Luxonis OAK
- Raspberry Pi
- NVIDIA Jetson
- A Docker container
- A web page
- iOS
- A Python script using the Roboflow SDK.

Below, we have instructions on how to use our deployment options.

### Code Snippets

Python cURL Javascript Swift .NET

Hosted API

Infer on Local and Hosted Images

To install dependencies, 'pip install inference-sdk'.

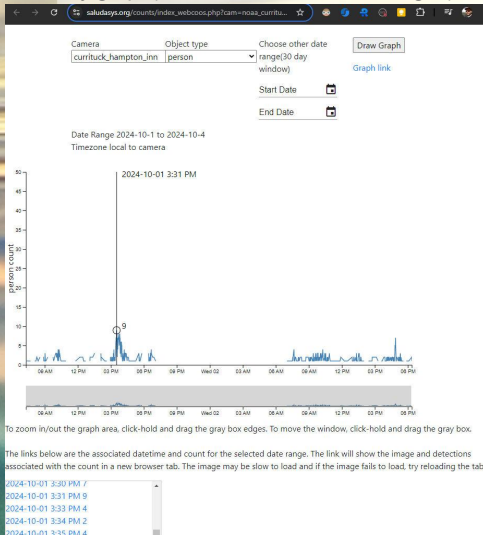


# Situational awareness & reporting

Object Detection(person)



Activity graph(time vs counts, links to images)



Alert/notification thresholds

Alerts

| Type               | Location                   | Activate | Delete |
|--------------------|----------------------------|----------|--------|
| person_count_gt_20 | noaa_currutuck_hampton_inn | Activate | Delete |
| person_count_gt_20 | noaa_currutuck_sailfish    | Activate | Delete |
| person_count_gt_30 | noaa_currutuck_sailfish    | Mute     | Delete |
| person_count_gt_5  | noaa_currutuck_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:  
[Currutuck-Sailfish-Activity-Graph](#)  
[Currutuck-Sailfish-Camera](#)  
[Currutuck-Hampton-Inn-Activity-Graph](#)  
[Currutuck-Hampton-Inn-Camera](#)

Text/Email notification

auto-alert: person count > 30 (at 34) at  
noaa\_currutuck\_sailfish

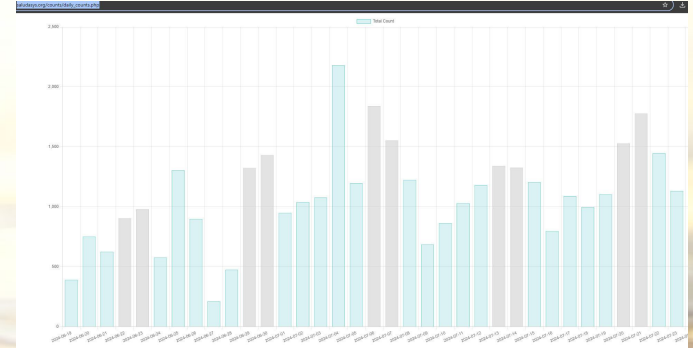
midnightreary7@gmail.com | Sat, Aug 10, 2:51 PM

person count > 30 (at 34)  
location noaa\_currutuck\_sailfish  
count: [https://saludays.org/counts/detect\\_webcoos.php?filenname=curretuck\\_sailfish-2024-08-10-1045432-1045432-1045432-person&station=noaa\\_currutuck\\_sailfish&action=get](https://saludays.org/counts/detect_webcoos.php?filenname=curretuck_sailfish-2024-08-10-1045432-1045432-1045432-person&station=noaa_currutuck_sailfish&action=get)  
activity: [https://saludays.org/counts/index\\_webcoos.php?cam=noaa\\_currutuck\\_sailfish](https://saludays.org/counts/index_webcoos.php?cam=noaa_currutuck_sailfish)  
camera: [https://webcoos.org/cameras/curretuck\\_sailfish/](https://webcoos.org/cameras/curretuck_sailfish/)

Notification settings: [https://saludays.org/notify/page/login.php?app\\_type=webcoos](https://saludays.org/notify/page/login.php?app_type=webcoos)



Daily status or activity summary



Hourly activity summary



# Technology pipeline - could mix and match from different providers

## Instrumentation

- Camera resolution
- Perspective / distance
- Programmability/OS/'edge'?
- **Power / connectivity**
- Installation /maintenance



## Video/image collection

Images can be pulled at timed intervals from video via FFMPEG

online/near real-time  
push - RTMP/FTP,...  
pull - RTSP/HTTP,...

offline  
SD card/manual for  
deployable/trailcam



## Storage

- Cloud(Amazon S3 object/file buckets)
- Recent / Archived





## Processing(AI/ML,...)

- Cloud / Local, GPU / CPU
- Models
  - Weights Files
  - Training sets



## Summary

Database(Postgres) - store/query  
location,timestamp,object(s)  
count,image bbox pixel x/y coords,  
confidence score



## Products(may reference any previous layers)

- Graphs/Displays
- Summary(Hour,Day,Month) / Reports
- Alerts/Notification



**SAM 3** (Segment Anything) introduces the ability to exhaustively **segment and track** all instances of an **open-vocabulary concept** specified by a **short text phrase or exemplars**. Unlike prior work, SAM 3 can handle a vastly larger set of open-vocabulary prompts. It achieves 75-80% of human performance on our benchmark which contains **270K unique concepts**.

<https://ai.meta.com/research/sam3/>

<https://github.com/facebookresearch/sam3>

Weights file [sam3.pt](#) 3.5 gigabytes can run on 8 gigabyte RAM GPU(can run on consumer-level GPU)



# YOLO

Sailfish

# SAM3

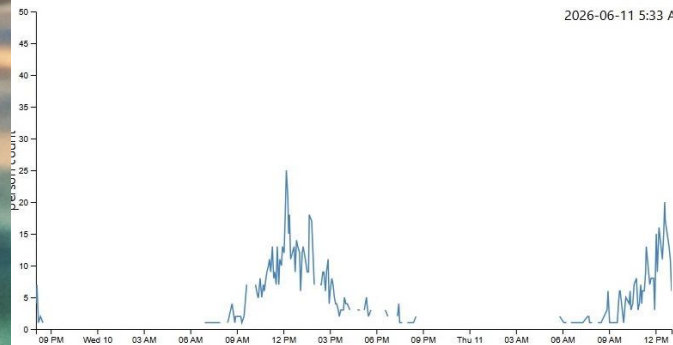
Sailfish

Camera  
currituck\_sailfish (rip\_current)

Object type  
person

Date Range 2026-6-10 to 2026-6-13  
Timezone local to camera

2026-06-11 5:33 AM

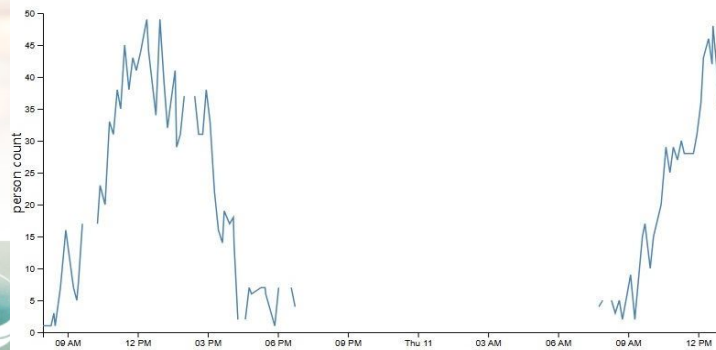


Camera  
currituck\_sailfish (rip\_current)

Object type  
person

Date Range 2026-6-10 to 2026-6-13  
Timezone local to camera

2026-06-11 12:50 PM





Sailfish July 10, 2026 12:16 PM - 106 objects - person, chair, umbrella, canopy

SAM3



Sailfish

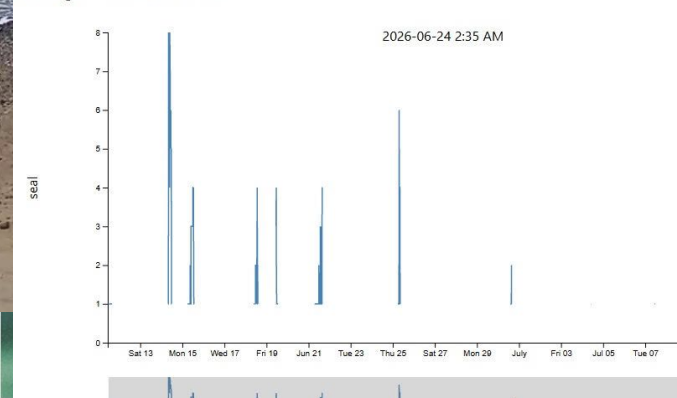


Camera:  Object type:  Classification model:

Choose date range(180 day window)

[Graph link](#)

Date Range 6/10/2026 to 7/10/2026

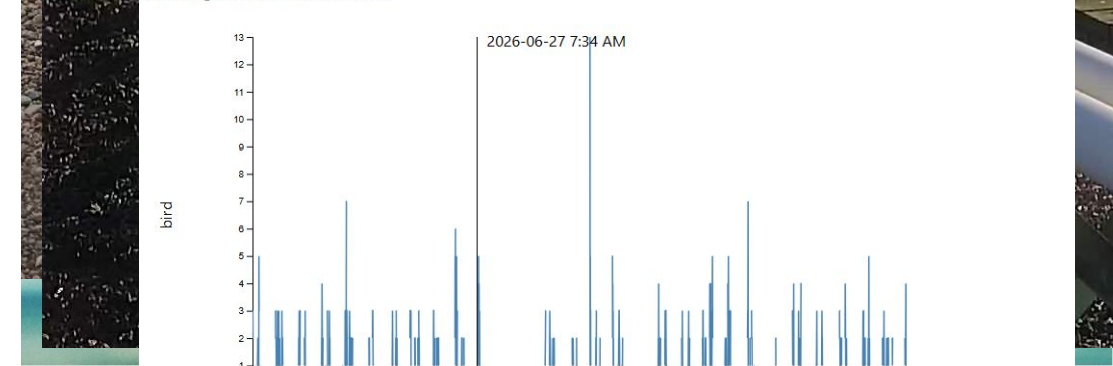


Camera:  Object type:  Classification model:

Choose date range(180 day window)

[Graph link](#)

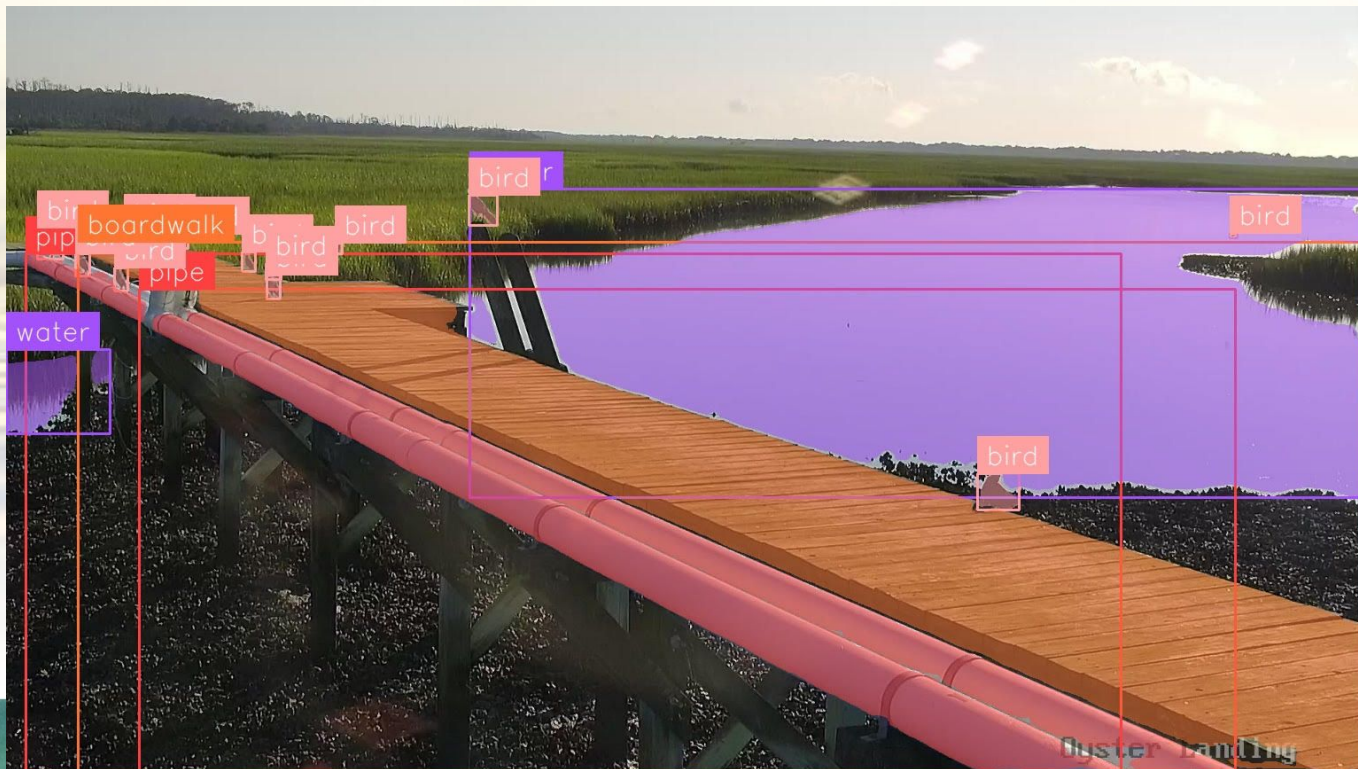
Date Range 6/17/2026 to 7/17/2026



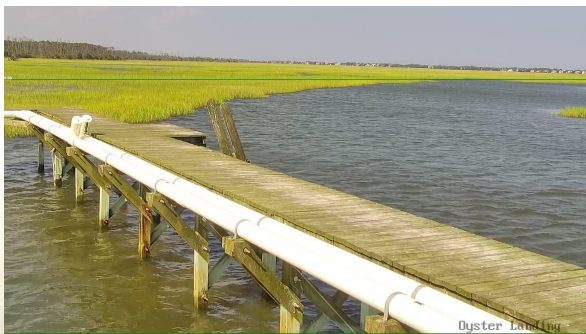


SAM3 text prompt example: water, bird, boardwalk, pipe  
free model image testing

<https://playground.roboflow.com/object-detection/seg-preview>







# water surface pixel area tracking/graphing

Camera

northinlet (bird,water) ▼

Object type

water(area) - sam3 model

Classification model

sam3\_native ▼

Choose date range(180 day window)

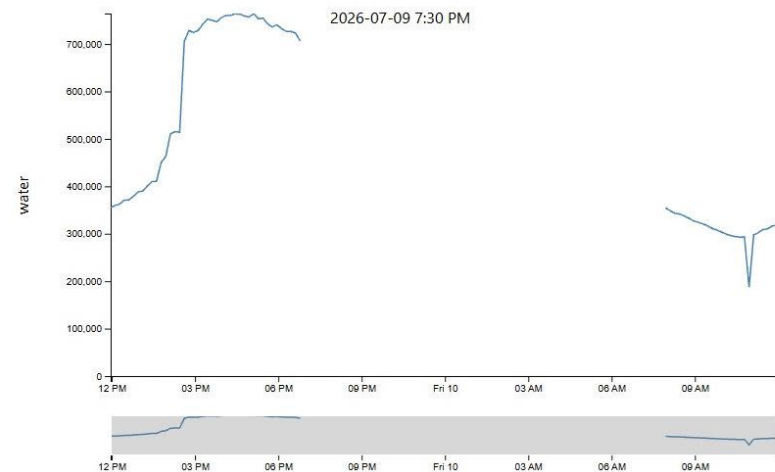
Start Date

End Date

Draw Graph

[Graph link](#)

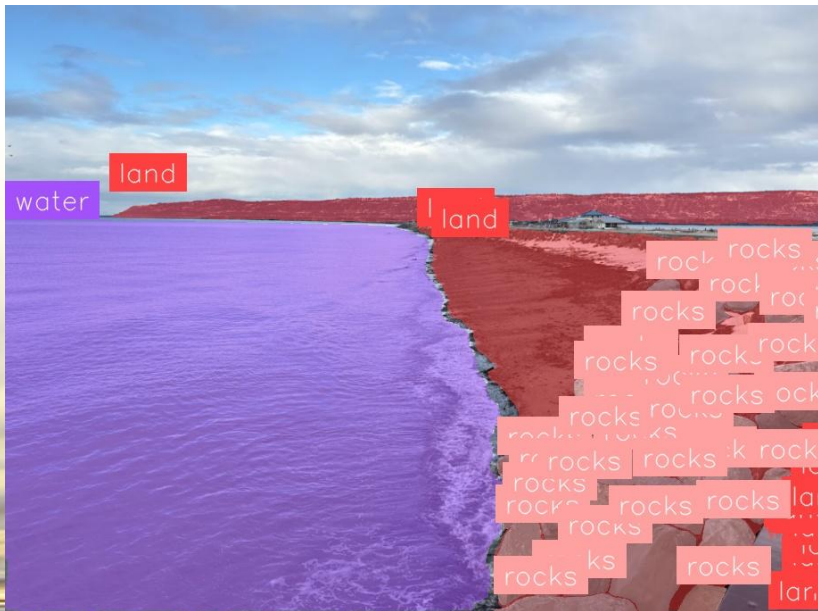
Date Range 2026-7-9 to 2026-7-12  
Timezone local to camera



To zoom in/out the graph area, click-hold and drag the gray box edges. To move the window, click-hold and drag the gray box.

The links below are the associated datetime and count for the selected date range. The link will show the image and detections associated in a new browser tab. The image may be slow to load and if the image fails to load, try reloading the tab.

- 2026-07-09 11:57 AM 355421
- 2026-07-09 12:06 PM 359329
- 2026-07-09 12:16 PM 362503
- 2026-07-09 12:26 PM 370757
- 2026-07-09 12:36 PM 371311
- 2026-07-09 12:46 PM 370757





## Do It Yourself approach(experiment/prototype) criteria

- lower rates of change/dynamics or monitoring/management response level = lower/tiered cost for data networked/processed
  - seasonal, adaptive(storm, event) scheduled or on-demand usage/cost
  - shared cost - higher frequency/batching processing/results once covers other users at lower time scales or more locations/coverage
- image or 'burst' image/video sampling at say minute, 10 minutes, hourly, etc period
- Low-cost cloud GPU processing <https://github.com/jcothran/runpods> currently running 11 camera feeds 12 hours/day at 10 minute snapshot interval = 792 images/day for \$5/month
- remote locations - trailcam+solar+cellular, raspberry pi+cam
- 'edge' processing - image processing at the camera/edge, results sent



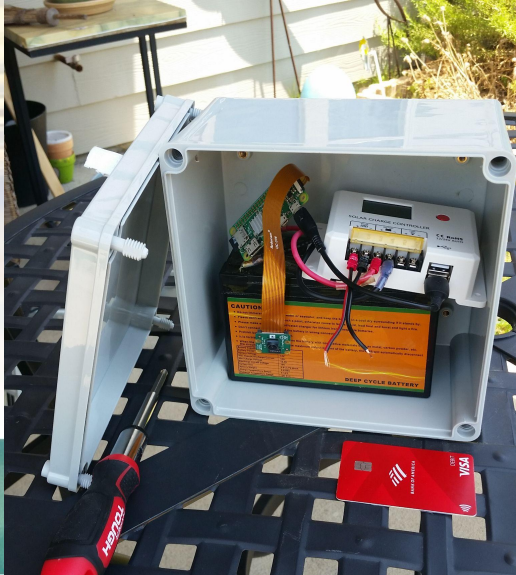


Trailcam - solar(power) + cellular(connectivity)  
Image every 10 minutes for beach counts, flooding, etc  
\$400 camera+solar, \$200/year cellular data plan





Raspberry pi or consumer  
camera+solar+battery+cellular hotspot





# Coastal flood visualization using WebCOOS and tide gauges

Matt Conlin<sup>1,2</sup>

<sup>1</sup> CO-OPS, National Ocean Service, NOAA

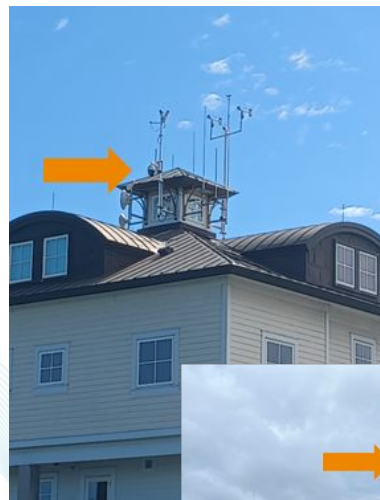
<sup>2</sup> Ocean Associates Inc.

| 2026 WebCOOS Workshop, La Jolla, CA  
| July 21, 2026

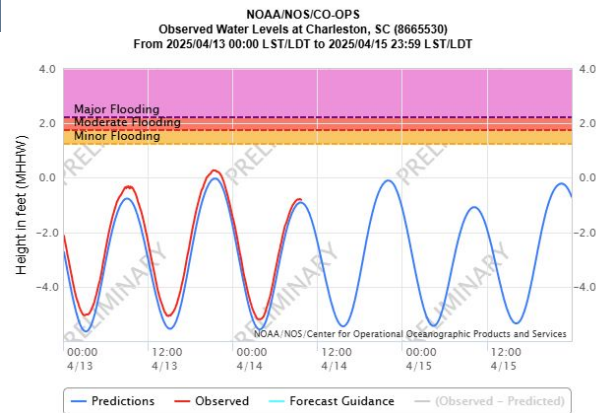
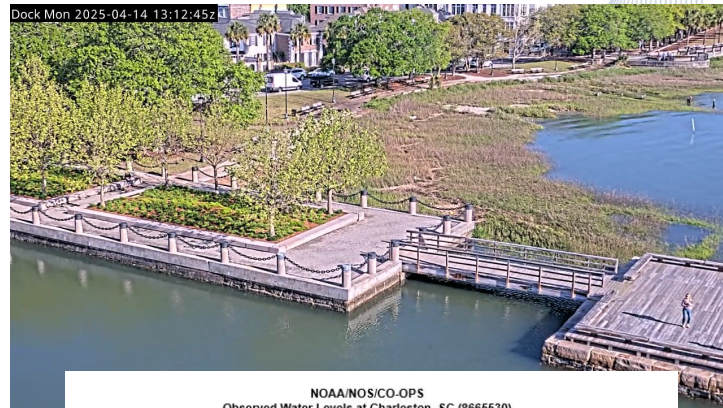




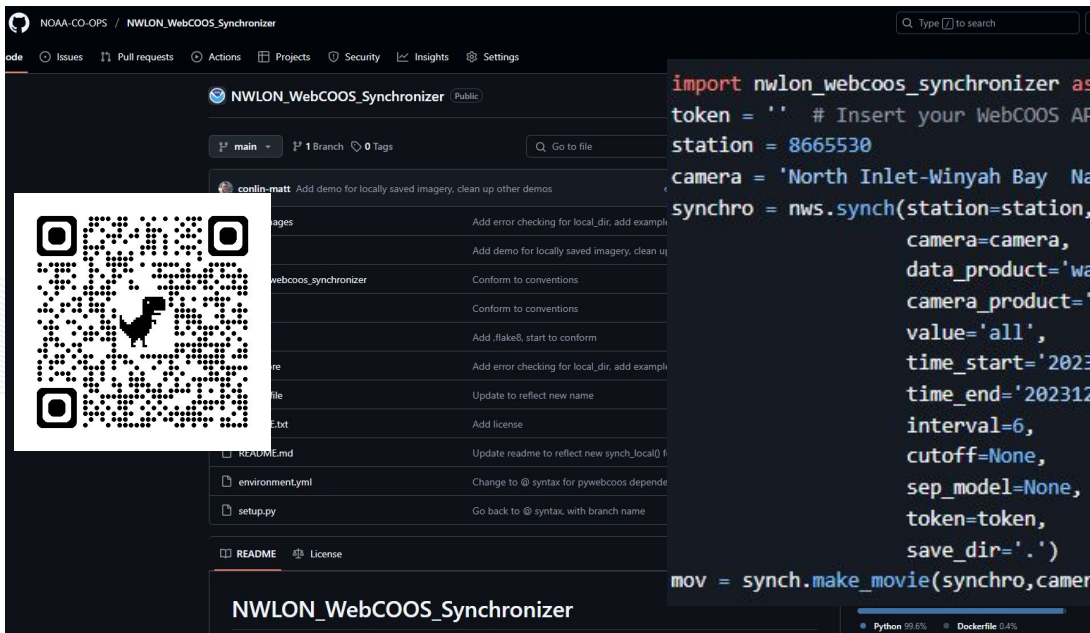
# Some WebCOOS cameras deployed near CO-OPS tide gauges



WebCOOS cameras  
co-deployed with  
CO-OPS tide gauges



# NWLON\_WebCOOS\_Synchronizer



```
import nwlon_webcoos_synchronizer as nws
token = '' # Insert your WebCOOS API token here #
station = 8665530
camera = 'North Inlet-Winyah Bay National Estuarine Research Reserve Dock, Georgetown, SC'
synchro = nws.synch(station=station,
                    camera=camera,
                    data_product='water_level',
                    camera_product='one-minute-stills',
                    value='all',
                    time_start='202312170800',
                    time_end='202312171000',
                    interval=6,
                    cutoff=None,
                    sep_model=None,
                    token=token,
                    save_dir='.')
mov = synch.make_movie(synchro,camera,station)
```

# The NWLON station ID  
# The WebCOOS camera name #  
# The CO-OPS data product to make a timeseries  
# The WebCOOS image product to use for the mov  
# Can be 'all' or a float value, depending on  
# Start of the movie in local time at the came  
# End of the movie in local time at the camera  
# Interval of data and imagery, in minutes. #  
# Make the movie of only this many data points  
# A trained view separation model. Can be made  
# Your WebCOOS API Token  
# The directory in which to save the images an

[https://github.com/NOAA-CO-OPS/NWLON\\_WebCOOS\\_Synchronizer](https://github.com/NOAA-CO-OPS/NWLON_WebCOOS_Synchronizer)

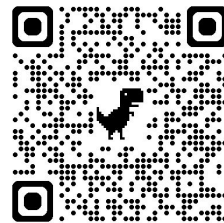
# py-webcoos-client

```
$ curl -H "Authorization: Token [your api token]" \
-H "Accept: application/json" \
"https://app.webcoos.org/webcoos/api/v1/elements/?starting after=2022-06-02T00%3A00%3A00Z&starting before=2022-06-03T00%3A00%3A00Z&service=waikiki_sheraton-video-archive-s3"
```



```
import pywebcoos

api = pywebcoos.API(token='') # Insert your token here #
api.download(camera_name='Charleston Harbor, SC',
              product_type='one-minute-stills',
              start       ='202401011000',
              stop        ='202401011030',
              interval    =5,
              save_dir     ='.')
```



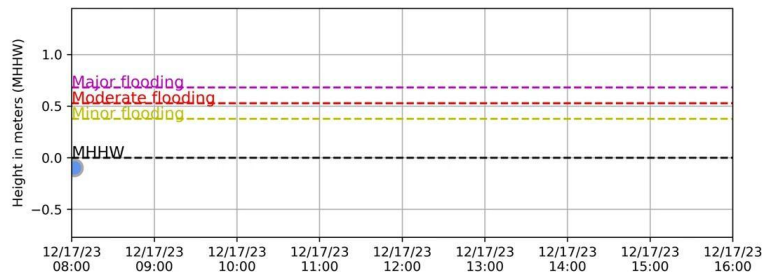
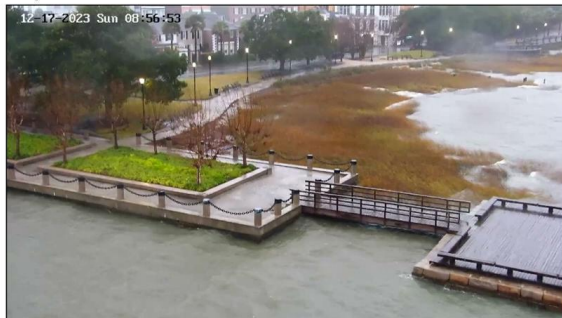
```
camera      = api.get_cameras()
products    = api.get_products(camera_name='Charleston Harbor, SC')
inventory   = api.get_inventory(camera_name='Charleston Harbor, SC', product_name='one-minute-stills')
```

<https://github.com/WebCOOS/py-webcoos-client>

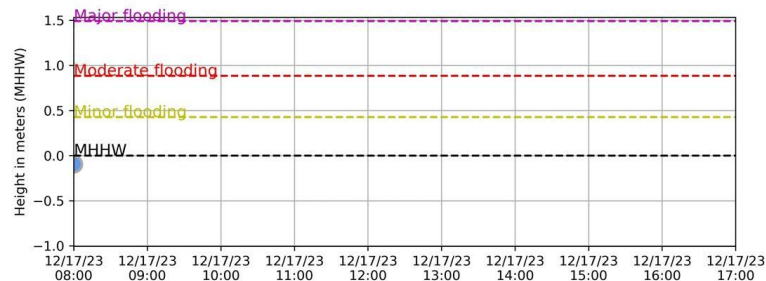


# Use case: Visualizing coastal flooding observations

Camera: Charleston Harbor, SC  
Gauge: 8665530



Camera: North Inlet-Winyah Bay National Estuarine Research Reserve Dock, Georgetown, SC  
Gauge: 8661070



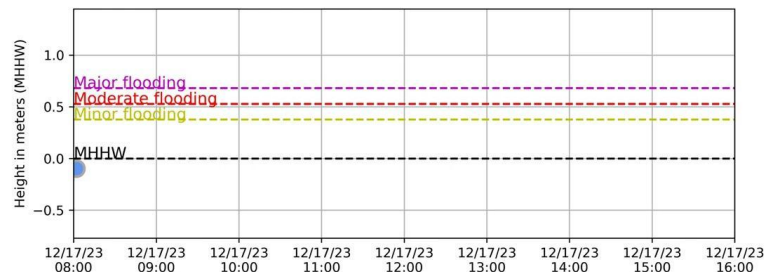
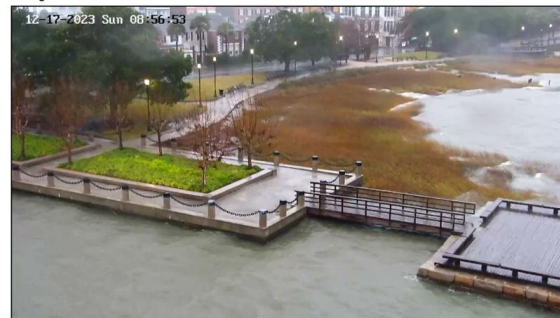
# Use case: Visualizing coastal flooding observations

```
538  class ViewSeparator():
539      """
540      A class that represents a tool to separate views from a PTZ (rotating) camera. The tool is first trained on data and can then be applied.
541
542      Example:
543      -----
544      vs = ViewSeparator('Charleston Harbor, SC', token, n_views=7)
545      vs.get_random_images('202401010000', '202410012359', n=250, direc='train_direct')
546      vs.label('train_direct')
547      model = vs.train('train_direct', decim_fac=10)
548      vs.save_model(model, decim_fac=10, 'save_direct', 'trained_model')
549      """
```

# Use case: Visualizing coastal flooding observations

```
538 class ViewSeparator():  
539     """  
540     A class that represents a tool to separate views from a PTZ (rotating) camera. The tool is first trained  
541     Example:  
542     -----  
543     vs = ViewSeparator('Charleston Harbor, SC', token, n_views=7)  
544     vs.get_random_images('202401010000', '202410012359', n=250, direc='train_direct')  
545     vs.label('train_direct')  
546     model = vs.train('train_direct', decim_fac=10)  
547     vs.save_model(model, decim_fac=10, 'save_direct', 'trained_model')  
548     """
```

Camera: Charleston Harbor, SC  
Gauge: 8665530





# Successes

- It works!
  - Just combines readily-available high quality data streams
- Project-team collaboration

# Challenges

- Not run in near real-time like other WebCOOS products, more of a post-processing tool.
  - Where should it live?
  - Who runs it? (Anyone can!)
  - Who maintains it?
- PTZ view separation

## The future

- More cameras near tide gauges coming!
- More flood visualizations to be made
- Expand to include other data (e.g. met.)?





11:00 am - 12:00 pm

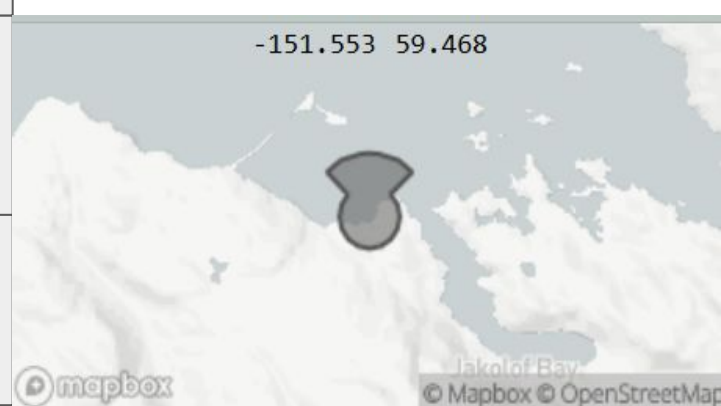
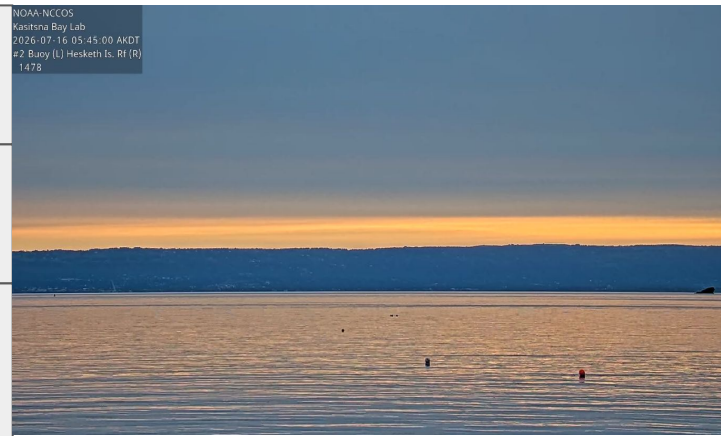
# **National Stakeholder Session**

| User                                                                                                | Use-Case                                                                                                                                                                                                                                                                                               | Future Efforts                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| KBL camera:<br>maritime domain awareness,<br>wildlife observation, and<br>general viewing purposes. | Two webcams installed in Seldovia, AK at the City Dock and Kasitsna Bay Lab.                                                                                                                                                                                                                           |                                                                                                                                                                                                                                       |
| Seldovia City Dock:<br>Marine navigation, NOAA<br>COOPS, local planner                              | Overlooks the Seldovia City Dock, which is an Alaska Marine Highway System ferry terminal, and hosts a NOAA-NOS CO-OPS water level station and a National Estuarine Research Reserve water quality station. The camera documents water level and local marine and aviation conditions in Seldovia Bay. |                                                                                                                                                                                                                                       |
|                                                                                                     | AK has very limited coastal infrastructure, very limited data availability, significant ice, and very wide and shallow tidal ranges that can make auto detection with webcams challenging. Continue to face challenges with finding installation locations.                                            | Potentially find additional deployment locations. Adapt ML to the large tidal ranges to better utilize the technology for erosion and overtopping monitoring (specifically of interest in Homer, which is across K Bay from Seldovia) |

## *Diving Deeper*

|                       |                                                                                                                                                                                              |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Camera Location       | Seldovia, AK                                                                                                                                                                                 |
| Goals of the Effort   |                                                                                                                                                                                              |
| Key Partners          | Kasitsna Bay Lab (KBL), University of Alaska Fairbanks (UAF)                                                                                                                                 |
| Success Story         | First WebCOOS web camera installed in Alaska.<br>Upon installation, local water taxi captains contacted the community partner to discuss local water conditions and utilize the camera feed. |
| Future of the Project |                                                                                                                                                                                              |

NOAA-NCCOS  
Kasitsna Bay Lab  
2026-07-16 05:45:00 AKDT  
#2 Buoy (L) Hesketh Is. RI (R)  
1478







# CARICOOS

**Luis Rodríguez & Julián Morell**

Email: [siul142004@gmail.com](mailto:siul142004@gmail.com) ;

[julianmorell1395@gmail.com](mailto:julianmorell1395@gmail.com)

| User                                                                 | Use-Case                                                                                                                                                                                                                                                                                                                                                | Future Efforts                                                                                  |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| NOAA NWS / Emergency Managers / Project Partners / Local Authorities | Deploy cameras at secure, elevated locations to support beach safety and coastal monitoring beyond the initial focus areas. Use camera observations to support alerts and decisions related to rip currents, high surf, and dangerous coastal conditions, improve integration of visual data into forecasts, advisories, and emergency response.        | Address site selection, ownership, and permitting challenges required for long-term deployment. |
| Port Authorities / Port Industries                                   | Monitor marine conditions, Sargassum arrival, inundation and other coastal hazards to support mitigation efforts and protect infrastructure that may impact port operations, infrastructure, and maritime activities. Example avoid the collapse of a desalinization plant or the island-wide power outage due to Sargassum clogging the water intakes. | Expand partnerships and complete permits and agreements for camera installations.               |
| Marine, Fisheries, and Environmental Agencies                        | Track Sargassum arrival, inundation, erosion, and other coastal changes to support mitigation efforts and protect infrastructure. Improve early detection and coordination for Sargassum and coastal monitoring.                                                                                                                                        | Address site selection, ownership, and permitting challenges required for long-term deployment. |
|                                                                      |                                                                                                                                                                                                                                                                                                                                                         |                                                                                                 |



# CARICOOS

## *Diving Deeper*

|                       |                                                                                                                                                                                |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Camera Location       | Port of San Juan                                                                                                                                                               |
| Goals of the effort   | Monitor Sargassum entry, navigation conditions, vessel activity, and visibility impacts from rain or Saharan dust to support informed decision-making and maritime operations. |
| Key Partners          | Puerto Rico Ports Authority                                                                                                                                                    |
| Success Story         | -                                                                                                                                                                              |
| Future of the Project | Finalize the agreement and camera installation with the stakeholder, support their operations.                                                                                 |

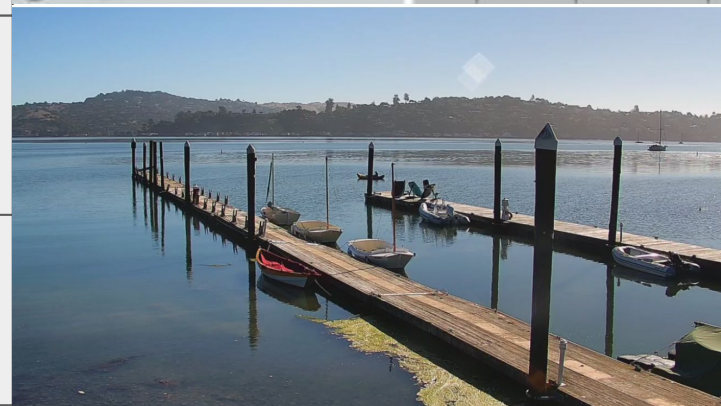


| User                                                                               | Use-Case                                   | Future Efforts                                        |
|------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------|
| Stinson Beach camera:<br>National Park Service                                     | Shoreline change                           | Use ML to define changes in Shoreline                 |
| Arcata wastewater treatment facility camera:<br>CalTrans, City of Arcata           | Flooding of highway 101 in Humboldt County | Use ML to define images with flooding                 |
| Galilee Harbor camera:<br>City of Sausalito, Galilee Harbor Community Association. | Track wave surge and flooding              | Use ML to define images with flooding                 |
| Santa Cruz Wharf Camera:<br>City of Santa Cruz                                     | Beach erosion/change and flooding          | Use ML to define beach location and change with time. |



## ***Diving Deeper***

|                              |                                                                                                           |
|------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>         | Sausalito, Galilee Harbor webcam                                                                          |
| <b>Goals of the Project</b>  | Monitor King tides and flooding                                                                           |
| <b>Key Partners</b>          | City of Sausalito, Galilee Harbor Community Association                                                   |
| <b>Success Story</b>         | Camera was installed                                                                                      |
| <b>Future of the Project</b> | Work with WebCOOS to use ML to identify flooding and king tides and to show nearby NWLON tide gauge data. |



| User                                 | Use-Case                                                                         | Future Efforts                                                                                                                                                                                                                                                     |
|--------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pointe-au-Chien Indian Tribe (PACIT) | Two cameras will be installed to monitor the water level on each side of a levee | The Pointe-au-Chien Indian Tribe will use the data from these webcams and the environmental monitoring station that will be co-located. The data will be sent near-real-time to LUMCON for public dissemination                                                    |
| UTMSI/USCG/TAMUCC-CBI                | Two cameras installed at the UTMSI pier in Port Aransas, TX                      | These cameras documents conditions in the Port Aransas shipping channel looking towards the intersection between the Aransas Pass/Corpus Christi Ship Channel, the Aransas Channel, and the Lydia Ann Channels for maritime awareness.                             |
| General Public                       | Two cameras installed at the Phoenix Towers in Gulf Shores, AL                   | <p>These cameras monitor, assess, and report on beach hazards. Live beach footage is available to the public to view from their desktop and mobile devices.</p> <p>** Experimental rip current analysis is also at these sites</p>                                 |
| General Public                       | Two cameras installed at the Tidewater Beach Resort in Panama City, FL           | <p>These cameras monitor conditions at the beach, including shoreline change and water levels. Live beach footage is available to the public to view from their desktop and mobile devices.</p> <p>** Experimental rip current analysis is also at these sites</p> |

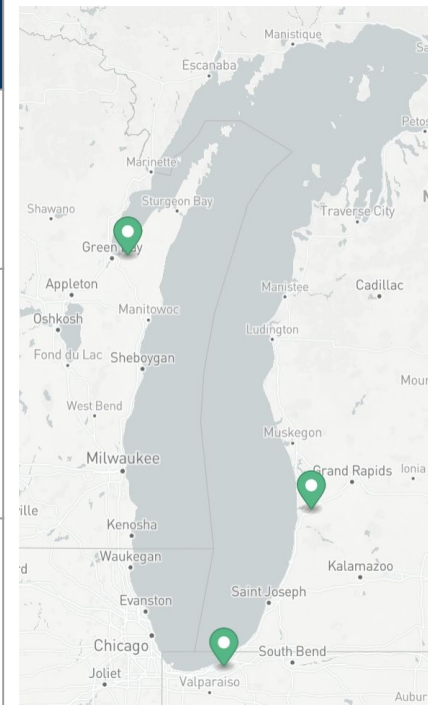
## ***Diving Deeper***

|                              |                                                                                                                           |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Camera location</b>       | UTMSI Pier, Port Aransas, TX                                                                                              |
| <b>Goals of the Effort</b>   | Provide vessel traffic monitoring to port management and the USCG                                                         |
| <b>Key Partners</b>          | <ul style="list-style-type: none"> <li>- UTMIS - TAMUCC</li> <li>- USCG - AI2ES.org NSF AI Institute</li> </ul>           |
| <b>Success Story</b>         | Two cameras were installed at on the Pier (east and west facing) to provide near-real time imagery of the ship channel    |
| <b>Future of the Project</b> | The cameras at this location are being evaluated for feasibility of surface current calculations in partnership with TAMU |



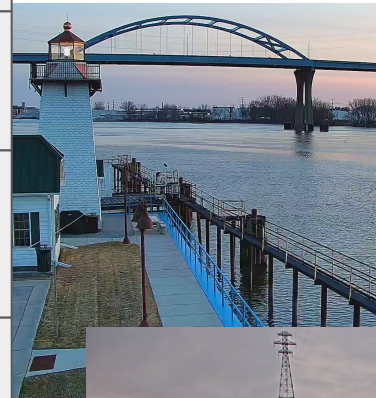


| User                                                            | Use-Case                                                                                                                         | Future Efforts                                                                                                                                                                |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Michigan DNR                                                    | <b>Holland, MI:</b> general viewing and rip current detection algorithm development                                              | <ul style="list-style-type: none"> <li>Integrate this (and all WebCOOS) cams into Seagull Coast app</li> </ul>                                                                |
| NEW Water, Green Bay Yacht Club, CO-OPS                         | <b>Green Bay (Fox River), WI:</b> Enhance capability for flood monitoring of local infrastructure; general situational awareness | <ul style="list-style-type: none"> <li>Ice applications?</li> </ul>                                                                                                           |
| Indiana-Illinois Sea Grant, Indiana Dunes State Park, IDNR, NWS | <b>Indiana Dunes, IN:</b> Monitoring and assessment of shoreline dynamics; support nearshore forecasting; situational awareness  | <ul style="list-style-type: none"> <li>Apply shoreline derivation algorithms</li> <li>Co-locate observing assets (e.g. buoy, x-band radar) for additional insights</li> </ul> |



## ***Diving Deeper***

|                              |                                                                                                                                                                                                                                                       |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>         | Fox River-Green Bay                                                                                                                                                                                                                                   |
| <b>Goals of the Project</b>  | Enhance capability for flood monitoring of local infrastructure; general situational awareness                                                                                                                                                        |
| <b>Key Partners</b>          | NEW Water, Green Bay Yacht Club, CO-OPS                                                                                                                                                                                                               |
| <b>Success Story</b>         | <ul style="list-style-type: none"> <li>• Installation (1st GLOS cam, navigating the process)</li> <li>• Local news station utilizing cam feed to update locality about on water conditions to complement weather updates and forecast data</li> </ul> |
| <b>Future of the Project</b> | <ul style="list-style-type: none"> <li>• Future applications for ice formation</li> <li>• Work with more local reporters at new cameras sites + existing reporters to gather feedback</li> </ul>                                                      |



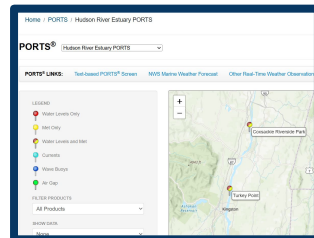
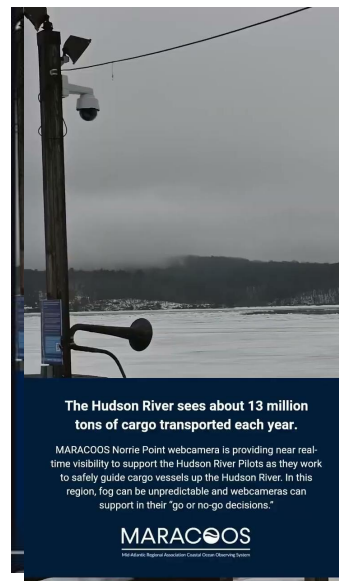
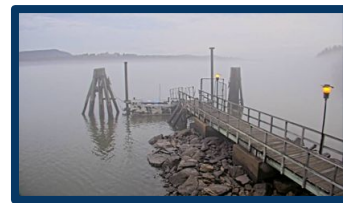
| User                                                                                                                                                                                                                                              | Use-Case                                                                                                                                                                                                                                                                     | Future Efforts                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Ocean City Beach Patrol, Virginia Beach Lifesaving Service, City of Virginia Beach, National Weather Service, Harrison Group</p> <p>Carova Fire &amp; Rescue, National Weather Service</p> <p>Robert Moses State Park staff and lifeguards</p> | <p><b><i>Ocean City, MD and VA Beach, VA</i></b> – Beach Hazards and Coastal Tourism</p> <p><b><i>Carova, NC</i></b> - Beach Hazards and Flood Monitoring</p> <p><b><i>Long Island, NY</i></b> - Beach Hazards (South camera); Recreational Use of Inlet (North camera).</p> | <p>Assist w/ ML rip current algorithm validation, pairing daily lifeguard reports with imagery during moderate/high risk NWS rip forecasts</p> <p>OceansMap insight pairing livestream and key wave/wind/tide data for lifeguard HQ use;</p> <p>Connect OCMD, Carova, and Robert Moses webcams to NOAA CO-OPS coastal inundation dashboard</p> |
| <p>Delaware Geological Survey, DE DNREC Shorelines &amp; Waterways, Town of Bethany Beach, USACE</p>                                                                                                                                              | <p><b><i>Indian River Inlet and Bethany Beach, DE</i></b>- Installing network of trail cams to monitor wave approach, breaking patterns, and beach morphology. Monitor storm impacts; inform sand management decisions and erosion control practices.</p>                    | <p>Partner with USACE CorpsCAM to integrate WebCOOS imagery with their IR Inlet cams; apply ML to quantify wave dynamics and shoreline change.</p>                                                                                                                                                                                             |
| <p>Stevens Institute, Camden Municipal Authority, and Rockaway Institute for Sustainability</p>                                                                                                                                                   | <p><b><i>Camden, NJ, Hoboken, NJ and Rockaway, NY</i></b> - Network of 3 cameras for flood monitoring in urban NY/NJ; co-located with ultrasonic sensors to test methods for multi-sensor cross-coastal flood observation systems</p>                                        | <p>Develop ML models for coastal-pluvial flood prediction to improve public safety</p>                                                                                                                                                                                                                                                         |



| User                                                                                                                     | Use-Case                                                                                                                                                                       | Future Efforts                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Virginia Institute of Marine Science, VA Beach Dept of Public Works, emergency managers, Va Beach & Sandbridge residents | <b><i>Virginia Beach and Sandbridge, VA -</i></b><br>Planning installations for flood monitoring for public safety; webcams to be co-located near existing water level sensors | Validate ML for estimating water levels by pairing webcam imagery with nearby water level sensors (USGS and other);<br><br>Integrate imagery into StormSense flood forecast portal for VA Tidewater communities and emergency responders |

## Diving Deeper

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>         | The Value of Near Real-Time Data for Maritime Traffic:<br>Hudson River at Norrie Point                                                                                                                                                                                                                                                                                                                              |
| <b>Goals of the Project</b>  | Provide near-real time data on river conditions and visibility to inform critical go/no-go decisions for Hudson River Pilots transiting cargo vessels between Norrie Point and Albany                                                                                                                                                                                                                               |
| <b>Key Partners</b>          |  <b>HUDSON RIVER PILOTS ASSOCIATION</b>  <b>NEW YORK STATE</b> Department of Environmental Conservation  <b>HUDSON RIVER</b> National Estuarine Research Reserve |
| <b>Success Story</b>         | Camera installed in February 2026<br>Site visit in March – interview with HR pilots and NERR staff<br>Partnership highlighted in HRNERR's NOAA 312 Review                                                                                                                                                                                                                                                           |
| <b>Future of the Project</b> | Add 2-3 webcam sites co-located with HRNERR tide stations/ NOAA PORTS network<br><br>Partner with Hofstra U. to develop fog detection and prediction ML algorithm for Mid-Atlantic ports/harbors; expand application to the national WebCOOS network                                                                                                                                                                |





# NANOOS

Northwest Association  
of Networked Ocean  
Observing Systems

**George Kaminsky**  
***gkam461@ecy.wa.gov***

| User                                                           | Use-Case                                                                                                                                                                                                                                                                                                                                                                     | Future Efforts                                            |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| WA Ecology, Westport by the Sea residents, beach visitors      | <b>Westport, WA – Erosion Monitoring &amp; Tourism Protection</b> Two cameras monitor shoreline change, comparing natural dunes and engineered defenses—helping protect coastal properties, public access, and tourism infrastructure. Visitors and residents benefit from improved awareness of beach conditions and long-term shoreline trends.                            | Include on NVS                                            |
| WA Ecology, City of Ocean Shores, residents and beach visitors | <b>Ocean Shores, WA – Flood Risk &amp; Community Resilience</b> Cameras track a shoreline vulnerable to breaching that could flood the city, supporting proactive hazard response and protecting homes, businesses, and visitor destinations. This heavily visited beach community benefits from improved safety and situational awareness for residents and tourists alike. | Include on NVS                                            |
| USCG, emergency responders, fishers, boaters, surfers          | <b>Siuslaw River, OR – Maritime Safety &amp; Fishing Economy</b> Real-time imagery supports safe bar crossings and U.S. Coast Guard operations, reducing risk for fishermen, charter operators, recreational boaters, and emergency responders while sustaining the working waterfront and being useful to local surfers.                                                    | Include on NVS                                            |
| Hotel proprietors, Beach visitors                              | <b>Newport, OR – Beach Safety &amp; Tourism Enhancement</b> Cameras provide live beach and surf conditions, helping visitors safely enjoy the coast while supporting local tourism and hospitality businesses.                                                                                                                                                               | Restore feed with new owners of the hotel; Include on NVS |
| State Parks, surfers, beach visitors                           | <b>Bastendorff Beach, OR – Recreation &amp; Coastal Planning</b> Monitoring of shoreline change and beach usage informs local management while enhancing visitor experience at a popular recreation site.                                                                                                                                                                    | Include on NVS                                            |



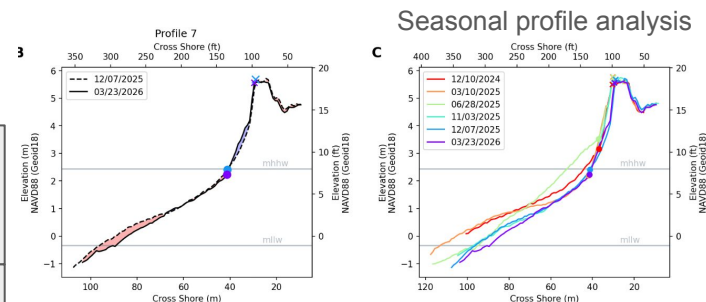


# NANOOS

Northwest Association  
of Networked Ocean  
Observing Systems

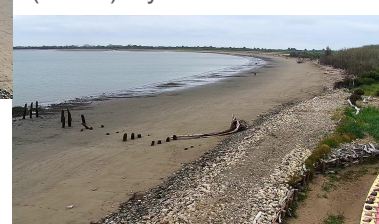
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|------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>         | <i>Monitoring Ocean Shores Oyhut Bay shoreline protection and evolution</i>                                                 |
| <b>Goals of the Project</b>  | Use webcams to monitor cobble berm performance and adjacent unmodified eroding shoreline                                    |
| <b>Key Partners</b>          | City of Ocean Shores, Washington Department of Ecology, Surfline                                                            |
| <b>Success Story</b>         | Two cameras were installed in Jan 26 for optimal viewing and data collection. Data products are under development.          |
| <b>Future of the Project</b> | Develop quantitative data and analyses to document wave run-up, shoreline change, and metrics to inform adaptive management |

## Diving Deeper



(above) View from Oyhut East camera

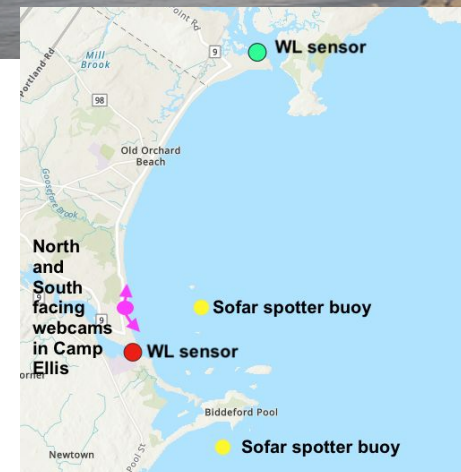
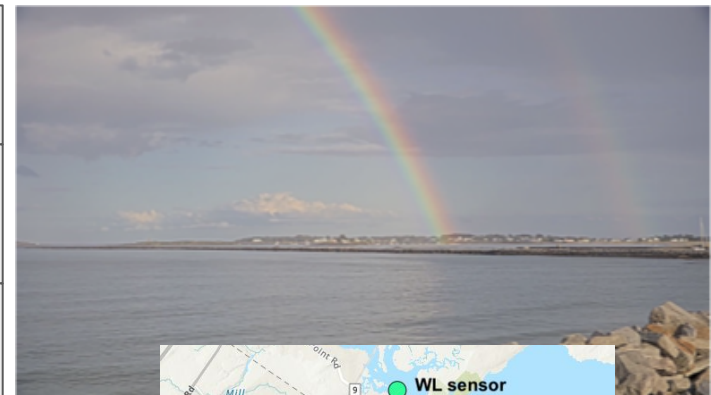
(below) Oyhut West camera



| User                                                                           | Use-Case                                                                                                                                                                                                                                                                                                    | Future Efforts                                                                                                           |
|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Maine Geological Survey,<br>NWS, local Ferry Beach<br>residents                | <b>Ferry Beach at Saco Maine:</b><br><b>North View:</b> Monitor storm impacts and changes specifically trends in beach width; validate wave run-up model<br><b>South View:</b> Monitor wave patterns around existing jetty and wave overtopping during storms, monitor changes with spur jetty construction | <i>Work with local government &amp; COOPS to deploy new cameras near an area prone flooding and near a COOPS station</i> |
| RI Coastal Resources<br>Management Council<br>Town of Westerly, URI            | <b>Town Beach, Westerly RI:</b><br>Monitor shoreline change and erosion                                                                                                                                                                                                                                     |                                                                                                                          |
| RI Coastal Resources<br>Management Council,<br>Town of South Kingstown,<br>URI | <b>Town Beach, South Kingstown, RI:</b><br>Monitor shoreline change and erosion and flooding impacts on nearby infrastructure                                                                                                                                                                               |                                                                                                                          |

## ***Diving Deeper***

|                              |                                                                                                                                                                                                                                                                             |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>         | Ferry Beach Cameras                                                                                                                                                                                                                                                         |
| <b>Goals of the Project</b>  | This location currently experiences significant wave run-up during storms, erosion and shoreline change. The Army Corp is constructing a spur jetty to help mitigate erosion.                                                                                               |
| <b>Key Partners</b>          | NWS, Maine Geological Survey, local Ferry Beach residents                                                                                                                                                                                                                   |
| <b>Success Story</b>         | Strong partnerships with local residents, the weather service, MGS, and local academic inst. have led to identifying good locations to test these assets                                                                                                                    |
| <b>Future of the Project</b> | This is the location with several different assets monitoring coastal conditions and impacts - Sofar spotter buoy, water level stations, webcams and high resolution model. We'd like to work on bringing this information together in a meaningful way for decision makers |







# PacIOOS

PACIFIC ISLANDS OCEAN OBSERVING SYSTEM

**Chris Olson**  
***olsoncj@hawaii.edu***

| User                                                       | Use-Case                                                                                                                                                                                   | Future Efforts                                                                                                             |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b><i>Beachfront Waikiki</i></b><br><i>Sheraton Hotel</i>  | Webcam is used to monitor wave and weather conditions as well as provides general viewing for beachgoers. Video could potentially be used to monitor shoreline change.                     | This camera went offline on 5/11/26 and needs to be replace. PacIOOS is working on a new MOU and coordinating replacement. |
| <b>Kahului Harbor</b><br>Maui Beach Hotel                  | Two cameras at this installation provide east and west views overlooking Kahului Harbor. In addition to showing local conditions, these cameras document water level and flooding impacts. | Potentially implement flood detection and coordinate with nearby NOAA NOS CO-OPS water level station.                      |
| <b>Wanini Beach</b><br>Kaua'i Fire Dept.                   | Potential new installation would support beachgoer safety through rip detection and monitoring swimmers entering/exiting the water.                                                        | Navigate remaining permit and logistical hurdles needed before installation.                                               |
| <b>Au'asi Harbor</b><br>American Samoa Port Administration | Potential new installation would support the portmaster in monitoring water and weather conditions in the Aunu'u channel.                                                                  | Develop roadmap for installation                                                                                           |



# PacIOOS

PACIFIC ISLANDS OCEAN OBSERVING SYSTEM

## *Diving Deeper*

### Project Title

## AI/ML Beach Occupancy

### Goals of the Project

Automate beach attendance estimation

### Key Partners

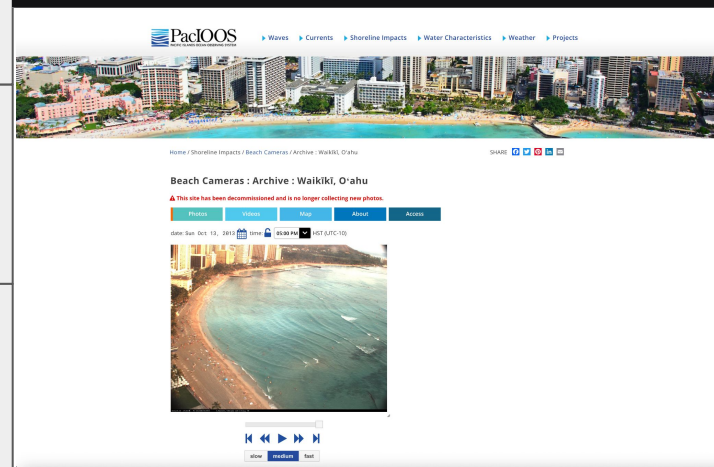
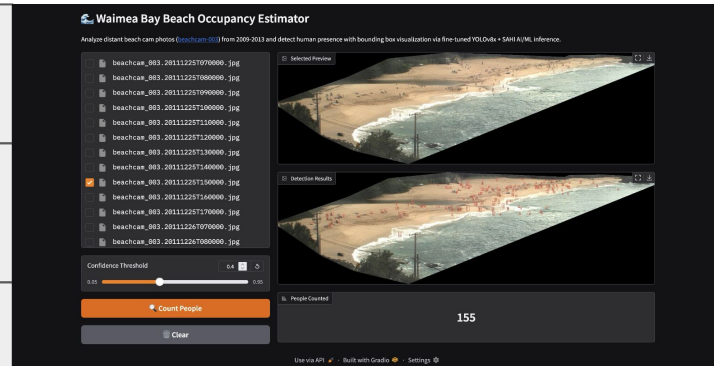
University of Hawai'i, PacIOOS,  
WebCOOS

### Success Story

Historical Waimea Bay camera footage used to estimate beach attendance and seasonal trends

### Future of the Project

Use the model to provide real time beach occupancy estimates for cameras



| User                                                                                                              | Use-Case                                                                                                                                                      | Future Efforts                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Scripps Oceanography<br/><a href="#">Coastal Process Group</a></p> <p>PI: Mark Merrifield &amp; Adam Young</p> | <p>Benefit the California Coastal Monitoring Network and modeling coastal flooding and inundation, which includes the CDIP buoy wave height observations.</p> | <p>Validate and improve predictive flood models</p>                                                                                           |
| <p>California State Parks</p>                                                                                     | <p><b>Carpinteria and San Elijo Camera:</b> Improved modeling forecasts with the SIO Coastal Process Group (PI: Merrifield)</p>                               | <p>Carpinteria State Beach, CA, Deployed 13-May 2026</p>  |
| <p>Cal Poly State University, San Luis Obispo</p>                                                                 | <p><b>Cal Poly Pier Camera:</b> Monitor wave-height and improve modeling forecasts with the SIO Coastal Process Group (PI: Merrifield)</p>                    |                                                                                                                                               |





# SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

## *Diving Deeper*

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                   |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>                  | Wave and Shoreline Observations to Assess and Predict Open Coast Flooding in the SCCOOS-CeNCOOS Regions                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                   |
| <b>Goals of the Project</b>           | Improved modeling forecasts with the SIO Coastal Process Group (PI: Merrifield)                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                   |
| <b>Key Partners / Site Selection</b>  | <b>Conflicts with Military Surveillance</b> <ol style="list-style-type: none"><li>1. Silver Strand Beach</li><li>2. Point Mugu</li></ol> <b>Approval not Granted</b> <ol style="list-style-type: none"><li>3. Newport Beach</li><li>4. Port Hueneme</li><li>5. Chevron</li></ol>                                                                                                                                                                                               | <b>Lack of Infrastructure or Power</b> <ol style="list-style-type: none"><li>6. Tijuana River Mouth</li><li>7. Emma Wood</li></ol> <b>To be determined...</b> <ol style="list-style-type: none"><li>8. Corral State Beach</li><li>9. Refugio State Beach</li><li>10. Hotel Del Coronado</li></ol> |
| <b>Success Story &amp; CHALLENGES</b> | SCCOOS has had a number of complications that has lead to finding suitable locations <ul style="list-style-type: none"><li>• City of San Diego's <u>surveillance ordinance</u></li><li>• Adjacent <u>military bases and training sites</u> for the Navy Seals and Pacific Fleet</li><li>• California State Parks, City of Newport, etc. <u>permit process.</u></li><li>• Program staff <u>availability</u></li><li>• Low resolution, obscured views, access to power</li></ul> |                                                                                                                                                                                                                                                                                                   |
| <b>Future of the Project</b>          | Continuing to build relationships and find a home for our final 3 cameras.                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                   |



## ***Diving Deeper***

|                              |                                                                                                                                                                                                                                                                                                   |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>         |                                                                                                                                                                                                                                                                                                   |
| <b>Goals of the Project</b>  |                                                                                                                                                                                                                                                                                                   |
| <b>Key Partners</b>          |                                                                                                                                                                                                                                                                                                   |
| <b>Success Story</b>         | <p>We have had only recent installations</p> <ul style="list-style-type: none"><li>• Carpinteria - May 13, 2026 (State Park)</li><li>• San Elijo - June 29, 2026 (State Park)</li><li>• Hotel del Coronado - Camera of opportunity</li><li>• Need 3 more - have leads - unknown outcome</li></ul> |
| <b>Future of the Project</b> |                                                                                                                                                                                                                                                                                                   |

\* State Parks permit allows for 3 cameras, expires 2/2027



***Debra Hernandez***

| User                                                             | Use-Case                                                                                                                                    | Future Efforts                                                                                                                                      |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| NOAA COOPS, local emergency managers & municipalities            | Use Webcam data with water level data and the NWLON WebCOOS Synchronizer to visualize flood impacts.<br>Charleston Harbor<br>Georgetown, SC | <i>Work with local government &amp; COOPS to deploy new cameras near flood prone areas that are also near COOPS or SECOORA water level stations</i> |
| Marina operators, local USCG                                     | Navigation and vessel traffic management:<br>West coast of Florida near a marina<br>Wrightsville Beach, camera overlooks channel            |                                                                                                                                                     |
| Harbor pilots, Port operators, weather forecasters               | Fog detection                                                                                                                               |                                                                                                                                                     |
| Beach communities, emergency and Public works staff, life guards | Monitoring erosion, flooding and beach use enables local municipal and emergency managers to make decisions about mitigating hazards        |                                                                                                                                                     |





# Lunch

**12:00 pm - 1:00 pm**

**Next Session:** Local Stakeholder Session at 1:00 pm