

A drone with a GoPro camera and four black spherical weights is flying in a clear blue sky. The drone is positioned in the upper center of the frame. Below the drone, there are green trees. The bottom of the image has a white, torn-paper-like border that separates the sky and trees from a solid black background.

Creating Standards of Procedures

For Data Collection by Drone

Brent Walls, Upper Potomac Riverkeeper



POTOMAC
RIVERKEEPER®
NETWORK

Potomac Riverkeeper Network

- Mission: Protect the public's right to clean water in the Potomac and Shenandoah Rivers and their Tributaries. We stop pollution to enhance the safety of our drinking water, protect healthy Habitats, and enhance public uses and enjoyment.



What do Riverkeepers do?

- Investigate Pollution
- Voice for the River
- Enforce State and Federal Laws

POTOMAC RIVERKEEPER®

20 YEARS

PROTECT • DEFEND • ENJOY!



Celebrating Two Decades of Protecting the Nations River

Check out our Instagram story for a brief history of what
we've accomplished over the past twenty years

Join the Celebration!



1972-2022

The Next 50 Years

Clean Water Act

Why do we collect water monitoring Data?

- Assess the condition of a water body
- Assess the impact to aquatic species
- Educate the public or decision makers
- Identify the source of pollution on a water body.
- Human Health Impacts
- Evidence for legal action



Targeted Monitoring for Evidence Collection

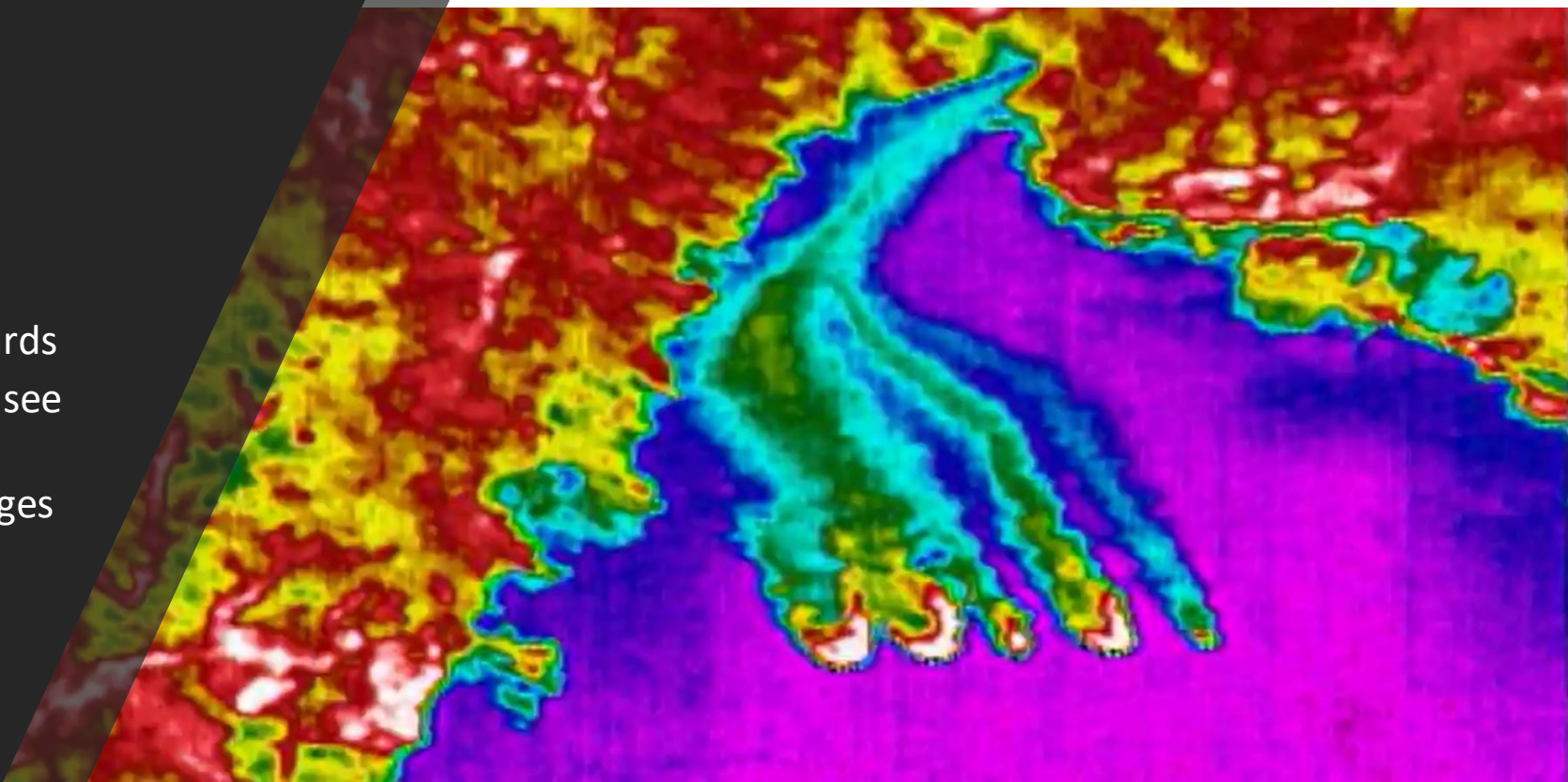
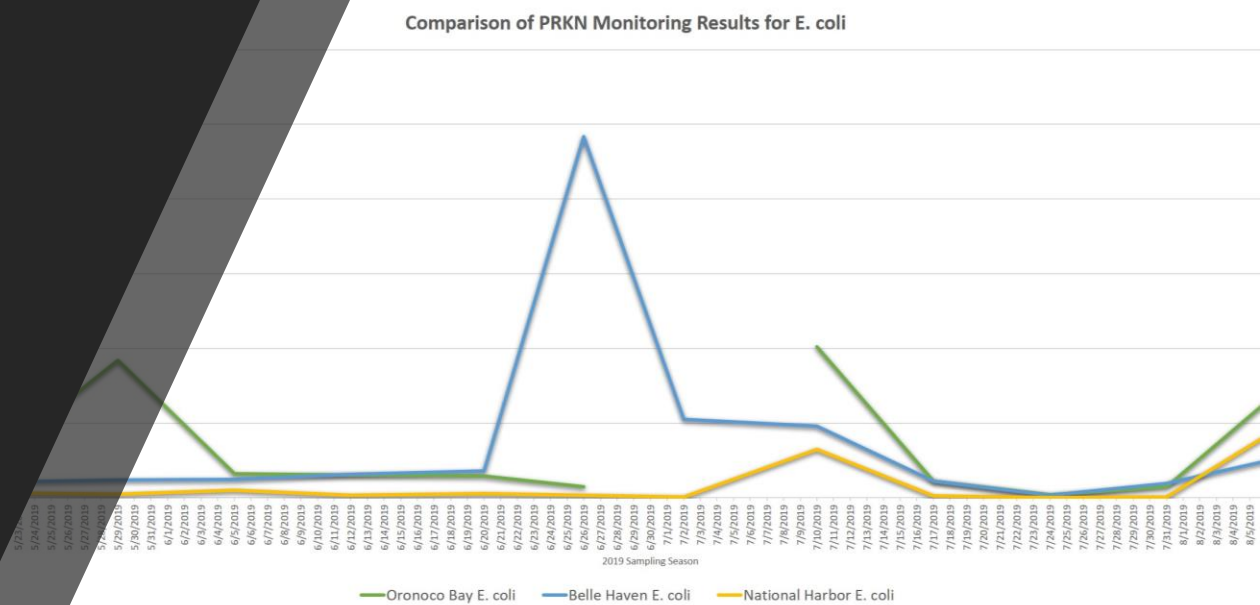
- Analysis of pollution after a spill
- Violation of a discharge permit



Numerical vs. Narrative Data

- Numerical water monitoring data
 - Concentration of a pollutant
 - Water quality Standards
 - Measurable violation

- Narrative water monitoring data
 - Observations
 - River Patrols
 - Drone and Airplane
 - Narrative water quality standards
 - Physical impacts you can see or smell
 - Violations based on visual images





Volunteer Operated Water Quality Lab

- Virginia DEQ Tier 3 certified
- Produce legally defensible water quality data
- Trained Volunteers



Monitoring with Drones

- More cost effective and convenient than airplanes
- Visual data collection
 - Evidence of pollution
- Physical evidence collection

SGI Basalt Mining



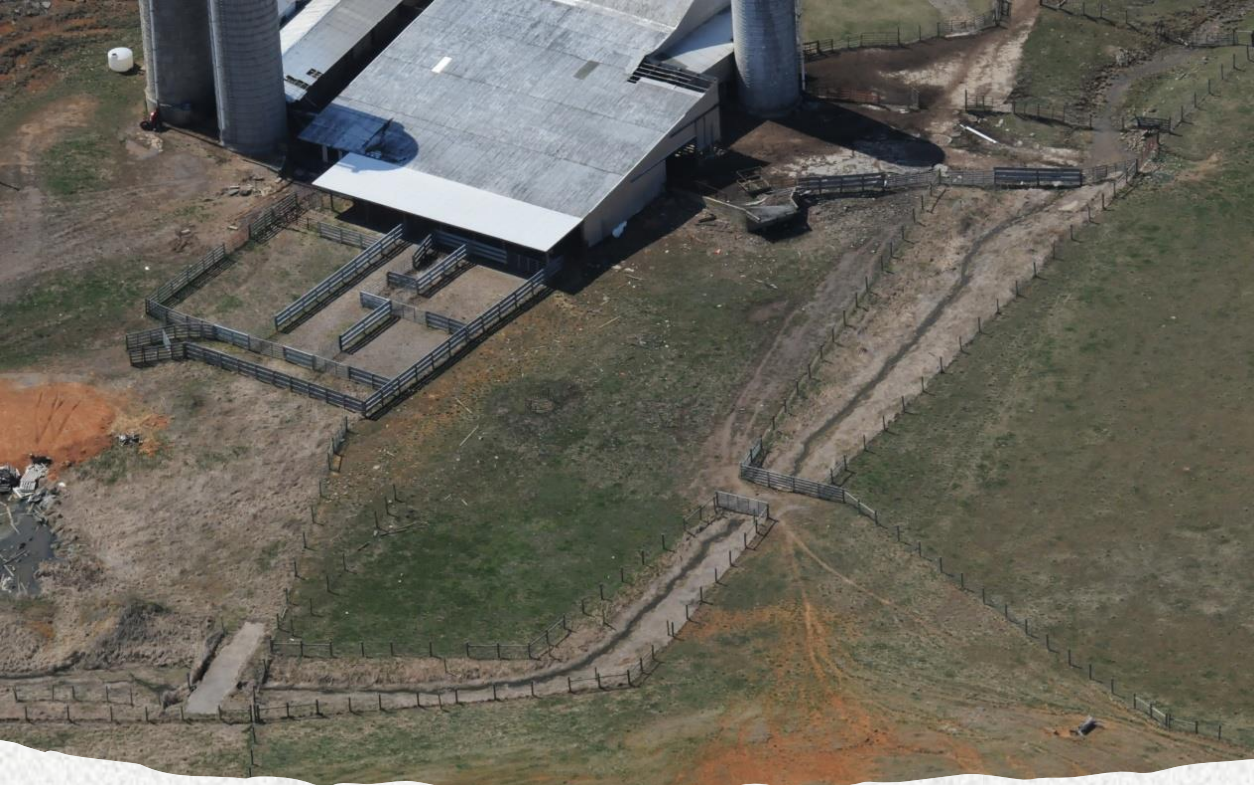


Pollution from SGI

- Green murky color downstream
- No violation of the discharge permit
- Drone image captures unpermitted discharge

Installation of
5 stage sand
filtration





Shenandoah Riverkeeper

- Observations from SRK Agricultural Stewardship Program
- Submission of complaint to VADEQ

D&L Coal Discharge Violation





D&L Coal Stormwater Discharge

- Visual impact
- Violation from no sampling of discharge



Before and After

- Removed all coal & reclaimed the site
- Site is permanently closed after 80 yrs of operation

Potomac Riverkeeper at Morgantown









PRKN Drone Surveillance Program

- Flying Drones for 6 years
 - Official drone program started in Fall of 2019
 - Legal advice from Sidley Austin Law firm
- Each Riverkeeper has a drone
 - DJI Mavic 2 zoom and Mavic 2 Enterprise dual
- FAA Part 107 Commercial license
 - Trained and tested
 - Required to follow FAA Laws
 - Use of images for pay, professional video and as evidence in legal action



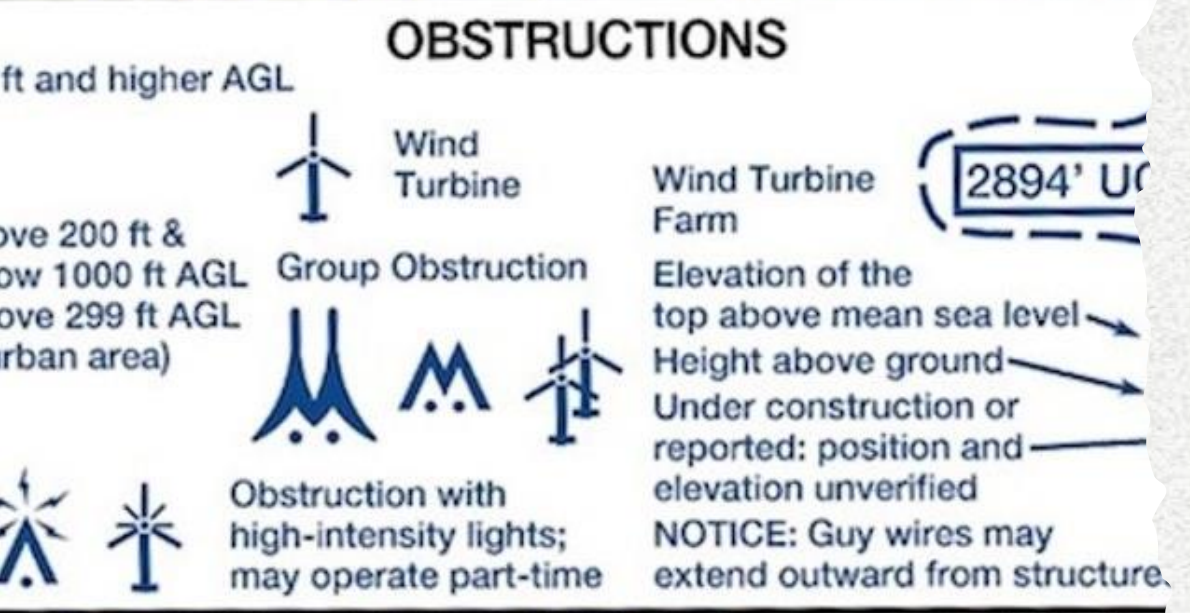
PRKN Drone Surveillance SOPs

- Designed to ensure safe flights
 - Identifies no fly conditions
 - Procedures that follow FAA regulations
 - Staff and Volunteers
- Minimize Intrusion of residential properties
 - Required flight path planning
 - Additional restrictions



Air Space Assessment

- Air space determines elevation of flight
- Identifies Restrictions
- Identifies Required Authorizations



Flight Path Assessment

- Flight Path
 - Launch location
 - Private Property
 - Local Drone Laws
 - Visual Line of sight Assessment
- File Flight Plan
 - Local authority permissions



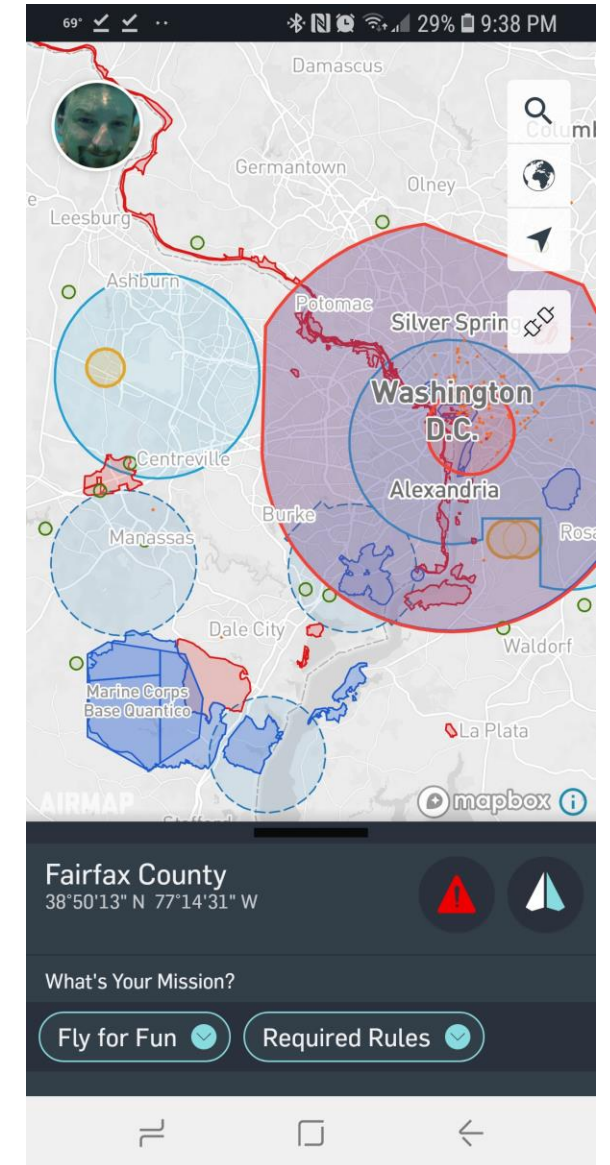
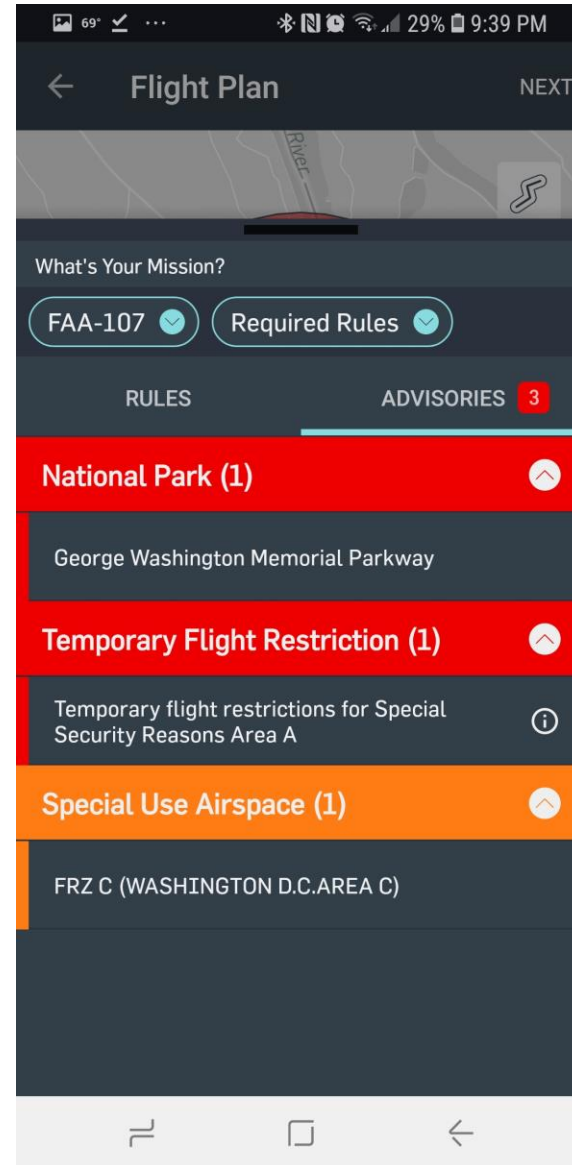
Weather Assessment

- What conditions are necessary?
 - Bright Sun vs. Cloud Cover
 - Flying over water
- Hazardous weather
 - High Winds
 - Precipitation
 - Elevation (fog, cold, air density)



Before You Fly Planning

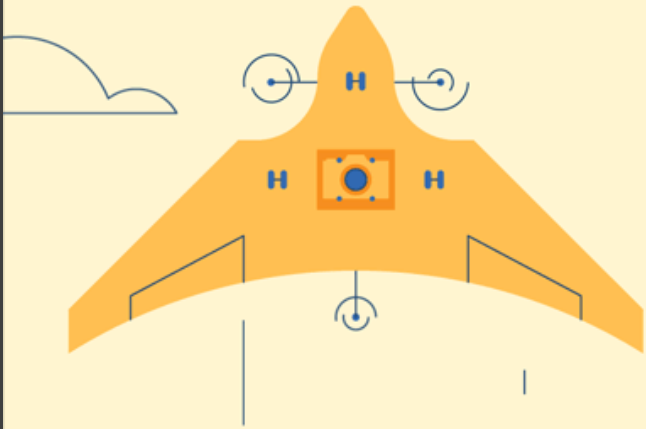
- Check list before you fly
 - Make sure equipment is in good working order
 - Check the weather
 - High winds or gusts
 - Software Updates
 - Charged Batteries
 - Image Storage
 - Know your limitations





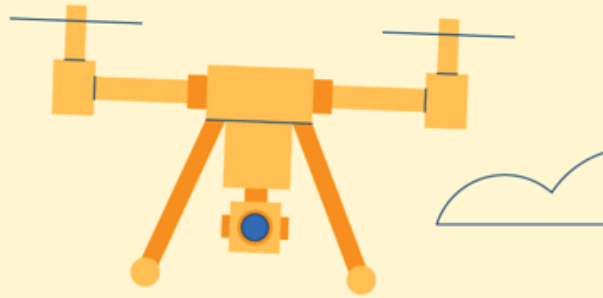
Training Requirements

- Annual training
 - Technology Refresher
 - Pre and post flight procedures
 - Guidance on how to handle data (image storage and original media)
- New techniques
 - Site Survey Mapping
 - Thermal Analysis



Fixed Wing Drone

Used for mapping and scanning over long distances.



Rotary Drone

Used for inspection and surveillance over short distances.



What Kind of Drone Do You Need?



Seed-Dropping Drones Can Plant 40,000 Trees

What Kind of Equipment?

- Determine the size of the Drone
- Sensors
 - Thermal
 - Multispectral
 - Air Quality
- Pay Loads
 - Water Sampling
 - Carry and Drop
- Duration

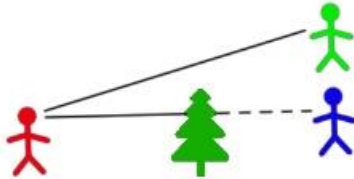
UAS Operations Key Terms

R. Line of Sight

- Straight line along which the observer has unobstructed view
- Abbreviated LOS

S. Beyond Line of Sight

- Operator and UAV too distant or obstructed
- Abbreviated BLOS



Prepared by: [Drone with Camera Research, Inc.](#)

EAGLE EYE VR
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Other Considerations for your Project

- Visual Line of Site vs. Beyond Visual Line of Sight
 - Project area size
- One time flight vs. Series of flights
- FAA certified
 - Pilot in Command
- Cost
 - Cheaper to Rent the Drone
 - Contract a Drone Company





Questions?

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