



POTOMAC
RIVERKEEPER®
NETWORK

**We Work to Protect the Public's Right to
Clean Water in Our Rivers and Streams.**

PRKN Drone Surveillance Program

Standard Operating Procedures

October 2020

Introduction

Potomac Riverkeeper Network has developed a program that uses drone technology to advance our ability to detect and gather information on water pollution sources that are impacting water quality in the Potomac and Shenandoah Rivers. PRKN's mission is to 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 river habitats, and enhance public use and enjoyment. Establishing a formal drone program is an important step to express the professionalism of our organization's ability to collect and use imagery for the purpose of advocacy and potential litigation. This document outlines the federal and state regulations on the use of drones, added safety precautions for PRKN staff and volunteers, drone training protocols, and a drone pre-flight and post-flight check list.

PRKN Rules for Drone Pilots

The Federal Aviation Administration has developed rules and regulations for recreational and commercial drone pilots. The rules and regulations for commercial drone pilots are similar to recreational drone pilots. Both categories require all pilots to adhere to airspace restrictions, monitor weather for safe flying conditions, must fly within visual sight of the drone, do not fly at night or under the influence, stay clear of emergency services and traffic, and do not fly over crowds of people. Commercial drone pilots with a FAA 107 license as a drone operator or as a Pilot in Command (PIC) of non-licensed pilots can fly greater than 400 ft, get permission to fly in some restricted areas, can fly beyond visual sight with field observers, and with permission can fly during emergency services.

The PRKN's drone program will primarily follow recreational drone rules. However, PRKN does have a licensed FAA commercial drone pilot that can fly as a commercial pilot for various projects and investigations. It is required that all PRKN staff and volunteers that fly a drone for a PRKN related operation must follow the guidelines set within this document. Following these rules will provide protection for persons and private property, which reduces the liability on PRKN and keeps flight operation as safe as possible. The following sections outline the FAA regulations in comparison with PRKN's guidance on the use of drones.

PRKN FAA Drone Registered Pilots

Currently, PRKN has three drones that are owned by the organization. The Staff and volunteers listed below are registered pilots with the FAA and have registration numbers visible on the drone. Also indicated for each staff or volunteer is the commercial drone pilot license and expiration date.

PRKN Staff

- Brent Walls - FA33EPC9FE - DJI Mavic II Enterprise Dual Thermo
 - Commercial certificate number 4187174, Expires Oct 2020
- Dean Naujoks - DJI Mavic II Zoom
- Mark Frondorf - DJI Mavic II Zoom

PRKN Volunteers

- Brent Walls - FA33EPC9FE, DJI Mavic II Zoom

Airspace

The FAA limits the use of recreational drones to an elevation of 400 ft in class G airspace. All PRKN staff and volunteers that fly drones will be required to follow the recreational drone rule of 400 ft elevation in class G airspace. If a volunteer or staff member has a FAA 107 commercial drone license and has approval from the PRKN Drone Program Manager, flight conditions may be adjusted to achieve a successful drone investigation and/or the collection of imagery for use by PRKN. PRKN staff and volunteer drone pilots must follow the Airspace assessment procedures before flying a drone for PRKN related flights.

The FAA does not have lower limits on airspace in class G or other classes of airspace for drones; however local drone laws may have restrictions on drones. Part of the airspace assessment is to check local drone laws for any restrictions. PRKN staff and volunteers will follow additional airspace flight restrictions. These additional restrictions are set to insure safe drone flights and protections for residential property owners.

- No drone flights or their flight paths will fly below 100ft.
- All drone operations must stay at least 200 ft laterally from any structure.
- All flight operations must avoid residential areas, unless permission is granted by the land owner(s). This includes along the flight path of the drone to the target location.
- Any drone operations in or close to restricted areas or other class airspace other than G, must require prior approval through the FAA.
- All PRKN drone missions should stay at or below the 400 ft above ground level (AGL) airspace ceiling. If any drone mission requires the pilot to exceed 400 ft AGL, the PRKN drone program manager must be consulted. Only FAA licensed drone pilots may conduct a drone mission over 400 ft AGL.

Visual Line of Sight

FAA requires all commercial and recreational drone pilots to fly their drone with visual line of sight. This means that the pilot must be able to see the airspace in which the drone is flying. The pilot needs to be alert to identify any potential hazards in the airspace and to yield to all other air traffic. Visual line of sight also means that obstacles such as dense trees and buildings should not be blocking the visual airspace the drone is flying.

All PRKN staff and volunteer drone pilots will follow FAA recreational rules for visual line of sight. If PRKN staff or volunteers have a commercial drone license, beyond visual line of sight (BVLOS) may be used. The PIC is required to use field visual observers on BVLOS flights that have communication with the PIC and have clear visibility of the airspace. PRKN staff and volunteers must coordinate with the PRKN Drone Program Manager before BVLOS flights are conducted.

Weather Conditions

The FAA highlights conditions where drone flights may become hazardous or are restricted. The FAA acknowledges that when there is low level fog in the airspace, that condition becomes a non-visual line of sight condition and therefore drone operations are restricted. The FAA also lists other weather conditions that make flights with a drone hazardous such as high winds or precipitation as rain, snow or hail. The FAA does not provide specific weather conditions as to wind velocity and rain intensity to cease drone operations.

PRKN staff and volunteers will not fly a drone under the following conditions:

- Low visibility due to fog
- High winds exceeding 40 mph or gusts at 35 mph or above
- All precipitation events

EMS, Crowds and Traffic

The FAA does not allow recreational drone pilots to fly near emergency medical service operations, over crowds or over heavy traffic right-of-ways. The FAA does allow commercial drone pilots to fly during events with crowds, during EMS operations, and over heavy traffic if there is prior approval from local and state police and a waiver from the FAA.

PRKN staff and volunteers will follow the listed conditions as they pertain to drone investigations:

- No drone operations over any state or interstate highways. Drone lift off may occur on the public right-of-way on all two lane roads. Drones can only cross these types of roads when the traffic is clear of all vehicles.
- No drone operations over crowds, unless the event is sponsored by PRKN, the drone maintains a safe distance away from the crowds, permission from local authorities, and a FAA 107 licensed pilot is in control of the drone.
- No drone operations near EMS responses, unless permission has been granted by the on scene investigator, local or state police.

Urban areas

The FAA does not have explicit rules or regulations about flying drones in urban areas, except the standard rules of crowds and traffic. Local jurisdictions may have drone restrictions that could include prior approvals, no fly zones, elevation minimums, private property restrictions or other regulations.

PRKN staff and volunteers will follow the following rules during flight operations in urban areas:

- Drone take off must be on a public right-of-way or with permission from a property owner.
- The target area for investigation has to be at a maximum of 300 ft from the drone pilot.
- Drone operations will not fly over private property unless prior approval from landowners have been attained.
- All other conditions of the PRKN UAV Drone Program must be followed.

Safety

The FAA has identified other safety restrictions for drone operators that include no flying a drone while under the influence of drugs or alcohol and no flying a drone at night. However, authorizations from local or state police may be granted for some night operations, but VLOS must be maintained.

PRKN staff and volunteers will adhere to the following restrictions:

- Do not fly a drone while under the influence of drugs or alcohol.
- Do not fly a drone at night.
- Flight operations that involve power lines in the proximity of the drone take off and flight path of the drone must be cautious and follow the below criteria:

- Do not fly a drone below the horizon of the power lines in the airspace between the drone and the pilot. Power lines emit high electromagnetic fields that disrupt communications with the drone and the pilot could lose control of the drone. A loss of control of a drone could mean a potential hazard to the surrounding persons and property.

Annual Staff and Volunteer Drone Pilot Training

PRKN staff and volunteers with a drone that will be conducting drone flights will need to attend an annual Drone Training program. The Drone training session will be conducted by the Drone Program Manager. The training will include a review of FAA rules and regulations, PRKN SOPs and a practical test of the drone pilot's ability to control the aircraft.

Volunteer Drone Pilots

PRKN welcomes the inclusion of volunteers with a drone to fly missions for the purpose of PRKN activity; which includes imagery for social media, flight operations during an advocacy event or identifying pollution issues. PRKN requires that the volunteer drone pilot attend an annual Drone Pilot Training course if the volunteer intends to fly missions for PRKN, even if the drone pilot has a FAA Drone Pilots License. PRKN also requests that any mission that is flown under the direction of PRKN by a volunteer drone pilot must follow all standard operating procedures outlined in this document. PRKN prefers that a staff member of PRKN is onsite with the volunteer drone pilot if conducting a mission directed by PRKN staff.

PRKN Staff and Volunteer Drone Procedures

Before You Fly (B4U Fly) Procedures

1. Airspace Assessment

- a. Identify the target location and determine what is the airspace classification.
- b. Identify if there are any airspace restrictions or no fly zones near the target site.

2. Flight Path Assessment

a. Launch location

- i. Identify the drone take off location.
- ii. Take off positions must be located on public property or on private property with permission of the landowner.

b. Private Property

- i. Identify any private property owners along the flight path between take off site and the target location.
- ii. Adjust launch position and flight path to avoid private property
- iii. If private property can not be avoided, get prior approval from landowner(s).

c. Local drone laws

- i. Identify any local drone regulations and adjust accordingly.
- ii. Get prior approval from local authorities before drone operations if needed.

d. Visual Line of Sight Assessment

- i. Identify any potential obstacles (i.e. buildings, tree stands, power lines) that would interfere with pilots visual line of site through either a site visit or through the use of google earth or other imaging software.
- ii. Use google earth mapping tools to approximate the total length of the flight path to the area that will be inspected.

e. Airspace review

- i. Use AirMap or B4UFly smartphone application to check the airspace of the flight path and target area for any restrictions or warnings.

3. **Weather Assessment**

- a. Check the weather forecast for the planned day of the drone mission.
 - i. If there is a fog in the forecast, schedule another time or date.
 - ii. If there are high winds above 40 mph or gusts over 35 mph, then schedule another time or date.
 - iii. If there is a 50% chance or higher of rain, schedule another date.

4. **File flight Plan**

- a. **AirMap** - If there are any class B (airports) airspace conflicts, or other yellow warning restrictions when site and area are selected on AirMap; then a flight plan must be filed with AirMap.
- b. **Local Authority Permissions** - If there are any warnings for local law enforcement or emergency service airspace with phone numbers, you must call the number to notify them of your flight plan. This usually applies in urban areas.

5. **Pre-flight Checklist**

a. **Drone inspection**

- i. Check drone aircraft body for any damages and ensure that all components are functional.
- ii. Make sure that the propeller blades are not chipped or warped.

b. **All software updates**

- i. Turn drone on and connect to the control
- ii. Make sure the controller or DJI Go 4 application is connected to the internet
- iii. Make sure all software updates are installed
- iv. Make sure airspace restriction database is updated

c. **Check batteries and other equipment**

- i. Make sure all batteries are charged
- ii. Check the condition of any other equipment used with the drone is in good working order

d. **Imagery storage**

- i. Make sure there is adequate storage space on the microSD card in the drone for the mission.
- ii. If the drone mission is to collect imagery data for legal action, replace the microSD card with a new card (16 GB or 32 GB).

6. **Post Flight Procedures**

a. **Drone inspection**

- i. Check condition of the drone and note any damages.

b. **Data imagery**

- i. Upload data imagery to the PRKN google drive.