Q: How can drones be used in a wetland program?

A: There are too many potential uses for drones to mention them all, but we'll give a few examples. Drones can be used to collect high-resolution pictures (imagery) or video that can help assess the extent and condition of wetlands, particularly in remote or inaccessible areas. Some drones can collect additional data such as elevation/topography (e.g., LiDAR). Data collected from drones can be used to asses different wetland characteristics, such as distinguishing between soil and vegetation types present, the height and health status of the vegetation present, seasonal and/or long-term chronological changes, and more. They are typically easier to deploy than a manned aircraft or field team, which can be particularly helpful for ephemeral wetlands or intermittent streams that are only wet for short (sometimes unpredictable) periods of the year. They can also document and assess impacts from stressors, both sudden events (e.g., natural disasters) or slow changes over time.

Q: Do we need any licenses or permits to operate a drone?

A: Yes. You will need to get a [Remote Pilot Certificate](#) through the FAA. This requires passing an initial test, and completing an online training every 24 months to maintain certification. The initial test is $175, however the renewal is free. Only one person on your field team needs to have a license, as long as they are present at all field missions with a drone. This person is called the Remote Pilot in Command (RPC) and can allow others to operate the drone under their direct supervision. Drones must also be registered with the FAA – as of August 2023, the cost is $5 for 3 years and the registration number must be visibly displayed on the drone at all times.

Q: What additional hardware/software would we need to utilize information from a drone?

A: There are many different apps and types of software that can assist in data collection and processing. First, for data collection, you will want to check with the manufacturer of your drone to download the flight app that is compatible with your device. Usually the operating apps are free. Next for data processing there are many apps that have similar processing capabilities at different price ranges. The most commonly used apps for processing drone data have been ArcGIS Pro and Pix4D.

Q: Are there any limitations to drones we should keep in mind?

A: Yes. The biggest limitation of drone technologies is the cost. Drones and their equipment can add up pretty fast, so it is important to understand your program's needs and what products will actually meet those needs. Battery life of the drone can also a huge limitation. The maximum battery flight time is currently 45min with no load on/in perfect environmental conditions. However, many users get around this by purchasing multiple batteries and switching them out in the field. Additionally, Federal Aviation Administration (FAA) flight restrictions can render some areas as no-fly zones so it's important to check airspace restrictions over potential study areas before planning a drone program. Also, various levels of government have been passing privacy laws restricting drone use. Check to see if any of these laws exist in your area and if they would impact your planned use.

Q: How can we decide what size or type of drone is best for our program?

A: Make a wish list of things your agency hopes to accomplish with the device and then do research based off of that list. The manufacturer tech specs will give you ample information to make your decision. For example: if you only hope to collect photo and video data, purchasing a basic device will suit your needs. You wouldn't need to purchase additional sensors. Many programs start with a basic device, then purchase more sensors/sophisticated devices later. They phase their programs in over a 5-10 year time period to spread out the cost.

Q: Can federal funding help cover the cost of a drone and staff training?

A: Yes. Some tribes have used Clean Water Act (CWA) Section 106 and Clean Air Act (CAA) Section 103 funding to pay for drones and staff training. Depending on your intended use, other possible funding sources include the General Assistance Program (GAP), CWA 319 (non-point source pollution), the Bureau of Indian Affairs' (BIA) Climate Resilience Program, or the Bureau of Reclamation's WaterSMART grants (western U.S. only). If partnering with an educational institution, you may be eligible for National Science Foundation (NSF) funding.

Additional Resources

Integrating Drone and LiDAR Technology into Tribal Wetland Programs: Part 2 of NAWM's 2020 webinar on Advancing Tribal Wetland Programs Through Innovations in Monitoring & Assessment

How to Start Using Drone Technology in Various Environmental Projects. A Tribal Case Study presented by the Pala Band of Mission Indians at the 2023 Tribal Lands and Environment Forum.

To learn more about the process of earning your drone pilot license, see:

Airman Testing Information/References

PSI Testing Services (to find a test center or schedule your exam)

Integrated Airman Certification and Rating Application (IACRA) (Register and create an account to complete documents)

Airman Testing Supplement (Reference document used during the exam)