UAS in the National Estuarine Research Reserve System
Sue Bickford, Wells NERR
Maine Beaches Conference
2017
Evaluate the efficacy of unmanned aerial system imagery and LiDAR

• Primarily interested in diverse marsh systems
• Use National Estuarine Research Reserves

Compare to manned data

Evaluate value of private sector contracting for an operational program
Technical Plan – Products

- Multi-spectral (at least four-band) image three-centimeter resolution or better
- Lidar flown on the same platform to produce elevation data
- Lidar data will be classified for ground, water, and unclassified and have a non-vegetated vertical accuracy of 10 centimeters or better
- A digital elevation model from SfM
General Questions to Address

Vegetation mapping

- Need to monitor habitat and vegetation changes
- Can this imagery provide a better product than manned?
- If so, at what price?

Elevation

- Lidar has trouble in marsh areas. Smaller footprint help?
- Transect versus 3D on beaches
- Canopy by combining imagery structure-from motion (SfM) and lidar data?
Black Needlerush, *Juncus roemerianus*

Pine savanna, *Pinus elliottii/palustris*

Smooth Cordgrass, *Spartina alterniflora*
Project Areas – San Francisco Bay Reserve
Flights planned for June 2017, Sept 2017
Considerating UAS?
Things to Think About…
Project Requirements – **Start with the End in Mind**

What is the question?

Type of Data Needed

- **Video**

- Imagery – which bands

- Topography – Structure from Motion (SfM) or LiDAR

- Other – Thermal, FLIR….

Spatial Accuracy - how accurate?

Time of collect – Vegetative state, seasonal, frequency
Site Restrictions

**FAA**

COA needed for restricted airspace?

Timeline of project (COA’s take time and patience)

**NEPA**

Environmental clearances

Events (e.g. bird nesting)

Transportation within and around site

**Land Ownership**

Authorization for takeoff and landing sites

Are there restrictions on overflights?
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Contract Services or Stand Up a UAS Program

**Pros**
- No cost of ownership
- Current technology
- Professional experience
- Collaborate and cost share

**Cons**
- Contracting Costs
- Time Frame

**Pros**
- Schedule control
- Fly until you get it right
- Available for other uses

**Cons**
- Labor and Resource Intense
- Technology Obsolescence
Results for NERRs

Certificate of Authorization
- Takes longer than you’d think
- Might not fit your window

Land Ownership
- Permission can take time
- You may be denied

Contracting
- Long process
- Rapid response a challenge
Questions?
Lidar: Bare Earth

Key to Features
- Vertical Check Points
- RTK Profiles

- JCNERR UAS AOI
- UAS Puck (Bare Earth)

Ellipsoid (m)
- High: -29.4427
- Low: -35.833

Projection is UTM zone 1B
Datums are NAD83/NAV88