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Recommended Citation

Draper, Tristen, "Using an unmanned aerial vehicle (uav) to survey Black Brant use of Sand Island in Arcata Bay" (2022). *IdeaFest 2022*. 21.

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Using an Unmanned Aerial Vehicle (UAV) to Survey Black Brant use of Sand Island in Arcata Bay



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INTRODUCTION

• Brant grit at a specific time in the tidal cycle ²

- Gritting- process which avian herbivores intake specific grains of sand to aid in food breakdown in their gizzard ⁴

• UAV's (drones) are an alternative to avoiding mass disturbance of large flocks of birds

- Way to see complete picture of island vs using a camera trap that will only capture a specific direction.

• Pilot camera trap data used to determine:

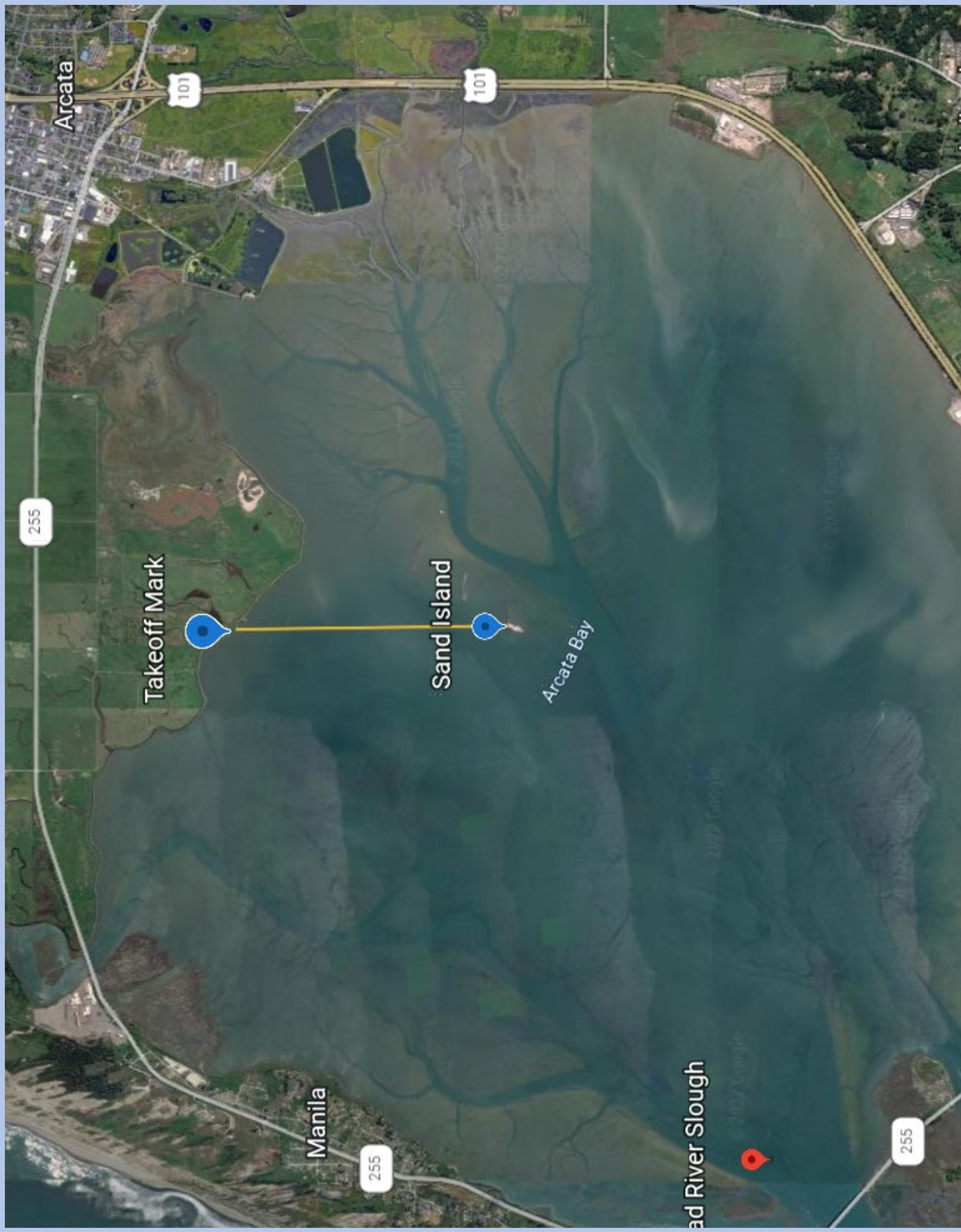
- Brant use Sand Island in the hours succeeding high tide
- Optimal time to use the drone to execute logistically difficult and potentially risky drone flights

METHODS

- Used pilot camera trap data and NOAA tidal data to match tidal cycles to when Brant were using the island and determine optimal flying time ³
- Three drone flights conducted at falling tide over the course of three different days in April 2022:
 - 3 April- High Tide: 2:39 pm, flight at 3:30 pm
 - 16 April- High Tide: 12:35 pm, flight at 1:30 pm
 - 17 April- High Tide: 1:26 pm, flight at 3:15 pm
- Flights conducted roughly in the span of two hours:
 - After take off, drone ascended to starting height of ~300 ft, descended down to 200 ft to minimize disturbance
 - ~45 stills and one hours worth of video was captured all together
- Still photos and videos were analyzed for total number of Brant + number of Brant gritting:
 - Performed one minute scan surveys per every 5 minute video
 - Classified gritting as when a bird dips their head into the water
 - Counted number of birds within that minute scan survey in the process of dipping their head
 - Counted total number of birds and calculated proportion of total vs gritting

STUDY AREA

- Drone flights were conducted from the northern shore of Humboldt Bay



- Drone take-off was conducted from the northern shore of Arcata Bay
- Footage was collected directly above Sand Island in Arcata Bay



Aerial shot of Sand Island taken with the drone

Figure 1. Total number of Brant counted gritting on Sand Island.

Flight	Total birds
1	262
2	156
3	373

Table 1. Total number of Brant using the island all together during all three flights.

DISCUSSION

- Approximately 373 birds total were using the island at one time
- Proportion of birds gritting on the island compared to the total number of birds is <50%.
- Falling tide could be an optimal time to observe gritting behavior.
- Days in which drone flights occurred were heavily weather dependent, which could be a drawback with using a drone as an alternative to camera traps in time dependent studies like this.

MANAGEMENT IMPLICATIONS/ FUTURE STUDIES

- Results of this study give us a better picture of Brant use of Sand Island.
- For future studies, more surveys will need to be done earlier in the migration season to fully assess use of the island.
- This research could be considered when assessing Brant grit sites in the future.
- This research could also be considered when determining future survey methods for areas like Sand Island that are difficult to access without causing a mass amount of disturbance.

LITERATURE CITED

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ACKNOWLEDGEMENTS

I would like to express my appreciation to Dr. Dan Barton, for without whom this project would not have been possible. I am endlessly grateful for his unwavering support, guidance and counsel as I navigated through my research. I would also like to thank Dr. Sean Mahoney, Dr. Frank Fogarty III and Bernard Fosnaugh for his encouragement and advice throughout. A special thanks to Dr. Jeff Black for his dedication to the Brant research this project was based on. And lastly, a thank you to my support system, my wildlife crew- Shalom Fletcher, Kyle Rader, Christopher Lee, Haylee Duey and Julia Harman for their endless support and belief in me.