



Soundscapes of Cumberland Island National Seashore

Cumberland Island National Seashore conserves and protects valuable resources, including a designated Wilderness area, undeveloped beaches, cultural and historic sites, and critical wildlife habitats. Within these environments, soundscapes connect us with echoes of the past and vocalizations of the present.

The island encompasses various acoustic resources, which include both natural sounds like wind, water, and wildlife, as well as the natural quiet, allowing peaceful contemplation of the island's cultural history.

During 2023-2024, an acoustic monitoring project identified natural sounds such as birds, ocean waves, and wind, as well as non-natural noise, including vehicles and aircraft. Together, these measurements tell scientists how noise could be affecting natural processes and visitors' experiences in the park.



The quiet stillness of Dungeness mansion ruins.

Photo: NPS / Kelsey White

What is acoustic monitoring?

Since 2000, Director's Order #47 has guided soundscape preservation and noise management within National Park Service units. Specifically, it directs park managers to measure baseline acoustic conditions and set acoustic management goals and objectives.

The Natural Sounds & Night Skies Division (NSNSD) supports these goals by providing specialized technical and operational assistance to parks, including field data

collection, analysis, and reporting. NSNSD scientists work with parks to identify where and when to deploy acoustic monitoring stations relative to park management zones, acoustical data needs, and potential sound sources.



An NSNSD scientist setting up an acoustic monitoring system at Lost Trail.

Photo: NPS / Kelsey White

Acoustic Monitoring at Cumberland Island

NSNSD collected sound measurements in winter, typically a season with lower visitation and relatively low acoustic activity, and spring, when there are more visitors and increased activity. During each deployment, the acoustic equipment ran for about 25 days, collecting continuous audio, sound pressure levels, and weather data (Table 1).

Table 1. Monitoring sites were set up at Terrapin, South Cut, and Lost trails at Cumberland Island National Seashore.

Site ID	Site Name	Dates Deployed
CUIS001	Terrapin Trail	3-16-22 to 4-20-22, 12-13-22 to 02-01-23
CUIS002	South Cut Trail	3-16-22 to 4-20-22, 12-14-22 to 2-01-23
CUIS003	Lost Trail	3-16-22 to 4-20-22, 12-14-22 to 02-01-23

Each site represents a unique section of the island's wilderness area and was expected to experience different sound sources throughout the deployments.

What did we hear at Cumberland Island?

During this study, NPS scientists used off-site listening to identify sound sources throughout the park. Common natural sound sources within the park were birds, insects, animals foraging, and wind blowing through vegetation. Waves and surf from the nearby oceanfront could also be heard at times during high tide.

Analysis shows that aircraft were the predominant source of noise at all sites, with aircraft audible between 50 and 56% of the 24-hour day. Less frequent sources of noise included watercraft and road/trail vehicles.



A group of wood storks occupying the island.

Photo: NPS

Understanding acoustic environments

Scientists characterize the acoustic environment by examining sound levels. Sound levels are expressed in decibels (dB), which demonstrate the amplitude, or loudness, of the sound source. These are then compared to functional values of interest (Table 2). The four functional values examined in this study were: the level above which noise/sound may affect the overall quality of the acoustic environment (35 dB), the level above which noise may affect wildlife (45 dB), the level at which noise may disrupt educational talks (52 dB), and the level at which noise may interfere with conversation (60 dB).

Table 2. Time above percentage values at four thresholds at the three monitoring sites during spring day/night. These frequency values are ANS weighted (20-1,250 Hz), eliminating high frequency sounds attributed to natural processes to better examine non-natural noise sources.

Site ID	Time above sound level (dB) (% of daytime hours, 07:00 to 19:00)				Time above sound level (dB) (% of nighttime hours, 19:00 to 7:00)			
	35	45	52	60	35	45	52	60
CUIS001	47.3	3.9	0.4	0.0	12.0	0.7	0.1	0.0
CUIS002	47.9	3.4	0.5	0.0	12.7	0.6	0.1	0.0
CUIS003	49.9	4.3	0.7	0.1	23.0	0.6	0.1	0.0

As expected, sound levels during the daytime exceeded those at night. For example, the range of exceedance at 35dB during the day peaked at 49.9%, while it peaked to 23% during nighttime hours. Importantly, the 45dB (wildlife) value was exceeded less than 1% of the time at night, suggesting a high-quality nocturnal environment for species that depend on the quiet of night to survive. According to our results, 52 and 60 dB (educational talks and conversation) were exceeded less than 1% of the time during both day and night, suggesting communication would not be interrupted by noise.

Why it matters

Acoustic monitoring provides a scientific basis for assessing the status of acoustic resources, identifying trends in resource conditions, and informing management decisions. NSNSD helps parks inventory, understand, and manage sounds in a way that protects park resources and visitors' experiences.

Cumberland Island National Seashore encompasses a unique environment, which provides refuge for park visitors and sensitive wildlife. From nesting sea turtles to scenic vistas, chattering birds to cultural heritage, Cumberland Island offers many experiences that make those who spend time on the island stop and listen.



A sea turtle crawling along the beach.

Photo: NPS / Doug Hoffman

For more information

[Natural Sounds and Night Skies Division](#)

([nps.gov/sound](https://www.nps.gov/sound))

[Natural Resource Condition Assessment Program](#)

(<https://www.nps.gov/subjects/science/nrca.htm>)

[Cumberland Island National Seashore](#)

(<https://www.nps.gov/cuis>)