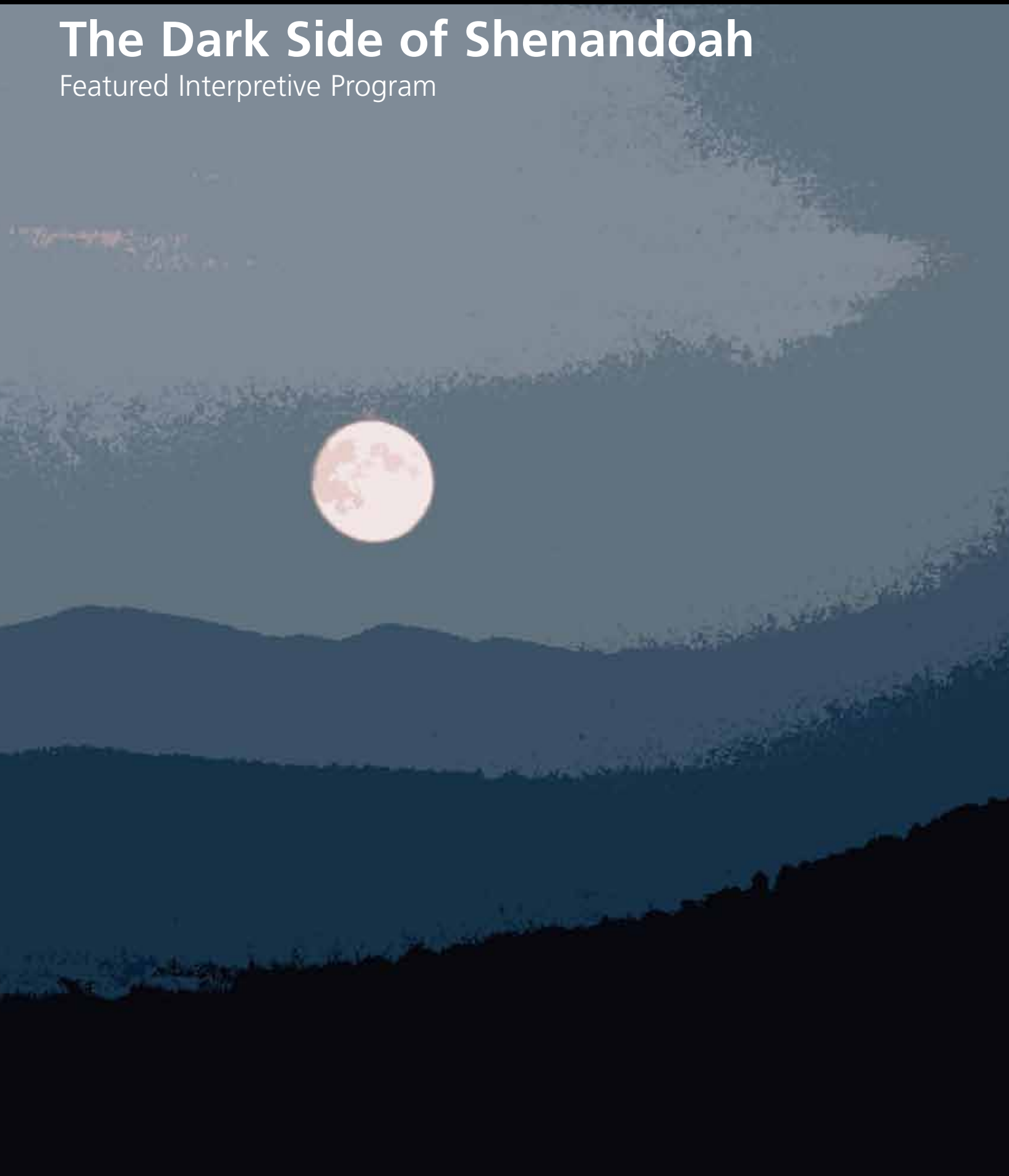
National Park Service
U.S. Department of the Interior

Natural Sounds & Night Skies Division

The Dark Side of Shenandoah

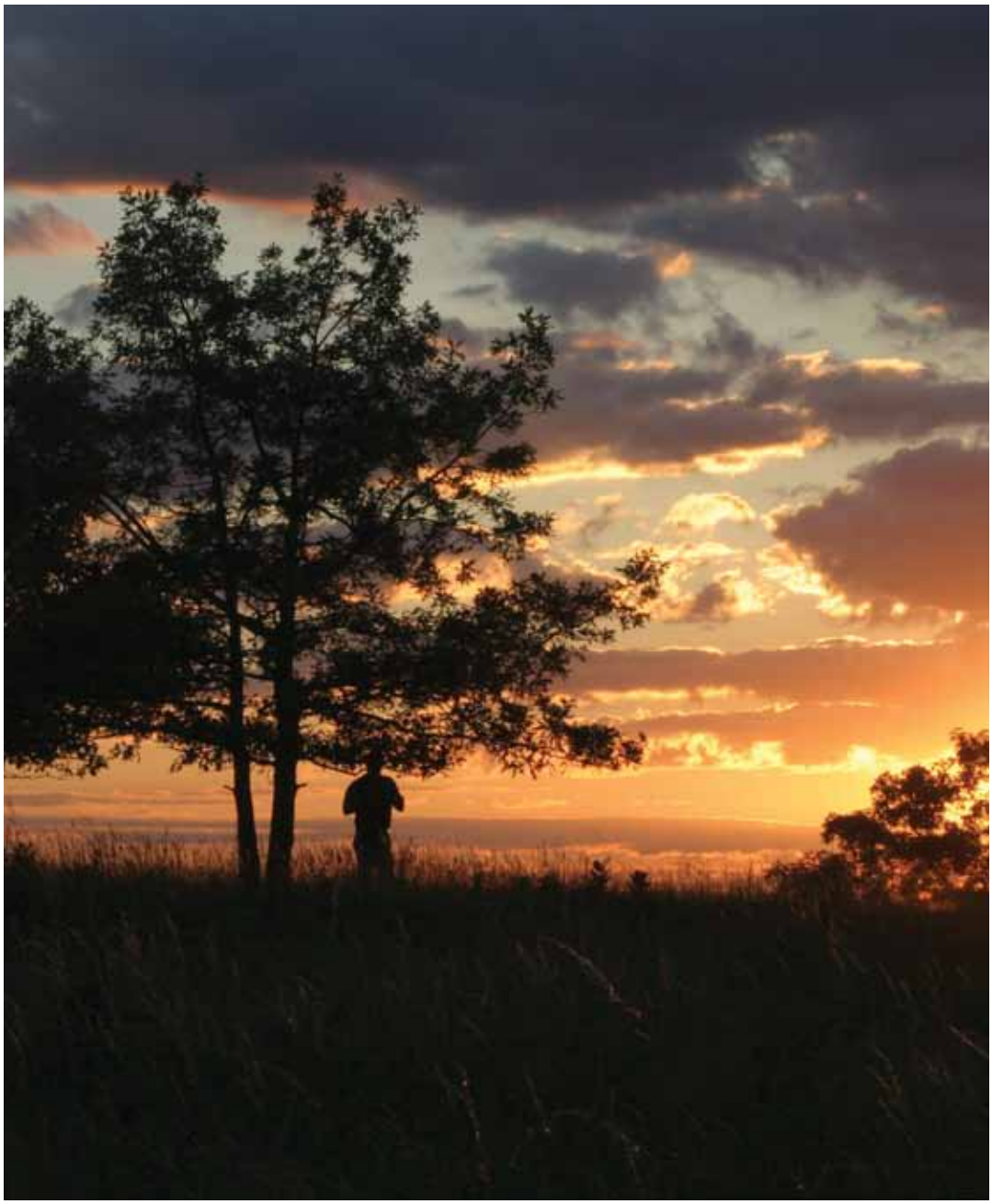
Featured Interpretive Program



Integrating Soundscape Topics into Interpretive Programs

The following program demonstrates how soundscapes and acoustic resources can be integrated into a variety of thematic topics for interpretive programs. Kathy Gross, park ranger at Shenandoah National Park, developed this program to reveal the importance of dark night skies. However, she also weaves soundscape-related concepts into the program as a way for the audience to listen in on Shenandoah at night.

Because the National Park Service works to protect and enhance both park resources and visitor experiences, the Natural Sounds & Night Skies Division differentiates between the physical sound sources and human perceptions of those sounds. The physical sound resources, regardless of audibility, at a particular location comprise what is known as the acoustical environment, while the human perception of that acoustical environment is defined as the soundscape. Examples of acoustic resources include sound sources such as wildlife, waterfalls, wind, rain, and historic and cultural sounds, and the quiet background in which to hear them.



Sunset at Shenandoah National Park. NPS photo by Bob Kuhns.

White-tailed deer at dusk in Shenandoah National Park. NPS photo by Bob Kuhns.

The Dark Side of Shenandoah by Kathy Gross

Program History

As a park ranger, I am frequently asked questions about sounds that people hear at night. I enjoy nighttime and am always amazed at the night skies here in Shenandoah National Park, so I decided to share my love of nighttime with others. I hope to be able to alleviate fears that people have about darkness and have visitors appreciate the sounds and sights of Shenandoah at night.

Theme

Darkness provides the safety and security necessary for nocturnal wildlife to thrive and survive.

Subthemes

- Some animals come out to chat at night.
- Unnatural light can disrupt animal behavior.
- We can help reduce light pollution.

Tangibles

Dark, night, nocturnal animals, sounds, stars, moon, lights

Intangibles

Darkness, diversity, viewshed, scary, awesome, light pollution, nocturnal life (ecosystem and niche)

Goals

Visitors will appreciate and understand the importance of darkness and night sounds. Visitors will recognize that darkness is a protected resource.

Sunrise over an ocean of fog. NPS photo.

Objectives
After the program:

- 95% of participants will be able to identify at least 2 nocturnal animal sounds.
- 90% of participants will be able to give one reason why darkness is important to the survival of animals.
- 20% of participants will walk back to their campsite or lodge room without using flashlights and will observe the night sounds and/or night sky.

Materials Used
PowerPoint presentation with sounds of various nocturnal animals followed by their photo; photos of night sky showing various signs of light pollution; slide with recommendations for reducing light pollution and enjoying darkness.

Reference Materials
NPS Natural Sounds and Night Skies Division, U.S. Fish & Wildlife Service, National Geographic, University of Florida IFAS Extension, Cornell All About Birds, International Dark Sky Association, fellow NPS rangers, SHEN Natural History information, National Geographic Magazine featured article on Light Pollution (November 2008).

Props
- PowerPoint presentation with audio recordings and nocturnal animal photos
- Photos from NASA of the night skies
- Slide with suggestions on how to enjoy darkness and night sounds
- Banana Slug Band song "Nocturnal Animals" – I play this as people arrive before the program. You may also want to consider having visitors focus on nighttime soundscapes, especially if they are particularly unique at that location.

Introduction and Script

Darkness actually provides the safety and security necessary for these animals to thrive and survive.

[Show images of pretty places to hike in the Shenandoah National Park]

Many of you may have hiked today. Perhaps you hiked to Old Rag, Hawksbill, Stony Man, or to a waterfall or a stroll along a nature trail. Perhaps some of you went to the top of Blackrock or Stony Man to see the sunset. How many of you visited the meadow at dusk looking for wildlife? Have you marveled at the lights in the valley from the lodge or an overlook?

Did any of you stay outside after the sun set? Have you seen the moon or looked up at the stars? Are the nighttime sounds different than daytime sounds? How many of you are "night owls"? What do you like to do after sunset? Watch TV, eat dinner, sleep, go out, or enjoy night lights (e.g., Vegas)? Does anyone work the night shift?

What do you do when you're in a national park and it gets dark? Most of us tend to stay indoors at the lodges, build fires at our campsites, light our lanterns, or turn in early when camping. Then we wonder… what is that noise outside of our tent? No, the animals aren't "coming to eat you"! Let's explore some of those sounds and discover what these animals are really doing out at night. Animals need food, water, shelter and space, but many animals also need darkness. The dark side of Shenandoah supports and protects a thriving night life.

Body

Some animals ome out to hat at night

Play an audio recording of a nocturnal animal commonly found in your area. Give the audience a chance to identify the sound. Then have a picture of the animal fade in. For each species, give brief natural history information on what the animal is doing out at nighttime—mating, foraging, traveling, communicating, etc.

Note: To develop the relevant idea that darkness provides safety and security necessary for animals to thrive and survive, information delivered for each species should try to develop opportunities for visitors to connect emotionally (the awe and amazement of survival tactics and adaptations, concern for its safety, compassion for the challenges it faces in trying to survive in the dark) or intellectually (understanding of adaptations, insight into survival tactics, understanding of relationships) in relation to resource meaning (dark night skies are necessary for survival, for finding food, for mating, etc). Different techniques (quotes, role-playing, questioning, and sensory involvement) can be used to make emotional and intellectual connections to the meanings inherent in the resource.

Telescope photo permission granted by flagstaffotos.com (Fir0002) under the GNU free documentation license.

To learn more light pollution studies in our national parks, visit: https://www.nps.gov/subjects/nightskies

Leave the lights off. Enjoy the darkness; the other side of Shenandoah!

For example, you can compare the nighttime activities of animals to what we may do: "Just like some of us go out on dates at night, crickets also date after dark." They chirp to attract females and send the message for other males to stay away. Explain how animals fulfill an important niche by keeping insect, rodent, and other populations in check by hunting them for food. Explore reasons why animals come out at night: cooler temperatures; easier to hide from predators, especially humans (hunters); birds migrate at night due to less danger from predators; etc... Examples of animals used in the program include: spring peepers, wood frogs, grey tree frogs, crickets, katydids, American woodcock, Common Nighthawk, screech owl, barred owl, raccoons, skunks, bobcat, fox, coyote, deer, and bear.

Unnatural light an disrupt animal behavior

Night skies are not only important to humans enjoying darkness and stars, but also they are essential for wildlife.. Light pollution has many documented effects on wildlife around the world. One example is that seabirds become disoriented by searchlights or gas flares on marine platforms. Nocturnal animals may forage with more caution in lighted areas to avoid predation. Even nesting sea turtles can be affected by light pollution. Hatchlings are naturally drawn to the reflective sea horizon as they journey toward the ocean. However, when lights are put up at developments along the beach, they can be drawn inland instead and never make it to their final destination.

Next, show various pictures of the night sky in different areas—urban, suburban, and rural and a true night sky. Discuss how darkness is also an important resource and that national parks are some of the best places to experience true night skies.

We can help reduce light pollution

The good news is that light pollution is reversible. Share suggestions on how to cut down on light pollution around homes, then include suggestions on how to enjoy darkness. We can make a difference in our cities and our homes by starting with small changes in lighting fixtures. At home, we can choose to use lighting only where needed. Aiming lights downward and shielding lights can reduce wasted lighting and glare, and allows the use of lower wattage bulbs. Encourage people to go for night walks in areas where it is safe. Watch for nocturnal animals. Observe the night skies: stars, moon, planets, etc.

Conclusion

Dark night skies allow animals to thrive and survive. Starry night skies and natural darkness are part of the special places that national parks protect. National parks hold some of the last remaining harbors of darkness and provide an excellent opportunity for you to experience this disappearing resource and the wildlife that darkness supports. So when you are lying in your tent or bed this evening and you hear the sounds of night, don't worry. It's just the "night shift" coming out to look for a mate or forage for food. Dark night skies bring out the sounds of the hooting owls, crickets, and many others animals that are part of your national park experience. While you are here in the park, take time to listen and watch at nighttime.

Earth's city lights. Visit http:/visibleearth.nasa.gov for images and animations of earth. NASA photo.

Program Notes

Mammals

- Fur/hair may be uncomfortable during heat of summer day
- Some mammals prefer cooler hours of darkness
- Nighttime allows for ease of hiding from predators, especially man who mainly hunts during daytime

Frogs

- Mating calls in spring

Insects

- Majority of nocturnal insect soundmakers belong to the order Orthoptera including crickets, grasshoppers, and katydids
- In general, field crickets and ground crickets sing both during the day or night
- Tree crickets and most katydids usually sing during the first few hours of darkness
- Cicadas and grasshoppers are vocal during the day
- Songs tend to speed up as the temperature rises and slow down as temperature falls.
- Snowy tree cricket: count # of chirps given in 15 sec + 40 = F temp

Crickets

To attract mates, males produce sound by rubbing their forewings against each other. The sharp edge of the "scraper" at the base of one front wing is rubbed across the bumpy ridge or "file" located at the base of the opposite wing. The wings are elevated and then moved back and forth rapidly. The resulting chirping sound is picked up by the female's ears on her front legs. Chirp sounds are different for each species so that individuals can find their own species. Musical trills and chirps are usually below 10,000 Hz. Compare to humans i.e. guys whistling at girls.

NPS photo

Katydids

- Have high-pitched songs that contain a wide band of frequencies

Cicadas

Males have a pair of special sound-producing organs or "tymbals" located at the sides of the basal abdominal segment. The contraction of muscles causes ribs in the tymbals to bend suddenly and produce sound that resonates inside a large tracheal air sac in the abdomen. Cicadas produce very loud and penetrating sounds that can be heard long distances.

Birds

- Many bird species migrate at night because there is less danger of predators (especially small birds such as vireos, warblers, sparrows, wrens, flycatchers, thrushes)
- Prey birds can easily be caught by hawks in the daylight
- Some fly high in sky to avoid hunting owls
- Many birds can't catch food at night because of eyesight limitations, so it is better to fly by night, hunt during the daytime, and sleep between foraging

Whip-poor-will

- Infrequently seen because of its nocturnal habits
- Coloring keeps it hidden during the day
- Loud calling at dusk makes it well known wherever it breeds
- Eats insects; especially moths and beetles
- Forages at dusk, dawn and moonlit periods of night; catches flying insects

Woodcock

- Migrates at nighttime from dusk to midnight
- Elaborate display attracts mates
- Gives repeated "peents" on the ground then flies upward in a wide spiral. As it gets higher, the wings start to twitter, reaching a height of 230-328 ft. (70-100m)
- Twittering becomes intermittent and bird starts chirping as he starts to descend
- Comes down in a zig-zag diving fashion, chirping as he goes

Rac oons

- They actually do not wash food, but "dabbling" facilitates finding food in an aquatic environment
- Long, humanlike fingers can untie knots, unscrew tops of jars, and turn door handles
- Thrive in populated areas

Skunks

- As a defense, musk comes from a nozzle like duct
- They can direct a jet of sulfur-alcohol solution up to 9 ft with pinpoint accuracy; fair degree of accuracy up to 16 ft.; spray noticeable up to a ½ mile away
- Begin foraging at sunset and are omnivores
- Diet consists of insects, small mammals, amphibians, reptiles, birds and eggs, fruit, plant material
- They help keep the rodent population in check
- 43% of diet consists of insects
- Specifically during the spring and summer, 90% of diet consists of insects (many of which are harmful to humans)

Opossum

- Most adaptable animals in existence; can tolerate all but extremely cold climates
- Eat just about anything from carrion to fresh fruit, crickets, and skinks; adapted well to human habitations
- Is a marsupial: rear young in pouch

Woodcock on Nest. USFWS photo.

Red Wolf. USFWS photo by SteveHillebrand.

- Prehensile tail: excellent tree climbers; use tail as extra limb to grip
- Play possum
- Hiss and growl; can also bite: have 50 teeth which is more than most other animals

Bobcat

- Elusive, nocturnal, solitary
- Most abundant wildcat in US
- Two times as big as average housecat
- Can kill prey bigger than themselves, but usually eat rabbits, birds, mice, squirrels, and other smaller game

Red wolf

- Originally roamed as far north as Pennsylvania and as far west as Texas
- Extirpated from its former range by large-scale predator control programs
- By late 1960s only two populations believed to remain in southern Louisiana and Texas
- Nearly extinct a few decades ago; recovered with captive breeding program—released in North Carolina
- Today there are 270–300 red wolves (220 in captivity)
- Eat mostly white-tailed deer and raccoons, but also eat smaller animals

If the stars should appear one night in a thousand years, how would men believe and adore... But every night come out these envoys of beauty, and light the universe with their admonishing smile."
- Ralph Waldo Emerson

Image of Pleiades. NASA photo.

Seven Simply Ways to Enjoy Natural Sounds

White-tailed deer. Image from Wikimedia Creative Commons www.wikimedia.org

Close Your Eyes

Stop. Listen to what's around you.
Do you hear more with your eyes closed?

Count Sounds

Lift up a finger for each sound you hear. Use your left hand for natural sounds and your right hand for human-made sounds.

Walk and Listen

Do you hear your footsteps? Do you hear your clothes rustle? Can you walk without making any sound?

Appreciate Sounds

What is the most beautiful sound you hear? What sound is the least appealing?

Listen to Landscapes

How does the shape of the land affect the way sound travels to your ear? Where is the source of each sound? Are there any echoes? What is the closest sound you hear?

Walk in the Wild

Walk as though a predator were after you. Walk as though you were a predator.

Chat Like an Animal

Listen for an animal. What sound does the animal make? Can you make its sound?

For more information on enjoying natural sounds visit:
https://www.nps.gov/subjects/sound

Seven Simple Ways to Enjoy Natural Darkness

Full moon. Image from Wikipedia Creative Commons. www.wikimedia.org

Try walking outside in a dark location while keeping your flashlight in your pocket.

By covering your flashlight with red cellophane or a red filter, you can prevent it from disrupting your night vision. Small flashlights work better than large ones.

Spend time looking through telescopes (stargazing) and learning about the cosmos with your local science center, astronomy club, or park ranger.

The full moon provides ample light to see in most places. Let your eyes fully adjust. Be safe. A full moon hike will be a memorable experience.

Find a comfortable spot and look around. Allow your eyes 20 minutes to adjust, and you may be surprised how well you can see by starlight. Do objects appear further? Listen. Do sounds seem louder at night?

Many animals live their "days" at night. Look for nocturnal wildlife such as owls, bats, deer, glowworms, or fireflies.

The night sky has been an inspiration for myth, literature, art, scientific discovery, and religion. Find your own way to connect with humankind's celestial companion. Revel in its beauty and wonder, and most of all, be inspired!

For more information on enjoying natural darkness visit:
https://www.nps.gov/subjects/nightskies

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The Natural Sounds & Night Skies Division works to protect, maintain, or restore acoustical environments throughout the National Park System. We fulfill this mission by working in partnership with parks and others to increase scientific and public understanding of the value and character of soundscapes and to eliminate or minimize noise intrusions. The division also works to protect and restore night sky views and nighttime environments and reduce light pollution. The NPS recognizes the night sky as more than a pretty sight; it is part of a complex ecosystem that supports both natural and cultural resources. The NPS works to conserve this resource because it is important to wildlife and ecosystem function, the setting of historic and cultural parks, and the quality of visitor experiences.

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