How do Hummingbirds Survive Cold Nights?

Hummingbirds and Torpor

By Devorah Bennu

A flash of scarlet and emerald zooms past me as I poke my sleepy head out of the kitchen door, a vibrant splash of summer color against the sullen winter sky. Suddenly, an indignant Anna’s Hummingbird, *Calypte anna*, confronts me, beak-to-nose, demanding his breakfast. Shivering, I retreat quickly into the kitchen to prepare warm sugar water for my feathery guest.

Hummingbirds are classified into the avian family, *Trochilidae*, which is from the Greek word, *trochilos*, or “small bird.” In fact, the smallest avian species alive today is the thumb-sized Bee Hummingbird, *Melisuga helenae*, found exclusively on the island of Cuba. With a total length of 2.25 inches (5 centimeters) and a weight of 0.07 ounces (2 grams), this tiny bird can comfortably perch on the eraser at the end of a pencil.

There are more than 330 described species of hummingbirds, and occasionally a new species is discovered by ornithologists and added to the list. Even though most people think of them exclusively as tropical birds, hummingbirds are found in diverse habitats, ranging from the wettest to the driest, from sea level to over 14,000 feet (4400 meters).

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2012 Washington Federal Junior Duck Stamp Results!

The Junior Duck Stamp Design Contest is the culmination of the Junior Duck Stamp educational program. After studying waterfowl anatomy and habitat, students may articulate their newfound knowledge by drawing, painting or sketching a picture of an eligible North American waterfowl species.

This year’s contest for Washington, held at the Refuge, received over 180 entries from across the state. The high quality artwork from all the young artists made for a very competitive contest. The judging panel consisted of five judges: Robyn Thorson (Regional Director US Fish & Wildlife Service), Nate Pamplin (WA Department of Fish & Wildlife), Shelley Carr (retired Communications/Community Relations & Arts Director for the Olympia School District and charter member of

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Hummingbirds

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The greatest diversity of hummingbird species is the neotropics (New World tropics) but many species live in or migrate to temperate zones in the United States and Canada to breed. Sometimes, for reasons that are not entirely clear, individual birds remain behind for the winter, and sometimes, they survive. Thus, as average seasonal temperatures increase, hummingbirds are increasingly becoming established as year-round residents outside of their traditional ranges. Anna’s Hummingbird is one species whose range has expanded steadily northward as seasonal temperatures have become milder. Thus, this bird is now a common year-round resident along the northwestern coast of the United States and even into some parts of Canada.

As most people know, hummingbirds feed on flower nectar, which is a tempting “gift” of high-energy sugars provided by flowers in exchange for pollination. In addition to nectar, hummingbirds also consume large quantities of small insects, which are full of higher-energy fats as well as essential proteins. Because of their tremendous metabolic requirements, hummingbirds have voracious appetites. Equivalent to the average human consuming an entire refrigerator full of food, hummingbirds eat roughly twice to thrice their own body weight in flower nectar and tiny insects each day.

Besides being among the smallest of all warm-blooded animals, hummingbirds also lack the insulating downy feathers that are typical for many other bird species. Due to their combined characteristics of small body size and lack of insulation, hummingbirds rapidly lose body heat to their surroundings. Even sleeping hummingbirds have huge metabolic demands that must be met simply to survive the night when they cannot forage. To meet this energetic challenge, hummingbirds save enough energy to survive cold nights by lowering their internal thermostat at night, becoming hypothermic. This reduced physiological state is an evolutionary adaptation that is referred to as torpor.

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Torpid hummingbirds exhibit a slumber that is as deep as death. In 1832, Alexander Wilson first described hummingbird torpor in his book, American Ornithology; “No motion of the lungs could be perceived … the eyes were shut, and, when touched by the finger, [the bird] gave no signs of life or motion.” Awakening from torpor takes a hummingbird approximately 20 minutes. During arousal, heart and breathing rates increase and hummingbirds vibrate their wing muscles. Heat generated by vibrating muscles, or shivering, warms the blood supply. Shivering is sufficient to warm the hummingbird’s body by several degrees each minute and the bird awakens with enough energy reserves to see him through to his first feeding bouts of the morning. Interestingly, humming-
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birds reliably awaken from torpor one or two hours before dawn without any discernible cues from the environment. Thus, it appears that the bird’s internal circadian clock triggers arousal.

What are hummingbirds doing during those pre-dawn hours when they are warm but not yet active? “One suggestion is that they might be using this time to sleep,” explains Hiebert. “Although there is some evidence that torpor is an extension of slow-wave sleep, there is also evidence that the body is too cold during torpor for the normal functions of sleep to occur.”

Torpor is not limited to hummingbirds; it has also been observed in swallows, swifts and poorwills. Additionally, scientists think that most small birds living in cold regions, such as chickadees, rely on torpor to survive long cold nights. Interestingly, even though rodents, bats and other small mammals typically show some form of regulated hypothermia during cold weather, these animals can only rely upon daily torpor during the winter months when they are not breeding. In contrast, noctivation is possible on any night of the year for hummingbirds. Because daily energy balance is progressively more difficult to maintain as body size decreases, hummingbird torpor is a finely tuned evolutionary strategy that preserves these birds’ daily metabolic budgets.

“Hummingbirds are the ‘champions’ of this kind of energy regulation because they have to be,” concludes Hiebert.

Deborah Bennu currently lives a scientifically interrupted life in NYC with her parrots. She writes the very popular blog, Living the Scientific Life (Scientist, Interrupted), for ScienceBlogs, an online outreach and educational project of Seed Media Group.
Summer Programs

July

Saturday, July 7
Birds of a Feather: Take Flight on a Bird Walk
10am – 1pm
Experience the thrill of seeing a Peregrine Falcon (the world’s fastest bird) or of hearing a woodpecker pecking away (up to 20 pecks per second)! Join experienced birder Eric Slagle for a guided walk full of the sights and sounds of one of the Refuge’s largest treasures: The birds! Meet at the landing overlooking the pond at the Visitor Center.

How to Keep a Wave on the Sand; Capturing the Outdoors in Photographs
10am – 1pm
Never again let nature’s beauty escape your lens! In this hands-on workshop with writer and photographer Greg Farley, you will learn to take your camera off the automatic settings and then head outside to apply basic and professional outdoor photography techniques. Bring your camera (film, DSLR, or point and shoot), extra batteries and a sense of adventure! Meet in the Visitor Center auditorium.

Sunday, July 8
The Nisqually and Medicine Creek: Where Nature, Culture and History Converge
1pm - 2:30pm
Learn about the events surrounding the signing of the Medicine Creek Treaty; explore how the Nisqually people came to the Nisqually delta and how their lives changed with the settlement of Europeans. Lynn Corliss leads you down history’s winding path, where you will discover important things about the people who enjoyed this land before you did. Meet at the flagpole in front of the Visitor Center.

Saturday, July 14
Birds of a Feather: Take Flight on a Bird Walk
8:30am – 12noon
Experience the thrill of seeing a Peregrine Falcon (the world’s fastest bird) or of hearing a woodpecker pecking away (up to 20 pecks per second)! Join experienced birder David Richardson for a guided walk full of the sights and sounds of one of the Refuge’s largest treasures: The birds! Meet at the landing overlooking the pond at the Visitor Center.

It’s in Your Nature: Exploring the Wild
10am – 11:30am
From bitterns to butterflies, chickadees to crabapples, the Refuge is home to many types of wildlife. Join naturalist Donna Snow on a nature walk that is sure to teach you something new about the creatures of the Refuge. Meet in the Visitor Center.

The Beauty of Nisqually
1pm – 3pm
From bitterns to butterflies, chickadees to crabapples, the Refuge is home to many types of wildlife. Join naturalist Juni Greenough on this nature walk that is sure to teach you something new about the creatures of the Refuge. Meet at the flagpole in front of the Visitor Center.

Saturday, July 21
Birds of Nisqually
9am – 11am
Many species of bird, from the tiny Rufous Hummingbird to the majestic Bald Eagle, nest on the Refuge. Check out the avian beauty with longtime birder Phil Kelley, who knows the Refuge backwards and forwards. On this guided walk, you are sure to learn something new! Meet at the landing overlooking the pond at the Visitor Center.

Saturday, July 28
How to Keep a Wave on the Sand; Capturing the Outdoors in Photographs
10am – 1pm
Never again let nature’s beauty escape your lens! In this hands-on workshop with writer and photographer Greg Farley, you will learn to take your camera off the automatic settings and then head outside to apply basic and professional outdoor photography techniques. Bring your camera (film, DSLR, or point and shoot), extra batteries and a sense of adventure! Meet in the Visitor Center auditorium.

It’s in Your Nature: Exploring the Wild
10am – 12 noon
From bitterns to butterflies, chickadees to crabapples, the Refuge is home to many types of wildlife. Join naturalists Art Pavey, Jan Kramer and Cheri Greenwood on this nature walk that is sure to teach you something new about the creatures of the Refuge.

Sunday, July 29
Nature Up Close; Introduction to Macro Nature Photography
10am – 12 noon
Dew crops on flower petals; the eyes of insects. These details represent the oft overlooked true visual poetry of nature. Join refuge photographer John Whitehead for discussion, demonstration and practice of up close nature photography. Meet in the Visitor Center.
August 4
Birds of a Feather: Take Flight on a Bird Walk
8:30am – 12noon
Experience the thrill of seeing a Peregrine Falcon (the world’s fastest bird) or of hearing a woodpecker pecking away (up to 20 pecks per second)! Join experienced birder David Richardson for a guided walk full of the sights and sounds of one of the Refuge’s largest treasures: The birds! Meet at the landing overlooking the pond at the Visitor Center.

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Saturday, August 11
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Swords and Lace: A Children’s Guide to Northwest Plants
2pm - 3pm
This program will engage kids and their families through poetry, art and activities in learning much more than just the names of some cool northwest plants. Author Dixie Havlak guides hands-on investigations that will help kids understand the fascinating variation and other characteristics that define our most interesting local flora. The program will end with a short walk to see which of these plants grow on the delta or the surrounding forests. Meet in the Visitor Center auditorium.

Sunday, August 12
The Nisqually and Medicine Creek: Where Nature, Culture and History Converge
1pm - 2:30pm
Learn about the events surrounding the signing of the Medicine Creek Treaty; explore how the Nisqually people came to the Nisqually delta and how their lives changed with the settlement of Europeans. Lynn Corliss leads you down history’s winding path, where you will discover important things about the people who enjoyed this land before you did. Meet at the flagpole in front of the Visitor Center.

Saturday, August 25
Birding Basics: Learning to See
9am – 11am
What subtle cues do experienced birders use to quickly and accurately identify species? Birding is nothing less than the art of seeing, so the techniques used by birders increase awareness of all things natural. Refuge Ranger Michael Schramm will guide you through the estuary’s diverse habitats on an odyssey of avian discovery, all the while teaching the ins and outs of birding. Meet at the landing overlooking the pond at the Visitor Center – and remember to bring binoculars!

It’s in Your Nature: Exploring the Wild
10am – 12 noon
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Summer Programs

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Sunday, August 26

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September

Saturday, September 1

Birds of a Feather: Take Flight on a Bird Walk
10am – 1pm
Experience the thrill of seeing a Peregrine Falcon (the world’s fastest bird) or of hearing a woodpecker pecking away (up to 20 pecks per second)! Join Eric Slagle, an experienced birder who knows the ins and outs of birding at Nisqually, for a bird walk full of the sights and sounds of one of the Refuge’s largest treasures (the birds!) Meet at the landing overlooking the pond at the Visitor Center.

Sunday, September 2

The Nisqually and Medicine Creek: Where Nature, Culture and History Converge
1pm - 2:30pm
Learn about the events surrounding the signing of the Medicine Creek Treaty; explore how the Nisqually people came to the Nisqually delta and how their lives changed with the settlement of Europeans. Lynn Corliss leads you down history’s winding path, where you will discover important things about the people who enjoyed this land before you did. Meet at the flagpole in front of the Visitor Center.

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Sunday, September 9

Our Amazing Plant World
1:30pm – 3pm
Summer is the perfect time to experience the Refuge plant life is all its diversity! Join Sally Vogel on a nature walk through the Refuge—all the while learning about plant-insect interactions, adaptations for survival and other interesting facts. You only live once: Stop to smell the flowers! Meet at the flagpole in front of the Visitor Center.

Saturday, September 15

Birding Basics: Learning to See
9am – 11am
What subtle cues do experienced birders use to quickly and accurately identify species? Birding is nothing less than the art of seeing, so the techniques used by birders increase awareness of all things natural. Refuge Ranger Michael Schramm will guide you through the estuary’s diverse habitats on an odyssey of avian discovery, all the while teaching the ins and outs of birding. Meet at the landing overlooking the pond at the Visitor Center – and remember to bring binoculars!

Sunday, September 16

The Photographer’s Eye: The Basics of Outdoor Photography
10am – 12 noon
Nature photography offers individuals the opportunity to develop their finer naturalist instincts and vision, and the beginner’s eye is often the eye that sees most clearly. With this in mind, experienced Refuge photographer John Whitehead offers guidance in technique and composition, with emphasis on learning to utilizing manual settings in order to more completely capture the image you want to capture. Meet at the Visitor Center.

Saturday, September 29

Nisqually Watershed Festival
10am - 4pm
Tours and guided walks through-out the day, as well as music, live animal presentations, educational exhibits, a marine touch tank, and Fin, the Wild Olympic Salmon! Join us in a celebration of the cultural, economic and natural resources of the Nisqually Watershed!

You can also view program schedules, updates, articles and more on our new website!
http://www.fws.gov/Nisqually/
Summer Lecture Series

Revealing Nature: Our Heritage and Our Future

The 25th Summer Lecture Series at Nisqually National Wildlife Refuge will be held the last three Wednesday evenings in July and every Wednesday in August.

July 11
Living With a Legend
With a special viewing of “Green Fire: Aldo Leopold and a Land Ethic for our Time”
Speaker: Estella Leopold, Ph.D.
Botanist and Conservationist
Professor Emerita, UW, Department of Botany

July 18
A Year With Wolves
Speaker: Helen Thayer
Author, Photographer, and Explorer
Affiliate Professor of Geology,
University of Alaska

July 25
Wildflowers of Mt. Rainier
Speaker: David Giblin, Ph.D.
Author, Botanist
Burke Museum Herbarium
Collections Manager

August 1
The Buzz about Bees
Speaker: Rob Sandelin
Author, Teacher
Environmental Science School
Sky Valley Education Center

August 8
Climate Change and Impacts in the Pacific Northwest
Speaker: Ingrid Tohver
Research Scientist, Climate Impacts Group
University of Washington

August 15
Pollutant Soup: Effects of Toxic Mixtures on Fish and their Food
Speaker: John D. Stark, Ph.D.
Director, WSU Puyallup Research and Extension Center

August 22
A Look at Our Migratory Swallows
Speaker: Frances Wood
Author, Naturalist
NPR’s “Birdnote”

August 29
Washington’s Not So Common Loon
Speakers: Daniel and Ginger Poleschook
Nature Photographers and Conservationists

Location: Lectures are held in the Visitor Center at Nisqually NWR. Take 1-5 exit 114 and follow the signs to the Refuge.

Time: The lectures start at 7pm and will last approximately 1 hour followed by questions. Doors open at 6pm.

Entrance Fee: The Refuge entrance fee is waived for those attending the lectures. The lectures are free.

Special Accommodations: Persons with disabilities who require accommodations should contact the Refuge at (360) 753-9467.

Limited Seating: The Visitor Center auditorium seats 100 people. Attendance is limited to seats available. Seating will be issued starting at 6pm on a first come basis, and you must be present. If there are not seats available when you arrive, you will not be able to attend the lecture. The trails are open until sunset.

Additional Notes: On lecture nights, the Visitor Center will be open until 7pm and after the lecture. Thanks to Friends of Nisqually NWR for their support of the Summer Lecture Series.
Shorebird Festival a Great Success!

Shorebird numbers were high this year at the Grays Harbor Shorebird Festival. The spring shorebird migration peaked on Saturday, May 5, when biologists counted some 98,000 shorebirds at Grays Harbor National Wildlife Refuge. Festival sponsors, The City of Hoquiam, Grays Harbor Audubon Society and Grays Harbor NWR estimated 1500 people participated in Festival events. The highlight for many was, of course, seeing the amazing shorebirds on their stopover during their long migration north.

The Festival, held the first weekend in May in Hoquiam, included three action packed days with field trips, lectures, exhibitors, vendors, a banquet, auction and shorebird viewing. Kids and families enjoyed the Nature Fun Fair and the Shorebird Festival Poster Contest Awards Ceremony. The auction raised $5775 of which $2675 was donated specially to support the Grays Harbor NWR AmeriCorps Education Volunteer.

The Grays Harbor Shorebird Festival could not happen without a large number of volunteers from several organizations helping to organize the event and working throughout the weekend. A big thank you goes to the volunteers with Grays Harbor Audubon Society, Nisqually and Grays Harbor NWR’s, Washington Conservation Corps and the Washington Service Corps/AmeriCorps.


 Below, this year’s poster contest Best of Show, a Long-billed Dowitcher by Holly Bergeson.
Join Friends Of Nisqually NWRC!

Name ___________________________________________
Address __________________________________________
City/State/Zip _____________________________________
Email ___________________________________________

☐ Please send information on making Friends of Nisqually NWRC a beneficiary of my estate.
☐ Check here to receive an electronic version of The Flyway newsletter by email.

Individual/Family Memberships
☐ $15 Student/Senior
☐ $25 Individual
☐ $50 Family
☐ $100 Supporting
☐ $250 Partner
☐ $500 Patron
☐ $1000 Benefactor

Corporate/Business Memberships
☐ $250 Business Sponsor
☐ $500 Community Partner
☐ $1000 Sustaining Business
☐ $2500 Corporate Patron
☐ $5000 + Corporate Benefactor

Friends of Nisqually NWR is a 501(c)(3) non-profit organization established in 1998 to promote conservation of the natural and cultural resources and fund education and outreach programs at Nisqually National Wildlife Refuge Complex.

Please make checks payable to: Friends of Nisqually NWRC, 100 Brown Farm Rd, Olympia, WA 98516

Your tax deductible contribution will help preserve the unique habitats, fish, and wildlife of the Nisqually Delta and the Grays Harbor Tideflats.

OFFICE USE  Rec’d__________  Mo___________  New______  Renew______  Ent__________  Mld___________

Summer 2012
“...conserving, protecting and enhancing fish, wildlife and plants and their habitats for the continuing benefit of the American people...”

You are invited to the 25th Annual

Nisqually Watershed Festival!

Great Fun for the Whole Family:
▶ Music and Live Animal Presentations
▶ Tours and Guided Walks throughout the day
▶ Great educational displays from around the area
▶ Fin, the Wild Olympic Salmon
▶ Red Salmon tent, storytelling, and critters parades
▶ Marine touch tank
▶ Check out the Nature Explore Area for children
▶ And of course, yummy food!

Saturday, September 29
at Nisqually NWR
from 10 am-4 pm
All Events are Free
(except the food!)

Join us and celebrate the cultural, economic, and natural resources of the Nisqually Watershed!

For more information, go to www.nisquallyriver.org or call (360)753-9467