



Sheriff's Meadow Foundation

Founded in 1959, Sheriff's Meadow Foundation is the land trust for the island of Martha's Vineyard. Its mission is to conserve, manage and administer lands for wildlife habitat and all other lands that represent the beautiful, rural, natural character of Martha's Vineyard.

Sheriff's Meadow Foundation is proud to be a partner in conservation with the Vineyard Golf Club. Sheriff's Meadow congratulates the Vineyard Golf Club for creating a golf course that is entirely organic, and for the numerous awards that the Club has received in recognition of this accomplishment. That this golf course is all-organic most certainly benefits the rare, and the common, plants and animals that find their home in this unique frost-bottom habitat.

If you have any questions about this frostbottom or Sheriff's Meadow Foundation, please do feel free to contact our Executive Director, Adam Moore, at moore@sheriffsmeadow.org, or our Director of Stewardship, Kristen Fauteux, at fauteux@sheriffsmeadow.org. You may also reach us via telephone at 508.693.5207.

Thank you for your interest in the Wintucket Cove Frostbottom and Sheriff's Meadow Foundation.

Sheriff's Meadow Foundation

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Eastern Towhee (*Pipilo erythrophthalmus*)



Imperial Moth (*Eacles imperialis*)



Property Map

Wintucket Cove *Frostbottom*



At the Vineyard Golf Club

The low, treeless area bordering holes 7, 8, and 9 is a globally rare geological feature called the Wintucket Cove Frostbottom. Frostbottoms are among the most biologically diverse natural features in all of New England. Over a dozen species listed in Massachusetts as endangered, threatened or of special concern have been recorded in this frostbottom alone. These species include moths, a rare tiger beetle, a hawk and several plants.

Depressions in the earth, frostbottoms are the remnants of ancient stream channels formed about 15,000 years ago by water flowing from the melting glacier. As the land slopes southward, this frostbottom becomes Wintucket Cove of the Edgartown Great Pond.

FROSTBOTTOM CLIMATE



Barrens Buckmoth (*Hemileuca maia*)

that this feature is a bowl, at the bottom of which there is likely to be frost. Such a guess would be correct.

Cold air is heavier than warm air. Thus, in the evening, cold air flows downhill and collects in the frostbottom. This simple fact has a profound effect. In the frostbottom, a killing frost can occur in any month of the year.

Such killing frosts markedly impact the types of plants and animals that live here. In the summer, the lack of shade results in intense heat on sunny days, making frostbottoms among the hottest places on the island. Temperature swings greater than 70°F have been measured within a single 24-hour period. In addition, frostbottom soil typifies the outwash sandplain: the soil is extremely dry and sandy, with little available water.

Only the toughest plants can survive these extreme conditions. Scrub oak dominates, and beneath it grow characteristic sandplain plants that include bushy rockrose, goat's rue, lowbush blueberry and little bluestem.

FROSTBOTTOM MOTHS

Surprisingly, a number of moths not only survive under the harsh conditions of the frostbottom, they actually appear to depend on these conditions to reproduce.

These moths, known as “frostbottom obligates,” share two common characteristics. One, they are summer flyers at the extreme northern edge of their range, and two, as caterpillars they feed on oak leaves.

These more southern species face an unusual dilemma. The moths need warm temperatures to fly about, find a mate and start the next generation. On the other hand, the caterpillars need new leaves that are tender, rich in nitrogen and don't yet have the tannins that quickly develop in older leaves.

Oak trees typically leaf out fairly early in the spring, when temperatures are still cool, particularly at night. If moth eggs hatch in time for the caterpillars to take advantage of the new oak leaves, it will still be too cold to fly when they are ready to change to moths, forcing them to remain as caterpillars for an extended time, increasing their chances of freezing or being eaten by a hungry bird.

However, due to the extreme nighttime temperatures in the frostbottom, the scrub oaks generally don't leaf out until June or even July. By then, the air temperature is warm enough for these moths to fly. By feeding on these late growing oak leaves in the frostbottom, the caterpillars get nutritious food that allows them to grow rapidly and change to the moth stage at a time when the air temperature is high enough for them to fly at night, mate and lay their eggs.

The rare moths that have been found in this frostbottom from 1990 through 2008 include the following species:

- Melsheimer's Sack Bearer (*Cicinnus melsheimeri*)
- Gerhard's underwing (*Catocala Herodias gerhardii*)
- Imperial moth (*Eacles imperialis*)
- Pine Barrens Lycia (*Lycia ypsilon*)
- Barrens Buckmoth (*Hemileuca maia*)
- Barrens Daggermoth (*Acronicta albarufa*)
- Southern Ptichodis (*Ptichodis bistrigata*)
- Pine Barrens Zale (*Zale sp. l nr lunifera*)
- Dune Noctuid Moth (*Oncocnemis riparia*)
- Pine Barrens Itame (*Itame sp. l nr iextricata*)
- Barrens Metarranthis Moth (*Metarranthis aspiciaria*)
- Coastal Heathland Cutworm (*Abragotis nefascia*).

FROSTBOTTOM FLORA

Two trees dominate the flora of the frostbottom: scrub oak (*Quercus ilicifolia*) and dwarf chestnut oak (*Quercus prinoides*). Again aptly named, the scrub oak and the dwarf chestnut oak are indeed trees that are small in stature.

Though small, these trees are very hardy, and they tolerate the harsh climate and the droughty soils of the frostbottom better than other trees. Other trees, however, can and do grow in the frostbottom, taller trees such as pitch pine (*Pinus rigida*) and white oak (*Quercus alba*). Being taller, these trees create shade, and ultimately they begin to alter the frostbottom's microclimate. Hence, it is best to remove these trees once they reach a certain overtopping height, as has been done in this frostbottom and will be done from time to time.

Three rare plants are known to grow in the frostbottom, too. These are the endangered bushy rockrose (*Helianthemum dumosum*), the Nantucket shadbush (*Amelanchier nantucketensis*) and sandplain flax (*Linum intercursum*).

FROSTBOTTOM BIRDS

A number of interesting bird species feed or nest in the frostbottom. The most frequently seen and heard are Eastern towhees, large sparrows that feed on insects in the leaf litter. A pair of northern harriers (also called marsh hawks) nested in the frostbottom from 1998 to 2002. The northern harrier is listed as a threatened species in Massachusetts, and the eastern towhee is in decline throughout its range. Both birds, however, nest on the ground, and the dense scrub oak of the frostbottom provides good protection from predators for the eggs and the fledglings. On summer evenings, the whip-poorwills can sometimes be heard as they hunt for insects over the frostbottom.



Northern Harrier (*Circus cyaneus*)