Project Nighthawk
Gravel Nest Patch Handbook

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N.H.AUDUBON

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Common Nighthawk. Photo by Mark Suomala

Project Nighthawk Overview

Project Nighthawk is a statewide research initiative aimed at conserving a state-threatened bird species, the Common Nighthawk (*Chordeiles minor*). The "peent" call of the nighthawk was once a familiar sound in cities and towns throughout New Hampshire. The birds, most active at dusk and dawn, nested on flat, peastone gravel roofs and fed on insects—everything from mosquitoes to large moths—attracted to city lights. Data from coordinated summer nighthawk surveys in 1990–91 showed a total of 108 individuals in 16 towns. In 2006 they were reported from only two towns, Concord and Keene, during the nesting season. The reasons for their decline are not clear, but one possibility is changes in roofing substrate from peastone to rubber and PVC.

Nighthawk gravel nest patches are experimental. We do not know if they will attract nesting nighthawks. There are other potential reasons for the nighthawk decline such as pesticide use, accidental poisoning on their wintering grounds in South America, migration hazards, road collisions, or predation. Any of these factors singularly or combined may be contributing to their decline. By installing nest patches, we can begin to test if the decline is in part, due to lack of appropriate nesting sites.

What is Project Nighthawk?

In 2007 New Hampshire Audubon initiated Project Nighthawk to investigate the potential for restoring nesting nighthawks by placing simple gravel "nest patches" on flat rooftops. As part of this project, researchers are examining the potential for restoring nesting nighthawks in cities and towns by placing simple gravel "nest patches" on flat rooftops.

Using a gravel patch design pioneered by Vincent Marzilli in Maine during the 1980s, New Hampshire Audubon began placing peastone patches on flat rooftops in Concord. The Ashuelot Valley Environmental Observatory (AVEO) and Ken Klapper, a Master's student in Conservation Biology at Antioch University New England, spearheaded a similar Keene effort. If the absence of nesting sites is a factor in nighthawk declines, we hope the gravel patches will lure the birds back. It could be several years before we know if the experimental gravel patches make a difference.

Why install a Patch?

You will be part of a very interesting experiment and supply valuable data to the project! The more nest patches there are available the better the experiment and the more information we will have. If nest patches attract nighthawks back to the area, then this strategy could be successful in other cities and towns where they once occurred.

Will my patch attract a Common Nighthawk?

It's hard to say – we certainly hope so! However, since this is an experimental study, we are not sure about the degree to which nighthawks will use these nest patches.

When do the nighthawks nest?

In New Hampshire, nighthawks generally return from their winter migration around May 15. Timing of nesting is variable – eggs may be laid as early as the end of May but chicks from late nestings may still be present in late August. They usually lay two eggs and may have one to two chicks. Incubation takes 16-20 days and chicks will fledge when they are around 18 days old. Nighthawks usually leave on their southward migration during the last week of August.

How can I help?

There are several ways you can contribute. Become a project volunteer and help construct a nest patch, monitor a patch, or participate in coordinated nighthawk "watches." Donate nest patch building materials such as gravel, landscape fabric, and wood for patch frames. Financial donations are always greatly appreciated and help us cover the project costs (see last page for donation information).

HOW TO INSTALL A GRAVEL NEST PATCH

Nighthawks once nested on flat, peastone gravel roofs, most of which have now been replaced with rubber, PVC, or large stone ballast which is not suitable for nesting nighthawk. Nest patches are made by placing peastone gravel on top of an existing roof substrate in hopes of providing a suitable nesting location for nighthawks. They should be placed in the open on any flat roof using the following method.

Remember: You are part of a real experiment and we do not know whether these patches will be successful at attracting nighthawks. Please register your patch and report back your results.

Step by Step

1. **Evaluate the Roof**
2. **Gather Materials**
3. **Install the Patch**
4. **Notify Project Nighthawk**
5. **Monitor the Patch**
6. **Report Back**

Classic patch location in the southeast corner of a large flat roof. Fractured peastone on top of large stone ballast.

1. Evaluate the Roof

The roof must be flat. Pitched roofs are not suitable for gravel nest patches. Nighthawks appear to prefer large roofs (>7,000 ft^2) enclosed with parapets at least 15 cm (6 inches) high, which may provide some protection and shade.

Determine the optimal location for the patch on the roof. You must have enough space for at least a 9′x 9′ patch. The ideal is a southern corner of the roof bordered by a low wall on the two outside edges, but other areas with adequate space may also be tried.

Shade. Consider accessibility to shade, which may be provided by parapets, an air duct or other structure. Females nest in the open but chicks are frequently moved into shade on hot days. If shade is not available, consider adding a shade structure such as two concrete blocks with a solid concrete tile on a top.

Minimize disturbance and water problems. Take into consideration activity that may occur on the roof such as worker traffic, and drainage patterns. Nest patches should not be located in areas that could have foot traffic or standing water.

Check with building maintenance. They may have concerns about damage to the current roof substrate that may be alleviated with the following:

- A border of 2x4s nailed together around the patch will prevent gravel from moving.
- Landscape fabric underneath the patch to protect the roof

Also check the FAQs for Building Owners/Managers.

Note: If you are considering installing a patch and major re-roofing or repair is planned within the year, please consider delaying patch installation until the work is completed, and incorporating the patch into the roof work plan.

2. Gather Materials

Fractured peastone
Small enough for gravel patches

River washed stone ballast
Do not use for patches – *stone is too large*

Gravel: the following substrates can be used to construct nest patches.

- 1.2-1.5 cm diameter (~ ½ inch) gravel, with natural color and variation.
- Peastone, smoothed to thickness of 2 stones, or fractured peastone (3/8″).

One 9′ x 9′ patch requires 10 sheetrock buckets of peastone, 2/3-3/4 full for rubber roofs. For gravel patches on top of larger stone roofs, you will need 13-14 buckets of peastone. You will need more if you want a larger patch.

Experimental Alternate - Nighthawks are also known to nest on the ground on wood chips. No experiments have been done with wood chips on roof tops. If gravel is not an option at your site, consider wood chips as an alternative. Please report your results.

Equipment needed:

Buckets for transporting gravel
Round shovels and buckets to collect gravel
Work gloves
Tape measure at least 9′ long
Rake or hoe to spread the stone
Wooden frame (2x4s) – if needed
Landscape fabric – if needed
Ladder – if needed
Digital Camera – if needed

***Experimental addition for shade*:** If there is no structure for shade/protection, try experimenting with two concrete blocks placed a foot apart with a solid concrete tile as a top.

3. Install the Patch

When: In New Hampshire, gravel nest patches should be in place by about May 15 – the average date that Common Nighthawks return. However, nest patches may be installed at any time of the season for late nesting or scouting during migration.

Where: Nest patches should ideally be placed in a south corner of roof that is enclosed by parapets. Avoid locations subject to disturbance from maintenance workers or areas subject to water collection. Choose a site that is open and sunny but with access to shade from an object such as a parapet, air duct, air conditioning unit or other structure.

Size: Nest patches can be square, round or triangular (actual shape will vary with specific roofs). The general area size should be a minimum of 9ft x 9ft square (i.e. ~ 81 square feet), and larger is better. If using a round nest patch, the size should be 5 ft radius. If constructing a triangular nest patch the sides should be 12 ¾ ft long. Other shapes may be used to take advantage of shade and other conditions.

How:

1. Place landscape fabric (if using) underneath patch location
2. Place frame (if using) around patch location
   Frame should be nailed together at corners. If using landscape fabric attach to frame to prevent wind damage.
3. Put down shallow layer gravel
   No rubber or other roof material should show through in patch area.
4. Rake smooth
5. Add shade structure (if needed)
6. Record details/measurements for nest patch registration form

That's it – you're done.

Take a photo for you and Project Nighthawk.

4. Notify Project Nighthawk

Please be a part of the study. Register your patch with Project Nighthawk using the form included in this Handbook.

5. Monitor the Patch

Monitoring is an important aspect of Project Nighthawk. In order to determine the success of nest patch placement, accurate data concerning nest patch usage and nesting attempts must be collected. It is important that all monitoring results be recorded and submitted to NH Audubon. Records should be submitted even if no activity is noticed. (The lack of nighthawk activity is just as important as the presence of birds.) A monitoring form is included in the Handbook.

Check for nighthawks in the area of the roof with the patch by watching and listening at dusk from the ground. You may actually see a bird in flight or you may hear the "peent and booming" of the male. Clear, calm evenings are the best for observing. Watch and listen from 15 minutes before sunset until at least an hour after sunset when it has become fully dark, usually about 2 hours. Monitoring should begin in late May and continue through July – preferably twice each month.

In addition, visit the patch three times in June and July during these suggested time periods: June 10-20, July 7-15, July 24-31. Nighthawks and their eggs are cryptically colored and blend in extremely well with the gravel. Observe closely and walk with care. If the nest patch does attract nesting nighthawks, you may want to arrange additional observations times. Be careful not to disturb the nesting birds by frequent visits. Check patches when temperatures are warm but not hot, to avoid possible heat or cold stress on eggs or chicks.

6. Report Back

Return registration and monitoring forms (see pages 10-11) to:

Project Highthawk
New Hampshire Audubon
84 Silk Farm Rd.
Concord, NH 03301

Photos of Installed Patches

Gravel patches are an experiment in progress. Not all of these patches are in ideal or classic locations and placement was adjusted to fit the conditions on each individual roof top. They can serve as examples of potential modifications if an ideal southern roof corner is not available.

Rounded peastone patch with landscape fabric underneath and a wooden frame.
Photos by Ken Klapper.

Fractured peastone patch in a small section on the southeast side of a larger roof, but adjacent to another building roof. Note shade from AC unit on right.

Fracture peastone patch on the southeast corner of one section of a roof. Note the low parapet on one side and the taller wall of the adjacent roof on the other.

Fracture peastone patch on the southwest corner of a roof with low parapets and adjacent to another roof. Note large structures that may provide too much shade.

Patch of rounded peastone placed at the center of a roof that had no parapets. Adjacent to cupola for shade.

Photo by Stephanie Parkinson.

Rounded peastone patch with a frame and landscape fabric, adjacent to a taller section of the building. The wall provides shade but may be too tall.

Common Nighthawk Gravel Nest Patch Summary

Size:

- Square, round, or triangular (actual shape will vary with specific roofs)
- Equivalent in area to a 9ft x 9ft square (i.e. ~ 81 square feet)
    - 5ft radius circle
    - Right triangle with sides 12 ¾ ft long
    - Other shapes may be used to take advantage of shade and other conditions

Substrate:

- 1.2-1.5 cm diameter (~ ½ inch) gravel, with natural color and variation
- Peastone – smoothed to thickness of 2 stones
  Can also use fractured peastone (3/8″)
- One patch requires 10 sheetrock buckets of peastone 2/3-3/4 full for rubber roofs
  For large stone roofs, need more – plan on 13-14 buckets

Equipment needed:

- Tape measure
- Rake or hoe to smooth gravel
- Shovels (round) and buckets to collect gravel

Optional additions:

- Landscape fabric underneath the gravel
- Border of 2x4s nailed together around patch to prevent gravel from moving
- Structure for shade/protection if not present (ideas welcome)
  Suggestion: 2 concrete blocks, a foot apart, with a solid concrete tile as a top

Preferred location:

- South corner of large, flat roof enclosed by parapets at least 15 cm high (6 in)
- Open area with access to shade (parapets may provide), otherwise an air duct or other structure
- Avoid areas with foot traffic or standing water

Timing:

- Gravel patches should be in place by about May 15 (average return date), but may be done later for late nesting or scouting during migration
- Fledging may occur from late June through mid-August

Monitoring:

- Register your patch with Project Nighthawk
- Check for nighthawks in the area of the roof with the patch
    - watch & listen at dusk from the ground
    - in late May (depending on arrival date), June (2 times), July (2 times)
- Check the patch for a nest 2-3 times in June & July
    - suggested times: June 10-20, July 7-15, July 24-31

Project Nighthawk - Frequently Asked Questions about Nest Patches

For Building Owners/Managers

Will the nighthawks make a mess on my roof?
Unlike pigeons or other familiar city birds, Common Nighthawks do not leave a disagreeable mess. They nest directly on gravel, and do not build any type of nest or bring in any nesting materials such as mud, sticks or grasses. Despite their name, nighthawks are not hawks – they eat insects which they feed directly to the young. There is no fur, feathers, or bones left from their dinner. After they hatch, chicks move around and most nest sites are extremely clean with no sign of droppings. Most people never know they have a nighthawk nest on their roof unless they happen upon the adult or young.

Will the patch attract other nesting birds?
Very few birds nest on open gravel and it is unlikely that any other bird will be attracted to the patch. Killdeer are known to nest on gravel roofs occasionally but they typically use low roofs without parapets and do not build any kind of nest. Their young leave the nest within 24 hours for nearby fields and lawns where they can find food. If a Killdeer were to nest, there would be no mess or nest material to clean up.

Will the nest patch damage my roof?
We have been working closely with roofing companies such as The Melanson Company in Keene. The weight of the stone generally should not be an issue, but we recommend contacting your personal roofer for information and advice. A sheet of material such as landscape fabric may be placed under the gravel patch for additional protection. You may want to avoid placing gravel patches where maintenance workers may need to walk. This will also help avoid disturbance to any nesting birds.

Will placing a gravel nest patch invalidate my roof warranty?
Please consult your roofing company for information on any warranty concerns or issues. The company that guarantees the roof is the only one that can answer those types of questions.

Will the nest patch cause potential maintenance issues?
The simple presence of the gravel on the roof should not cause maintenance issues. Gravel may drift in the rain and could potentially clog nearby drains, depending on the drain type. A 2x4 frame around the patch will prevent gravel from moving away from the patch area.

Will a nighthawk nest affect our ability to do roof work or other activity?
In order for patches to be potential nest sites, please avoid major roof work between mid-May and late August if possible. Like most other birds, the Common Nighthawk is a protected species, including its nest, eggs, and nestlings. As a state-threatened species it is important not to impact nesting birds, but activities which do not disturb the birds during their brief nesting time, are not a problem. Minor adjustments in the timing of activities in the vicinity of the nest may be all that is needed. The patch monitor or Project Nighthawk can provide more information on avoiding disturbance if you have a nesting nighthawk. Contact the NH Fish & Game Department's Nongame and Endangered Wildlife Program if you have questions regarding the significance of state-threatened status.

Will a noisy unit on the roof discourage the nighthawks from nesting?
Nighthawks have been known to nest near or under noisy equipment, such as an AC unit and it does not appear to bother them. Different bird species hear in different ranges and we do not always know what noises they can actually hear. Although it is impossible to know whether a specific noise will be an issue for the birds, most noises do not appear to be a problem.

REGISTER YOUR NEST PATCH

Help contribute to Project Nighthawk's* research experiment. Please inform New Hampshire Audubon if you install a nest patch and provide the following information. It is also critical to monitor your patch and report results (see page 2).

1. Date of installation:

2. Building where patch was installed:
   Address:

   Town:

3. Location of patch on building (i.e., southeast corner):

4. Roof substrate (i.e., what the patch was constructed on: cobble, PVC, etc):

5. Roof Parapets (none, complete or partial – where?):

   Parapet height:

6. Describe patch design (i.e., 9′x 9′ pea stone rectangle, shaded by air conditioner):

   Patch material:

   Dimensions:

   Shade:

7. Frame used: (Y or N, and type)

8. Fabric underneath: (Y or N, and type)

9. Building Owner (name, address, phone #, email):

   Name: _____

   Address: _____

   Phone: _____ Email: _____

10. Contact Person (name, address, phone #, email):

    Name: _____

    Address: _____

    Phone: _____ Email: _____

Please return to Becky Suomala via email: bsuomala@nhaudubon.org, or via postal service: Becky Suomala, NH Audubon, 84 Silk Farm Road, Concord, NH 03301. Thank you.

* Common Nighthawk population declines may or may not be linked to available nesting sites. Project Nighthawk is an experiment and there is no guarantee that nest patches will attract nighthawks to a particular site.

MONITOR YOUR NEST PATCH

- Watch and listen for nighthawks at dusk on clear, calm evenings from 15 minutes before sunset until at least an hour after sunset when it has become fully dark. Monitoring should begin in late May.
- Visit the patch times during these suggested periods: June 10-20, July 7-15, July 24-31. Check patches when it is warm but not hot, to avoid stress on eggs or chicks. If nighthawks do nest, consider additional observations times. Be careful not to disturb nesting birds by frequent visits.
- REPORT WHAT YOU FIND. We need to know if you do or do not have birds each year. **Please return this form even if you have no activity.**

PATCH INFORMATION: Town:_____ Location: _____

YOUR INFORMATION: Name: _____

Address: _____

Phone: _____ Email: _____

DATE CHECKED	OBSERVATION TYPE	FINDINGS
Examples:	(roof visit, from a distance)	
6/5/2008	*observed from window*	*no activity*
6/10/2008	*roof visit*	*1 egg*

Presence of eggs/chick (Please attach more detailed observation notes):

of eggs: Date laid (if known): or Date first observed:

chicks hatched: Date hatched (if known): or Date first observed:

chicks fledged: Date fledged (if known): or Date first observed:

Date(s) and cause of chick mortality (if applicable/known):

Date nest abandoned (if known): or Date confirmed:

Nest notes (include any additional details regarding nest failures):

Please return to Becky Suomala via email: bsuomala@nhaudubon.org, or via postal service: Becky Suomala, NH Audubon, 84 Silk Farm Road, Concord, NH 03301. Thank you.

Please help our nighthawk conservation effort!

Can you find the nighthawk chick?

Finding a real nighthawk chick is just as hard as finding the one in this photo. Please help us carry out a second year of Project Nighthawk. We are raising funds now to continue our work to determine if gravel nest patches on rooftops will reverse the decline of nighthawks in urban areas. Our work is dependent on the funds we receive.

Your contribution makes a difference.

Project Nighthawk – A Partnership

Project Nighthawks depends on volunteers, partners, and supporters. We hope you will help.

□ I would like to volunteer □ I would like to know more about placing a gravel patch on my flat roof

□ I would like to support Project Nighthawk with a contribution of:
□ $50 □ $100 □ $500 □ $1000
Other_____

Name_____Phone_____

Address_____Email_____

City_____State_____Zip_____

Payment is by: □Check enclosed. Make check payable to NHA. □ MasterCard □ Visa □ Am. Ex.

Signature_____

Card #_____ Expiration Date_____

Return this form with payment to: New Hampshire Audubon, Membership Department, 84 Silk Farm Road, Concord, NH 03301-8200.