

CANADA GOOSE EGG ADDLING PROTOCOL

The Humane Society of the United States



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Introduction

Addling means “loss of development.” It commonly refers to any process by which an egg ceases to be viable. Addling can happen naturally when incubation is interrupted for long enough that eggs cool and embryonic development stops. Humans addle where they want to manage bird populations. Addling should be only one component of a comprehensive, integrated, humane program to resolve conflict between people and wild Canada geese (see *Humanely Resolving Conflicts with Canada Geese: a Guide for Urban and Suburban Property Owners and Communities* available online at www.hsus.org/ace/20343).

This protocol is for Canada geese (*Branta canadensis* spp.) only. Other species of birds have different nesting chronologies and incubation periods that make appropriate addling different. Addling for any other species requires a protocol developed for that species.

Information and training is essential for a successful egg-addling program. Program organizers and addlers must learn how to addle effectively, humanely, and legally. Understanding goose behavior and what works for other addling programs will help. Information on all these topics is covered in the following sections of this protocol. Program organizers and addlers may need to refer to additional sources for specific information on some topics.

This document is meant to serve as general guidance to assist those interested in helping stabilize Canada goose populations where they have been determined to cause conflicts with humans. However, this document is not an exhaustive, all-inclusive guide to addling Canada Goose eggs, but only contains suggestions as to possible procedures for use in the addling; it is to be considered open-ended and subject to revision and amendment as we learn more about humane approaches to solving problems with Canada geese. As with all potential interactions with wildlife, care and caution must be exercised when attempting any of these procedures.

Legal Authority

The federal Migratory Bird Treaty Act and its amendments protect virtually all native bird species, including Canada geese. Protected birds, their nests, and their eggs cannot be “taken” or harmed in any way without a permit from the United States Fish and Wildlife Service (USFWS). Under current law, all addling programs **must** be permitted by USFWS. Addling programs should also be coordinated with state wildlife officials. **Anyone seeking to addle the eggs of any bird is responsible for obtaining the necessary permit before proceeding.** Addlers must carry a copy of their permit when addling and be prepared to show it to law enforcement authorities.

Currently, each of the seven regional USFWS Migratory Bird Management offices issues federal addling permits. The application process and coordination with state wildlife agencies are not described here but are vital first steps before the information in this protocol can be applied. As this is being written, the USFWS has proposed sweeping changes in the way it oversees the permitting process for resident Canada geese. We urge readers to consult The Humane Society of the United States (HSUS) Wild Neighbors website at www.wildneighbors.org or the USFWS website at www.fws.gov for up-to-date information.

Species Biology

For an addling program to be successful, it is essential to understand the birds' biology and behavior since these guide addling timing and methods. It also ensures that other species are not affected and Canada geese are not harmed.

Canada geese are easy to recognize by their size, color and markings, and---of course---their distinctive "honking" calls. Canada geese tend to eat and loaf in grassy areas with open sight lines and access to a body of water. Sexual maturity is usually not until three years of age and geese can live up to 20 years. Both parents defend the nest and goslings until they are approximately 10 weeks old and can fly.

Nesting Chronology

For addling to be effective and for potentially developing embryos to be treated humanely, it is critical to know the timing of nesting and egg laying in your area. Geese start nesting at slightly different dates in different areas; earlier in southern areas and later in northern areas, ranging from March through June with peak activity in April and May in most of the United States.

Since they tend to start nesting about the same time each year in any particular area, annual records of earliest, peak, and latest *nest initiation* dates (dates geese begin nesting) in an area are very helpful for timing addling. Addling programs should record these dates but it is not necessary to wait until an addling program starts to begin noting nest initiation dates. Weather conditions may effect nest initiation so also note them. Also note the earliest, peak and latest dates at which geese *incubate* (sit on the eggs to keep them warm). If you have not been noting nest initiation and incubation dates, ask knowledgeable local authorities or individuals about goose nesting periods. State wildlife biologists and local wildlife rehabilitators frequently have good insight into nesting chronologies.

In addition to these sources of information, the geese themselves will offer insight into their nest timing. Begin checking for mating behavior and nesting activity very early in the spring. Outside of nesting season, people mainly see flocks forage and rest together. Early in spring, mated pairs will begin to stay together near their preferred nest site and to defend that site against other geese. When you begin to see pairs of geese "hanging around" one spot and chasing other geese away, note that location because they may have or soon will start a nest near that spot. When you later see only one goose "hanging around" there, it is very likely that his mate is sitting on that nest nearby.

Locating Nests

Geese prefer nest sites near water with a good view of the surrounding area, especially on islands and peninsulas. Where these sites are not available or are already defended by other geese, they often nest on or near the shores of ponds, lakes, and other water bodies. They also prefer sites where a natural or human-built barrier prevents approach on one side and a good view of the remaining area allow easy defense of the nest. Therefore, nests are frequently found very near buildings and fences, and at the edge of mowed grassy areas where vegetation changes to taller plants. Geese will also nest in less-than-ideal places, such as landscaped areas in parking lots, planters next to busy building entrances, or flat roofs. In more natural setting, look for nests on

muskrat houses and beaver lodges, elevated platforms of vegetation, stumps, and other raised, protected areas.

Geese tend to return to nest in places where they have been successful before. Some seem to return to nest exactly at or within feet of their earlier nest sites. Therefore, keeping good records of exactly where nests were found will make work easier in subsequent years.

Once the goose begins to incubate, the male or gander will adopt the role of sentinel and will be the only one of the two that is conspicuous. Although the male will not usually be immediately near the nest, he will be within a few hundred feet at most. A search of the area in which an alert and watchful bird is “standing guard” will generally lead to the discovery of a much less noticeable bird on a nest. She will be crouched low to the ground and may be hard to see. The most conspicuous feature of a sitting goose is often the white cheek patch.

A goose nest will be a round or oval structure made from vegetation, mulch, or similar material. Downy feathers plucked by the female may line the nest to protect the eggs. When a sitting goose leaves her nest to eat and drink, she frequently covers the eggs with nest material to keep them warm and hidden while she is gone. If you find a nest without a goose sitting, touch the eggs. If they are warm, incubation has begun.

A nest with cool eggs but no birds nearby likely contains an incomplete *clutch* (all the eggs laid and incubated together by one goose). Geese lay an average of five to six eggs per nest at about the rate of one egg a day, but you may find nests with anywhere from two to 12 eggs, or rarely even more. The goose completes her clutch over several days and does not incubate until her clutch is complete. While eggs are being laid, but before incubation, the pair will spend little time near the nest to avoid attracting potential predators. Eggs do not begin to develop until the goose incubates, so all the goslings hatch about the same time. Very rarely, a sitting goose (whose clutch should have been complete) has been found with more eggs a week or two later.

If you find a “cold” nest, it can be marked and revisited within a week. Alternatively, cold eggs can be addled but the nest should still be revisited very soon (within a week) to be sure additional eggs added to the clutch are treated.

Egg Development

Knowing how eggs develop is also essential to a successful, humane addling program. ***It is imperative to addle eggs in early stages of development.*** Humane treatment of developing embryos becomes an issue when an air sac develops inside the egg. An air sac forms as the developing embryo uses the egg’s stored food and air, passing through the porous shell, fills the space. At that point, development is typically advanced enough to demand euthanasia to ensure humane death. It is simply far more effective, efficient, and humane to stop development at earlier stages to avoid the need to consider humane destruction. Appropriate humane euthanasia for developing embryos is beyond the scope of this protocol.

In Canada geese, eggs that are less than 14 days old can be addled humanely. Beyond that time, and when the eggs first begin to float when placed in water, humane treatment of the developing embryo must be considered. The simplest way to deal with this concern is to

return eggs older than 14 days (eggs that float) to the nest without addling them. Note where and when these eggs were found to adjust the timing of addling next year. The “float test” is discussed in more detail below.

Approaching the Nest

When searching for nests, be prepared to come upon nests and defending geese as soon as you enter the site (perhaps as soon as you step out of your vehicle or building). Once a nest is located, approach cautiously. For most participants, their most pressing question is how they will get defending geese to stay far enough away from the nest for them to addle the eggs.

Geese are active protectors and defenders of their nests, and birds will challenge people who approach their nests. Some even challenge vehicles approaching too near. As you approach a nest, the geese will be very noisy. Some geese will simply leave the nest before or just as you get close, although they will generally stay nearby honking and may return to challenge you for the nest before you finish addling. If the gander is not immediately obvious, be watchful for his return, perhaps by air, in response to his mate’s calls.

Marking the Nest Site

Once a nest is found, addlers will need some way to find it again. Nests found early in the spring may be “lost” within a couple of weeks under rapid growth of vegetation. New nests can be confused with nests found previously, especially where geese cluster nests at preferred location such as islands. It will not be easy to tell nests or geese apart a week or two later.

One option is to mark the nest site either before you move the geese off the nest or after you have completed addling. Plastic surveyors’ tape, flags, surveyors’ spray-on marking paint, or some other system can leave a distinguishing mark. It is *not* recommended that the marking be placed immediately next to the nest site. Curiosity about the markings tends to draw people to the site, and possibly some egg predators such as crows. Use an agreed distance and direction (e.g., north of the nest at 20 feet) for markings.

Marking material can be unsightly and, depending on the material used, retrieving it can be problematic at some sites. These considerations, sometimes combined with concerns in high traffic public areas that marking will draw people into conflicts with defending geese, may lead to a decision to leave nests unmarked. However, addling teams will still need to find treated nests again. In these situations, very thorough notes with sketch maps, if possible supplemented by photos such as from a digital camera, can help teams find nests again. Placing something in the photo to label each nest (i.e. note with nest site and number) can help later to identify nests in photos. Such notes, maps, and photos are very helpful even where nests are also marked.

Fending Geese Off Nests

Some geese will remain sitting or standing over the nest; hissing, honking, and flapping as people approach. These geese will have to be gently moved off their nests and may need to be fended off during addling. While it is often the male who most vigorously defends the nest, in some pairs the female may be the stronger defender and in some pairs both may defend vigorously.

Goose defensive behavior is primarily honking, hissing, flapping wings, and running towards approaching threats. Rarely, a goose will make physical contact and actually strike with flapping wings, bump with body, or peck with beak. These are large birds and can cause bruises or knock someone off balance, leading to a fall. Have means of defense to hold birds at bay.

Umbrellas, trash can lids, brooms, or anything similar can be used to hold birds off. Cheap umbrellas have several advantages for this purpose. Carried closed and opened near the goose with some shaking and noise, there is an element of surprise when a solid visual barrier springs open in front of the geese. (The advantage of using cheap umbrellas is that geese do break some.) A goose can be gently coaxed off her nest with the open umbrella canopy, if necessary. Open umbrellas can be placed around the nest as addlers work to discourage geese's return.

Depending on the pair's behavior, you may need two fending tools, one in each hand of the person assigned to fend. Some geese circle around on the ground and challenge the addling team while they are working. A very few fly at addlers who will need to be alert for this possibility. If both members of the pair are strong defenders and move at the nest from different directions, two fenders may be needed.

It is imperative not to strike at, harm, or attempt to harm any protected bird. Injury to any federally protected species without a federal permit is a criminal offense.

Organize so you are ready to addle quickly as soon as the bird is off the nest. Have tasks assigned to team members and needed materials at hand before moving her off. For geese and addlers' sakes, hold the birds off their nests for the shortest time needed to complete addling. It is better to mark nest sites, take notes and record data, and take reference photos either before or after birds are fended off nests.

Marking Eggs and Data Collection

If using the oiling method to addle, after the goose is off the nest, mark each egg by simply writing on them, either a simple "X" or similar mark or a more elaborate code (for example, nest 1 egg 1 or 4). A wide variety of pens and pencils, including number 2 pencils, indelible markers of various kinds, grease pencils, and livestock tag markers, are used for egg marking. None is reported to be universally successful.

Each goose turns her eggs in the nest and rubs against them as she incubates. This may cause marks simply to rub off some eggs. Some eggs are rather dirty after a couple of weeks' incubation and marks can be hidden. We suggest oiling programs mark eggs but be aware they may not be able to rely on marking alone to determine if a nest or an egg was previously treated. Also consult notes, maps, and photos (if used) if addlers need to determine whether a particular nest or egg has been oiled.

If there are enough people in the team, one member can now begin recording data. The data sheet should be used to record: 1) the date and time of the procedure, 2) the location and number of the nest, 3) the number of eggs in the clutch, 4) the method of addling used, and 5) the personnel involved. Other information can also be helpful, in particular, notes about pairs' defensive behavior.

Determining Incubation

Feel the eggs; if they are warm, incubation has started. If they are cold, the clutch is not complete and the nest can be marked and/or noted and revisited within a week. Alternatively, cold eggs can be oiled, if you are using that method, but the nest should still be revisited within a week to be sure additional eggs added to the clutch are treated.

Determining Egg Age

Before any addling procedure, the eggs must be aged. For Canada geese eggs, the “float test” is an excellent indicator of age. Eggs less than 14 days old can be addled humanely. The Humane Society of the United States recommends that Canada goose eggs older than 14 days of age, at the stage at which they begin to float in water, be returned to the nest to complete development. If it is necessary to render eggs older than 14 days nonviable, the addling procedures described below **will not be humane**. Eggs that are pipped (the gosling has begun hatching by breaking a small hole through the shell) **cannot be addled**. Eggs that are not pipped, but where movement can be detected or sounds are being made by the gosling **also cannot be addled**.

Look at the last page of this protocol for an illustration of the “float test” or immersion test. It illustrates how eggs will act in water at different developmental stages, counting from the beginning of incubation (not from laying). Be sure you have a container of water with enough room and enough water that eggs can float freely. At many sites, you can simply fill a bucket from the pond next to the nest but at some sites you may need to bring water with you. Place eggs in the water. Some addlers float every egg while some float at least two or three from each nest. Remove eggs. If you are using the oiling method, dry each egg very well. Proceed based on test results.

Addling Procedures

Several procedures can stop egg development effectively and humanely in an early stage. Of these, the methods that physically impede development, piercing and shaking, are more difficult to learn and do correctly and completely than oiling, egg replacement, and nest destruction. Incorrect or incomplete piercing and shaking can leave the embryo alive but deformed. Therefore, these addling methods are not recommended. There are advantages and disadvantages to each of the three recommended procedures that should be weighed in selecting the most appropriate for a site, program, or nest.

Addlers should record data on each nest as they work. Depending on the number of team members and how many are needed to fend the geese at a particular nest, one member may record data while another addles. If this is not practical, data for each nest should be recorded as soon as work at that nest is finished. Since most geese are eagerly reminding addlers that they want their nest back, it is usually best to finish the actual addling quickly (while still being careful and thorough) and then move back while you complete the data for that nest. If you are using the oiling method, the geese will reclaim the nest and settle down.

Addling should be done in teams. One person alone cannot both deal with the defending parents and addle. At a minimum, two people are needed; three make a very good-sized team; at some sites and for some pairs, even four are not too many.

Regardless of addling method, teams will need:

- the federal permit,
- data sheets,
- material for marking nest (if they will be marked),
- something to write with,
- fending tools (umbrellas or others), and
- bucket or similar container and water for float test.

Other useful supplies for all methods are:

- clipboard (to write data on),
- sheet protector (to keep data sheets and permit dry),
- camera,
- disposable gloves,
- public education handouts, and
- this addling protocol.

Nest destruction method. After assuring eggs are young enough to remove humanely, remove nests and eggs and dispose of as directed on the USFWS permit. Remove all the nesting material to discourage the geese from simply reusing. The nest material and eggs from several nests may be bulkier and heavier than you expect. Be prepared with plenty of sturdy containers. If using trash bags, we suggest you double the bags. Securely close containers and dispose.

This method is simple and is being used extensively in some states. Observations of geese after their nests are removed suggest some pairs build new nests and lay additional eggs. How many geese will renest is still not known, but there is some information suggesting that if eggs have been incubated for a week the tendency to renest may be significantly diminished.

You will need to make repeated visits to find and remove new nests to be highly successful. Given this consideration, nest destruction may be most appropriate where addlers will be frequently on-site for other duties, such as grounds keepers at golf courses, and the number of pairs to keep track of is not very large. Visit nest sites no more than 14 days apart due to the 14-day limit on humanely addling eggs. Weekly or more frequent visits are ideal. If visits are longer apart than 14 days, it is much more likely addlers will find some eggs too old to disturb. The ideal timing would be to remove nests between 7 and 14 days of incubation, long enough incubation to reduce renesting but not so long that eggs are too old to remove.

In addition to the supplies needed for all addling methods, teams will need:

- containers for the nest material and eggs.

Oiling Method. Oiling is a widely used addling method. Eggs that are young enough to addle humanely are coated with corn oil that keeps air from passing through the shell so the embryo cannot develop. Oiling is reported to be highly effective (between 95 and 100 percent) in studies. However, in field use oiling has sometimes failed to stop egg development and oiled nests have, on rare occasions, hatched goslings.

Only use 100-percent food-grade corn oil, obtainable from any grocery supplier to oil eggs.

This is usually stated on USFWS permits. Although they may seem more convenient, we strongly recommend that you do not use aerosol spray cooking oil. These products have other ingredients added so the oil will not clog the spray head and will spread over the cooking surface. It is not clear whether these additional ingredients interfere with the oil's effectiveness in blocking air movement through the shell. Since these spray products are not 100 percent oil, they may not comply with permit conditions.

Oil can be rubbed onto eggs. Eggs can be dipped in a container of oil. Oil can be sprayed from pump-type (non-aerosol) containers, although these may clog. If spraying, be sure to oil all surfaces of each egg, not just the exposed surface as the egg lies in the nest. You will need to turn each egg to expose and spray the entire surface. Disposable gloves are very useful to keep hands clean when applying oil. Change them between nests. Whatever coating method you use, the goal is an even coat with a light to moderate amount of oil over the entire egg. Eggs need to be thoroughly dry after the float test so the oil adheres. Bring plenty of rags or towels and oil eggs in the same order you floated them. This way eggs will have the maximum opportunity to air dry before oiling.

Oiling requires less frequent visits than nest destruction. However, visits to nest sites need to be no more than 14 days apart due to the 14-day limit on humanely addling eggs. If visits are longer apart than 14 days, it is more likely addlers will find some eggs too mature to oil. Oiling requires addlers spend more time at each nest than nest destruction but they are likely to have fewer nests in total. Returning the oiled eggs to the nest tricks the goose into continuing to incubate nonviable eggs instead of laying additional eggs, preventing renesting.

In addition to the supplies needed for all addling methods, oiling teams will need:

- oil,
- rag or towels (to dry eggs between floating and oiling), and
- marking pen or pencil for eggs.

Removal and Replacement Method. Dummy eggs also trick the goose into continuing to incubate. With a supply of suitable dummy eggs, addlers simply remove real eggs young enough to be removed humanely and replace them with dummies. In clutches with five or fewer eggs, three dummy eggs will suffice; for larger clutches, use four. The removed eggs do not need to be further addled; by being removed from incubation, they will stop developing.

Dummy eggs that are about the same size, color, and weight as real eggs must be obtained in quantity, retrieved from nests at the end of the nesting season, cleaned, and stored for next season. Finding a source for appropriate dummy Canada geese eggs has been and continues to be difficult. These supply and handling considerations limit the use of this method. Replacement requires less frequent visits than nest destruction and about the same frequency of visits as oiling. As with those methods, visits to nest sites need to be no more than 14 days apart due to the 14-day limit on humanely addling eggs. If visits are longer apart than 14 days, it is more likely addlers will find some eggs too old to replace.

In addition to the supplies needed for all addling methods, teams doing replacement will need:

- dummy eggs and
- containers for both dummy and real eggs.

Revisiting Nests

Depending on the addling procedure, it may be either desirable or necessary to revisit nests. In the normal course of work, addlers will revisit nests destroyed or treated early in the season as they search for new nests. Where the egg replacement method is used, addlers will need to collect dummy eggs at the end of the season. While it may not be necessary to revisit oiled nests treated late in the season, addlers will learn useful information such as whether treated nests are abandoned, number of eggs in nests (if the number does not agree with the number treated, go back to addling procedure, above), and number of goslings, if any.

It is rare that goslings can be traced to specific nests; however, any information that might indicate the likely source of gosling will be helpful next year. Do not consider a small number of goslings a failure. As with any form of population management, addling cannot completely eliminate reproduction. Goslings do rarely hatch from oiled nests. Parents may lead goslings as far as two miles to grass and water if their nest site does not offer them. So, goslings at your site could come from nests offsite.

In the past, we recommended addlers revisit oiled nests after two weeks and remove oiled eggs. This was based on a concern that some geese might sit on nonviable eggs well beyond the natural incubation period. Several years' experience with addling programs and lack of scientific findings to support this concern leads to the conclusion that geese abandon oiled nests just as they do nests that fail for other reasons. Additionally, determining whether any particular egg was oiled has been problematic when markings do not hold up. The rare occurrence of oiling failure worried some addlers that they might inadvertently remove eggs too old to remove humanely. Compounding these concerns, the float test does not distinguish eggs with developing embryos from previously oiled eggs. Both can float; the developing egg from an air sac and the oiled egg from decomposition gasses. For all these reasons, we no longer recommend routine removal of oiled eggs.

If oiled eggs must be removed later, be aware that nonviable eggs may have spoiled to a point where they have or are about to burst. Be careful handling and be prepared for offensive smells. Double bag and dispose as directed on your permit. It is generally best simply to leave oiled eggs to recycle naturally.

Cautions for Operators

Addlers must be aware of risks to their own safety. Any outdoor task done under varying weather conditions at many types of sites presents some risks. Preferred nesting sites being commonly near water, water safety is a particular concern for many addling programs, especially if boats are needed to reach island nests. It is beyond the scope of this protocol to cover boating, water, and outdoor safety beyond this reminder. Learn and follow appropriate safety rules.

For the safety of all, including addlers and geese, children should not addle. Teenagers may be helpful members of addling teams for locating nests, recording data, and similar tasks that do not require directly handling eggs or birds, if supervised closely.

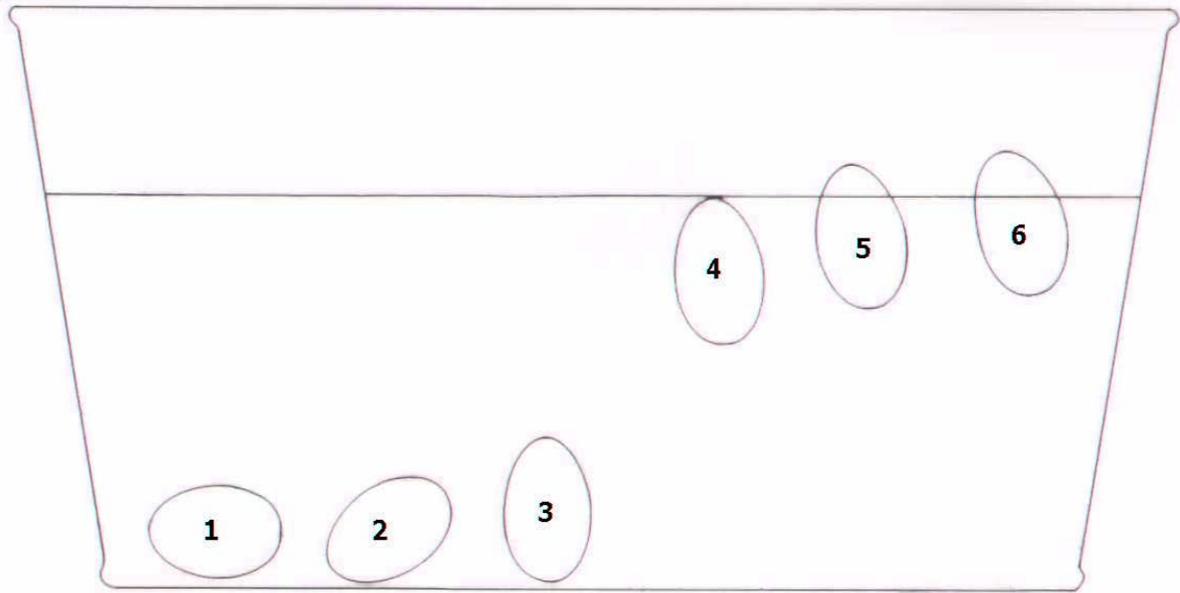
Record Keeping and Reporting

Federal permits require certain record keeping and reporting. This will be stipulated on the permit itself. It is a good idea to collect as much information as possible beyond the required data to facilitate the addling program from year to year.

Public Education

When addlers are working in public places, people may approach them with questions or concerns (either for or against the geese). It is very helpful for addling programs to be prepared with an educational component. This can be someone on each team willing to explain the program or a simple fact-sheet that team members can hand out to the public. Contact information to get more information is a particularly good item to include on such a handout. Other forms of community outreach such as information in the local media, newsletters, and other outlets about both the addling program and other efforts to resolve human-geese conflicts without killing wild birds can help create community support for the program.

Float Test Illustration



Age in days: **0-3** **4-8** **9-13** **14-18** **19-23** **24-27**
(Approximate, from beginning of incubation)

Interpreting this chart: It pictures a cross-section through a large container of water with eggs of various ages. The line across the container represents the water level. Eggs at the very beginning of incubation (number 1 on the left), lay on the bottom of the container, clearly not floating. By about 13 days of incubation, eggs will turn upright in the water (as number 3 on the chart) but will remain at the bottom of the container. At about 14 to 18 days of incubation, eggs will be clearly floating near the top of the water, although they may not break the surface of the water. Floating eggs (like numbers 4, 5, or 6 in the chart) are too old to be addled humanely.

The Humane Society of the United States. Charts based on materials provided by the U.S. Fish and Wildlife Service and the Department of Agriculture's Wildlife Services. Illustration by Lori Baker.