AN INTERPRETATION OF BALD EAGLE NESTING BIOLOGY IN CONNECTICUT

By Donald A. Hopkins

Since 1992, when the first Bald Eagle (*Haliaeetus leucocephalus*) nest in about 40 years was reported in Connecticut, the number of active breeding territories has increased to at least nine, with more expected in coming years. This is indeed good news, but with it come problems, often in the form of harassment by an uninformed and/or uncaring public that encroaches upon the nesting territory. To protect the eagles during the sensitive period of nest construction, incubation and brooding, the U.S. Fish and Wildlife Service, Bald Eagle Recovery Plan, attempts to secure a buffer zone around each nesting tree, usually a 330-foot radius. Anyone violating this zone could face arrest and/or fine for harassment of eagles under the federal Endangered Species Act.

As a deterrent, I offer the following interpretation of the eagle's nesting activity. While remaining outside the buffer zone, with the aid of a telescope of 25 power or more and using this article as a guide, one should gain a fair understanding of the nesting biology of the eagles, with little or no impact on them.

I will start with a description of a typical eagle's nest (Figure 1). This was constructed in an oak tree. White pine and eastern cottonwood are also used in Connecticut. The nest is built by placement of sticks in a crotch formed by multiple limbs. The tree is usually a super-canopy tree rising above surrounding trees, thus providing a clear flight path into the nest. The sticks are gathered from the ground or broken from the limbs of

nearby deciduous trees. Once a foundation of sticks has been constructed, grasses and fine plant material along with dirt are added forming a bowl, which is below the rim of sticks around the edge of the nest. The dirt comes in on the roots of the grasses. The material forming the bowl is referred to as a "duff" and in it, the eagle forms an egg cup just prior to laying. The loose latticework of the rim serves to prevent newly hatched chicks from falling out. The tree chosen for the nest is usually within a few hundred feet of a watercourse, but can be a quarter of a mile from water.

The adults are ready to start a new nesting season after the previous season's young have fledged and moved out of the nesting territory. Usually, in October or November, the adult pair will start making repairs to the nest or construct a new one. The winters in southern New England are less severe than those to the north, so the eagles are able to remain on their nesting territories with open water, where they can forage within a short flight from their nest. Eagles that nest on or around reservoirs may reap an extra advantage of deer going

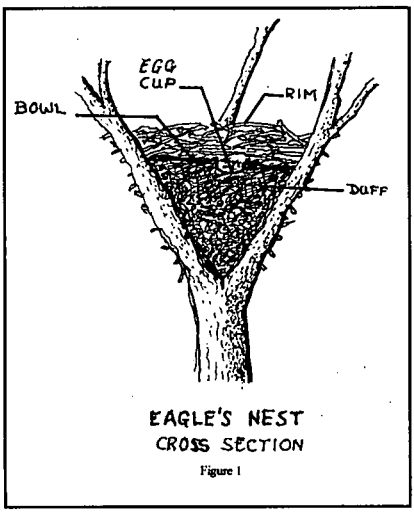

Figure 1

down as winter kills on the ice. By not having to migrate the eagles save energy and defend their nesting territory.

During the late fall and through the winter, resident eagles are often active around their nests, usually making visits in the morning. They will arrange the sticks and bring in new ones. They will bring in green sprigs of white pine, which could be an indication to other birds that this nest is occupied. They also sit at a distance and observe the nest. As the egg-laying time approaches, the number of visits to the nest increases each day, the time in the nest increases and the number of new sticks brought in increases. In Connecticut, the egg-laying date can vary from the second week in February until the last week in March. Just prior to egg laying one of the pair of eagles will spend a considerable amount of time sitting in the nest. I have recorded them doing this for as long as one to four hours. This is done with no eggs in the nest and is called pseudo-incubation. It can lead to the false assumption that eggs have been laid. This can be avoided, as we shall see below.

Copulation usually takes place at the nest tree. It can take place up to three weeks prior to laying eggs and if unsuccessful continues for a month after the normal laying date. Usually an egg can be laid three days after a successful copulation.

Once the egg(s) have been laid the incubating activities become very predictable. Both adults share incubating duty, split into about four hour shifts. While sitting on eggs, the posture of the eagle is such that the head is barely visible and the wing can be just seen at the rim of

the nest (Figure 2). Approximately every 40 minutes the eagle will stand up and reach down with its beak and turns the eggs. This keeps the eggs' internal membrane moist on all sides, preventing it from sticking to the inside of the shell, and rotating the eggs' cooler side up allows for the more efficient heat transfer from the adult's body. You can now see the reason for the egg cup, to keep the egg(s) in the center of the nest. Once done rotating the eggs the adult will appear to dive head first into the nest, slowly settle its back end down, then rock sideways six or more times and is now ready to resume incubation. The adult assumes a different orientation across the nest after each egg rolling. The large number of rocking motions help position the egg(s) under its feathers, up against the brood patch, which is on the lower part of its body. Turning the egg(s) and the rocking motion are definitive indications that there are eggs in the nest. This behavior does not occur during pseudo-incubation. I will come back to the number of rocking motions again (Figure3).

When a change over occurs, the incoming adult will step into the nest with its toes balled up, so the talons do not puncture the egg(s). As this is a very unstable way of moving, the adult will raise its wings for balance. This display is readily visible to an observer. In the meantime, the relieved adult will have jumped out of the nest to a nearby branch or tree to preen for about an hour or more before flying away to hunt or feed. After approximately four hours, the other adult will return for another shift. Occasionally upon returning, the incoming adult will bring in a stick to add to the rim of the nest. In all, this routine will go on for the 35 days that it takes for an egg to hatch.

SITTING ON EGGS

Figure 2

ROCKING SIDEWAYS

Figure 3

BROODING CHICKS

Figure 4

As the hatching date approaches the adults will bring food to the nest. This usually occurs the day before the chick(s) hatches. It takes a day or two from the start of pipping until the chick breaks free of the eggshell. Thus with pipping the adults have noticed hatching is imminent. The first day the chick is out of the shell it is not fed; by the second day the adult will start to feed the chick. The adult does this by grasping the food in its talons and tearing off small pieces of food with its beak. Holding the food in its partially opened beak, the adult turns its head horizontally and reaches down to present the food to the chick. The chick will pluck the food from the adult's beak. Should the adult tear off a piece that's too large for the chick, it will swallow the piece itself. If there is more than one chick in the nest, the adult will alternately reach in different spots in the nest with food. This can be used as an early indication of the number of chicks. It will be approximately two weeks before the chicks grow large enough so that their heads are visible above the nest rim when reaching for food.

When hatched the chick(s) is down-covered, but is not large enough to thermoregulate its body temperature, so an adult has to constantly brood the chick(s) for the first three weeks. Brooding is done by the adult setting down on the chick, back end first and then rocking

less than five times while lowering its breast down into the nest. The number of times the adult rocks is definitive, more than five times signals that there are eggs in the nest, five or less times means there are chicks in the nest. There is an exception to this. The eggs hatch sequentially, three days apart, thus for three to six days (two or three eggs) the rocking and posture of the adult is ambiguous. Normally, while brooding, the adult sits erect with the head and portion of the body clearly visible above the rim (Figure 4). The adult will occasionally stand up and look down at the chicks and feed them or just sit back down, again rocking. There does not appear to be any specific time interval associated with this.

The adults continue their rotation of four hours each of brooding. The adult returning to the nest usually brings in a fish or a stick. After three weeks of constant brooding the adult will spend some time sitting on the edge of the nest or on a limb near the nest. For the next few weeks the adults will brood only during inclement weather and at night. After six weeks the chicks can take care of themselves.

When the chick is a couple of days old it is able to drag itself to the edge of the nest and facing inward will defecate either over or through the rim. An observer can usually see the resulting white stream. Should this be seen more often than once an hour it would indicate another chick in the nest.

When the chick is about three weeks old, flight feathers start to emerge on the wings and tail. At this time, the adults can be seen biting into the duff of the nest and shaking the material loose. This may be to soften the bowl of the nest, thus reducing the wear on the new feathers of the chick as it drags itself about.

The adults feed the chick(s) as it demands. In the early weeks the chick(s) spends most of its time sleeping. When it wakes up it is fed. The time spent feeding is usually about 15 to 20 minutes. There are usually one or more fish in the nest at all times. At about the age of four weeks the chick(s) is able to grasp and tear at the food and feed itself. At this stage the adults merely bring food to the nest, drop it and leave, to avoid being mobbed by the chick(s).

As the weeks go by physical activities increase, progressing from walking around the nest to flapping, jumping and flapping and jumping together. When the chick(s) is ready to fledge it can jump, flap and hover above the nest for a second or two. This activity can go on for a couple of days. By the eleventh week the chick(s) is capable of flying from the nest, thus fledging.

The fledgling's first flight is usually short and it's landing is clumsy. Over the next few weeks it continues to fly back and forth in the vicinity of the nest. Occasionally it will revisit the nest. During this time the adults continue to bring food to the fledgling(s) either at the nest or to the nearby shoreline.

By September the fledgling(s) has developed enough flying and hunting skills so that the adults can wean it. Once the fledgling(s) is independent the adults can start their next breeding cycle.

The above interpretation is based on 12 years of personal observations of nesting Bald Eagles in Connecticut and monitoring Northeast Utilities web-cam at Barton's Cove, Mass. (www.nu.com/eagles)