



P R O J E C T O V E R V I E W

Project: *Great Horned Owl Nesting Behavior, Remote Monitoring*, a public participation in scientific research (PPSR) project. The Owl Research Institute (ORI) and explore.org began a live cam partnership in 2014. Since that time, five cams have focused on Great Horned Owl (GHOW) nests. This is the 6th GHOW nest cam.

Project duration: 1 March 2020 - fledging

Project staff: A collaborative partnership between the Owl Research Institute, Explore.org, and volunteer participants

Owl Research Institute: Project development, oversight, and analysis

Explore.org: Provider of all cam equipment, 24/7 live stream of the nest via explore.org and YouTube, volunteer forum platforms, ie. community chats, and the data entry module. Live cams are accessed at:

explore.org: <https://explore.org/livecams/owl-research-institute/great-horned-owl-cam>

YouTube: <https://www.youtube.com/watch?v=VII5IYOYFcQ>

Project volunteers: All cam viewers are welcome to participate. The number of project volunteers is unlimited and will be calculated at the close of the season. Volunteers will monitor, interpret behaviors, and enter events in the data entry module, which is accessed online:

<https://www.surveygizmo.com/s3/5475464/Great-Horned-Owl-Prey>

Project Objectives: Remotely monitor, via live stream camera, a Great Horned Owl nest from incubation through fledging to document a range of nest events and behaviors. The objectives and reporting methods of this study are all designed around the conditions, views, advantages and limitations of remote monitoring via live stream. This is the first year of what we hope will be a multi-year study.

Project Outcomes: Final analysis will document behaviors specific to this nest and Great Horned Owl family, such as: hatch dates, frequency of prey deliveries, food distribution rates, and more. Over time, remote monitoring efforts such as this will reveal nesting behavior norms for the Great Horned Owls in this area of western Montana. The project will expand what is known about this species, both from a public education and scientific research perspective, which can influence and inform conservation action.

S P E C I E S O V E R V I E W - G R E A T H O R N E D O W L

Great Horned Owl pairs mate for extended periods and possibly for life, although if one of the pair dies, they will likely find a new mate. This differs from other species such as Snowy, Long-eared, and Saw-whet Owls who are seasonally monogamous but may have a different mate each season.

Like all species of owls, Great Horned Owls do not build their own nests but move into existing structures. In the Mission Valley, they most often utilize the abandoned nest of magpies, or appropriate nests built by red-tailed hawks. In other parts of their range, they may also utilize tree cavities, cactus, haylofts, manmade nest platforms, cliffs, and caves.

Great Horned Owls are found in almost all areas of North America and in a wide variety of habitats, including both coniferous and deciduous forests, swamp forests, mangroves, farmland, deserts, and even areas of

dense human presence and activity, like city parks. The nest we are monitoring near Charlo, MT is located on private property in the heart of the Mission Valley. It is surrounded by grasslands, wetlands, and mainly agricultural land.

Great Horned Owls have a diverse diet which mostly consists of small mammals such as voles, mice, ground squirrels, rabbits and hares; but also includes birds, amphibians, reptiles, fish, and insects.

Great Horned Owls are the earliest species of owl to nest in western Montana, usually around mid-February, and continue to raise their young longer than most other owl species – as late as December. Females typically lay 1 - 4 eggs, depending on prey availability. In this area, we most commonly see two eggs; the female on this nest is incubating three. Incubation is around 33 days and eggs hatch asynchronously, about two days apart.

K E Y T E R M I N O L O G Y A N D B E H A V I O R S

Use this guide to help understand the behaviors we are monitoring for, and what to look for when identifying events. In the world of owl research, some Great Horned Owl nesting behaviors are well documented, others are not. Our goal is to create a record for this nest and this pair. Over more seasons and nests, we will be able to increase our knowledge of this species in this area. We're including some of these markers, however, to help you anticipate what to expect.

Egg Pip

A pip is the first sign of hatching which is visible as a small piercing to the eggshell. Pipping refers to the process of breaking open the eggshell using an egg tooth - a small, sharp protuberance on the beak that is used to break through the egg's hard surface. Strong muscles in the chick's neck give them the strength needed to do this. Chicks initiate pipping when they are ready to survive outside of the shell and have grown too large to absorb oxygen through the pores of the eggshell. Not long after hatching, the egg tooth falls off.

This nest has a nice deep bowl that may make it impossible to see any pips. Nonetheless, stay on the lookout and watch for behavioral changes in the female. She will hear her chick's earliest pipping efforts and may show an increased interest in checking on the eggs, as though she is listening intently. Please only record pipping if the egg is visible.

Egg Hatch

Great Horned Owl chicks hatch after about 33 days of incubation. After a chick fully emerges from its shell, the shell may remain in the bowl and crumble under the activity of the nest; the female may set the pieces to the side; or she may eat them. There isn't a lot of documentation in this area, so if you see any of these behaviors related to egg shells, please record them under the "other" event category and write in what you observed.

Great Horned Owl chicks hatch asynchronously. This means that they will hatch in the order they were laid, about two days apart. When owl chicks hatch, they are vulnerable and helpless. They cannot walk, see, self-feed, or regulate their body temperature, and are entirely dependent on the care of

their parents. They appear pink and white - the combination of exposed skin and partial down covering. Around three days in age, a chick gains the strength to lift its head. When this happens, it may offer the first glimpse of the chick. Prior to this, a hatch may only be indicated by the female's behavior. She will begin tearing off bits of prey and making visible feeding attempts. If you see her exhibiting this behavior, please record this in the "other" event category. There you can write in what you observed. A chick may also be seen when she leaves the nest.

Eyes Open

A chick's eyes will open around day 10. By this time, you will probably see its fuzzy white head above the nest rim or peeking out from under the mother regularly. By day 7, chicks even begin casting pellets. These are quickly consumed by the female in order to keep the nest clean. With some close-up views provided by the cam, we should be able to identify when the eyes have opened and record it.

Chick Swallows Prey Whole

Around 3 weeks of age, or 20-27 days, chicks are able to self-feed and begin swallowing prey whole. This marks a milestone in their development and another step toward independence. The male continues to hunt for all the nestlings and will continue delivering the prey to the female so she can pass it on to the chicks. This may continue up to 5 weeks in age.

Branching

Also known as nest departure, branching is when young owls move out of the nest and begin exploring the area around them, but before they are able to fly. Most often, this happens on the branches of the nest tree around 6 weeks of age. At this stage, the young owls are unsteady and tipsy - they often fall, sometimes catching themselves by their feet and hanging upside down for a bit before dropping to another branch, or sometimes to the ground. They often return to the nest for periods or, if they are on the ground, find lower limbs or bushes to spend time in - roosting, exploring, and staying safe in the cover of branches. For several weeks they remain in close proximity to the nest tree and each other. Parents oversee their movements and continue to make food deliveries.

Fledging

While branching, young owls often make their first flight attempts. These are short and clumsy at first but around 7 weeks they are capable of short flights. "Fledging" can be defined in different ways and differs from species to species, but generally refers to the development of enough feathers to sustain flight. Flight practice takes place on the ground after running starts or from branches. For the purposes of our study and based on the views we're afforded, fledging will be defined as a chick leaving the nest and not returning. We may have the opportunity to see a chick make its first flight with a coordinated takeoff and landing, but will most likely observe practice runs that involve hopping up and down, or flights with crash landings.

Predator at Nest

Almost all eggs and young chicks are vulnerable to predators. This natural nest is located in an area shared with mesopredators like coyotes, foxes, raccoons and skunks; where bears, and occasionally wolves pass through; and where eagles, hawks, and other owls are common. When confronting a threat or predator, owls demonstrate a variety of nest defense strategies: bark-like hoots, distraction displays, or by diving at the threat. It varies among species and between individuals. Just as a wild animal might prey on the young of this nest, these Great Horned parents could prey on the young of another nest to feed their brood. All of these behaviors are survival strategies.

When watching owl live cams, please remember that these are wild animals in nature. Events that occur on cam can be hard to watch sometimes. At the Owl Research Institute, we have a non-intervention policy. You can find this on the last page of this document.

Other - Write in

When conducting research, standardized categories and methods of data collection are imperative to the process and results. But these are just part of the picture. Unforeseen and surprising events will always happen. As such, please make note of events of special interest.



Owl Research Institute

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Owl conservation through research and education since 1988

Dear Great Horned Owl Cam Volunteers,

Thank you for your time and interest in contributing to this research project! We are very excited to be collaborating with you!

This live stream of a Great Horned Owl nest represents a rare opportunity for behavioral research. At the Owl Research Institute, we are interested in quantifying some of the behaviors – or events – that take place at this nest. To do so, we are asking for your help. If you have an interest in these owls, we encourage you to participate! Please carefully read the instructions that follow before recording behaviors.

As you are watching the camera, look for behaviors you see on cam that correspond to the events we are monitoring for. These events are listed below and will be entered on the following page. To record an event, make your selection from the list and answer the follow-up questions that appear.

Many events will ask you to reference a specific egg or chick. To determine which chick you are looking at, compare size and developmental stages. Chicks are numbered in hatching order, from the oldest (1) to the youngest (3). Keeping track of age order can be difficult, however, so if you don't know which chick or egg it is, please do not guess! We would much rather have an entry of "unknown chick," than have erroneous information. You can always add a note that says, for example, "the chick was one of the smaller two."

We expect to have many "unknown" entries relating to prey species, chick ages, etc. This is fine! If you are unsure about something, ask for feedback in the chat. We are all learning together, and this is a collaborative project in every way.

Important points to remember are:

1. *Err on the side of caution.* If you are unsure about a specific element of the event, please do not guess. Simply record as "unknown."
2. *Please contribute.* This study relies on the volunteer assistance of cam watchers like you. We would much prefer an entry with "unknown" fields over no entry at all. This leaves an event unrecorded.
3. *Familiarize yourself with the behaviors list before you start recording.* It is important that you can easily recognize what each behavior is and what it looks like. You can watch the camera, replays, YouTube videos, or chat with other viewers to practice.

There is much to be learned about these owls and the process of collaborative data collection. Your volunteer efforts expand our understanding of these spectacular owls and create new pathways for how research is conducted. Thank you for your interest and involvement!

Now let's get started!

Hoots,

The Owl Research Institute

If you have a question or feedback, please email Liberty at liberty@owlresearchinstitute.org.



DATA ENTRY FIELDS

1. Date of event

Enter date in the following format: 03/02/2020, or month/day/year

2. Time of event

This is the actual time of the event, not the time you are recording the event.

Record time in 24 hour Mountain Standard Time, or nest time. See the time conversion chart in the following pages.

Exact times are important to our data analysis, so please be as accurate as possible.

3. Event/Behavior Observed

Select the behavior you observed. Please respond to any other questions that appear regarding this event.

Prey Delivery

Select the behavior you observed. Please respond to any other questions that appear regarding this event.

Who was fed?

- Female
- Chick 1
- Chick 2
- Chick 3
- Multiple chicks
- All chicks
- Female and chicks
- Unknown

What prey did you see?

- Rodent
- Vole
- Pocket Gopher
- Mouse
- Chipmunk
- Squirrel
- Ground Squirrel
- Rabbit

- Hare
- Cat
- Bird
- Duck
- Goose
- Pheasant
- Pigeon
- Dove

- Skunk
- Amphibian
- Insect
- Other - write in species
- Unknown

Any other notes or behaviors we should know about?

Female leaves nest

Any other notes or behaviors we should know about?

Female returns to nest

Any other notes or behaviors we should know about?

Egg pip

Which egg pipped?

Egg 1

Egg 2

Egg 3

Any other notes or behaviors we should know about?

Egg hatch

Which egg hatched?

Egg 1

Egg 2

Egg 3

Any other notes or behaviors we should know about?

Chick opens eyes

Which chick opened its eyes?

Chick 1 opens eyes

Chick 2 opens eyes

Chick 3 opens eyes

Any other notes or behaviors we should know about?

Chick swallows whole prey

Which chick swallows whole prey?

Chick 1 swallows whole prey

Chick 2 swallows whole prey

Chick 3 swallows whole prey

Any other notes or behaviors we should know about?

Chick branches

Which chick is branching?

Chick 1 is branching

Chick 2 is branching

Chick 3 is branching

Any other notes or behaviors we should know about?

Predator at nest

What species of predator?

Any other notes or behaviors we should know about?

Other

Write in an unlisted behavior

Any other notes or behaviors we should know about?



TIME CONVERSION FOR DATA ENTRY

1. Convert to nest time, Mountain Standard Time (MST)

TIME ZONE CONVERSION CHART	NEST TIME			
	PACIFIC	MOUNTAIN	CENTRAL	EASTERN
	12:00	1:00	2:00	3:00
	1:00	2:00	3:00	4:00
	2:00	3:00	4:00	5:00
	3:00	4:00	5:00	6:00
	4:00	5:00	6:00	7:00
	5:00	6:00	7:00	8:00
	6:00	7:00	8:00	9:00
	7:00	8:00	9:00	10:00
	8:00	9:00	10:00	11:00
	9:00	10:00	11:00	12:00
10:00	11:00	12:00	1:00	
11:00	12:00	1:00	2:00	

2. Convert and record in 4-digit 24 hour/military time

24HR/MILITARY TIME CONVERSION	RECORD AS		RECORD AS	
	REGULAR	24 HOUR	REGULAR	24 HOUR
	12:00 AM	00:00	12:00 PM	12:00
	1:00 AM	01:00	1:00 PM	13:00
	2:00 AM	02:00	2:00 PM	14:00
	3:00 AM	03:00	3:00 PM	15:00
	4:00 AM	04:00	4:00 PM	16:00
	5:00 AM	05:00	5:00 PM	17:00
	6:00 AM	06:00	6:00 PM	18:00
	7:00 AM	07:00	7:00 PM	19:00
	8:00 AM	08:00	8:00 PM	20:00
	9:00 AM	09:00	9:00 PM	21:00
10:00 AM	10:00	10:00 PM	22:00	
11:00 AM	11:00	11:00 PM	23:00	

Example: If you live in EST and see an event at 8:17 PM EST, the event would be at 6:17 PM MST, and would be recorded as 18:17.

If you are in PST and see an event at 10:09 AM PST, this event is at 11:09 AM MST, and would be recorded as 11:09.



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INTERVENTION POLICY

The opportunity to be immersed in the lives of wild creatures makes it easy to become emotionally invested in their well-being. This connection is one of the most powerful things about wildlife cameras, but it also makes them difficult to watch sometimes.

At the Owl Research Institute (ORI), our approach to research and monitoring, including situations that occur on camera, aims to reveal and document how natural processes unfold. These are wild animals and we've made a conscious decision to keep ourselves out their lives as much as possible. While immediate intervention might sometimes seem like the appropriate response, it's important to remember that we often don't have the right answer. There are countless instances of human intervention which have not solved the problem at hand, and in fact, created a whole host of other unintended consequences.

At ORI, we have a non-intervention policy. The exception, however, are situations caused by humans. We have, for example, removed fishing line from the beak of an Osprey chick. A chick that is starving, however, would not warrant intervention of any kind.

Decisions involving a bird in distress often need to be made quickly, with the information at hand. Sometimes it isn't entirely clear what is going on and gray areas exist. We do the best we can. And like you, we want to see the birds thrive. But, as researchers and cam watchers, our role is not to influence the natural interactions between species and their environments. It is to learn, enjoy, document, and promote the conservation of these animals and their ecosystems.

Even when it's hard.

Thank you for your interest,

The Owl Research Institute