Hello Conservation Course students ~~
Here is the paper Libby wrote in preparation for and after concluding her talk on birds for the Methow Conservancy Phenology class. The websites she mentioned are also included at the bottom. ~~ Mary

Winged Wonders: *Libby Mills will introduce us to the phenology of birds including lessons on timing of mating, hatching, fledging, feeding and migration using Methow species as examples.*

"With that introduction I find the topic overwhelmingly large to treat in one evening. The basis of the study of phenology is the physical aspect of our planet, how it tilts toward and away from the sun, and how that directs all inhabitants in their lives. Animals off the equator sense changes in seasons initially as the days begin to lengthen a few weeks after a winter solstice. While we look at our watches and say in amazement, "It's still light and it's 5 o'clock!" the birds sense daylight through their skulls in a tiny place called the pineal gland located in the brain. This is thought to be the directing organ in the bird's sense of daily cycles. Circadian rhythm is another word for the internal 24 hour clock which drives our physiological functions through the day and night cycle. Circannual rhythms guide a year's activities.

There are many avian behaviors which occur with seasonal changes and are timed to enhance chances of survival of the individual and perpetuation of the species. The most important cue in an avian annual cycle is the change in day length. Lengthening days in the end of winter initiate hormonal changes that put the birds back into breeding condition by recharging testosterone and estrogen into their sex organs, putting on a layer of fat for use in migration for energy stores, and finally sending the migratory bird off into the night (or day) to get to its breeding grounds. Migration, breeding activity and molt are all on a complex calendar for the bird and timing is often critical to survival and reproductive success. Every species is on a unique individual annual cycle.

For every species of bird, there are cues that drive their movements and activities. Most birds begin preparing for migration with lengthening daylight, then use a combination of phenological cues to direct them toward their destination. For many birds, though not necessarily all species, changes in temperature and/or precipitation are additional migratory cues. Birds like Bald Eagles don't want to arrive at a lake before prey is available beneath the ice. It is probably even more critical for insectivorous birds that they not reach the breeding grounds before reliable daily food is available. An untimely snow and freeze can wipe out insects and therefore the insectivores caught too far from alternate food supplies. I remember a visit to Denali in 1984 when a foot of snow fell in August and American Pipits were dropping like flies out of the air. Probably thousands were killed in that single untimely storm.
The opening of leaves from tight buds and pollen blowing from a catkin are likely cues that drive many birds northward. As the plants green up the insect larvae hatch, and good timing between birds and their prey is fairly critical to the success of plant and bird alike. Insects are more closely tied to changes in the plant, since their eggs are generally present on the plant itself, and will begin to hatch as soon as spring temperatures allow. If spring begins early with an early arrival of warmth, even by five

days, the birds can miss the peak of available food for their migratory stopover refueling sites. Meanwhile the insects can get away with murder. On the breeding grounds where birds time their clutch for feeding chicks when there should be maximum food supplies, the birds may find that there is a shortage of desirable food if larvae have already changed to pupae. Bird nesting is supposed to be timed so that larvae of insects are at their largest and juiciest when the hatchlings are at their hungriest and the feeding birds balance this burst of insect life. A pair of Evening Grosbeaks can eat up to 50,000 caterpillars in the time it takes to raise their young and fledged them from the nest!

In my preparation for this talk I ran across a Finnish study of birds and climate change in latitudes 60-90 degrees north. It brought up some interesting possibilities to consider. As the earth warms and spring changes come sooner, what will migratory species do? Will they continue to migrate at usual times and miss the peak of available food? Will they become more sedentary or quit migrating altogether? How will this tip the balance with sedentary species already occupying an area of impoverished winter supply of food? Will this expose many birds to sudden disaster in seasonal storms? How will a redistribution of competing bird species play out in the ecological balance that has been established over thousands of years of natural selection, if the changes appear in mere decades? Migratory routes and stopover sites along the routes may change. With all our work to protect valuable habitat for select species we could find that the birds have either vanished altogether or moved to new regions and need desirable habitat protected in those places.

An interesting example in my neighborhood is the Great Blue Heron. When I first arrived in Skagit Valley I learned about a heronry in Deception Pass State Park and enjoyed observing it fairly regularly. Over the course of only a few years the herons abandoned the site. Now a heronry exists on Padilla Bay nearer to where we live and more than 500 herons have nests on the small acreage of alder forest. The Skagit Land Trust purchased the land to protect habitat for the herons, but how long will they continue to use the site? Nobody knows, but not to have preserved the site would have had a certain outcome of industrial or residential development resulting in disaster to the gigantic and therefore critical heronry. Some birds will respond to shifts in climate with a redistribution or shift in their range. Birds that make vertical migrations into the mountains for breeding find an ever-diminishing area to exploit as they move higher into the hills searching for appropriate food and nesting habitat. Some species may become sedentary while other will change the duration of time they spend on both their breeding range and on their wintering range.

Autumn departure of birds is less well known than spring migration which occurs with greater regularity and urgency as birds compete for the best nesting territories. How will an earlier spring affect the length of time until they depart for the southlands?

From observations of climate change in the north, by 2100 spring breeding may be initiated anywhere from a few days to two weeks (or more) earlier than we presently observe for many migratory songbirds. Because not all plants and animals in the ecosystem will respond equally to climate change, there is difficulty predicting that effect this will have.

The Finnish study pointed at data with both some migratory and some sedentary

species of birds, their breeding cycle timing was beginning to miss the peak of insect food availability as the insects respond more quickly to climate change than the birds' behavioral changes to accommodate that changed timing. How this will ultimately affect breeding success and numbers of surviving bird offspring is being studied and no conclusive answers are yet evident.

Studies of response to climate change in the avian world are ongoing and you can join in in your own yard. To learn about birds requires more than just checking them off on a list, but as we begin to learn birds this is a good start. A graph is recommended to become conscious of who your avian neighbors are. Across the bottom of the graph you put the days of the month. Across the left side of your graph you list species seen on a regular route you establish to study, whether it is your yard, your favorite walk or your observations in the whole valley. If you were to record approximate numbers with the birds it would be even more valuable information to collect. To observe trends of change requires a lot of data over time. In your own life, you may see changes, but the first step to making yourself a naturalist is to get out there and look! Then write it down. Observing bird behavior is a vital part of understanding how the landscape is utilized, thus cluing us in on how best to maintain and restore shrinking habitats.

Carrying a little book with you in your pocket is always a good idea, to take notes, to make lists, to quickly sketch field marks of an unknown bird to look up later, to even write a poetic line that brings an experience back. Whatever works to enhance your experience or knowledge is what you need to become hooked on keeping nature notes. My personal journals are a mix of reflection, quick often funky sketches, long luxurious drawing sessions, bird lists and specific observations. They are a tool for personal learning and review and a loose record of a life lived, with many weeks and months omitted from time to time. There are no rules to break. A field journal can be a wonderful companion, more so when you go alone or when you persuade your companion to bring a journal too, and you give yourself the time to use it. Keeping a journal is one of the few ways in the fast-moving electronic world you can slow down time, and I highly recommend it.

Finally, when you are back plugged-in in front of a computer I want to direct you to some good websites on global climate change and birds.

This year's International Migratory Bird Day (May 12, 2007) theme is global climate change and birds. See this page: http://www.birdday.org/. Then click on the themes for the last three years to learn more about birds and boreal forests, bird collision hazards and of course, climate change. Click http://www.birdday.org/ imbd_climate.htm to go straight to the topic.

The American Bird Conservancy is a great organization to become familiar with. Try them at http://www.abcbirds.org/climatechange/. ABC has a good pdf file to read on line, or copy if you like:
http:// www.abcbirds.org/climatechange/birdwatchersguide.pdf
The other website and fabulous resource I referred to in the talk is the Birds of North America Online, http://bna.birds.cornell.edu/BNA/. There are free demos to explore including four species that frequent the Methow valley. If you want to give yourself a cheap course in ornithology you should consider subscribing to this tome of information

for a year or two.

And don't miss the wonderful local paper publication The Methow Naturalist. You can subscribe by contacting dana@methownet.com

I defer to the websites referred to above to fill in lots of details in what ornithologists are now trying to predict in the world of a changing biosphere. Read, think and share these ideas with your friends and neighbors. It's a good start to try and keep a livable planet for all inhabitants."

Libby Mills, Feb 2, 2007