for passive acoustic and ultrasonic sampling, Reconyx trail cameras, wildlife callers and digital field recorders with shotgun microphones. Before getting into the field, students learn to use a variety of software programs including Presence, Distance, SPOMsim, SongScope, and Past. With these computational tools, they are ready to estimate population sizes of various species, but also to develop spatial patch occupancy models.

Our course is open to both undergraduates and graduate students. Of the 9 students in the course, 6 were graduate students, and all students were Wildlife majors.



Grizzly observed while entering Grand Teton National Park.

#### ✦ GRAND TETON NATIONAL PARK

We arrived in the Tetons with a week of field work already completed in the Black Hills. Thus, students were acclimated to the course routine, and all students were involved in course projects. The first few days in the park were spent familiarizing the students with the park habitats and wildlife, and, importantly, where we were likely to observe species of interest. This involved numerous hikes, with spectacular scenic views, and observations of numerous charismatic mammal and bird species.



Lunch while hiking above Jenny Lake in search of marmots and pikas.



Vigilance behavior by a yellow-bellied marmot above Jenny Lake.



Social interactions among yellow-bellied marmots.



Red fox (gray phase) with a freshly killed marmot above Jenny Lake. The fox cached the marmot and returned to the rocky outcrop in an unsuccessful atempt to kill another marmot.

### VIGILANCE BEHAVIOR IN YELLOW-BELLIED MARMOTS

Several students were involved in a project designed to evaluate a model of vigilance behavior in social mammals. To do this, they video-recorded the above-ground activity of black-tailed prairie dogs at Wind Cave National Park, and yellow-bellied marmots in the Northern Black Hills. In the Tetons, the yellow-bellied marmots above Jenny Lake and the Uinta ground squirrels on the AMK Field Station were video-recorded. This provided 2 graduate students with nearly 100 hours of archived video data for analysis, and important data for their master's thesis research. The preliminary results suggest that colony size does influence scanning rates in smaller ground squirrels, but not in larger ground squirrels like marmots.

## ✦ EFFICACY OF PASSIVE ACOUSTIC SAMPLING FOR DETECTION OF NORTHERN FLYING SQUIRRELS

Using both Anabat II and Songmeter ultrasonic detectors, several students set up recording stations within the Tetons in an effort to listen for northern flying squirrels. Before the start of field work, we developed a call library of southern and northern flying squirrels using captive colonies of animals housed at Southeast Missouri State University. We used these calls together with a bat call library obtained from the Museum of Southwestern Biology at the University of New Mexico to develop discriminant functions for classification of unknown The model was applied using previously calls. recorded calls from the Black Hills, Northern Idaho and from Prince of Wales Island AK to demonstrate Once our calls were downloaded to efficacy. computer, we were able to identify the presence of Northern Flying Squirrels within several habitat patches in the Tetons. The students working on this project plan to develop a survey protocol for northern flying squirrels that will not require trapping or handling this sensitive species.

# ESTIMATION OF POPULATION SIZE IN ELK AND PRONGHORN

Using rangefinders, compass and GPS, several students embarked on an effort to estimate population sizes of elk and pronghorn, and, specifically, to compare pronghorn population sizes with those estimated for Custer State Park in the southern Black Hills. The surveys involved both vehicular transects and transects on foot. Clearly, the estimates are unreliable because the sample sizes are small and too restricted in terms of area, but the exercise provided valuable hands-on experience in the technique and an opportunity to use programs Presence and Distance in a real-world setting.



Elk observed while on a transect.

### WILDLIFE OBSERVATIONS

Because most of our students have never been in the west, they are unfamiliar with many of the species we observe. Most have never seen a Barrow's Goldeneye, Western Tanager or Crossbill, and for some of these students the world has suddenly grown much larger.

One reason this course has been so successful over the last 10 years is that we prepare our students beforehand. They come into the field with an idea of what they want to accomplish, and the tools necessary to be successful. The dramatic scenery and abundant wildlife we found in the Tetons reinforced in our students their commitment to careers in Wildlife Biology.

Observing elk as they establish their position in the social heirarchy, or pronghorn and moose as they forage is an experience that comes too rarely for most students.



Barrow's Goldeneye.



Western Tanager.



Crossbill at the AMK station.



Tamiasciurus working on a drey.



Elk cow establishing her position in the heirarchy.



Vigilance in a Uinta ground squirrel on the AMK field station.

### ✦ SUMMARY

Two of the students that participated in the field course at the AMK field station are finalizing the analysis of their data, and will defend their MNS theses in the spring. The data they collected in the Tetons is an integral part of their research. They will present the results of their work at the annual meetings of the American Society of Mammalogists in 2014. Because of her experience in the Tetons, one of the undergraduate students has decided to pursue graduate education in wildlife biology, and has applied for admission to several graduate schools. The course was a positive experience not only for the students, but for the instructors as well. We look forward to our next opportunity to return to the Tetons and the AMK field station.



Preparing for potential predation event by a red fox on yellow-bellied marmots.



After several days of field work, a chance to relax with a hike.





Two of the many views that made a return to the Midwest difficult.