2022 SDTWS Annual Meeting Virtual through ZOOM March 2nd, 2022 (Central Standard Time)

WEDNESDAY, 2nd March

9:00   9:05   **Welcome and Introductions**

9:05   9:20   **Central Mountains and Plains Section Updates** – Shelly Deisch, President, Central Mountain and Plains Section

Special Session: *The Challenge of Change*

9:20   10:20   **KEYNOTE: Challenges of Change for Tribal Fish and Wildlife Programs**   Julie Thorstenson

Dr. Julie Thorstenson (Lakota) is the Executive Director for the Native American Fish and Wildlife Society. She grew up on a cattle ranch on the Cheyenne River Sioux Reservation in Northcentral SD, where a love for the land and the environment was instilled in her. Dr. Thorstenson earned a B.S., M.S. and PhD in biological sciences from South Dakota State University. Her research focused on cottonwood site selection using GIS for riparian restoration and incorporating culture into ethics education for scientists and engineers. Dr. Thorstenson has worked in Indian Country her entire career in various positions, including Wildlife Habitat Biologist and Health Department CEO for her tribe. She currently lives on the Cheyenne River Sioux Reservation in South Dakota with her husband and three children.

10:20 10:40 **Bison restoration on tribal lands: A potential ecological approach to native food sovereignty within the Northern Great Plains in the midst of a changing climate** Olivia Cosby* et al.

10:40 10:50 **BREAK**

10:50 11:10 **Effects of 50 years of forest management and natural disturbances on Northern Goshawk nest-site habitat suitability in the Black Hills National Forest** Jason E. Bruggeman*, Patricia L. Kennedy, David E. Andersen, Shelly Deisch, and Eileen Dowd Stukel

11:10 11:30 **Introducing the Great Plains Bumble Bee Atlas** Daniel H. Kim*, Richard Hatfield, Katie Lamke, Charlie Bessken, and Salina Jepsen

11:30 11:50 **Conservation social science in action: Balancing the needs of people with the needs of wildlife** Faren Wolter

11:50 1:00 **LUNCH BREAK**

1:00 1:20 **Ranavirus detection among multiple South Dakota amphibian populations during summer 2021** Danielle Galvin*, Emily Eisenbraun and Jacob Kerby

1:20 1:40 **Effects of agricultural pollutants on stress hormones and viral infection in larval salamanders** Drew Davis*, Matthew S. Schwarz, and Jacob L. Kerby

1:40 2:00 **Relationships between changes in relative abundance of male Ring-necked pheasant (*Phasianus colchicus*) and its habitat components at multiple scales in South Dakota** Reza Goljani Amirkhiz*, Mark Dixon, Ranjeet John, and David Swanson

2:00 2:20 **BREAK**

2:20 2:40 **Assessing landscape hazards on artificial nest survival: Do patch size and landscape configuration matter?** Alex Solem* and Travis Runia

2:40 3:00 **Chiggers as ectoparasites of prairie skinks at the SDSU Oak Lake Field Station** Bruce Eichhorst*, and Wendy Blickensderfer

3:00   3:20   **Cottonwood regeneration project on LaFramboise Island Nature Area**
Nathan Baker

3:20   3:40   **Estimating variable pronghorn survival across their northern populations**   Molly C. McDevitt*, Andy Lindbloom, Paul Lukacs

3:40   4:00   **Kitten survival and cause specific mortality of bobcats in the Black Hills, South Dakota**   Erin Morrison*, Brady Neiles, Chad Lehman, and Christopher Rota

THURSDAY, 3rd March

09:00   11:00   **Annual Chapter Business Meeting**

11:00   11:15   **Presentation of MS Student, Citizen, and Professional of the Year Awards**

THE WILDLIFE SOCIETY
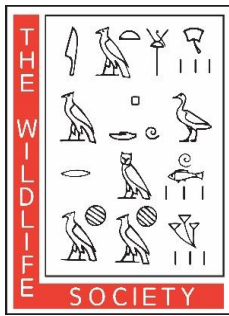
Founded in 1937 as The Society of Wildlife Specialists, The Wildlife Society has evolved into an international nonprofit organization of professional wildlife ecologists and managers. Members number over 10,000 from 40 different countries, and include administrators, biologists, conservation officers, educators, managers and researchers.

The objectives of TWS are to:

1. Promote sound stewardship of wildlife resources and the environments upon which wildlife and humans depend;

2. Undertake an active role in preventing human-induced environmental degradation;

3. Increase awareness and appreciation of wildlife values; and

4. To seek the highest standards in all activities of the wildlife profession.

SOUTH DAKOTA CHAPTER OF THE WILDLIFE SOCIETY
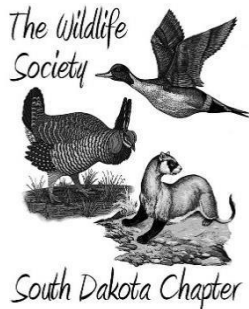
The South Dakota Chapter of TWS (SDTWS) was initiated on February 19, 1966 with 56 charter members. SDTWS is affiliated with the Central Mountains and Plains Section, one of eight subdivisions of TWS. The full membership of SDTWS meets annually in the spring to exchange scientific information through presented papers, debate current issues in wildlife management and land use, and conduct chapter business. The chapter's Executive Board of Directors, consisting of President, PastPresident, President-Elect, Secretary-Treasurer, and two standing board members meet at least 4 times each year to discuss issues that don not require full chapter approval. The chapter also communicates with its members through a newsletter, The Prairie Voice, published within 30 days of Executive Board meetings. SDTWS has a current membership of 171 people interested in the welfare of South Dakota wildlife.

Abstracts

Bison Restoration on Tribal Lands: A Potential Ecological Approach to Native Food Sovereignty within the Northern Great Plains in the midst of a Changing Climate

Olivia G. Cosby[1*], Hila Shamon[1], Chamois L. Andersen[2], Helen Augare[3], Jonny BearCub Stiffarm[4], Claire E. Bresnan[1,5], Brent L. Brock[6], Ervin Carlson[7], Jessica L. Deichmann[1,8], Aaron Epps[9], Noelle Guernsey[10], Cynthia Hartway[11], Dennis Jørgensen[10], Willow Kipp[12], Daniel Kinsey[13], Kimberly J. Komatsu[14], Kyran Kunkel[15], Robert Magnan[4], Jeff M. Martin[16], Bruce D. Maxwell[5], William J. McShea[1], Cristina Mormorunni[11,12], Sarah Olimb[10], Monica Rattling Hawk[10], Richard Ready[5], Roxann Smith[17], Melissa Songer[1], Bronc Speakthunder[18], Grant Stafne[4], Melissa Weatherwax[3] and Thomas S. Akre[1,8]

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[3] Blackfeet Community College, Browning, MT, United States,
[4] Fort Peck Buffalo Program, Poplar, MT, United States,
[5] Montana State University, Bozeman, MT, United States,
[6] Wildlife Conservation Society, Bozeman, MT, United States,
[7] Blackfeet Buffalo Program, Browning, MT, United States,
[8] Working Land and Seascapes, Conservation Commons, Smithsonian Institution, Washington, DC, United States,
[9] Rosebud Economic Development Corporation, Mission, SD, United States,
[10] World Wildlife Fund, Bozeman, MT, United States,
[11] Wildlife Conservation Society, Santa Fe, NM, United States,
[12] Iinnii Initiative, Browning, MT, United States,
[13] Aaniiih Nakoda College, Fort Belknap Agency, Fort Belknap, MT, United States,
[14] Smithsonian Environmental Research Center, Edgewater, MD, United States,
[15] Conservation Science Collaborative, Inc., Bozeman, MT, United States,
[16] Center of Excellence for Bison Studies, South Dakota State University, Rapid City, SD, United States,
[17] Fort Peck Community College, Poplar, MT, United States,
18 Fort Belknap Buffalo Program, Fort Belknap Agency, MT, United States
*Presenter

Climate projections indicate that conventional agricultural and production practices will become less sustainable, ecological and economical, within the Northern Great Plains (NGP) due to a disproportionate increase in warming and drying relative to the rest of the United States. As a result, the livelihoods of people that rely on conventional practices throughout NGP will be negatively impacted. This is especially true for rural Native American communities living on reservations where the land is often vast but marginal and non-tribal operators have an outsized role in food production. Given this, it is critical to identify models of sustainable land management that can improve ecological function and socio-economic outcomes for NGP communities, all while increasing resilience to a rapidly changing climate. Efforts led by Native American Nations to restore Plains bison (*Bison bison bison*) to tribal lands can bring desired socio-ecological benefits to underserved communities while improving their capacity to influence the health of their people, lands, and livelihoods. Ecological sustainability will depend on the restoration of bison herds and bison's ability to serve as ecosystem engineers across the NGP. The historically broad distribution of bison suggests a capacity to adjust to a wide-range of

climates and habitat conditions. Here we present a brief overview of bison's ecological, cultural, and economic value within four Native American communities across NGP, then discuss the potential contributions of bison to food sovereignty, sustainable economies, and conservation of a working landscape with limited protections and significant risk of conversion. We emphasize that the ecological role of bison within this setting has potential due to cultural acceptance and the vast availability of suitable lands; however, it is critical to address tribal needs for funding support, enhanced community capacity, and solving complex landownership for these goals to be achieved.

Effects of 50 Years of Forest Management and Natural Disturbances on Northern Goshawk Nest-Site Habitat Suitability in the Black Hills National Forest

Jason E. Bruggeman[1*], Patricia L. Kennedy[2], David E. Andersen[3], Shelly Deisch[4], and Eileen Dowd Stukel[5]

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[2] Department of Fisheries and Wildlife & Eastern Oregon Agricultural Research Center, Oregon State University, Union, Oregon, USA
[3] U.S. Geological Survey, Minnesota Cooperative Fish and Wildlife Research Unit, University of Minnesota, St. Paul, Minnesota, USA
[4] South Dakota Department of Game, Fish and Parks, Rapid City, South Dakota, USA
[5] South Dakota Department of Game, Fish and Parks, Pierre, South Dakota, USA

*Jason Bruggeman will be the presenting author; email: jebruggeman@protonmail.com; phone: 952-905-1664.

Relationships between Northern Goshawk (*Accipiter gentilis*; hereafter Goshawk) breeding ecology and timber harvest have been the focus of debate for decades. We used data from 466 Goshawk nest sites found during 1965–2019 in the Black Hills National Forest (BHNF), South Dakota and Wyoming, to assess spatial variation in Goshawk nest-site habitat suitability (estimated by odds ratios); changes in nest-site habitat suitability over time; and the roles of anthropogenic factors and natural disturbances in affecting these changes. We developed conditional logistic regression models and evaluated covariates related to topography, anthropogenic factors, disturbance events, and dynamic forest and habitat attributes spanning seven sequential periods to assess whether observed relationships changed over time. We evaluated forest attributes across five spatial scales relevant to Goshawks, used information-theoretic methods to select models, and assessed the predictive capability of the best-approximating models. Nest-site habitat suitability was positively related to mean percent canopy cover and median canopy base height, and negatively related to variability in canopy base height within 12 ha of the location. Nest-site habitat suitability was related to interactions between canopy cover and commercial thinning, and canopy cover and fire. Forest attributes at the 12-ha scale were a better predictor of nest-site habitat suitability than covariates evaluated at the point or >12-ha scales, indicating the importance of managing Goshawk habitat beyond the nest tree. Nest-site habitat suitability was negatively related to slope and distance to drainage bottoms, and positively related to distance to ridges, which may be related to

microclimate factors influencing nest-site selection. We documented a significant decrease in suitability of Goshawk nesting habitat across the BHNF over the past three decades. Through a combination of timber harvest practices and unpredictable natural disturbances, our results suggest the BHNF has lost much of its high-quality Goshawk nesting habitat over the past 30 years.

Introducing the Great Plains Bumble Bee Atlas.

Daniel H. Kim[1], Richard Hatfield[2], Katie Lamke[2], Charlie Bessken[1], and Salina Jepsen[2]

[1] USFWS South Dakota Field Office.
[2] The Xerces Society

Conservation efforts rely on accurate distribution and abundance data. Like insects in general, many native pollinator populations have decreased rapidly over the past 25 years. For one group of important pollinators, Bumble Bees, 12 of 46 species occurring in America north of Mexico are considered species of conservation concern by the ICUN. Efforts to track population trajectories of all bumble bee species are uneven throughout the US and Canada, with many states possessing historic range-wide data with more recent data collected solely from either high diversity areas or easily sampled areas. The Great Plains represents an area of overlap for eastern and western bumble bee species, with 29 species historic records in South Dakota, but data from the past 40 years has only recorded 22 species. In order to address the contraction of species ranges and loss of abundance we are introducing the Great Plains Bumble Bee atlas, a citizen science project. For this talk, we will introduce basic bumble bee biology, the history of bumble bee atlas projects, current species common in South Dakota, introduce some basic methodology, and provide information on how people can get involved in the Great Plains Bumble Bee atlas.

Ranavirus Detection Among Multiple South Dakota Amphibian Populations During Summer 2021

Danielle Galvin[1]*, Emily Eisenbraun[1], Jacob Kerby[1]

[1]University of South Dakota, Vermillion, SD 57069

Abstract: Amphibians in South Dakota are subjected to multiple stressors including the potentially deadly pathogen Ranavirus. Symptoms of Ranavirus infection include edema, hemorrhaging, erythema, and lethargy. To determine the magnitude of the threat posed by Ranavirus for South Dakota amphibians, state-wide sampling occurred during summer of 2021. A total of 17 sites were sampled to determine Ranavirus prevalence among amphibian populations across the state. Sampling techniques included ventral-cloacal swabbing, toe clipping, tail clipping, and harvesting the liver from deceased specimens. 250 samples were collected from six different amphibian species. Sites were designated as either eastern or western South Dakota. All samples were analyzed at the University of South Dakota using quantitative polymerase chain reaction (qPCR) to determine the viral

load of each sample. We detected Ranavirus at six sites and among five different species, including two listed heritage species: the Blanchard's Cricket Frog (*Acris blanchardi*) and the Plains Leopard Frog (*Rana blairi*). Two of these sites were in western South Dakota (n=8) and four were in eastern South Dakota (n=9). Among the positive sites, the prevalence values range from 6-94%. Although Ranavirus was not positively detected at each site, several factors, including Ranavirus disease dynamics and weather, can influence our ability to detect Ranavirus. Outbreaks of Ranavirus infections are considered episodic, often lasting only a few days, and are therefore difficult to detect. To improve our prevalence estimates additional sampling is required to determine how prevalence changes on a year-to-year basis in South Dakota. Due to the presence of Ranavirus at sites across the state, this virus poses a threat to our amphibian populations. In addition to sampling for Ranavirus prevalence, we need to investigate what effects Ranavirus may have on other aspects of amphibian life history including overwintering, drought tolerance, and breeding phenology.

Effects of Agricultural Pollutants on Stress Hormones and Viral Infection in Larval Salamanders

Drew R. Davis[1,2], Matthew S. Schwarz[2], and Jacob L. Kerby[3]

[1]School of Earth, Environmental, and Marine Science, The University of Texas Rio Grande Valley, Brownsville, TX 78520
[2]South Dakota Field Office, U.S. Fish and Wildlife Service, Pierre, SD 57501
[3]Department of Biology, University of South Dakota, Vermillion, SD 57069

Abstract: Declines in amphibians are a global problem with complex local factors. While many factors contribute to these declines, much attention has been focused on the role of environmental contaminants and pathogens. Throughout eastern South Dakota, the use of tile drainage in agricultural fields has contributed to habitat degradation for many amphibian species, often through the increase in environmental contaminants in affected wetlands. These contaminants may represent additional stressors to amphibians, and prolonged exposure may affect immune function and influence pathogen dynamics. As part of a two-year study, we visited four wetlands (two reference, two tile drain) to measure water quality and both ranavirus infection and water-borne corticosterone (CORT) levels in larval Western Tiger Salamanders (*Ambystoma mavortium*). Although ranavirus infection prevalence among sites and between years was similar, we found that environmental contaminants were significantly greater and salamanders had significantly higher ranavirus infection loads at tile drain wetlands. Additionally, we found that water-borne CORT was greater from individuals at tile drain wetlands and that water-borne CORT is positively correlated with ranavirus infection load. While the causal relationships between environmental contaminants, ranavirus infection, and CORT are difficult to determine, chronically elevated CORT can be immunosuppressive and may result in high infection loads. This study adds to existing data describing the negative effects of

agricultural tile drainage on wetland habitat quality and may suggest that additional stressors may trigger mass-mortality events in this system.

Relationships between changes in relative abundance of male Ring-necked pheasant (*Phasianus colchicus*) and its habitat components at multiple scales in South Dakota.

Reza Goljani Amirkhiz[1]* (PhD Candidate), Mark Dixon[1], Ranjeet John[1], and David Swanson[1]

[1] Department of Biology, University of South Dakota, Vermillion, SD 57069

Recognizing habitat components governing species abundance can reveal information on population-level responses to environmental changes. We developed Bayesian hierarchical models to identify the environmental covariates and their scales of effect (from 319m to 12km) that are most important in predicting relative abundance of male ring-necked pheasants in South Dakota. Using a suite of remotely-sensed biophysical land surface properties, cover type, climate data, and pheasant brood survey counts, we investigated how and why pheasant relative abundance changed over the years 2015 to 2019. We found that the importance of various covariates changed at different scales while some scales failed to reveal any relationships. Grassland cover was an important covariate and was positively associated with pheasant abundance in all years. Other landcover and weather covariates were also associated with pheasant abundance, but the most important covariates differed among years. Gross primary production, along with nighttime and daytime winter land surface temperatures were better predictors than snow cover and depth. In addition, conditions of these variables in seasons other than winter were also important predictors in some models. Our results indicate that pheasant roosters may show seasonal changes in their habitat by expanding or limiting their search range for essential habitat requirements. Prediction maps showed that geographic patterns in pheasant abundance changed annually based on the availability of resources at various scales of effect. Pheasant distribution contracted and expanded between drought and wet years. We conclude that the ability of Bayesian hierarchical models to correct for imperfect detection and effectively handle uncertainties in data could be useful in predicting annual pheasant populations from brood surveys.

Assessing landscape hazards on artificial nest survival: do patch size and landscape configuration matter?

Alex Solem[1]* and Travis Runia[1]

[1] South Dakota Department of Game, Fish, and Parks, Huron, SD

Populations of ring-necked pheasants and other upland nesting game birds have responded positively to the establishment of undisturbed nesting habitat. Federal programs such as the Conservation Reserve Program (CRP) offer a quality source of undisturbed nesting habitat, however, the average patch size of this conservation practice has declined in recent years resulting in potentially lower quality nesting cover. Nest success is an important parameter in driving pheasant and waterfowl populations and can

be influenced by habitat patch size, configuration, and juxtaposition. We used artificial nests to investigate if the patch size of CRP and landscape-level characteristics surrounding these fields influenced nest predation risk. Logistic exposure modeling indicated nest survival had a positive association with % grassland cover types within 2000 m from nest sites in small CRP patches and a slight negative association with large CRP patches. A positive association with the average litter depth at the nest site, a positive association with an increased distance from the edge of the field, and a positive relationship with % developed cover types within 2000 m of the nest site were also observed. Wildlife managers should continue to manage and advocate for large patches of undisturbed nesting cover to maximize overall nest success, while offering additional nesting cover where small patches exist.

Chiggers as ectoparasites of Prairie Skinks at the SDSU Oak Lake Field Station

Bruce Eichhorst[1] and Wendy Blickensderfer[1]

[1]Department of Natural Resource Management, South Dakota State University,
 Brookings, SD 57007

Chiggers are larvae of members of the mite family Trombiculidae and are well known for the temporary irritation of the skin caused when they feed on humans. *Eutrombicula alfreddugesi* is the most common and widespread trombiculid mite in the Western Hemisphere and in addition to humans, are known to feed on a variety of amphibians, birds, other mammals, and reptiles. Here we report on our observations of *Eutrombicula alfreddugesi* parasitizing Prairie Skinks at the Oak Lake Field Station, Brookings County, SD. Skinks were captured during May-August 2021 from under a large series of artificial cover objects place on the ground in grassland and grassland/woodland ecotone areas of the field station. A total of 36 adult and 54 young-of-the-year skinks were captured with 83.3% of the adults and 90.7% of the young found to be parasitized by chiggers. To our knowledge this is the first reported observation of chiggers as ectoparasites of lizards in South Dakota. Since there is limited information on the frequency of chigger parasitism of North American lizards, we propose initiating an assessment project utilizing the iNaturalist crowdsourcing initiative.

Cottonwood Regeneration Project on LaFramboise Island Nature Area

Nathan Baker[1]

[1]South Dakota Department of Game, Fish and Parks, Pierre, SD

LaFramboise Island was historically forested with cottonwood trees (Populus deltoids). As upstream dams changed the water flow in the Missouri River in the mid-1960s, tree habitat on this sandbar island has changed to include species such as eastern red cedar (Juniperus virginiana), Rocky Mountain juniper (Juniperus scopulorum), green ash (Fraxinus pennsylvanica), and Russian olive (Elaeagnus angustifolia). Native cottonwood trees are also part of the island landscape, and once flourished due to the natural flooding

of the river. As a result of regulated flows, the Missouri River no longer overflows onto the floodplain in most places. Consequently, conditions are not favorable for cottonwood regeneration. During the summer of 2006, an experimental cottonwood regeneration site was established on LaFramboise Island to attempt to grow cottonwoods from seeds and cuttings. Over the past 16 years Game, Fish and Parks staff have continued to plant, protect, and irrigate cottonwoods at this site. Roots of the older trees have reached the water table and established enough that after the summer of 2020, we will ceased irrigation on the original stand, and our expectation is to plant a new 10 - 15 acre cottonwood stand adjacent to the current planted stand in the spring of 2022. Cottonwood trees are native to the Missouri River floodplain and provide habitat for numerous species of birds and mammals. Bald Eagles have been observed both nesting and roosting in cottonwoods on LaFramboise Island.

Estimating variable pronghorn survival across their northern populations

Molly C. McDevitt (Ph.D. Candidate)[1*], Andy Lindbloom[2], Paul Lukacs[1]

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Estimating demographic parameters (i.e., survival and recruitment) is critical for tracking and predicting trends in wildlife populations. Learning how demographic parameters change in response to dynamic landscape and climatic conditions can provide ecologists with insight into how wildlife populations might respond to future environmental changes. Further, identifying how demographic rates vary across populations can guide management actions to maximize conservation. In this project, we study how pronghorn population survival rates vary across a range of landscapes throughout their northern distributions. Leveraging GPS location and survival data from nearly 1,000 GPS collared pronghorn across Montana and South Dakota, we estimate annual survival from over 10 populations. South Dakota Game, Fish and Parks (SDGFP) and the University of Montana have partnered with Montana Fish, Wildlife and Parks to collar over 500 juvenile male and female and adult, female pronghorn in northwestern South Dakota, central South Dakota as well as an additional 500 adult female pronghorn across eastern, central, and southwestern Montana. We used a hierarchical Bayesian survival model to estimate annual survival rates and variability across populations. By gaining more insight into how pronghorn survival rates vary across populations, we can begin to ask more probing questions about the mechanisms driving survival across space and time, and adapt conservation actions to best meet management objectives in a changing landscape.

Kitten Survival and Cause Specific Mortality of Bobcats in the Black Hills, South Dakota

Erin Morrison[1]* (MS Candidate), Brady Neiles[2], Chad Lehman[2], Christopher Rota[1]
[1] West Virginia University, Morgantown, WV 26506
[2] South Dakota Department of Game, Fish, and Parks, Custer, SD

The bobcat (*Lynx rufus*) is an important furbearer in South Dakota. However, management of bobcats can be difficult because of their elusive nature and lack of demographic information. This project aims to build a bobcat demographic model for the region that will be used to predict population growth rates and understand how sensitive growth rates are to demographic processes. My objectives for this study are to: (1) Obtain estimates of reproductive rates for bobcats and (2) obtain estimates of annual survival rates and cause specific mortality for bobcat kittens in the Black Hills, South Dakota. Adult bobcats were captured and radio collared as part of a concurrent study to estimate adult survival rates for the demographic model through South Dakota Department of Game, Fish, and Parks. I located the dens of these collared adult female bobcats using ground triangulation. I obtained estimates of reproductive rates by directly observing the number of kittens in the dens. To evaluate kitten survival, I fitted bobcat kittens with VHF radio collars that were equipped with a mortality switch. I then located kittens on at least a weekly basis. I investigated mortalities as quickly as possible to determine cause of death. Estimates of kitten survival were analyzed with a binomial model fitted using Bayesian methods. Kitten survival was modeled as a function of several covariates, including maternal age, date of birth, and litter size. Reproductive rates were on par with reported estimates while kitten survival was lower than reported estimates. Primary causes of mortality were starvation and predation from coyote (*Canis latrans*) and cougar (*Puma concolor*).