

SUMMARY OF COMPLETED PROJECTS FUNDED UNDER STATE WILDLIFE GRANTS
As of 3 Nov 2023 (SWGprojdescriptionscompleted.doc)s

Project	Objectives	PI or contractor	SDGFP contact	Final products	Publications
Survey of animal species of greatest conservation needs at representative public areas in South Dakota T-2-R FA Code 2401	<ol style="list-style-type: none"> 1. survey animal species of greatest conservation need at three publicly-owned areas in eastern SD 2. draw attention to species of concern and methods used to conduct biological surveys 3. compile set of survey protocols that have application to future taxa surveys in SD 	Ken Higgins, SDSU, Coop. Unit	Dowd Stukel	Bioblitz event checklists of documented plant and animal species	Higgins, K.F., C.R. Berry, Jr. and S.R. Chipps. 2005. South Dakota's first "Bioblitz". SD Conservation Digest May/June 2005. SDGFP.
Black-backed and Lewis's woodpeckers responses to fire; can post-burn use be predicted using pre-burn forest structure variables? T-3-R FA Code 2403	<ol style="list-style-type: none"> 1. determine the validity of a black-backed woodpecker model predicting occurrence in a burned site based on pre-fire forest structure 2. determine the response of other woodpecker species to fire 3. quantify habitat characteristics of nest sites compared to random sites to determine habitat preferences of breeding woodpeckers 	Kerri Vierling, SD School of Mines and Technology	Dowd Stukel and Deisch	Final report	Vierling, K. 2005. Report on woodpecker breeding in the Jasper fire. Submitted to the Game, Fish, and Parks Department. South Dakota School of Mines and Technology/University of Idaho May 18, 2005. Vierling, K.T. L.B. Lentile, and N. Nielsen-Pincus. 2006. Preburn characteristics and woodpecker use of burned coniferous forests. Journal of Wildlife Management 72(2):422-427.
Enhance wildlife habitat provided by aspen in Custer State Park T-4-R FA Code 2404	Protect/enhance essential habitats for wildlife species by treating at least 40 aspen clones	Gary Brundige, CSP	Brundige	Performance reports	Brundige, G. 2004. Enhance wildlife habitat provided by aspen in Custer State Park. Performance Report, SD Game, Fish and Parks.
An evaluation of nesting success of grassland birds in fragmented and unfragmented areas in the mixed grass prairie region of South Dakota, with emphasis on declining grassland species T-5-R FA Code 2405	<ol style="list-style-type: none"> 1. to evaluate the relationship between nest density and grassland patch size and landscape composition 2. to evaluate the relationship between nest success and grassland patch size and landscape composition 3. to evaluate the relationship between nest predation and parasitism and grassland patch size and landscape composition 4. to determine the most effective size of grassland patches for bird 	Kristel Bakker, DSU and Ken Higgins, SDSU, Coop. Unit	Dowd Stukel	M.S. Thesis Gillian Berman	Berman, G. M. 2007. Nesting success of grassland birds in fragmented and unfragmented landscapes of north central South Dakota. MS thesis. South Dakota State University, Brookings, SD. 64pp.

	<p>conservation areas in eastern South Dakota</p> <p>5. to determine habitat requirements for Le Conte's and Henslow's sparrows, if encountered</p> <p>6. to record species of concern from all taxa encountered during research</p>				
Development of South Dakota's comprehensive wildlife conservation plan T-6-R FA Code 2406	Complete the South Dakota wildlife comprehensive plan by September 30, 2005	Jon Haufler, Ecosystem Management Research Institute	Dowd Stukel	approved plan	SDGFP. 2006. South Dakota Comprehensive Wildlife Conservation Plan. SDGFP, Pierre, Wildlife Division Report 2006-08. Hawkinson, B. 2005. Comprehensive Planning – A Fresh Approach to Wildlife Management. SD Conservation Digest May/June 2005. SDGFP, Pierre.
Ecology of the Black Hills redbelly snake (<i>Storeria occipitomaculata pahasapae</i>) with emphasis on food habits T-7-R FA Code 2407	<p>1. determine seasonal activity, reproductive characteristics, relative body size, habitat selection, population characteristics, distribution, and food habits of the Black Hills redbelly snake</p> <p>2. determine if there is an association between prey selection and abundance of prey and whether prey abundance is influencing the Black Hills redbelly snake population</p>	Chuck Dieter, SDSU	Kempema	M.S. Thesis Megan Hall	<p>Hall, M. 2006. Ecology of the Black Hills redbelly snake (<i>Storeria occipitomaculata pahasapae</i>) with emphasis on food habits. Final Report to SDGFP. South Dakota State University, Brookings.</p> <p>Have not received M.S. Thesis. Most recent deadline was 12/31/2008.</p>
Herpetology surveys for South Dakota Comprehensive Wildlife Conservation Plan T-8-R FA Code 2408	By January 30, 2005, survey ten priority habitats for all species of reptiles and amphibians; these surveys will focus on species of concern and state listed species of amphibians and reptiles	Many (10 total)	Backlund	Final report	South Dakota Statewide Herpetology Survey 2004. South Dakota Department of Game, Fish and Parks. Report prepared by Doug Backlund, South Dakota Department of Game, Fish and Parks, Pierre.
Evaluation of a decision support tool to help support fish species at risk in South Dakota streams T-9-R FA Code 2409	<p>1. assess the accuracy of models to validate their use as decision support tools</p> <p>2. increase data on distributions of fish species focusing on 9 species of concern</p> <p>3. obtain data on the habitat and community associations of 9 fish species of concern</p>	Chuck Berry, SDSU, Coop. Unit	Dowd Stukel and Shearer	Final report	Hayer, C., S.S. Wall, and C.R. Berry, Jr. 2006. Evaluation of aquatic gap analysis fish distribution models, with emphasis on rare fish species in South Dakota. Final Report to SDGFP. SD Cooperative Wildlife and Fisheries Research Unit, South Dakota State University, Brookings.
Reintroduction of osprey into suitable sites along the Missouri River in South	1. reintroduce 20-30 osprey chicks per year from 2004 through 2007 at selected sites in southeastern South	Melissa Horton, Wildlife Experiences, Janie	Dowd Stukel	Final report	Fink, J. 2009. Wings over water – Restoring a piece of South Dakota's natural heritage. SD Conservation Digest March/April 2009. SDGFP, Pierre.

Dakota T-10-R FA Code 2410	<ol style="list-style-type: none"> Dakota document timing, distance and routes of migration for juvenile ospreys hacked from selected sites in South Dakota identify wintering areas and arrival and departure dates evaluate characteristics of the migration routes and wintering areas and attempt to identify potential threats to ospreys based on this evaluation 	Fink and Wayne Melquist, University of Idaho			Dowd Stukel, E. and W. Melquist. 2011. Reintroduction of osprey into suitable sites along the Missouri River in South Dakota. Final Report, T-10. SDGFP, Pierre.
Peregrine falcon (<i>Falco peregrinus</i>) reintroduction in South Dakota T-10-R-1 Amendment 4 &5 FA Code 2458 65% federal	By September 30, 2013: Reintroduce 15 captive-reared falcons in an urban setting in South Dakota to facilitate the return of adult peregrine falcons to establish breeding territories in the vicinity of the reintroduction area.	Janie Fink, Birds of Prey Northwest	Dowd Stukel	Final report	Fink, J. 2013. Black Hills peregrine falcon reintroduction project. South Dakota Conservation Digest 80(3):12-15. SDGFP, Pierre. Dowd Stukel, E. 2013. Peregrine falcon (<i>Falco peregrinus</i>) reintroduction in South Dakota. Final Report, T-10-R-1, Amendment #5. SDGFP, Pierre.
A proposal to examine endemism and population relationships of the Black Hills <i>Oreohelix</i> snails T-11-R FA Code 2411	<ol style="list-style-type: none"> determine if the <i>Oreohelix</i> in the Black Hills consist of one or more than one biological entities that can be defined by genetics, morphology, anatomy, and/or environmental conditions determine if <i>Oreohelix</i> in the Black Hills represent an endemic group, unique from other <i>Oreohelix</i> in the geographical region 	Tamara Anderson, University of Colorado	Backlund	Final report	Anderson, T., R. Guralnick, and K. Weaver. 2006. Endemism and population relationships of the Black Hills <i>Oreohelix</i> snails – Final Report. Anderson, T. K., K. F. Weaver, and R. P. Guralnick. 2007. Variation in adult shell morphology and life-history traits in the land snail <i>Oreohelix cooperi</i> in relation to biotic and abiotic factors. Journal of Molluscan Studies 73: 129-137. Weaver, K., T. K. Anderson, and R. P. Guralnick. 2006. Combining phylogenetic and ecological niche modeling approaches to determine distribution and historical biogeography of the Black Hills Mountain Snails (Oreohelcidae). Diversity and Distributions 12:756-766. Anderson, T. K and C. Schmidt. 2007. Population demography of a land snail species of conservation concern in the Black Hills. Intermountain Journal of Sciences 13:13-31. Anderson, T. K. 2004. Field Guide to Black Hills Land Snails. Natural History Inventory Publication No. 22. University of Colorado Museum. Anderson, T. K. 2004. A Review of the U.S. distribution of <i>Melanoides tuberculatus</i> (Muller, 1774), an exotic freshwater snail. Ellipsar 6(2): 15-18.
Topeka shiner (<i>Notropis</i>	Develop and implement a 3-year Topeka	Steve Wall	Burgess	Final report	Wall, S.S. and S. K. Thomson. 2007. Topeka shiner

<i>topeka</i>) monitoring in eastern South Dakota streams T-12-R FA Code 2412	shiner survey program in 11 watersheds necessary to evaluate the management goals outlined in the State Plan and provide baseline data for evaluating long-term trends in Topeka shiner populations and habitat				(<i>Notropis topeka</i>) monitoring in eastern South Dakota streams (2004-2006). Unpublished report submitted to the South Dakota Game, Fish and Parks, Pierre, SD.
Nesting success, brood survival, and movements of long-billed curlews (<i>Numenius americanus</i>) in grazed landscapes of western South Dakota T-13-R FA Code 2413	<ol style="list-style-type: none"> determine the effects of land-use practices (grazing regimes) on nesting habitat selection, nest density, and nesting success by long-billed curlews determine the effects of land-use practices (grazing regimes) on movement rates and brood survival of long-billed curlews assess the importance of early-seasons food availability from different grazing regimes on the resultant nesting success and population recruitment in long-billed curlews 	K.C. Jensen, SDSU	Dowd Stukel	M.S. Thesis Jessica Clarke	Clarke, J. N. 2006. Reproductive ecology of long-billed curlews breeding in grazed landscapes of western South Dakota. M.S. Thesis, South Dakota State University, Brookings. 94 pp.
Natural history and genetic makeup of the northern flying squirrel (<i>Glaucomys sabrinus bangsi</i>) population in the Black Hills and northeastern South Dakota T-14-R FA Code 2414	<ol style="list-style-type: none"> determine reproductive characteristics, morphological characteristics, habitat selection, seasonal activity patterns, population characteristics, distribution and food habits to develop proper handling, trapping, and radio-collaring techniques determine the genetic variability and genetic distance between the Black Hills, South Dakota and northeastern South Dakota populations of northern flying and red squirrel using microsatellite markers, mitochondrial DNA markers, and Y-chromosome markers study the population and develop parentage testing for the <i>Glaucomys sabrinus</i> and <i>Tamiasciurus hudsonicus</i> in the Black Hills, South Dakota and northeastern South 	Chuck Dieter, SDSU and Hugh Britten, USD		M.S. Thesis Melissa Hough PhD Dissertation Alyssa Kiesow	Hough, Melissa and Chuck Dieter. 2007. Flying squirrels: Graceful Gliders. SD Conservation Digest March/April 2007. SDGFP, Pierre. Hough, M.J. 2008. Research techniques, habitat use, and ecology of northern flying squirrels, and research techniques and distribution of red squirrels in the Black Hills National Forest and northeastern South Dakota. M.S. Thesis, South Dakota State University, Brookings. Kiesow, A.M. 2008. Genetic structure of Northern flying squirrel (<i>Glaucomys sabrinus</i>) and red squirrel (<i>Tamiasciurus hudsonicus</i>) populations in the Black Hills. PhD Dissertation, University of South Dakota, Vermillion. Hough, M.J. and C.D. Dieter. 2009. Resource selection habitat model for northern flying squirrels in the Black Hills, South Dakota. Am. Midl. Nat. 162:356-372. Hough, M.J. and C.D. Dieter. 2009. Summer nest tree use by northern flying squirrels in the Black Hills, South Dakota. Am. Midl. Nat. 162:98-111. Hough, M.J. and C.D. Dieter. 2009. Home range and habitat use of northern flying squirrels in the Black Hills, South

	Dakota using microsatellite markers				<p>Dakota. Am. Midl. Nat. 162:112-124.</p> <p>Kiesow, A.M., L.E. Wallace, and H.B. Britten. 2011. Characterization and isolation of five microsatellite loci in northern flying squirrels, <i>Glaucomys sabrinus</i> (Sciuridae, Rodentia). Western North American Naturalist 71: 553-556.</p> <p>Kiesow, A.M., E.M. Monroe, and H.B. Britten. 2012. Genetic structure of the arboreal squirrels <i>Glaucomys sabrinus</i> and <i>Tamiasciurus hudsonicus</i> in the North American Black Hills. Canadian Journal of Zoology 90(9): 1191-1200.</p> <p>Hough, M. and C. Dieter. 2013. Relative abundance of northern flying squirrels and red squirrels in different forest types, Black Hills, South Dakota. Great Plains Research 23:25-31.</p>
<p>Bat habitat protection and evaluation: implementing and assessing management techniques</p> <p>T-15-R</p> <p>FA Code 2415</p>	<ol style="list-style-type: none"> 1. evaluate the management activities undertaken within the Black Hills region to date 2. determine the role of Black Hills habitat in supporting regional bat populations 3. identify ten additional sites providing significant habitat to regional bat species and develop management plans for their protection 4. establish a database of bat survey data based upon active and hibernation seasons 5. compile a call library of bat echolocation calls for all species identified within South Dakota 	Joel Tigner, Bat Works	Dowd Stukel	Final report	<p>Tigner, J. 2007. Bat habitat project, Final Report, 2004-2007. Prepared for SD Game, Fish and Parks, Pierre. Batworks, Rapid City, SD. 18 pp.</p> <p>NOTE: This report has not been made available for public viewing to protect the sensitivity of the evaluated sites, many of which are on private lands.</p> <p>Tigner, J. 2006. Abandoned mines are wildlife habitat. Landowner Matters Vol. 4, February/March/April. SDGFP, Pierre.</p>
<p>Statewide colonial and semi-colonial waterbird inventory with a plan for long-term monitoring</p> <p>T-16-R</p> <p>FA Code 2416</p>	Implement a statewide inventory of colonial and semi-colonial waterbird populations in South Dakota and develop a plan for their long-term monitoring	Nancy Drilling, Rocky Mountain Bird Observatory	Dowd Stukel	Final report	<p>Drilling, N.E. 2007. South Dakota statewide colonial and semi-colonial waterbird inventory with a plan for long-term monitoring: Final report. SDGFP Wildlife Division Report 2008-01. Tech. Rep. M-ColonySD-04. Rocky Mountain Bird Observatory, Brighton, CO. 80 pp.</p> <p>Drilling, N. 2009. Breeding colonial waterbirds. SD Conservation Digest, pages 12-15, July/August 2009. SDGFP, Pierre.</p>
Monitoring the American burying beetle in South	<ol style="list-style-type: none"> 1. expand monitoring efforts to cover more habitat annually than is 	Doug Backlund and Gary Marrone	Backlund	Population monitoring data	<p>Backlund, D.C., G.M. Marrone, C.K. Williams, and K. Tillman. 2008. Population Estimate of the Endangered</p>

Dakota T-17-R FA Code 2601	<ul style="list-style-type: none"> 2. currently being surveyed 2. increase sampling time in June and August, when adult ABB are most active 3. tag individuals with numbered bee tags to facilitate tracking movements and estimate population size through recaptures 				American Burying Beetle, <i>Nicrophorus americanus</i> , Olivier (Coleoptera: Silphidae) in South Dakota. The Coleopterists Bulletin 62(1): 9-15.
Monitoring butterfly species of concern in South Dakota T-17-R FA Code 2602	<ul style="list-style-type: none"> 1. survey suitable habitat throughout the Black Hills and northeastern South Dakota for 4 target species 2. collect information on plant species used as larval food sources and adult nectar sources 3. develop a monitoring plan for 4 target species, if populations are found that warrant monitoring 	Doug Backlund	Backlund	Final report to GFP	<p>Marrone, G. 2009. Summary of Five Years of Butterfly Monitoring in the Black Hills with Emphasis on Species Monitored by the South Dakota Natural Heritage Program. Report to SD Department of Game, Fish and Parks.</p> <p>Backlund, D. 2009. Monitoring Butterfly Species of Greatest Conservation Concern in South Dakota, 2005-2009. Final Report, Project 17-R, Study #2602.</p>
Monitoring American dippers in the Black Hills T-17-R FA Code 2603	<ul style="list-style-type: none"> 1. monitor annual production at nest sites for 5 years 2. assess aquatic insect abundance at nest sites 3. monitor winter use of stream habitat by dippers for 5 years 4. track movements and length of survival of color banded dipper for 5 years 	Doug Backlund	Backlund	Final report to GFP	Lovett, K. no date. The American Dipper (<i>Cinclus mexicanus</i>) in the Black Hills of South Dakota. Final report to SD Department of Game, Fish and Parks.
Comprehensive aquatics survey of the Minnesota River tributaries T-17-R FA Code 2604	Provide up-to-date survey information on the relative abundance of fish, unionid mussel, and aquatic insect species to determine populations trends and state heritage ranks	Jeff Shearer and Andy Burgess	Burgess	Final report	Burgess, A. and J. Shearer. 2008. A comprehensive aquatics survey of Minnesota River tributaries. SDGFP, Pierre.
Biology of American three-toed woodpeckers in the Black Hills T-18-R FA Code 2418	<ul style="list-style-type: none"> 1. survey Black Hills white spruce habitat for resident American three-toed woodpeckers 2. characterize Black Hills white spruce habitats and other habitats used by American three-toed woodpeckers 3. locate nests and monitor production 4. band American three-toed woodpeckers in the Black Hills with standard FWS bands and color bands 	Dave Swanson, USD	Backlund	PhD dissertation Amanda Ervin	<p>Swanson, D. L. 2009. Breeding Ecology of American Three-toed Woodpeckers in the Black Hills. Final Report to SD Dept. of Game, Fish and Parks.</p> <p>Ervin, A.M. 2011. Habitat selection, nesting success and genetic structure of American three-toed woodpecker (<i>Picoides dorsalis</i>) in the Black Hills of South Dakota. PhD Dissertation, University of South Dakota, Vermillion. 157 pp.</p>

	<p>and use radio transmitters to track movements of a subset of banded birds</p> <ol style="list-style-type: none"> 5. collect information on foraging behavior and attempt to relate this to habitat 6. record presence and nesting of sympatric avian species inhabiting Black Hills white spruce habitats and evaluate competition 7. collect DNA samples from the Black Hills populations of American three-toed woodpeckers and sequence mitochondrial and microsatellite DNA 8. obtain samples from other populations and determine the genetic uniqueness of Black Hills population 				
<p>Assessing the impacts of tree plantings on grassland birds in South Dakota T-19-R FA Code 2419</p>	<ol style="list-style-type: none"> 1. compare bird density among transects placed at variable distances from tree plantings 2. evaluate bird density in transects at sites with trees to those from grassland sites without trees (i.e., controls) 3. assess changes in bird density at sites before and after trees are removed as part of an experimental manipulation 	Dave Naugle, University of Montana	Dowd Stukel	component of Frank Quamen's PhD dissertation	Quamen, F.R. 2007. A landscape approach to grassland bird conservation in the prairie pothole region of the Northern Great Plains. PhD Dissertation. University of Montana, Missoula, MT.
<p>Northern cricket frog (<i>Acris crepitans</i>) seasonal status and distribution in southeastern South Dakota T-20-R FA Code 2440</p>	<ol style="list-style-type: none"> 1. determine cricket frog occurrence and abundance in appropriate habitats within its historic range in South Dakota 2. determine overwintering habitat and habitat conditions in South Dakota 3. determine freezing tolerance capacity for cricket frogs in South Dakota 	Dave Swanson, USD	Kempema	M.S. Thesis Seth Burdick	<p>Burdick, S. 2008. Seasonal status and distribution of Blanchard's cricket frog in South Dakota. M.S. Thesis, University of South Dakota, Vermillion.</p> <p>Burdick, S.L. and D.L. Swanson. 2010. Status, distribution and microhabitats of Blanchard's cricket frog <i>Acris blanchardi</i> in South Dakota. Herpetological Conservation and Biology 5:9-16.</p> <p>Swanson, D.L. and S.L. Burdick. 2010. Overwintering physiology and hibernacula microclimates of Blanchard's cricket frogs at their northwestern range boundary. Copeia 2010:248-254.</p> <p>Dinsmore, S., II, and D.L. Swanson. 2008. Temporal patterns</p>

					of tissue glycogen, glucose and glycogen phosphorylase activity prior to hibernation in freeze-tolerant chorus frogs, <i>Pseudacris triseriata</i> . Canadian Journal of Zoology 86:1095-1100.
Status and distribution of turtles and turtle nests, particularly species of greatest conservation need, in southeastern South Dakota T-20-R FA Code 2441	<ol style="list-style-type: none"> 1. survey waterways in southeastern South Dakota, particularly the Missouri River, to locate and identify turtle nests and locations 2. determine characteristics of the identified areas, including occupied niches 3. compare habitats occupied to habitats available as nest sites to help in making management recommendations 	Chuck Dieter, SDSU	Kempema	M.S. Thesis Laura Dixon	<p>Dixon, L.A. 2009. False map, spiny softshell and smooth softshell turtle nest and nest-site habitat characteristics along the lower stretch of the Missouri National Recreation River in South Dakota. M.S. Thesis, South Dakota State University, Brookings.</p> <p>Dieter, C. D., L. A. Dixon, S. L. Ronningen, and T. Ronningen. 2014. Survey of turtles nesting on the Missouri River on the South Dakota-Nebraska Border. Great Plains Research 24 (Fall 2014):111-118.</p>
Genetic variation in the smooth green snake, <i>Liophorophis vernalis</i> , in South Dakota T-21-R FA Code 2421	<ol style="list-style-type: none"> 1. analyze the extent of genetic variation in this species within South Dakota. 2. examine genetic distance amongst South Dakota populations relative to those outside of the state 	Brian Smith, Black Hills State University	Kempema	Final report to GFP	<p>Smith, B. E., C. Anderson, S. Sarver, and L. R. Cottingham. 2007. Genetic variation in the Smooth Green Snake, <i>Opheodrys vernalis</i>, in South Dakota. Final Report Submitted to the South Dakota Department of Game, Fish, and Parks. Department of Biology, Black Hills State University.</p> <p>Sarver, S.K., C.M. Anderson, F. Cain, and B. Smith. 2010. Development of polymorphic microsatellite markers for the smooth green snake <i>Opheodrys vernalis</i>. Molecular Ecology Resources, Database I.D. #43323-43330, 7 pp.</p>
Distribution and monitoring of bat species along the lower Missouri River with emphasis on resident vs. migratory behavior T-22-R FA Code 2422	<ol style="list-style-type: none"> 1. determine migratory behaviors/patterns and migratory timing of bats in South Dakota, specifically those that may use the Missouri River drainage as a corridor 2. determine the distribution, seasonal activity pattern and habitat selection of bats using the Missouri River drainage 	Scott Pedersen, SDSU	Kempema	M.S. Thesis Brandon Bales	<p>Bales, B.T. 2007. Regional distribution and monitoring of bats, especially species of conservation concern, along the lower Missouri River in South Dakota. M.S. Thesis, South Dakota State University, Brookings.</p> <p>Bales, B.T. 2007. Records of western small-footed myotis in central South Dakota. Prairie Naturalist 39(3/4):159-162.</p> <p>Ke, W. and B. Bales. 2007. Estimation of sampling effort for catching enough bats. Significance 4(1):19-21.</p>
Does prairie dog colony size matter? Implications for the conservation of grassland biota in South Dakota T-23-R FA Code 2423	<ol style="list-style-type: none"> 1. compare burrowing owl abundance across a range of prairie dog colony sizes 2. compare prairie dog density and productivity across a range of prairie dog colony sizes 3. compare vegetation cover and 	Kristy Bly and Mike Phillips, Turner Endangered Species Fund	Dowd Stukel	M.S. Thesis Kristy Bly	Bly, K.L.S. 2008. Influence of local and landscape characteristics of prairie dog colonies on burrowing owl nest ecology in South Dakota. M.S. Thesis, Montana State University, Bozeman.

	<p>composition across a range of prairie dog colony sizes as a measure of forage utility to prairie dogs and other herbivores</p> <p>4. develop a suite of competing models that compare the influence of covariates (i.e., colony size, age, and spatial arrangement, soil type, and annual precipitation) on burrowing owls, prairie dogs, and vegetation</p>				
<p>Development and application of a habitat assessment tool for juvenile pallid sturgeon in the upper Missouri River</p> <p>T-24-R</p> <p>FA Code 2424</p>	<p>1. develop and evaluate a juvenile pallid sturgeon bioenergetics model.</p> <p>2. quantify effects of water temperature, turbidity and water velocity on feeding rate of juvenile pallid sturgeon.</p> <p>3. model habitat suitability for juvenile pallid sturgeon in the Missouri River.</p> <p>4. quantify prey selectivity of age-0 pallid sturgeon</p>	<p>Steve Chipps, SDSU, Coop. Unit</p>	<p>Dowd Stukel</p>	<p>M.S. Thesis (3) Elizabeth Wright (did not finish; her information is contained in final report – Chipps, et al. 2008)</p> <p>Bryan Spindler Kristen Berg (Grohs)</p>	<p>Spindler, B.D. 2008. Modeling spatial distribution and habitat associations for juvenile pallid sturgeon (<i>Scaphirhynchus albus</i>) in the Missouri River. M.S Thesis, South Dakota State University, Brookings.</p> <p>Grohs, K.L. 2008. Macroinvertebrate composition and patterns of prey use by juvenile pallid sturgeon (<i>Scaphirhynchus albus</i>) in the Missouri River, South Dakota and Nebraska. M.S. Thesis, South Dakota State University, Brookings.</p> <p>Chipps, S.R., R.A. Klumb and E.B. Wright. 2008. Development and Application of Juvenile Pallid Sturgeon Bioenergetics Model. Final Report, State Wildlife Grant Program, Study T-24-R Study No. 2424. Submitted to South Dakota Department of Game, Fish and Parks, Pierre, SD.</p> <p>Grohs, K. L., R. A. Klumb, S. R. Chipps and G. A. Wanner. 2009. Ontogenetic patterns in prey use by pallid sturgeon in the Missouri River, South Dakota and Nebraska. J. Appl. Ichthyol. 25: 48-53.</p> <p>Spindler, B. D., S. R. Chipps, R. A. Klumb and M. C. Wimberly. 2009. Spatial analysis of pallid sturgeon <i>Scaphirhynchus albus</i> distribution in the Missouri River, South Dakota. J. Appl. Ichthyol. 25: 8-13.</p> <p>French, W. E., B. D. S. Graeb, S. R. Chipps, K. N. Bertrand, T. M. Selch and R. A. Klumb. 2010. Vulnerability of age-0 pallid sturgeon <i>Scaphirhynchus albus</i> to fish predation, J. Appl. Ichthyol. 26: 6-10.</p> <p>Spindler, B.D., S.R. Chipps, R.A. Klumb, B.D.S. Graeb, and M.C. Wimberly. 2012. Habitat and prey availability attributes associated with juvenile and early adult pallid sturgeon occurrence in the Missouri River, USA. Endangered Species Research Vol. 16: 225-234.</p>

					<p>French W.E., B.D.S. Graeb, K.N. Bertrand, S.R. Chipps, R.A. Klumb. 2013. Size-dependent trophic patterns of pallid sturgeon and shovelnose sturgeon in a large river system. <i>Journal of Fish and Wildlife Management</i> 4(1): 41–52.</p> <p>French, W.E., B.D.S. Graeb, S.R. Chipps, R.A. Klumb. 2014. Vulnerability of age-0 pallid sturgeon <i>Scaphirhynchus albus</i> to predation; effects of predator type, turbidity, body size, and prey density. <i>Environmental Biology of Fishes</i> (2014) 97:635-646.</p>
<p>Restoring swift foxes (<i>Vulpes velox</i>) to the Bad River Ranches and environs in western South Dakota T-25-R FA Code 2425</p>	<p>Job 1:</p> <ol style="list-style-type: none"> 1. establish a self-sustaining population of swift fox in west-central South Dakota (Haakon, Jackson, Jones, Lyman and Stanley counties) that serves as a course for swift fox recovery and expansion in the northern Great Plains, assists in removing this species from the South Dakota threatened species list, restores native biodiversity to the area, and promotes prairie conservation awareness. 2. collect and disseminate scientific information on the ecology of the species, the ecological requirements for successful restoration, and the evaluation of reintroduction and management techniques. <p>Job 2:</p> <ol style="list-style-type: none"> 1. to evaluate resource selection of swift foxes during the pup-rearing period in the mixed-grass prairie of west-central South Dakota 2. to refine the existing habitat suitability model developed by Kunkel et al. (2003) for the pup-rearing period using updated techniques and area-specific data 	<p>Kevin Honness and Mike Phillips, Turner Endangered Species Fund; amended to Dr. Jon Jenks, SDSU</p>	<p>Dowd Stukel</p>	<p>Completion report</p>	<p>Honness, K., M. Phillips, and K. Kunkel. 2008. Restoring swift foxes (<i>Vulpes velox</i>) to the Bad River Ranches and environs in western South Dakota. Final Report (2005 - 2007). Turner Endangered Species Fund, Bozeman, MT.</p> <p>Jenks, J. 2010. Assessing Swift Fox (<i>Vulpes velox</i>) habitat use and resource selection in the pup-rearing period in the mixed grass prairie of west-central South Dakota. Final Report to SDGFP.</p> <p>Sasmal, I. 2011. Population viability analysis of swift fox (<i>Vulpes velox</i>) at the Badlands National Park. Ph.D. Dissertation, South Dakota State University, Brookings.</p> <p>Sasmal, I., J. A. Jenks, T. W. Grovenburg, S. Datta, G. M. Schroeder, R. W. Klaver, and K. M. Honness. 2011. Habitat selection by female swift foxes (<i>Vulpes velox</i>) during the pup-rearing season. <i>Prairie Naturalist</i> 43(1/2):29-37.</p> <p>Sasmal, I., J. A. Jenks, L. P. Waits, M. G. Gonda, G. M. Schroeder, and S. Datta. 2012. Genetic diversity in a reintroduced swift fox population. <i>Conserv. Genet.</i> DOI 10.1007/s10592-012-0429-8. Published online 27 November 2012.</p> <p>Sasmal, I., K. Honness, K. Bly, M. McCaffery, K. Kunkel, J. Jenks, and M. Phillips. 2015. Release method evaluation for swift fox reintroduction at Bad River Ranches in South Dakota. <i>Restoration Ecology</i>. doi: 10.1111/rec.12211. Published online 9 March 2015.</p>
<p>Wildlife habitat inventory on game production areas in eastern South Dakota</p>	<p>To map, categorize, and make management recommendations for remaining tracts of native grassland and</p>	<p>Dan Limmer, Sustained Horizons</p>	<p>Ode</p>	<p>Digital maps to GFP</p>	<p>Ode, D.J. 2009. Wildlife habitat inventory on GPA's in eastern South Dakota. Final Report, T-26-R-1. SD Game, Fish and Parks, Pierre.</p>

T-26-R FA Code 2426	associated native habitats on state Game Production Areas in a 33 county area of eastern South Dakota				
Exploration of factors that influence productivity of American white pelicans at Bitter Lake in northeastern South Dakota T-27-R FA Code 2427	<ol style="list-style-type: none"> 1. determine nest-attendance schedules and chick-feeding rates during the pre-crèche stages of breeding 2. estimate distances to foraging sites 3. determine locations and attributes of foraging sites 4. document sources of disturbance at nesting areas; 5. monitor colony productivity 	Marsha Sovada and Pam Pietz, USGS-Northern Prairie Wildlife Research Center	Dowd Stukel	Final report	<p>Sovada, M. A., P. J. Pietz, K.A. Converse, D. T. King, E. K. Hofmeister, P. Scherr, and H. S. Ip. 2008. Impact of West Nile virus and other mortality factors on American white pelicans at breeding colonies in the northern plains of North America. <i>Biological Conservation</i> 141:1021-1031.</p> <p>Sovada, M. A., L. D. Igl, P. J. Pietz, and A. J. Bartos. 2014. Influence of climate change on productivity of American white pelicans, <i>Pelecanus erythrorhynchos</i>. <i>PLoS ONE</i> 9(1): e83430. doi:10.1371/journal.pone.0083430.</p> <p>Sovada, M. A., P. J. Pietz, , R. O. Woodward, A. J. Bartos, D. A. Buhl and M. J. Assenmacher. 2013. American white pelicans breeding in the northern plains – Productivity, behavior, movements, and migration. U.S. Geological Survey Scientific Investigations Report 2013-5105, 177 p., http://pubs.usgs.gov/sir/2013/5105/.</p>
Sage-steppe and prairie conservation planning T-28-R FA Code 2428	By 30 June 2010, develop a cohesive, comprehensive, WAFWA prairie conservation strategy that integrates pertinent components of companion efforts for the white-tailed, Gunnison's, and black-tailed prairie dogs; black-footed ferret; swift and kit foxes; lesser prairie chicken; mountain plover; burrowing owl; ferruginous hawk; Swainson's hawk; loggerhead shrike; and, as appropriate and feasible, other shrub and grassland species in the Western Great Plains.	WAFWA	Kempema		
Mapping big sagebrush vegetation in western South Dakota T-29-R FA Code 2429	To map remaining stands of big sagebrush vegetation in three western SD counties: Butte, Harding and Fall River	Mike Pucharelli, USBR and Dan Cogan, Cogan Technology Inc.	Ode	Final report to GFP	Wright, P. and D. Wegner. 2007. Mapping sagebrush for sage grouse habitat in Butte and Harding counties, South Dakota. Final Report to SDGFP. Technical Memorandum No. 86-68260-08-01. Remote Sensing and GIS Group. Technical Service Center. Bureau of Reclamation. Denver, CO.
Population estimates, habitat relationships, and movement patterns of turtles, with an emphasis on	<ol style="list-style-type: none"> 1. determine age structure, sex ratios, and abundance of turtles 2. investigate effects of harvest in James River 	David Swanson USD	Kempema	PhD Dissertation Aaron Gregor Graduation	Final Report: Abundance, Habitat Relationships, and Movement Patterns of Turtles in Southeastern South Dakota. Prepared by Aaron Gregor, USD.

two species of greatest conservation need, the False Map Turtle, <i>Graptemys pseudogeographica</i> and the Smooth Softshell, <i>Apalone mutica</i> , in southeastern South Dakota T-30-R FA Code 2430 50% federal	<ol style="list-style-type: none"> utilize radio telemetry to investigate how patterns of movement relate to seasonal, sexual and age related parameters of Smooth Softshells and False Map Turtles on the Missouri River and associated tributaries monitor radio tagged turtles and environmental variables associated with their hibernacula in order to investigate the occurrence of, and factors related to winter mortality document and determine how habitat characteristics of aquatic and riparian areas relate to the utilization and distribution of turtle assemblages within southeastern South Dakota 			anticipated spring 2013	(awaiting PhD dissertation)
Testing the ecosystem diversity approach of South Dakota's Wildlife Action Plan T-31-R FA Code 2431	<ol style="list-style-type: none"> develop a prototype process for focussing the scope of the South Dakota Wildlife Action Plan to address discrete local-level planning areas using a selected portion of the Missouri Coteau Planning Area identify and explore additional opportunities to assess South Dakota's ecosystem diversity at a local level 	EMRI	Dowd Stukel	Final report to GFP	Mehl, C. A., J. B. Haufler, and S. Yeats. 2009. Native ecosystem diversity of the South Dakota Missouri Coteau. Ecosystem Management Research Institute, Seeley Lake, MT.
Avian monitoring in the Black Hills T-32-R FA Code 2432	Monitor aspen and shrubland habitats on Black Hills National Forest using techniques developed by Rocky Mountain Bird Observatory	Glenn Giroir, RMBO	Dowd Stukel	Results incorporated into BHNF report	
An evaluation of habitat use and requirements for grassland bird species of greatest conservation need in central and western South Dakota T-33-R FA Code 2433	<ol style="list-style-type: none"> describe local vegetational habitat requirements of SoGCN and Level I and Level II priority grassland bird species describe habitat associations for SoGCN and Level I and Level II priority grassland bird species identify patch and landscape level habitat requirements for SoGCN and Level I and Level II priority 	Kristel Bakker, DSU and Charles Dieter, SDSU	Kempema	M.S. Thesis Mitch Greer	Greer, M.J. 2009. An evaluation of habitat use and requirements for grassland bird species of greatest conservation need in central and western South Dakota. M.S. Thesis, South Dakota State University, Brookings. Greer, M.J., K.K. Bakker, and C.D. Dieter. 2016. Grassland bird response to recent loss and degradation of native prairie in central and western South Dakota. Wilson Journal of Ornithology 128(2):278-289.

	grassland bird species				
Estimating conversion of native grassland to cropland in South Dakota: Loss of habitat for grassland-nesting birds T-34-R FA Code 2434	<ol style="list-style-type: none"> 1. estimate recent rates of conversion of native grassland to cropland in South Dakota 2. use observed recent conversion to validate predictive models of the probability of conversion of grassland to cropland 3. develop predictive models of the cost of protection for native grassland 4. employ probability models to develop a GIS which will enable wildlife managers to assess the conservation priority of grassland habitats and landscapes in South Dakota 	Scott Stephens, DU	Dowd Stukel	Final report and GIS layers to GFP	Prioritizing grassland conservation on the Missouri Coteau of South Dakota. Final report to the South Dakota Department of Game, Fish, and Parks. 21 December 2007. Scott E. Stephens, Johann A. Walker, Aaron J. Smith, and Darin R. Blunck, Ducks Unlimited, Inc.
Understanding the relationship between prairie dog ecology and black-footed ferret resource selection T-35-R FA Code 2435	<ol style="list-style-type: none"> 1. measure the spatial distribution of prairie dogs at multiple spatial scales through state-of-the-art resource monitoring and GIS techniques 2. measure resource selection by ferrets and relate resource selection to the spatial distribution of prairie dogs 3. measure prey selection by ferrets 	Joshua Millspaugh, University of Missouri-Columbia	Kempema	M.S. Thesis David Eads	<p>Millspaugh, J.J. 2009. Understanding the relationship between prairie dog ecology and black-footed ferret resource selection. Final Report to SD Game, Fish and Parks. University of Missouri-Columbia.</p> <p>Jachowski, D. S., J. J. Millspaugh, D. E. Biggins, T. M. Livieri, and M. R. Matchett. 2008. Implications of black-tailed prairie dog spatial dynamics to black-footed ferrets. <i>Natural Areas Journal</i> 28:14-25.</p> <p>Eads, D. A. 2009. Evaluation and development of black-footed ferret resource selection models. M.S. Thesis, University of Missouri, Columbia.</p> <p>Jachowski, D. S., J. J. Millspaugh, D. E. Biggins, T. M. Livieri and M. R. Matchett. 2010. Home-range size and spatial organization of black-footed ferrets <i>Mustela nigripes</i> in South Dakota, USA. <i>Wildl. Biol.</i> 16:66-76.</p> <p>Eads, D. A., J. J. Millspaugh, D. E. Biggins, T. M. Livieri, and D. S. Jachowski. 2011. Postbreeding resource selection by adult black-footed ferrets in the Conata Basin, South Dakota. <i>Journal of Mammalogy</i> 92:760-770.</p> <p>Eads, D.A., D.E. Biggins, D.S. Jachowski, T.M. Livieri, J.J. Millspaugh, and M. Forsberg. 2010. Morning ambush attacks by black-footed ferrets on emerging prairie dogs. <i>Ethology, Ecology & Evolution</i> 22:345-352.</p> <p>Eads, D. A., J. J. Millspaugh, D. E. Biggins, D. S. Jachowski,</p>

					<p>and T. M. Livieri. 2011. Evaluation of a black-footed ferret resource selection model. <i>Journal of Wildlife Management</i> 75:1155-1163.</p> <p>Jachowski, D.S., J.J. Millspaugh, D.E. Biggins, T.M. Livieri, M.R. Matchett, and C.D. Rittenhouse. 2011. Resource selection by black-footed ferrets in South Dakota and Montana. <i>Natural Areas Journal</i> 31:218-225.</p> <p>Eads, D. A., D. E. Biggins, D. Marsh, J. J. Millspaugh, and T. M. Livieri. 2012. Black-footed ferret digging activity in summer. <i>Western North American Naturalist</i> 72:140-147.</p> <p>Eads, D. A., D. S. Jachowski, D. E. Biggins, T. M. Livieri, M. R. Matchett, and J. J. Millspaugh. 2012. Resource selection models are useful in predicting distributions of black-footed ferrets in prairie dog colonies. <i>Western North American Naturalist</i> 72:206-215.</p> <p>Eads, D. A., D. S. Jachowski, J. J. Millspaugh, and D. E. Biggins. 2012. Importance of lunar and temporal conditions for spotlight surveys of adult black-footed ferrets. <i>Western North American Naturalist</i> 72:179-190.</p> <p>Eads, D.A., D.E. Biggins, T.M. Livieri, and J.J. Millspaugh. 2014. Space use, resource selection and territoriality of black-footed ferrets: implications for reserve design. <i>Wildlife Biology</i> 20:27-36.</p>
<p>An aquatic invasive species risk assessment for South Dakota T-36-R FA Code 2436</p>	<ol style="list-style-type: none"> 1. supply information required for effective control and management of aquatic invasive species (AIS) in South Dakota 2. develop an objective ranking of threat from AIS 	<p>Dr. Katie Bertrand, South Dakota State University</p>	<p>Burgess</p>	<p>Final report to SDGFP</p>	<p>Bertrand. K. 2008. South Dakota aquatic nuisance species risk assessment. Dept. of Wildlife and Fisheries Sciences, South Dakota State University, Brookings.</p>
<p>Assessment, monitoring and protection of bat habitats in western South Dakota T-37-R FA Code 2437</p>	<ol style="list-style-type: none"> 1. continue to evaluate the management activities undertaken within western South Dakota to date to benefit bat species by surveying protected hibernacula (both abandoned mines and natural caves), surveying active season bat use of protected sites (compared with pre-gating surveys), and annually monitoring protected sites for vandalism 2. identify and install bat-friendly, 	<p>Joel Tigner, Batworks</p>	<p>Dowd Stukel</p>	<p>Final report to SDGFP</p>	<p>Tigner, J. 2010. Final Report: Assessment, monitoring and protection of bat habitats in western South Dakota, Grant Number T-37-R-1.</p>

	vandal-resistant gates at up to 20 additional sites that provide significant habitat to regional bat species and develop management plans for their protection				
What factors affect territoriality and productivity of black-footed ferrets? T-38-R FA Code 2438	<ol style="list-style-type: none"> 1. measure space use of black-footed ferrets in small black-tailed prairie dog complexes and relate territory size, colony size, and carrying capacity by December 15, 2010 2. measure space use by female ferrets and compare the degree of overlap with offspring and unrelated ferrets by December 15, 2010 3. measure space use and resource overlap between black-footed ferrets and badgers by December 15, 2010 4. measure and relate ferret productivity, prairie dog productivity, and forage productivity by December 15, 2010 	Shaun Grassel, University of Idaho	Kempema	PhD Dissertation Shaun Grassel	<p>Grassel, S. M. 2015. Ecological relationships of black-footed ferrets, American badgers, and black-tailed prairie dogs in South Dakota. Ph. D Dissertation, University of Idaho, Moscow.</p> <p>Grassel, S. M., J. L. Rachlow, and C. J. Williams. 2016. Reproduction by black-tailed prairie dogs and black-footed ferrets: Effects of weather and food availability. Western North American Naturalist 76(4):405-416.</p>
Importance of mountain pine beetle infestations and fire as Black-backed Woodpecker habitat in the Black Hills, South Dakota T-39-R FA Code 2439 50% federal	<p>Understand the relative importance of fire and MPB infestations on population and habitat selection processes of BBWO:</p> <ol style="list-style-type: none"> 1. estimate home ranges during the breeding season, fall, and winter in recently burned and MPB habitats 2. document seasonal time budgets in recently burned and MPB habitats 3. compute general and forage resource selection models for BBWO 4. develop a demographic population model that compares BBWO demographics in burned and MPB habitats of the Black Hills, SD 5. write an article for the public (e.g., South Dakota Conservation Digest, etc.) about the role of disturbance in maintaining BBWO habitat 	Josh Millspaugh, UMC and Mark Rumble, Forest Service	Dowd Stukel	<p>PhD Dissertation Christopher Rota</p> <p>Popular article</p>	<p>NOTE: Some of these publications were funded in part by SDGFP hard dollars.</p> <p>Bonnot, T. W., J. J. Millspaugh, and M. A. Rumble. 2009. Multi-scale nest-site selection by black-backed woodpeckers in outbreaks of mountain pine beetles. Forest Ecology and Management 259:220-228.</p> <p>Bonnot, T. W., M. A. Rumble and J. A. Millspaugh. 2008. Nest success of black-backed woodpeckers in forests with mountain pine beetle outbreaks in the Black Hills, South Dakota. Condor 110(3):450-457.</p> <p>Lehman, C. P., D. C. Kesler, C. T. Rota, M. A. Rumble, E. M. Seckinger, T. J. Juntti, and J. J. Millspaugh. 2011. Netguns: a technique for capturing Black-backed Woodpeckers. J. Field Ornithology 82(4):430-435.</p> <p>Rota, C. T., D. C. Kesler, C. P. Lehman, M. A. Rumble, J. J. Millspaugh. 2012. The importance of wildfire and mountain pine beetle infestations as Black-backed Woodpecker habitat. Final report to South Dakota Department of Game, Fish and Parks, Agreement 05-0600-085.</p> <p>Rota, C. T. 2013. Not all forests are disturbed equally:</p>

					<p>Population dynamics and resource selection of black-backed woodpeckers in the Black Hills, South Dakota. Ph.D. Dissertation, University of Missouri-Columbia.</p> <p>Rota, C. T., M. A. Rumble, J. J. Millspaugh, C. P. Lehman and, D. C. Kesler. 2014. Space-use and habitat associations of Black-backed Woodpeckers (<i>Picoides arcticus</i>) occupying recently disturbed forests in the Black Hills, South Dakota. Forest Ecology and Management 313 (2014) 161-168.</p> <p>Rota, C. T., J. J. Millspaugh, M. A. Rumble, C. P. Lehman, and D. C. Kesler. 2014. The role of wildfire, prescribed fire, and mountain pine beetle infestations on the population dynamics of black-backed woodpeckers in the Black Hills, South Dakota. PLoS ONE 9(4): e94700. doi.10.1371/journal.pone.0094700</p> <p>Rota, C. T., M. A. Rumble, C. P. Lehman, D. C. Kesler, and J. J. Millspaugh. 2015. Apparent foraging success reflects habitat quality in an irruptive species, the Black-backed Woodpecker. The Condor: Ornithological Applications 117:178-191.</p>
<p>Nesting success of tree-nesting waterbirds in colonies on selected wetlands in northeast South Dakota</p> <p>T-40-R</p> <p>FA Code 2540</p>	<p>By June 30, 2010:</p> <ol style="list-style-type: none"> 1. to determine the nesting success of tree-nesting waterbirds breeding in colonies on selected wetlands in northeast South Dakota as suggested in the SDWCCP and SDABCP 2. to identify important aspects of habitat required for colonial tree-nesting waterbirds on wetlands of northeast South Dakota in order to create management recommendations 	<p>Chuck Dieter, SDSU and Kristel Bakker, Dakota State University</p>	<p>Dowd Stukel</p>	<p>M.S. Thesis</p> <p>Nathan Baker</p>	<p>Baker, N. J. 2010. Nesting success of colonial tree-nesting waterbirds on selected wetlands in northeast South Dakota. M.S. Thesis, SDSU. 104 pp.</p> <p>Baker, N. J., C. D. Dieter, and K. K. Bakker. 2015. Reproductive success of colonial tree-nesting waterbirds in prairie pothole wetlands and rivers throughout northeastern South Dakota. Am. Midl. Nat. 174:132-149.</p>
<p>South Dakota Breeding Bird Atlas 2</p> <p>T-41-R</p> <p>FA Code 2541</p> <p>50% federal</p>	<p>By December 30, 2015:</p> <ol style="list-style-type: none"> 1. document current distribution of all breeding bird species, including under-surveyed species such as owls and secretive marshbirds 2. assess changes in distributions of breeding birds since the first SDBBA (1988-1992) 3. identify habitat associations and requirements for all breeding species 	<p>Nancy Drilling, Rocky Mountain Bird Observatory</p>	<p>Dowd Stukel</p>	<p>Final report</p> <p>Interactive web site</p> <p>(book production will be handled separately)</p>	<p>Drilling, Nancy E., Robert A. Sparks, Brittany J. Woiderski, and Jason P. Beason. 2016. South Dakota Breeding Bird Atlas II: Final Report. Tech. Rep. M-SDBBA2-07. Rocky Mountain Bird Observatory, Brighton, CO.</p>

	4. produce a report and interactive web site with species distribution maps and analyses				
Faunal survey of the delta habitat of Upper Lewis and Clark Lake T-42-R-1 FA Code 2453 50% federal	By June 1, 2012: 1. Survey the delta for marsh birds, amphibians, reptiles, and freshwater invertebrates, specifically targeting Wildlife Action Plan species of greatest conservation need. 2. Examine the potential for trematode infection in amphibian, snail, and bird hosts. 3. Disseminate information concerning the delta fauna to both wildlife biologist and the general public.	Jacob Kerby and David Swanson, USD	Ode	Final report; GIS data layers	Wert. K. 2012. An examination of the effects of anthropogenic habitat modification and contaminants on Missouri River valley fauna. M.S. Thesis, University of South Dakota, Vermillion. Kerby, J. and D. Swanson. 2012. Final Report: Faunal Survey of the Delta Habitat of Upper Lewis and Clark Lake. University of South Dakota, Department of Biology.
Status of the Bear Lodge Meadow Jumping Mouse (<i>Zapus hudsonius campestris</i>) T-43-R1 FA Code 2451 50% federal	By December 31, 2012: 1. Determine the present distribution, abundance, and habitat affinity of <i>Zapus hudsonius campestris</i> in the Black Hills of South Dakota during June and July of 2010 and 2011. 2. Compare the present distribution and abundance with historical records of this species.	Tim Mullican, Dakota Wesleyan University	Kempema	Final report	Mullican, T. R. 2013. Status and habitat association of the Bear Lodge meadow jumping mouse in the Black Hills of South Dakota. Final report to South Dakota Game, Fish and Parks. 25 pp. Mullican, T.R. 2011. First Record of the Least Weasel in the Black Hills of South Dakota. The Prairie Naturalist. 43(1/2): 59-60. Mullican, T.R. 2014. Population estimates and habitat associations of the Bear Lodge meadow jumping mouse in the Black Hills of South Dakota. Proceedings of the South Dakota Academy of Science 93:89-99.
Distribution, abundance, and seasonal habitat use patterns in ornate box turtles in South Dakota T-44-R1 FA Code 2452 50% federal	By May 15, 2012: 1. Estimate the geographic range of ornate box turtles in South Dakota through the use of ecological niche modeling. 2. Document the macro- and microhabitat use throughout the active season (May through September). 3. Describe movements and estimate home range size. 4. Document daily and seasonal activity periods. 5. Estimate population size. 6. Provide training in ecological field research to Oglala Lakota College	Alessandra Higa and Hugh Quinn, Oglala Lakota College	Dowd Stukel	Final report; GIS data layers	Higa, A., H. Quinn, and D. W. Uresk. 2012. Distribution, abundance, and seasonal habitat use patterns in ornate box turtles (<i>Terrapene ornata</i>) in South Dakota. Final Report, Grant Number: T-44-R-1. Quinn, H.R., H. Quinn and A. Higa. 2014. Notes on reproduction and growth of South Dakota ornate box turtles (<i>Terrapene ornata</i> .) Chelonian Conservation Biology 13:65-71. Uresk, D. W. and A. Higa. 2019. Habitat characteristics and selection by ornate box turtles in the Sandhills of South Dakota. Western North American Naturalist 79:56-62.

	(OLC) students.				
Survey and mapping of Black Hills montane grasslands T-45-R-1 FA Code 2454 50% federal	By December 31, 2012: 1. Digitally map higher quality Black Hills montane grasslands; construct a montane grassland GIS layer in cooperation with public agencies. 2. Provide a set of photos of survey sites from relocatable points. 3. Thoroughly characterize the Black Hills montane grassland vegetation type. 4. Develop a field key to the type. 5. Share information through national databases and publication in an academic journal.	Hollis Marriot, Don Faber- Langendoen, and Jim Drake	Ode	Field key, contributions to national databases; GIS data layer	Marriot, Hollis. 2012. Survey and Mapping of Black Hills Montane Grasslands. Unpublished report to the SD Game, Fish & Parks Department, Pierre, SD. 58 pp.
Evaluation of artificial bat roost selection and occupancy in South Dakota ecoregions T-46-R-1 FA Code 2455 50% federal	By May 15, 2014: 1. Determine optimal bat house designs for habitat specific ecoregions in South Dakota. 2. Record and assess occupancy and microclimate of existing artificial roosts for comparison with historical data collected by Joel Tigner and throughout the period of the grant. 3. Develop bat house design recommendation plans for landowners and homeowners; create a pamphlet for the SDSU Extension Service and link to South Dakota Bat Working Group website to make research results available to the public. 4. Evaluate potential for a continued volunteer monitoring program at sites. 5. Assess potential influence of environmental factors on artificial roost selection/occupancy. 6. Perform acoustic surveys at occupied sites for determination of bat species present and DNA fecal analysis to determine species using	Scott Pedersen, SDSU	Kempema	M.S. Thesis Sarah Lewis several products for the public and extension staff	

	bat houses.				
Mapping and characterization of calcareous fens in eastern South Dakota T-47-R-1 FA Code 2456 50% federal	By December 31, 2015: 1. Delineate favorable fen habitat and identify potential fen locations in South Dakota. 2. Confirm fen locations and characterize plant community composition, peat depth, water chemistry, and surrounding land use of both previously described and newly delineated calcareous fens. 3. Develop indices of calcareous fen condition and develop statistical models to relate condition to site-level management, size and isolate of fen, and landscape and regional land use factors. 4. Develop an ArcGIS geodatabase.	Mark Dixon, USD and Gary Larson, SDSU	Ode	M.S. Thesis Elizabeth Hill (student did not complete graduate work) GIS layers	Stewart, James and Mark Dixon. 2016. Mapping potential sites of calcareous fens in Eastern South Dakota using ecological niche modeling. Unpublished report to the SD Game, Fish and Parks Department, Pierre, SD. 34 pp.
Revision of South Dakota comprehensive wildlife conservation plan T-48-R-1 FA Code 2457 75% federal	By December 31, 2013: Revise the South Dakota Wildlife Action Plan by reviewing and updating the 8 required elements and including consideration of climate change as a potential cause of concern for South Dakota's fish and wildlife species and associated habitats.	Jon Haufler, EMRI, and GFP staff	Dowd Stukel	Revised WAP various GIS products and other web-based applications	South Dakota Department of Game, Fish and Parks. 2014. South Dakota Wildlife Action Plan. Wildlife Division Report 2014-03. South Dakota Department of Game, Fish and Parks, Pierre. Cochrane, M.A. and C.J. Moran. 2011. Past, present, and future climates for South Dakota – Observed climatic variation from 1895-2010 and projected climate change to 2009. Wildlife Action Plan Climate Change Consultancy, Brookings, SD. 158 pp. Approval letter from USFWS dated May 12, 2015.
Preliminary investigation into migratory movements of bats in South Dakota T49-R-1 FA Code 2459 65% federal	By June 30, 2013: 1. Describe (graphically) and detect (statistically) significant peaks in annual, monthly, and nightly bat activity (as measured by a bat activity index) at 16 selected bat migration stations located throughout South Dakota. 2. Determine if the 15 selected monitoring stations experience peaks in bat activity during spring and fall migration during each calendar year of the study.	Joel Tigner, Batworks, and Silka Kempema	Kempema	Final report	Kempema, S. 2013. Preliminary investigation into migratory movements of bats in South Dakota. Final Report, T-49-R-1. SDGFP, Pierre. This report satisfied SWG requirements, but did not include information from all sites. This work has continued under project T-64.

	<ol style="list-style-type: none"> Determine if a correlation exists between environmental variables (time, temperature, wind speed, etc.) and a bat activity index at each of the 16 selected bat migration stations during spring and fall or throughout the calendar year. Measure annual and seasonal (spring and fall) bat species (or species group) richness at each of 16 selected bat migration stations. Provide recommendations for a long-term bat migration monitoring program. 				
Classification and mapping of riparian forest along the White River in South Dakota T-50-R-1 FA code 2462 65% federal	By June 30, 2014: <ol style="list-style-type: none"> Map vegetation extent, structure, and composition along the riparian corridor of the White River in South Dakota within a GIS framework, using a hierarchical classification system compatible with the National Vegetation Classification. Sample and quantify riparian forest composition and structure within selected study reaches along the White River, with a particular emphasis on the delta where the White River flows into the Missouri River (Lake Francis Case). Quantify historic changes in riparian vegetation extent, recruitment, and channel dynamics via analysis of historic aerial photography using GIS, along selected reaches of the White River. 	Mark Dixon, USD and W. Carter Johnson, SDSU	Ode	Ph D Dissertation Alex Cahlander-Mooers Vegetation maps Digital veg. data in VegBank format Final report	Cahlander-Mooers, A., M. Volke, M. Dixon, and W. C. Johnson. 2014. Final Report: Classification and Mapping of Riparian Forest along the White River in South Dakota. Dept. of Biology, USD and Dept. of Natural Resource Mgmt., SDSU. Volke, M. A. 2015. Ecological significance of emerging reservoir deltas: Evidence from the White River delta in South Dakota. Ph. D. Dissertation, South Dakota State University, Brookings.
Past and Current Vegetation Conditions of Core Sagebrush Habitat and Leks of the Greater Sage-Grouse (<i>Centrocercus urophasianus</i>) at the easternmost extent of its	By April 30, 2013: <ol style="list-style-type: none"> Review and analyze data and field check locations of historical data on GRSG occurrences and associated habitat information. Repeat data collection at historical sites described in Carter data, 	Shelly Deisch, SDGFP and Daryl Mergen, Mergen Ecological Delineations, Inc.	Ode	Final report	Mergen, D. E., C. J. Corley, and S. Deisch. 2013. Past and recent vegetation conditions of sagebrush habitat and habitat of the greater sage-grouse (<i>Centrocercus urophasianus</i>) in western South Dakota. Final report to South Dakota Game, Fish and Parks. 110 pp.

range in Western South Dakota T-51-R-1 FA code 2460 65% federal	<p>including vegetation data and observations of individual GRSG, GRSG leks and collection of plant voucher specimens, as needed.</p> <p>3. Compile and summarize existing information on GRSG counts and lek data collected in South Dakota for comparison to the historical Carter data and the results obtained in Objective 2.</p> <p>4. Compile information on sagebrush habitat restoration methods and evaluate public land sites for potential future restoration work.</p>				
Colonial and semi-colonial waterbird monitoring T-52-R-1 FA code 2461 65% federal	<p>By December 31,2012:</p> <p>1. Survey major and important colonial and semi-colonial waterbird breeding colonies to document and enumerate breeding species.</p> <p>2. Document current habitat conditions at each major and important colony site and identify the surrounding land use and management practices within ½ mile of the colony centroid.</p> <p>3. Conduct aerial surveys in the Prairie Coteau, Lake Thompson watershed, and Northern Pothole regions of South Dakota to document breeding status in known colonial and semi-colonial waterbird colonies and search for new colonies.</p>	Nancy Drilling, RMBO	Mehls	Final report	Drilling, N. E. 2013. South Dakota 2012 Colonial waterbird survey. Tech. Rpt. SC-Colony-SD-05. Rocky Mountain Bird Observatory, Brighton, CO, USA. 56 pp.
Status and distribution of Franklin's ground squirrels and Richardson's ground squirrels in eastern South Dakota T-53-R-1 FA code 2463 65% federal	<p>By June 30,2015:</p> <p>1. To identify colony sites, determine the current range, and estimate relative abundance of <i>S. franklinii</i> and <i>S. richardsonii</i> in eastern South Dakota, as suggested in the SDCWCP (SDGFP 2006).</p> <p>2. To describe land use and habitat characteristics of colony sites of <i>S. franklinii</i> and <i>S. richardsonii</i>, and</p>	Charles Dieter, SDSU and Tim Mullican, DWU	Dowd Stukel	Final report	Ronningen, T. 2015. Status and distribution of Franklin's and Richardson's ground squirrels in eastern South Dakota. M. S. Thesis, South Dakota State University, Brookings.

	<p>create a georeferenced database of <i>S. richardsonii</i> colony locations as suggested in the SDCWCP (SDGFP 2006).</p> <p>3. To identify important areas of habitat required for <i>S. franklinii</i> and <i>S. richardsonii</i> in order to create management recommendations.</p>				
<p>Black-footed ferret enhancement in Conata Basin, SD T-54-R-1 FA code 2464 65% federal</p>	<p>By December 31, 2013, develop and evaluate 600 acres of suitable black-footed ferret habitat on TNC lands in the Conata Basin through grazing management.</p>				<p>Project cancelled because of sale of TNC lands; funds reobligated to T-54-R-1, amendment 2.</p>
<p>Mapping and characterization of native grassland habitats on South Dakota's prairie coteau T-54-R-1, Amendment 2 FA code 2464 65% federal</p> <p>(originally approved as Black-footed ferret habitat enhancement in Conata Basin, SD)</p>	<ol style="list-style-type: none"> 1. Delineate all remaining grassland habitat within a 225-square mile study area located on a portion of the Prairie Coteau with the highest number of documented records of Dakota skipper butterflies. This grassland inventory will involve the use of aerial imagery and ground truthing to produce a GIS layer of remaining native grassland. 2. Rank the ecological condition of delineated grassland parcels within the study area based upon the "Condition Ranking Guidelines" developed by the Minnesota County Biological Survey, and other vegetation inventory projects. 3. Quantitatively characterize the native vegetation that predominates at sites inhabited by Dakota Skipper butterflies. This will involve quantitative sampling of representative stands of each native grassland vegetation type within the study area. Vegetation plot data will be collected to enable comparison with previously collected plot data 	<p>Lan Xu and Gary Larson, SDSU</p>	<p>Ode</p>	<p>M.S. Thesis Diane Narem</p>	<p>Narem, D. M. 2015. Classifying and mapping native grasslands of South Dakota's Northern Prairie Coteau and characterizing habitat for Dakota skipper conservation. M.S. Thesis, South Dakota State University, Brookings, SD. 144 pp.</p>

	<p>from elsewhere on the Prairie Coteau.</p> <p>4. Identify sites within the study area likely to support Dakota Skipper butterflies based upon vegetation and habitat characteristics.</p> <ul style="list-style-type: none"> All objectives will be met and outputs completed by May 31, 2015. 				
<p>Determination of river otter distribution and evaluation of potential sites for population expansion in South Dakota</p> <p>T-55-R-1</p> <p>FA code 2465</p> <p>65% federal</p>	<p>By December 31, 2014:</p> <ol style="list-style-type: none"> Update river otter occupancy status of drainages with evidence more than 5 years old. Determine river otter occupancy status of agreed-upon drainages. Evaluate agreed-upon sites for reintroduction suitability. 	Wayne Melquist	Kempema	Final report	<p>Melquist, W. E. 2015. Determination of river otter (<i>Lontra canadensis</i>) distribution and evaluation of potential sites for population expansion in South Dakota. Report for Grant Number T-55-R-1, Study No. 2465.</p>
<p>Development of a long-term grassland songbird monitoring program for South Dakota with an emphasis on species of greatest conservation need</p> <p>T-56-R-1</p> <p>FA code 2466</p> <p>65% federal</p>	<ol style="list-style-type: none"> Update existing literature review with peer-reviewed publications published after 2003 and synthesis with a focus on grassland passerines to be completed by September 2012 Conduct literature review, synthesis, and analysis of bird survey and monitoring methodologies by May 2013. Conduct review and analysis of existing grassland bird monitoring programs and consult with monitoring experts by May 2013 (ongoing). Propose, finalize, and test monitoring program methodologies - -Collect, analyze and compare field data 2013 and 2014 -Investigate feasibility of collecting productivity information to enhance survey data. Develop long-term (10-15 year) monitoring plan containing specific data collection field methodology and estimated cost. Plan methodology will increasing 	Kristel Bakker, DSU and Silka Kempema	Kempema	Final report to include long-term monitoring program; M.S. Thesis (Cassie Hendricks)	<p>Hendricks, K. 2017. Improving survey methodology to monitor rare grassland birds in South Dakota. M.S. Thesis, South Dakota State University, Brookings.</p> <p>Bakker, K., K. Hendricks, and S. Kempema. 2017. South Dakota Grassland Bird Monitoring Plan. Report submitted to South Dakota Game, Fish and Parks, T-56-R-1. 46 pp.</p>

	grassland passerine species detection rates, provide statistically valid data and address bird population monitoring criteria outlined by the U.S. NABCI Monitoring Subcommittee.				
Threats, management, and suggested harvest and collection policy of herpetofauna of South Dakota T-57-R-1 FA code 2467 65% federal	By September 1,2012: 1. Provide recommendations on take allowances. 2. Provide data to justify the amount of take, both commercially and via fishing licenses. 3. Identify best management practices which could be implemented for herpetofauna during construction projects. 4. Identify general threats to reptiles and amphibians in South Dakota. 5. Provide a final report with data supported recommendations to South Dakota Game, Fish, and Parks (SDGFP) which could be implemented in management decisions.	Brian Smith, BHSU and Hugh Quinn, OLC	Dowd Stukel	Final report	Smith, B. and H. Quinn. 2012. Threats to South Dakota Amphibians and Reptiles. Final Report to South Dakota Department of Game, Fish and Parks. Department of Biology, Black Hills State University, Spearfish, SD.
Breeding ecology of ferruginous hawks and golden eagles in north-central and western South Dakota T-58-R-1 FA code 2469 65% federal	By 30 June 2016: 1. Using ground and aerial surveys, document locations of all nesting raptor species of interest in the study area. 2. Evaluate reproductive parameters of ferruginous hawk and golden eagle nests. 3. Evaluate food habits of ferruginous hawks and golden eagles in space and time. 4. Document mammalian prey species abundance using line transects, focusing on prey species documented in the literature as major prey items for ferruginous hawks and golden eagles. 5. Identify landscape characteristics	Troy Grovenburg, SDSU	Kempema	PhD dissertation Shubham Datta spatial layers related to raptor nest distribution, prey availability, habitat at various spatial scales updated FEHA and GOEA spatial distribution models	Datta, S. 2016. Raptors in temperate grasslands: Ecology of Ferruginous Hawk, Golden Eagle, and Northern Harrier in the Northern Great Plains. Ph.D Dissertation, South Dakota State University, Brookings. NOTE: final documents submitted, but one of the objectives was not covered

	<p>associated with raptor nests within each study area by examining habitat characteristics within multiple spatial scales around each nest site, and evaluating how local- and landscape-level processes influence nesting patterns and overall reproductive success.</p> <p>6. Using nest occupancy data gathered during this study and survey data gathered during previous research in Harding, Perkins, and McPherson counties, determine raptor detection probability and nest occupancy through time, and model how future land-use changes could potentially influence population viability and sustainability.</p>				
<p>Evaluation of the James River Conservation Reserve Enhancement Program in South Dakota T-59-R-1 FA code 2470 65% federal</p>	<p>By December 31, 2016:</p> <ol style="list-style-type: none"> 1. Assess effects of CREP on water quality, aquatic habitats and fish assemblage structure in the James River, its tributaries, and watershed wetlands. 2. Assess functional and numerical responses of avifauna to the James River Conservation Reserve Enhancement Program. 	<p>Joshua Stafford, SD Coop. Unit and Katie Bertrand, SDSU</p>	<p>Dowd Stukel (terrestrial)</p> <p>Pasbrig (aquatic)</p>	<p>2 PhD dissertations David Schumann, aquatic student</p> <p>Jarrett Pfrimmer, terrestrial student</p> <p>Related scientific publications and presentations</p> <p>relevant geospatial databases</p> <p>SD Conservation Digest article</p>	<p>Schumann, D. A. 2017. Measuring aquatic organism responses to grassland restoration: Does the Field of Dreams really exist? PhD Dissertation, South Dakota State University, Brookings.</p> <p>Pfrimmer, J. D. 2017. An integrated evaluation of the Conservation Reserve Enhancement Program in South Dakota. PhD Dissertation, South Dakota State University, Brookings.</p> <p>Schumann, D.A., J.M. Haag, P.C. Ellensohn, J.D. Redmond, K.N.B Graeb. 2018. Restricted movement of prairie fishes in fragments riverscapes risks ecosystem structure being ratcheted downstream. Aquatic Conservation: Marine and Freshwater Ecosystems 2018: 1-10.</p> <p>Schumann, D.A., K.N. Graeb, M.D. Wagner, B.D.S. Graeb, E. Prenosil, J. Hoekwater. 2020. Suitability of surgically implanted 8 mm- passive integrated transponder tags for small-bodied fishes. Journal of Applied Ichthyology 00:1-11.</p> <p>Schumann, D.A., K.N.B. Graeb, J. Pfrimmer, J.D. Stafford, S.R. Chipps. 2021. The local responses of aquatic ecosystems to adjacent grassland conservation: Can streams of dreams exist in a degraded riverscape? Aquatic Conservation: Marine and Freshwater Ecosystems 2021: 1-15.</p>

<p>Preliminary investigation of the role of small mammals in the maintenance of plague on Lower Brule black-tailed prairie dog colonies T-60-R-1 FA code 2471</p>	<p>By June 30, 2016:</p> <ol style="list-style-type: none"> 1. Estimate the effect of treatment with deltamethrin on the survival, density, and diversity of small rodents on black-tailed prairie dog colonies. 2. Estimate the prevalence of <i>Yersinia pestis</i> in burrow-collected fleas on black-tailed prairie dog colonies pre- and post-treatment with deltamethrin and in fleas from prairie dogs collected in 2010 to obtain an estimate of <i>Y. pestis</i> prevalence in the study colonies. 3. Estimate and detect any differences in <i>Y. pestis</i> prevalence in fleas on small rodents on treated, untreated, inactive colony, and off-colony plots and compare these prevalence estimates to <i>Y. pestis</i> prevalence of fleas collected from prairie dog burrows. 4. Measure the exposure of small rodents to plague on and near black-tailed prairie dog colonies by titers for plague antibodies in blood samples. 5. Detect any change in flea abundance and flea species diversity on small rodents on treated, untreated, inactive colony, and off-colony plots and in black-tailed prairie dog burrows on dusted and undusted plots. 	<p>Hugh Britten, USD</p>	<p>Kempema</p>	<p>PhD dissertation Lauren Maestas related scientific publications and presentations</p>	<p>Maestas, L. P. and H.B. Britten. 2017. Investigation of the role of small mammals in the maintenance of plague on Lower Brule black-tailed prairie dog colonies; Project No. T-60-R-1. Final Report to SD Game, Fish and Parks. University of South Dakota, Vermillion. Maestas, L. P. and H.B. Britten. 2017. Flea and Small Mammal Species Composition in Mixed-Grass Prairies: Implications for the Maintenance of <i>Yersinia pestis</i>. Vector-Borne and Zoonotic Diseases 17 (7): 467-474. Maestas, L.P. 2018. The vector chronicles: The implications of plague management on ectoparasite and host ecology, and the search for <i>Ixodes scapularis</i> and <i>Borrelia burgdorferi</i> in South Dakota. PhD Dissertation, University of South Dakota, Vermillion. 164 pages.</p>
<p>A population survey of mussels in South Dakota rivers T-61-R-1 FA code 2472 65% federal</p>	<p>By June 30, 2019:</p> <ol style="list-style-type: none"> 1. Assess the presence of mussel populations, distribution, abundance, and habitat affinity from wadeable streams across the state of South Dakota. 2. Conduct effort-based survey of mussel species occurrence followed 	<p>Nels Troelstrup, SDSU, Chelsey Pasbrig and Mike Smith, SDGFP</p>	<p>Pasbrig</p>	<p>M.S. Thesis Kaylee Faltys M.S. Thesis Katherine Wollman Final Report outlining 5</p>	<p>Faltys, K.L. 2016. Assessing freshwater mussels (<i>Bivalvia: Unionidae</i>) in South Dakota and identifying drivers of assemblage variation. M.S. Thesis, South Dakota State University, Brookings. <i>with corrections</i> Troelstrup, N.H. Jr., K. Beebout, K. Faltys, K. Wollman. 2019. A statewide survey of freshwater mussels (<i>Unionidae</i>) in wadeable streams and eastern South</p>

	<p>by quantitative species counts and habitat assessment from wadeable tributary and main stem sites of major river basins to determine species composition and habitat preference.</p> <ol style="list-style-type: none"> 3. Provide recommendations for an effective long-term monitoring plan for mussels across the state of South Dakota. 4. Assess the presence of mussel populations, distribution, relative abundance and habitat affinity from Prairie Pothole lakes in eastern South Dakota. <p>Conduct spatial analysis to examine correspondence between the distribution (availability) of fish hosts and mussel species recently sampled.</p>			<p>objectives and errors with Faltys Thesis</p> <p>database with collection and habitat data; scientific publications and presentations</p>	<p>Dakota lake basins. A final completion report submitted to South Dakota Game, Fish and Parks. 112 pp.</p> <p>Wollman, K.M. 2019. Assessing freshwater mussel (<i>Bivalvia Unionidae</i>) assemblages and effects of eutrophication on <i>Pyganodon grandis</i> in lakes of eastern South Dakota.</p>
<p>Status of salamander species in South Dakota T-62-R-1 FA code 2473 65% federal</p>	<p>By April 30, 2016: Investigate the threat of ranavirus to false map turtle (<i>Graptemys pseudogeographica</i>), smooth softshell (<i>Apalone mutica</i>), Cope's gray treefrog (<i>Hyla chrysoscelis</i>) and Blanchard's cricket frog (<i>Acris blanchardi</i>) by sampling tiger salamander populations (<i>Ambystoma tigrinum</i>) for the presence of ranavirus infection.</p>	Jacob Kerby, USD	Dowd Stukel	Final report	Kerby, J. and D. Davis. 2016. Status of salamander species in South Dakota. Final Report to South Dakota Department of Game, Fish and Parks. University of South Dakota, Vermillion.
<p>Updating and evaluating the distribution, density, and movement patterns of Mountain Sucker (<i>Catostomus platyrhynchus</i>) in South Dakota T-63-R-1 FA code 2474 65% federal</p>	<p>By June 30, 2019:</p> <ol style="list-style-type: none"> 1. Update the distribution of SGCN including Mountain Sucker and Longnose Sucker in the Black Hills of South Dakota for comparison with Schultz (2011). 2. Estimate current density of Mountain Sucker and assess stream habitat in the Black Hills of South Dakota. 3. Quantify habitat use, movement patterns, migration distances and survival of Mountain Sucker in the 	Chelsey Pasbrig and Jake Davis, SDGFP and Katie Bertrand and Brian Graeb, SDSU	Pasbrig	<p>PhD dissertation Seth Fopma</p> <p>updated distribution maps; database of GPS coordinates for fish collections and photos of sites and species; scientific publications and presentations</p>	<p>Fopma, S.J. 2020. Distribution, Density, Movement, and Support for Management of Mountain Sucker, <i>Pantosteus jordani</i>, in the Black Hills of South Dakota. PhD Dissertation, South Dakota State University, Brookings. Electronic Theses and Dissertations. 4071. https://openprairie.sdstate.edu/etd/4071</p> <p>Fopma, S. J. 2019. Updating and evaluating the distribution, density and movement patterns of the Mountain Sucker (<i>Catostomus platyrhynchus</i>) in South Dakota. Final Performance Report, T-63-R-1. South Dakota State University, Brookings.</p>

	Black Hills of South Dakota				
Continued analysis of migratory bat data from South Dakota T-64-R-1 FA code 2475 65% federal	By December 31, 2015: 1. Describe (graphically) and detect (statistically) significant peaks in annual, monthly, and nightly bat activity (as measured by a bat activity index) at 15 selected bat migration stations located throughout South Dakota. 2. Determine if the 15 selected monitoring stations experience peaks in bat activity during spring and fall migration during each calendar year of the study (i.e. repeated use of an area as a movement corridor). 3. Determine if a correlation exists between environmental variables (temperature and wind speed) and bat activity at each of the 15 selected bat migration stations during spring and fall or throughout the calendar year. 4. Measure annual and seasonal (spring and fall) bat species richness at each of 15 selected bat migration stations. 5. Provide recommendations for a long-term bat migration monitoring program for South Dakota.	Joel Tigner, Batworks LLC and Kempema, SDGFP	Kempema	Final report, including recommended monitoring program	Kempema, S.L.F. 2017. Continued analysis of migratory bat data from South Dakota. Final Report, T-64-R-1. SD Game, Fish and Parks, Pierre. Placeholder report submitted to USFWS; additional work needed to produce a final report covering all objectives.
Population estimate for black-backed woodpeckers (<i>Picoides arcticus</i>) in the Black Hills T-65-R-1 FA code 2476 65% federal	By June 30, 2017: 1. Determine relationships between environmental and habitat factors with detection probability and density of black-backed woodpeckers. 2. Incorporate objective 1 into models that estimate black-backed woodpecker density in the Black Hills and provide a population estimate for the Black Hills and Bearlodge Mountains.	Mark Rumble and Frank Thompson, U.S. Forest Service; Joshua Millsbaugh, UMC	Heimerl	final report (M.S. thesis, UMC) Elizabeth Matseur GIS data layers peer-reviewed scientific publications	Matseur, E.A. 2017. Abundance of black-backed woodpeckers and other birds in relation to disturbance and forest structure in the Black Hills and Bear Lodge Mountains of South Dakota and Wyoming. M.A. Thesis, University of Missouri-Columbia. Matseur, E. A., F. R. Thompson, B. E. Dickerson, M. S. Rumble, and J.J. Millsbaugh. 2018. Black-backed Woodpecker Abundance in the Black Hills. Journal of Wildlife Management; DOI: 10.1002/jwmg.21450.
Pilot study of the use of	By December 31, 2016:	Chelsey Pasbrig,	Pasbrig	final report	Bertrand, K. 2016. Pilot study of the use of otolith

otolith microchemistry to identify Blue Sucker distribution and habitat use in South Dakota T-66-R-1 FA code 2477 65% federal	1. To determine natal habitats of blue suckers in the Missouri River, South Dakota using otolith microchemistry analysis.	SDGFP and Katie Bertrand, SDSU			microchemistry to identify Blue Sucker distribution and habitat use in South Dakota. Final Report to SD Game, Fish and Parks. South Dakota State University, Brookings.
Small stream fish ladders for steel culverts T-67-R-1 FA code 2478 65% federal	By December 31, 2015: 1. Using 3 control road crossings and the best ladder design at 2 road crossings, estimate the increase in passability of round galvanized steel culverts modified with the best ladder design in natural streams in eastern South Dakota. 2. Using 3 control road crossings and the best ladder design at 2 road crossings, estimate the increase in passability of round galvanized steel culverts modified with the best ladder design in natural streams in western South Dakota.	Chelsey Pasbrig, SDGFP and Katie Bertrand and Brian Graeb, SDSU	Pasbrig	M.S. Thesis (John Lorenzen)	Lorenzen, J.A. 2016. Fish ladders designed for drop culverts and Central Stoneroller ecology across a latitudinal gradient. M.S. Thesis, South Dakota State University, Brookings. 100 pages.
Examining the impacts of agricultural tile drainage on wetland fauna in eastern South Dakota T-68-R-1 FA code 2479 65% federal	By April 30, 2017: 1. Sample water quality across 18 total wetlands in eastern South Dakota affected by tile drainage, surface runoff, or buffered reference sites 2. Examine relationships between water quality and the following end points: a. Vegetation (SD-WRAP) b. Macroinvertebrates (richness and abundance) c. Aerial adult aquatic insects (richness and abundance) d. Amphibians (richness and abundance) e. Fish (richness and abundance)	Jake Kerby and Jeff Wesner, USD	Dowd Stukel	final report; relevant GIS layers and scientific publications	Kerby, J. and J. Wesner. 2018. Examining the Impacts of Agricultural Tile Drainage on Wetland Fauna in Eastern South Dakota. Final Report for T-68-R-1 submitted to South Dakota Game, Fish and Parks. University of South Dakota, Vermillion. Schwarz, M. S., D. R. Davis, and J. L. Kerby. 2018. An evaluation of agricultural tile drainage exposure and effects to wetland species and habitat within Madison Wetland Management District, South Dakota. Final Report, Region 6, U.S. Fish and Wildlife Service, Environmental Contaminants Program. USFWS Project: FFS# 6N61 Final Report. 242 pp.
Upgrading South Dakota Ornithologists' Union's bird reporting system to improve knowledge of rare bird	By June 30, 2017: Improve the functionality of the SDOU bird sighting reporting system by	Jeff Palmer, DSU	Dowd Stukel	final report and enhanced SDOU bird reporting system on website	Palmer, J. S. 2017. Upgrading South Dakota Ornithologists' Union's Bird Reporting System to Improve Knowledge of Rare Bird Species in South Dakota. Final Report to SDGFP for State Wildlife Grant T-69-R-1.

species in South Dakota T-69-R-1 FA code 2480 50% federal	incorporating records from the recently-completed South Dakota Breeding Bird Atlas 2 project, expanding the site's functionality to other web browsers besides Internet Explorer, improving search functions, adding functionality to the Observer level, updating the mapping function to make it more compatible with current updates of Java software, allowing queries to be conducted for specific regions in the state rather than just county; and adding the ability to generate county checklists from the database records.			hosted by DSU	https://sdou.org/Birds/Reporting.aspx
Reproductive ecology and habitat selection of greater sage-grouse in Harding County, South Dakota T-70-R-1 FA code 2481 65% federal	By June 30, 2019: 1. Estimate breeding season survival of female sage-grouse and determine cause-specific mortality. a. Quantify the influence of West Nile Virus on sage-grouse mortality. b. Estimate brood survival. 2. Estimate fecundity, including nest success, nesting rates, nest dispersal, and cause-specific nest failure of sage-grouse. 3. Determine breeding season home ranges of female sage-grouse in Harding County, South Dakota. a. Determine brood home range size. 4. Estimate land-use composition and breeding season habitat use of female sage grouse. a. Estimate brood habitat use.	Troy Grovenburg, SDSU (see below) (amendment #1 changed PI to Andrew Gregory, Bowling Green State University) approved effective 31 Aug 2016	Switzer	final report/PhD Dissertation graduate student Lindsey Bischoff (amended to modify to PhD project) GIS data layers scientific publications	Parsons, L. A. 2019. Greater Sage-Grouse survival, breeding ecology, resource selection, and West Nile Virus prevalence on the eastern fringe of their range. PhD Dissertation, South Dakota State University, Brookings. 245 pp. Parsons, L. A., T. J. Runia, G. P. Vincent, A. J. Gregory, and J. A. Jenks. 2021. Greater Sage-Grouse survival varies with breeding season events in West Nile virus non-outbreak years. Ornithological Applications 123:1–14. DOI: 10.1093/ornithapp/duab002
Wildlife species of greatest conservation need habitat survey and inventory of plant communities on twelve South Dakota game production areas within the	By June 30, 2019: 1. Survey each of the twelve Game Production Areas with the Black Hills for all SGCN, all mammal, amphibian, and reptile species tracked by the SDGFP, provide site	Daryl Mergen, Mergen Ecological Delineations, Inc.	Dyer	final report, including individual reports for each of the 12 GPAs	

<p>Black Hills, SD T-71-R-1 FA code 2481 65% federal</p>	<p>specific habitat data for these species when they are observed, and survey all plant species. (May 2016-October 2018).</p> <p>2. Delineate and provide GIS maps and vegetation data that present details of major plant communities found on each GPA within the Black Hills. All plant communities will be delineated and inventoried, but only the major plant communities will have quantitative data collected to characterize the current conditions (May 2016-October 2018).</p> <p>3. Provide detailed summaries of each individual GPA with a list of all wildlife and plant species observed and plant communities that could be priorities for future wildlife habitat enhancement or restoration projects along with possible disturbance factors. (November 2018-May 2019).</p> <p>4. Provide permanent wildlife habitat monitoring locations and detailed methodology for repeated monitoring. This project would be considered baseline and year one and two of a long-term monitoring project for each GPA and will include all available data already collected. (November 2018-May 2019).</p> <p>5. Create an individual report for each GPA that will provide and display the current wildlife habitat data and vegetation data that land managers can use to monitor specific management objectives. The methodology for field data collection would be designed so it can also be compatible with GIS</p>			<p>GIS data layers, including submissions to Vegetation Data Banks</p> <p>presentations and publications in appropriate venues</p>	
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	systems. Sample plot locations will be specifically selected to be included within the plant community polygons that best represent each plant community. (November 2018-May 2019).				
Population characteristics, movement, and habitat use of Shovelnose Sturgeon in Lake Sharpe, South Dakota T-72-4-1 FA code 2483 65% federal	<ol style="list-style-type: none"> 1. Determine recruitment, growth and mortality of Shovelnose Sturgeon on Lake Sharpe Reservoir, SD by June 30, 2021. 2. Determine seasonal movements and habitat use of Shovelnose Sturgeon on Lake Sharpe Reservoir, SD by June 30, 2021. 	Chelsey Pasbrig and Mark Fincel, SDGFP	Pasbrig	final report scientific publications	<p>Goble, C., M. Fincel, C. Pasbrig, D. Gravenhof, and H. Morey. 2022. Distribution, habitat use, and population persistence of Shovelnose Sturgeon in Lake Sharpe, South Dakota. <i>The Prairie Naturalist</i> 55(2023):14-22.</p> <p>Fincel, M., C. Goble, C. Pasbrig, D. Gravenhof, and H. Morey. 2022. Age, growth, and mortality of Shovelnose Sturgeon in Lake Sharpe, South Dakota. <i>The Prairie Naturalist</i> 55(2023):1-13.</p>
Evaluating the impacts of prescribed fire on Dakota skipper populations and habitat T-73-R-1 FA code 2484 65% federal	Evaluate the impact of prescribed fire on the adult and larval habitat quality and population status of Dakota skipper (<i>Hesperia dacotae</i>) butterflies by December 31, 2020.	Marissa Ahlering, TNC	Dyer	<p>Approved effective July 1, 2016</p> <p>Reporting period July-June</p> <p>interim reports due Sept. 28 of 2017, 2018, 2019 and 2020</p> <p>final report due March 31, 2021</p>	Ahlering, M. and N. Hill. 2021. Evaluating the impacts of prescribed fire on Dakota skipper (<i>Hesperia dacotae</i>) populations and habitat. Final Report to SD Game, Fish and Parks. 32 pp.
Design and assessment of dreissenid veliger filtration system for field use T-74-R-1 FA code 2485 65% federal	<p>By December 31, 2018:</p> <ol style="list-style-type: none"> 1. To design a portable filtration system capable of filtering raw water containing suspended particles smaller than 70 microns. 2. To test the efficacy of the system and identify potential limiting factors such as filter size, volume of use and flow rates. 3. To develop a standard protocol for incorporating the system into standard fish culture, management and research activities. 	Chelsey Pasbrig and BJ Schall, SDGFP	Pasbrig	water filtration system and protocol; final report; reporting at appropriate meetings; peer-reviewed journal manuscripts	Schall, F. J. 2019. Evaluation of portable water filtration systems to reduce the transport risk of zebra mussels and Asian clams during fish spawning and trap-and-transfer operations. <i>North American Journal of Aquaculture</i> 81:253-257.

Public opinions of native nongame fishes in the Black Hills T-75-R-1 FA code 2486 65% federal	By June 30, 2018: Identify Black Hills resident attitudes, perceptions, and values regarding native nongame fishes and acceptance of native nongame fish management in the Black Hills.	Jake Davis, SDGFP and Seth Fopma, SDSU	Pasbrig	final report; reporting at appropriate meetings; peer-reviewed journal manuscripts	Gigliotti, L. M. and S. J. Fopma. 2019. Low survey response! Can I still use the data? <i>Human Dimensions of Wildlife</i> 24(1):71-79.
Identification and monitoring of American Dipper populations and inhabited areas in South Dakota T-76-R-1 FA code 2487 65% federal	By March 31, 2019: 1. Conduct annual surveys in each of two years of potential breeding habitat to document new dipper nest locations. 2. Monitor nest site occupancy and reproductive success during two breeding seasons. 3. Band adult and nestling dippers, improving conservationists' abilities to determine population trends and population demographics.	Nancy Drilling, BCR	Heimerl	final report GIS data layers scientific presentations and publications, as appropriate	Drilling, N. E. 2019. Identification and Monitoring of American Dipper Populations and Inhabited Areas in South Dakota: Final Report. Bird Conservancy of the Rockies. Brighton, Colorado, USA.
Surveys for false map turtles and identification of key nesting sites in the upper Missouri River of South Dakota T-77-R-1 FA code 2488 65% federal	By March 31, 2019: 1. Quantify false map turtles detected in Lake Oahe and its associated tributaries. 2. Estimate population size and collect demographic data on false map turtles in high density areas. 3. Determine high quality nesting sites along Lake Oahe. 4. Record presence and demographic data of other turtle species in the area: smooth softshell (<i>Apalone mutica</i>), spiny softshell (<i>Apalone spinifera</i>), snapping turtle (<i>Chelydra serpentina</i>), painted turtle (<i>Chrysemys picta</i>).	Jacob Kerby, USD	Heimerl	final report GIS shapefiles support M.S. student (thesis and scientific publications) graduate student	Madison, J.D., S. Austin, D. R. Davis, and J. L. Kerby. 2018. Bacterial microbiota response in <i>Graptemys pseudogeographica</i> to captivity and Roundup® exposure. <i>Copeia</i> 106(4):580-588. Butterfield, M. M., D. R. Davis, J. D. Madison, and J. L. Kerby. 2019. Surveillance of <i>Ranavirus</i> in false map turtles (<i>Graptemys pseudogeographica</i>) along the lower Missouri River, USA. <i>Herpetological Review</i> 50(1):76-78. Kerby, J., D. Davis, and A. Kase. 2019. Surveys for false map turtles and identification of key nesting sites in the upper Missouri River of South Dakota. Final Report, Grant Number T-77-R-1, Study Number 2488, to South Dakota Department of Game, Fish and Parks, Pierre, SD, USA. Kase, A. C. 2023. Effects of Anthropogenic Modification to the Landscape on Turtle Distribution and Health in South Dakota. PhD Dissertation, University of South Dakota, Vermillion. 127 pp. (<i>Dissertation is under embargo; can be downloaded after 26 Dec 2023</i>). https://red.library.usd.edu/diss-thesis/156/
Associating swift fox presence with the	1. Assess swift fox distribution in Meade, Butte, Harding, Perkins,	Jon Jenks, SDSU and Doni Schwalm,	Stukel	final report	Mitchell, E. 2018. Associating swift fox presence with the distribution of other carnivores in western South Dakota.

distribution of other carnivores in western South Dakota T-78-R-1 FA code 2489	<p>South Dakota and Bowman County, North Dakota, as it relates to sympatric carnivores, specifically coyote and red fox, by June of 2018.</p> <p>2. Assess red fox relative abundance in areas with lethal coyote control in Meade, Butte, Harding, Perkins, and Bowman counties, by June of 2018.</p> <p>3. Determine if swift foxes occupying Meade, Butte, Harding, Perkins, and Bowman counties have larger home ranges than those in other populations, by June of 2018.</p>	Oregon State University		<p>M.S. Thesis chapter and related scientific publications</p> <p>graduate student Emily Mitchell</p>	<p>Final Report to SD Game, Fish and Parks.</p> <p>Mitchell, E.L. 2018. Distribution, ecology, disease risk, and genetic diversity of swift fox (<i>Vulpes velox</i>) in the Dakotas. M.S. Thesis, South Dakota State University, Brookings. 160 pp.</p>
Native pollinator inventory in northeastern South Dakota T-79-R-1 FA code 2491 65% federal	<p>1. Inventory the diversity of primary pollinator groups, focusing on native bees, in prairie remnants in northeastern South Dakota over the course of three field seasons between 2018 and 2021.</p> <p>2. Assess the presence and population extent of all butterfly species with an emphasis on four skipper and one fritillary butterfly species of concern at remnant tallgrass prairie sites not previously surveyed.</p> <p>3. Document seasonal changes in flower availability by plant species and relate variation in pollinator communities to variations in the abundance and diversity of floral resources.</p>	Paul Johnson, SDSU, Jordan Purinton and Jacob Dyer, SDGFP	Dyer	<p>final report</p> <p>M.S. Thesis</p> <p>PhD dissertation</p>	<p>Davis, K.A. 2020 The Status of Dakota Skipper (<i>Hesperia dacotae</i> Skinner) in Eastern South Dakota and the Effects of Land Management M.S. Thesis, South Dakota State University, Brookings. 73 pp.</p> <p>Project ended before being amended to extend end date.</p> <p>Bee samples were analyzed and final report written under T-97.</p>
Conservation genetics and management of the Black Hills redbelly snake, <i>Storeria occipitomaculata pahasapae</i> T-80-R-1 FA code 2492 65% federal	<p>1. Determine the amount of genetic variation present in Black-Hills redbelly snake populations to identify populations and to assess genetic isolation of populations by June 30, 2022.</p> <p>2. Study prey remains of Black Hills redbelly snakes via dissection of dead snakes and regurgitation of stomach contents from live snakes as part of normal processing of</p>	Brian Smith, BHSU	Dowd Stukel	<p>M.S. theses</p> <p>Final reports</p>	<p>Clark, J. L. 2021. Conservation Genetics and Management of the Black Hills Redbelly Snake, <i>Storeria occipitomaculata pahasapae</i>. M.S. Thesis, Integrative Genomics, Dept. of Biology, Black Hills State University, Spearfish, South Dakota.</p> <p>DeVries, K. 2022. Molecular diet analysis of the Black Hills Red-bellied Snake (<i>Storeria occipitomaculata</i>). M.S. Thesis, Black Hills State University, Spearfish. 20 pp.</p>

	snakes by June 30, 2022.				
Surveys for Nesting Peregrine Falcons (<i>Falco peregrinus</i>) in Western South Dakota T-81-R-1 FA code 2493 65% federal	By August 31, 2020: 1. Monitor nest occupancy and productivity of documented peregrine nests. 2. Survey locations outside of the Black Hills (i.e. Slim Buttes) to identify suitable cliff nesting sites. 3. Survey identified suitable cliff nesting sites to document breeding pairs of peregrines.	Bob Oakleaf, contractor	Dowd Stukel	final report relevant raw data and GIS data layers	Oakleaf, R. J. 2023. Peregrine Falcon Surveys for South Dakota Department of Game, Fish and Parks, 2023. Lander, WY.
Western South Dakota game production area breeding bird inventory and monitoring T-83-R-1 FA code 2495 65% federal	By September 30, 2021: 1. Conduct two seasons of bird surveys on selected Region 1 GPAs, and use data to: a. Generate bird species lists for each GPA b. Estimate densities, population sizes, and occupancy rates of breeding bird species on Black Hills GPAs 2. Compare bird responses to management (grazing vs. not grazed; timber management vs. no timber management) on Black Hills GPAs for species with sufficient data.	Matt Smith, Bird Conservancy of the Rockies	Dowd Stukel	final report relevant raw data and GIS data layers	SDGFP Region 1 GPA Breeding Bird Inventory and Monitoring: Final Report. September 2021. Tech. Report # 2021-01, Partner Agreement Number: T-83-R1:2495. Bird Conservancy of the Rockies, 14500 Lark Bunting Lane, Brighton, CO.
Evaluation of northern goshawk population viability on Black Hills National Forest T-84-R-1 FA code 2496 65% federal	By December 31, 2020: 1. Compile existing data on Northern Goshawk and related habitats within the Greater Black Hills from all available sources into one central database or into formats that allow centralized data analyses. 2. Assess what existing population, nest site presence/absence, and habitat data indicate about the status and/or trend of the Northern Goshawk population in the Black Hills of South Dakota and Wyoming. 3. Identify monitoring and/or research	Beartooth Wildlife Research, LLC; Jason Bruggeman	Heimerl	final report relevant raw and compiled data and data analyses; GIS data layers	Bruggeman, J.E. 2021. Annotated bibliography for Northern Goshawk (<i>Accipiter gentilis</i>) peer-reviewed and grey literature from Western North American studies, 2000-2021. Prepared for South Dakota Department of Game, Fish and Parks by Beartooth Wildlife Research, LLC. 47pp. March 15, 2021. Bruggeman, J.E. and P.L. Kennedy. 2021a. Literature review and technical assessment of the Northern Goshawk (<i>Accipiter gentilis</i>) in Western North America. Prepared for South Dakota Department of Game, Fish and Parks. March 15, 2021. 88 pp. (NOTE: This is an updated expansion to: Kennedy, P.L. 2003. Northern Goshawk (<i>Accipiter gentilis atricapillus</i>): A technical conservation assessment. Prepared for the USDA Forest Service, Rocky Mountain Region.

	data needed to determine and subsequently monitor the population viability of the Northern Goshawk in the Black Hills.				<p>Bruggeman, J.E. and P.L. Kennedy. 2021b. Evaluation of Northern Goshawk nest-site data and population status in the Black Hills National Forest of South Dakota and Wyoming: Changes in nest-site habitat suitability and related forest attributes. Final Report Prepared for South Dakota Department of Game, Fish & Parks, Pierre, SD. 184 pp. September 17, 2021.</p> <p>Bruggeman, J.E. and P.L. Kennedy. 2021c. Evaluation of Northern Goshawk nest-site data and population status in the Black Hills National Forest of South Dakota and Wyoming: Changes in nest-site habitat suitability and related forest attributes. Final Technical Report Prepared for South Dakota Department of Game, Fish & Parks. 207 pp. September 17, 2021. (NOTE: This report is an expansion of Bruggeman and Kennedy (2021b) with more detailed descriptions of methodology, analyses, and modeling).</p>
Customization and adoption of NatureServe's environmental review tool for South Dakota T-85-R-1 FA code 2497 65% federal	<p>By June 30, 2022:</p> <ol style="list-style-type: none"> 1. Contract with NatureServe for a customized Environmental Review Tool to meet environmental review and conservation planning needs of South Dakota Game, Fish and Parks. 2. Fully test the ERT for a sufficient interval with internal and external users to assure that all South Dakota-specific needs have been incorporated. 	NatureServe staff; Erik Gelhausen and Michele Bottiaux	Heimerl	<p>final report</p> <p>ERT tool that functions to GFP's satisfaction</p>	NatureServe. 2022. South Dakota Deliverable Report V.
Biological characteristics and seasonal use of Blue Sucker in the James River, South Dakota T-86-R-1 FA code 2498 65% federal	<p>By June 30, 2023:</p> <ol style="list-style-type: none"> 1. Collect information on the population characteristics (size structure, growth, diet, and condition) of blue suckers in the lower James River and compare them to historical information. 2. Collect some coarse-scale information on movement of blue suckers throughout the lower James River using PIT tags. 3. Determine patterns in seasonal movement and habitat use in the lower James River through passive 	Lucchesi, SDGFP and Jeff Wesner, USD	Pasbrig	<p>final report</p> <p>M.S. Thesis</p> <p>articles in peer-reviewed journals and appropriate presentations at professional meetings</p>	<p>Carlson, T. 2022. Population dynamics and seasonal movements of Blue Suckers (<i>Cycleptus elongatus</i>) in the James River, South Dakota. M.S. Thesis, University of South Dakota.</p> <p>Carlson, T.L., B.J. Schall, D.O. Lucchesi, and J.S. Wesner. 2022. Development and application of a size structure index for Blue Sucker. North American Journal of Fisheries Management 42: 200-206.</p>

	and active tracking of blue suckers.				
Surveys for selected aquatic insects in northeast South Dakota lakes, streams and wetlands T-87-R-1 FA code 2499 65% federal	By June 30, 2022: 1. Aquatic invertebrates from five families; Mayflies (Ephemeroptera), Stoneflies (Plecoptera), Damselflies/Dragonflies (Odonata), Caddisflies (Trichoptera), and Alderflies/Fishflies (Megaloptera), will be collected and identified to species level where possible. 2. Surveys will be conducted on several lakes, wetlands, and wadable streams located in the northeast South Dakota counties of Day, Deuel, Grant, Marshall, and Roberts.	Dennis Skadsen, contractor	Dowd Stukel	final report voucher specimens of each taxon collected to SDSU invert. collection specimen photographs data on water quality and land stewardship	Skadsen, D. 2022. Surveys for Selected Aquatic Insects of Northeast South Dakota Streams, Lakes, and Wetlands. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota. State Wildlife Grant T-87-R-1, Study 2499. 176 pp.
Population structure and habitat use of benthic fishes of the Missouri River and its major tributaries with an emphasis on Sicklefin and Sturgeon Chub in South Dakota T-89-R-1 FA code 2501 65% federal	By December 30, 2022: 1. Update the distribution and status of benthic fishes of the Missouri River and its major tributaries with an emphasis on Sicklefin and Sturgeon Chub in South Dakota. 2. Describe habitat use and dominant macrohabitats of Sicklefin and Sturgeon Chub in South Dakota.	Mark Pegg, UNL Mitch Magruder M.S. Student	Pasbrig	M.S. Thesis Final Report	Magruder, M.R. 2022. Sturgeon Chub distributional patterns and habitat use and benthic fish assemblage structure in Missouri River tributaries of South Dakota. M.S. Thesis, University of Nebraska, Lincoln. 106 pp. Magruder, M., M. Pegg, C. Pasbrig. 2023. Sicklefin Chub and Sturgeon Chub distribution and abundance in the Missouri River in South Dakota. Final Report to SD Game, Fish and Parks. University of Nebraska, Lincoln.
The occurrence patterns, current distribution, and population interrelatedness of at-risk native fishes in the Black Hills ecoregion T-93-R-1 FA code 2405	By June 30, 2023: 1. Describe the current distribution and estimate population densities of at-risk native fishes in the Black Hills ecoregion with an emphasis on Lake Chub and Longnose Sucker 2. Estimate probabilistic occurrence and co-occurrence patterns of native and non-native fishes to predict important habitat conditions that support Longnose Sucker and Lake Chub populations 3. Describe the population structure and interrelatedness of Lake Chub and Longnose Sucker throughout the Black Hills ecoregion using hierarchical genetic structure and	Chelsey Pasbrig and Jake Davis, SDGFP David Schumann and Todd Osmundson, Univ of WI-LaCrosse Kristina Morben, M.S. Student	Pasbrig	M.S. Thesis Final Report	Morben, K.A. 2023. Updated distribution, population genetic structure, and local occurrence patterns of Longnose Sucker (<i>Catostomus catostomus</i>) and Lake Chub (<i>Couesius plumbeus</i>) in the Black Hills of South Dakota. M.S. Thesis, University of Wisconsin-La Crosse. 119 pp. Morben, K.A., D.A. Schumann, C.A. Pasbrig. 2023. The occurrence patterns, current distribution, and population interrelatedness of at-risk fishes in the Black Hills ecoregion. Final Report to SD Game, Fish and Parks. University of Wisconsin-La Crosse.

	assignment methods				
Analysis of samples collected during native pollinator inventory in northeastern South Dakota T-97-R-1 FA code 2509	<p>By June 30, 2023:</p> <p>1) Process native bee samples acquired during the previous project (Native pollinator inventory in northeastern South Dakota [T-79-R-1] from 2018 to 2021) and compile samples and specimen data in an Excel database.</p> <p>2) Quantify the diversity of native bees and develop standard biodiversity metrics for comparison of the regional biota to other regions.</p> <p>TRACS OBJECTIVE: Strategy: Create or manage 1 database by June 2023 Activity Tag 1: Information technology and management Unit of Measure: 1 database</p>	Paul Johnson, SDSU	Dowd Stukel	<p>Data files on pollinators at the species level. Data also available via the Internet from an SDSU website associated with the Severin-McDaniel Insect Collection (SMIRC)</p> <p>Digital text and photo essay in PowerPoint format for outreach use.</p> <p>Webpage on the native pollinators of northeastern South Dakota for the SMIRC website.</p> <p>Publications in peer-reviewed journals.</p> <p>Poster and oral presentations on the project at the South Dakota Academy of Science, SD TWS Chapter, and other venues.</p>	Johnson, P. J. 2023. Analysis of samples collected during native pollinator inventory in northeastern South Dakota. Final Report to SD Game, Fish and Parks, T-97-R-1. South Dakota State University, Brookings.
Project numbering system changes here					
Evaluation of timber harvest on nongame bird abundance and diversity in	By May 15, 2013: 1. compare nongame bird abundance and diversity before and after timber	Chad Lehman, SDGFP and Kent Jensen, SDSU	Dowd Stukel	M.S. Thesis Jessica Panning	Panning, J., K.C. Jensen, and C. P. Lehman. 2013. Evaluation of timber harvest on nongame bird abundance and diversity in Custer State Park, South Dakota. Final

Custer State Park, South Dakota T2-1-R-1 FA Code 2442 50% federal	<ul style="list-style-type: none"> 2. sale treatments 2. determine the effects of timber harvest on abundance of sensitive or species of greatest conservation need 3. quantify macro- and micro-habitat characteristics used by nongame birds in a ponderosa pine ecosystem 				<p>Report to South Dakota Department of Game, Fish and Parks. 35 pp.</p> <p>SDGFP never received M.S. thesis.</p>
Conservation status of the mountain sucker (<i>Catostomus platyrhynchus</i>) in South Dakota T2-2-R-1 FA Code 2443 50% federal	<p>By December 31, 2011:</p> <ul style="list-style-type: none"> 1. document the current distribution and abundance of mountain sucker in South Dakota for comparison with historical data 2. evaluate the potential influence of physical and biological factors on the abundance and distribution of the mountain sucker 3. inform management recommendations related to the conservation of mountain suckers in South Dakota 	Katie Bertrand, South Dakota State University	Howell	M.S. Thesis Luke Schultz	<p>Schultz, L. D. 2011. Environmental factors associated with long-term trends of mountain sucker populations in the Black Hills, and an assessment of their thermal tolerance. M.S. Thesis, South Dakota State University, Brookings. 102 pp.</p> <p>Schultz, L. D. and K. N. Bertrand. 2011. An assessment of the lethal thermal maxima for mountain sucker. <i>Western North American Naturalist</i> 71(3):404-411.</p> <p>Schultz, L. D. and K. N. Bertrand. 2012. Long term trends and outlook for mountain sucker in the Black Hills of South Dakota. <i>Am. Midl. Nat.</i> 167:96-110.</p> <p>Schultz, L. D., S. J. Lewis, and K. N. Bertrand. 2012. Fish assemblage structure in Black Hills, South Dakota streams. <i>Prairie Naturalist</i> 44:98-104.</p> <p>Breeggemann, J.J., C.A. Hayer, J.R. Krause, L.D. Schultz, K.N. Bertrand, and B.D.S. Graeb. 2014. Estimating the ages of Black Hills Mountain Sucker: Precision, population dynamics, and management implications. <i>Western North American Naturalist</i> 74:299-310.</p> <p>Schultz, L. D., K. N. Bertrand, and B.D.S. Graeb. 2015. Factors from multiple scales influence the distribution and density of an imperiled fish-mountain sucker in the Black Hills of South Dakota, USA. <i>Environmental Biology of Fishes</i> 99(1):3-14.</p> <p>Bertrand, K. N., J. A. VanDeHey, T. J. Pilger, E. A. Felts, and T. F. Turner. 2016. Genetic structure of a disjunct peripheral population of mountain sucker <i>Pantosteus jordani</i> in the Black Hills, South Dakota, USA. <i>Conservation Genetics</i> 17(4):775-784.</p>
Prevalence of an emerging disease in South Dakota amphibian populations T2-3-R-1 FA Code 2444	<p>By June 1, 2011:</p> <ul style="list-style-type: none"> 1. Survey the prevalence of the chytrid fungus in amphibian populations across South Dakota 2. Use an Amphibian Disease Testing Center to provide timely and cost- 	Jake Kerby University of South Dakota	Kempema	Final report to GFP M.S. Thesis Jennifer Brown Database	<p>Brown, J. 2011. Impacts of chytrid fungus and contaminants on amphibians of the Missouri River. M.S. Thesis, University of South Dakota. 65 pp.</p> <p>Kerby, J. 2011. Final Report – Prevalence of an emerging disease in South Dakota amphibian populations. Report to SDGFP. Dept. of Biology, University of South</p>

	<p>efficient evaluations of amphibian disease outbreaks for researchers working in the state of South Dakota</p> <p>3. Disseminate information concerning the chytrid fungus to both wildlife biologists and the general public</p>				Dakota.
<p>Classification and mapping of riparian vegetation along the Big Sioux River</p> <p>T2-4-R-1</p> <p>FA Code 2445</p> <p>50% federal</p>	<p>By August 31, 2012:</p> <ol style="list-style-type: none"> 1. Map vegetation extent, structure, and composition along the riparian corridor of the Big Sioux River from Watertown to Sioux City within a GIS framework, using a hierarchical classification system compatible with the National Vegetation Classification 2. Sample and quantify dominant overstory and understory plant species composition within at least 5 stands of each classified vegetation type in a format compatible with VegBank 3. Quantify historic changes in riparian vegetation extent, adjacent land cover, and channel dynamics along the Big Sioux River in Brookings, County, SD 	<p>Mark Dixon</p> <p>University of South Dakota</p>	Ode	<p>M.S. Thesis</p> <p>Matt Ley</p> <p>ArcGIS geodatabase</p> <p>hardcopy maps</p> <p>veg. data in VegBank format</p>	<p>Ley, M. J. 2012. Riparian forest vegetation patterns and historic channel dynamics of the Big Sioux River, South Dakota. M.S. Thesis, University of South Dakota, Vermillion. 185 pp.</p>
<p>Burrowing owl distribution in western South Dakota</p> <p>T2-5-R-1</p> <p>FA Code 2446</p> <p>50% federal</p>	<p>By June 30, 2012:</p> <ol style="list-style-type: none"> 1. Determine distribution of burrowing owl occupied black-tailed prairie dog colonies on 50% of known colonies in western South Dakota 2. Construct a database of black-tailed prairie dog colonies containing multiple burrowing owl pairs which includes size, ownership and management of colonies 3. Describe local vegetational habitat factors associated with occurrence and density of burrowing owls in black-tailed prairie dog colonies 4. Describe habitat associations (active/inactive black-tailed prairie 	<p>Kristel Bakker,</p> <p>Dakota State University and</p> <p>Chuck Dieter,</p> <p>SDSU</p>	Kempema	<p>M.S. Thesis</p> <p>Jason Thiele</p>	<p>Thiele, J. 2012. Burrowing owl distribution and nest site selection in western South Dakota. M.S. Thesis, Biological Sciences, South Dakota State University, Brookings. 140 pp.</p> <p>Thiele, J. P., K. K. Bakker, and C. D. Dieter. 2013. Multiscale nest site selection by burrowing owls in Western South Dakota. <i>Wilson Journal of Ornithology</i> 125(4):763-774.</p> <p>Thiele, J. P., K. K. Bakker, and C. D. Dieter. 2019. Tree cover in the surrounding landscape reduced burrowing owl (<i>Athene cunicularia</i>) occupancy of black-tailed prairie dog colonies in South Dakota. <i>Journal of Raptor Research</i> 53(4):367-376.</p>

	<p>dog colonies, poisoning and grazing regimes, ownership of colonies), colony and landscape level factors affecting burrowing owl use of black-tailed prairie dog colonies</p> <p>5. Compare vegetation, habitat associations, colony- and colony- and landscape-level characteristics of burrowing owl occupied and unoccupied colonies.</p> <p>6. Determine factors associated with nest site selection by burrowing owls in select colonies.</p>				
<p>Biodiversity inventory of native bees in the Black Hills Ecoregion T2-6-R-1 FA Code 2447 50% federal</p>	<p>By December 31, 2012:</p> <ol style="list-style-type: none"> 1. Provide a biodiversity inventory of the native bee species of the Black Hills 2. Focus the survey and inventory on exemplary forest, meadow, and shrub-steppe habitats in the Black Hills of Lawrence, Pennington, Custer, and Fall River counties in South Dakota 3. Document host flowers and analyze floral visitation patterns through seasonal changes 4. Use data collected on species occurrence and associated habitat characteristics for initial geospatial evaluations in order to seek patterns associated with historical and contemporary land-use 	<p>Paul Johnson, SDSU</p>	<p>Kempema</p>	<p>M.S. Thesis David Drons</p> <p>Updated bee records database at Severin-McDaniel Insect Research Collection, SDSU</p>	<p>Drons, D. J. 2012. An Inventory of Native Bees (Hymenoptera: Apiformes) in the Black Hills of South Dakota and Wyoming. M.S. Thesis, Plant Science, South Dakota State University, Brookings. 98 pp.</p>
<p>Distribution and lek locations of Greater Prairie-Chickens and Sharp-tailed Grouse outside of their traditional range in South Dakota T2-7-R-1 FA Code 2448 50% federal</p>	<p>By June 30, 2012:</p> <ol style="list-style-type: none"> 1. To identify and survey areas of eastern South Dakota where populations of Greater Prairie-Chickens and Sharp-tailed Grouse are suspected to reside, and document their distribution and numbers. 2. To characterize the landscape attributes within 3000 m of 	<p>Charles Dieter and Kent Jensen, SDSU</p>	<p>Kempema</p>	<p>M.S. Thesis Mandy Orth</p> <p>GIS layers</p>	<p>Orth, M. R. 2012. Distribution and landscape: Attributes of greater prairie-chickens and sharp-tailed grouse outside of their traditional range in South Dakota. M.S. Thesis, South Dakota State University, Brookings. 77 pp.</p>

	<p>identified display grounds (leks).</p> <p>3. To analyze landscape characteristics using Geographic Information System modeling to develop a predictive model to assist natural resource managers in identifying potential prairie-chicken and sharp-tailed grouse habitats.</p>				
<p>Glacial relict fishes in spring fed headwater streams of South Dakota's Sandhills region</p> <p>T2-8-R-1</p> <p>FA Code 2450</p> <p>50% federal</p>	<p>By June 30, 2013:</p> <p>1. To assess the occurrence of northern redbelly dace, peal dace, finescale dace, blacknose shiner, and plains topminnow in the Sandhills of South Dakota.</p> <p>2. To provide recommendations for an effective long-term monitoring plan for relict fishes in spring-fed headwater streams</p>	<p>Katie Bertrand, SDSU</p>	<p>Pasbrig</p>	<p>M.S. Thesis</p> <p>Eli Felts</p>	<p>Felts. E. 2013. Ecology of glacial relict fishes in South Dakota's Sandhills. M.S. Thesis. South Dakota State University, Brookings, SD. 85 pp.</p> <p>Felts, Eli A., and Katie N. Bertrand. 2014. Conservation status of five headwater stream specialists in southwestern South Dakota. American Midland Naturalist 172(1): 131-159.</p> <p>Felts, E.A., K. Bertrand, and B.D.S. Graeb. 2014. Northern Pearl Dace Population Dynamics in Southwestern South Dakota Streams. Prairie Naturalist 46:70-75.</p> <p>Felts, E.A. and K. Bertrand. 2013. Comparison of barge and backpack electrofishing for sampling fish assemblages in small South Dakota streams. South Dakota State University, Brookings. Report to SD Game, Fish and Parks.</p>
<p>Topeka shiner (<i>Notropis topeka</i>) monitoring in eastern South Dakota streams (round two)</p> <p>T2-9-R-1</p> <p>FA Code 2449</p> <p>50% federal</p>	<p>Collect standardized biological and physical habitat data from all previously monitored streams by 2012.</p>	<p>Pasbrig</p>	<p>Pasbrig</p>	<p>Species occurrence and habitat data</p>	<p>Pasbrig, C. A. and D. O. Lucchesi. 2012. Topeka shiner (<i>Notropis topeka</i>) monitoring in Eastern South Dakota streams (2010-2012), #T2-9-R-1. SDGFP, Pierre.</p>