Appendix V

Nebraska Game and Parks Commission Consultation Letter for Marsland Expansion Area

NEBRASKA
—GAME PARKS—

Nebraska Game and Parks Commission
2200 N. 33rd St. • P.O. Box 30370 • Lincoln, NE 68503-0370 • Phone: 402-471-0641 • Fax: 402-471-5528

January 24, 2011

Chad Olson
Hayden-Wing Associates, LLC
2308 South 8th Street
P.O. Box 1689
Laramie, WY 82073

Re: Marsland Uranium Mine Expansion Project, Dawes County and Box Butte County, Nebraska

Dear Mr. Olson:

Please make reference to your emails and our phone conversations dating back to October 2010. This letter is in response to your request for a review of this project's potential impacts to threatened and endangered species and other special-status species and their habitats in Dawes and Box Butte counties in Nebraska. As we understand it, the project involves construction of an in-situ uranium mining site, which will require a permit from the Nebraska Department of Environmental Quality.

Threatened and Endangered Species
Staff of the Nebraska Game and Parks Commission (Commission) have conducted a review of the proposed sites under Neb. Rev. Stat. § 37-807 (3) of the Nongame and Endangered Species Conservation Act and we offer the following comments.

This project area (including the two mile buffer as indicated on the map provided) is within the range of the state-listed threatened finescale dace (*Phoxinus neogaeus*) and northern redbelly dace (*Phoxinus eos*), and the state-listed endangered swift fox (*Vulpes velox*). Additionally, the range of state-listed endangered blacknose shiner (*Notropis heterolepis*) occurs approximately four miles downstream of the project area.

Blacknose Shiner
The blacknose shiner is in the minnow family and is found only in clear, well-oxygenated portions of streams that are relatively undisturbed. It was once very common in Nebraska and is now extremely rare. In Nebraska it spawns in the end of June. Given its limited distribution, this species would be impacted by a reduction in flows or impairment of stream quality. The blacknose shiner is state endangered.

Northern Redbelly Dace and Finescale Dace
Northern redbelly dace and finescale dace are state threatened and are members of the minnow family. Northern redbelly dace can reach three inches in length and have two dark side stripes with a lighter area between them. Finescale dace have a stout body, a large mouth and can reach lengths of five inches. These dace are among Nebraska's most colorful minnows. In Nebraska, these dace are often found together in the headwaters of clear, cool, high quality streams. Potential factors that influence spawning include the water temperature and photoperiod. In

northern redbelly dace (Nebraska Game and Parks Commission 1994). Both species would be impacted by a reduction in flows or impairment of stream quality.

Swift Fox

The swift fox is a state-listed endangered species. Swift fox is the smallest of the North American canines, and they utilize burrows more than any other canine. They are typically found in topographically flat (slopes <20%), arid regions. In Nebraska, suitable habitat is in the shortgrass prairie ecoregion where vegetation is less than 40 cm tall. They can be found in large expanses of prairie as well as prairie intermixed with agriculture. Dens are also found in anthropogenic areas such as near roads and trails, and in agricultural fields, culverts, pipes and buildings (Tannerfeldt et al. 2003). Swift fox den entrances have a diameter of 17-23 cm. Swift fox are highly mobile and will use a variety of dens throughout the year. However, a female swift fox with young pups will typically be tied to one den during the denning season, which is from April through August in Nebraska. Pups do not leave the den until they are at least 6 – 7 weeks old, and sometimes older. During both breeding and non-breeding seasons, they are susceptible to any activities that disturb the ground and may destroy their dens. These activities include, but are not limited to, digging, trenching, drilling, and directional boring. If construction activity will occur in suitable habitat during the denning season, a survey for swift fox dens should be conducted by a qualified biologist, prior to construction. Results of the survey should be sent to the Nebraska Game and Parks Commission to determine if actions are needed to avoid impacts to the swift fox.

At this time, the information we have received regarding the uranium mining operation is insufficient. Therefore, we are unable to determine if this project will impact the aforementioned state listed threatened or endangered species. It is unclear whether or not the facility would affect water quality or quantity in the streams and rivers that provide habitat for state-listed species. Is there potential for large-scale contamination events, and is there a contingency plan in place for such events? What types of activities will occur within the project area and what impact will they have on native habitats? Is there potential for the site to expand in the future?

Answers to these and other questions will allow us to make an informed decision as to whether or not this project will impact state-listed species and if any type of mitigation is needed for loss of habitat for these species. If possible, it would be very helpful to tour an active in-situ uranium mining operation and the proposed site. If this is not possible, I would recommend a meeting to discuss the project in detail and to gain a better understanding of mining operations.

Other Species of Concern

As requested, the following information is being provided regarding non-listed special status species. The Nebraska Natural Legacy Project (NNLP) (Schneider et al. 2005) identifies numerous "at-risk" species within the state. The NNLP Tier 1 at-risk species are those that are globally or nationally most imperiled. Threatened and endangered species are among those classified as Tier 1 at-risk species. However, there are several other Tier 1 at-risk species that are not currently on the threatened and endangered species list. At-risk species that are not listed as threatened or endangered are not afforded legal protection under the federal Endangered Species Act or the Nebraska Nongame and Endangered Species Conservation Act. Regardless of whether or not they receive legal protection, all at-risk species are considered a valuable state resource worthy of ensuring their continued existence in Nebraska. It is prudent to implement appropriate conservation measures for at-risk species that are not listed as threatened or endangered in order to maintain the biological diversity of the ecosystems within our state, and to avoid accelerating their decline to the point where they need to be listed. One of the goals of the NNLP is to ensure

at-risk species do not decline to the point where they warrant listing. Therefore, it is common for the environmental review to include information on these species.

There are records of the following Tier 1 at-risk species within approximately five miles of the project area: burrowing owl, ferruginous hawk, long-billed curlew, plains topminnow, pearl dace, long-legged myotis, fringe-tailed myotis, and tawny crescent. There are also numerous records of Tier 2 at-risk species within five miles of the project area, including golden eagle, Swainson's hawk, prairie falcon, and a variety of other birds, mammals, fish, reptiles, and plants. A copy of the NNLP and a complete listing of Tier 1 and Tier 2 at-risk species are available online at http://outdoornebraska.ne.gov/wildlife/programs/legacy/review.asp.

Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act
The following recommendations are being made in order to help the project proponent comply with federal laws, such as the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (16 U.S.C. 703-712: Ch. 128 *as amended*). For more information regarding these laws, please contact Jeanine Lackey, Nebraska Field Office, U.S. Fish and Wildlife Service, 203 W. Second St., Grand Island, NE 68801

The Bald and Golden Eagle Protection Act provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*). Bald eagles utilize mature, forested riparian areas near rivers, streams, lakes, and wetlands and occur along all the major river systems in Nebraska. The bald eagle southward migration begins as early as October and the wintering period extends from December-March. The golden eagle is found in arid open country with grassland for foraging in western Nebraska and usually near buttes or canyons which serve as nesting sites. Golden eagles are often a permanent resident in the Pine Ridge area of Nebraska. Both bald and golden eagles frequent river systems in Nebraska during the winter where open water and forested corridors provide feeding, perching, and roosting habitats, respectively. The frequency and duration of eagle use of these habitats in the winter depends upon ice and weather conditions. Human disturbances and loss of wintering habitat can cause undue stress leading to cessation of feeding and failure to meet winter thermoregulatory requirements. These affects can reduce the carrying capacity of preferred wintering habitat and reproductive success for the species. Many bald and golden eagles nest in Nebraska from mid-February through mid-July. Disturbances within 0.5-mile of an active nest or within line-of-sight of the nest could cause adult eagles to discontinue nest building or to abandon eggs. We recommend conducting a habitat assessment to determine if bald and/or golden eagles could use the project area (including the two mile buffer) during wintering and/or nesting periods. If wintering or nesting habitat is present, a survey for individuals and nests (both active and inactive) should be conducted.

Under the Migratory Bird Treaty Act (MBTA) construction activities in grassland, wetland, stream, woodland, and river bank habitats that would otherwise result in the taking of migratory birds, eggs, young, and/or active nests should be avoided. Although the provisions of MBTA are applicable year-round, most migratory bird nesting activity in Nebraska occurs during the period of April 1 to July 15. However, some migratory birds are known to nest outside of the aforementioned primary nesting season period. For example, raptors can be expected to nest in woodland habitats during February 1 through July 15, whereas sedge wrens, which occur in some wetland habitats, normally nest from July 15 to September 10. If development in this area is planned to occur during the primary nesting season or at any other time which may result in the take of nesting migratory birds, the Commission would request that the project proponent arrange to have a qualified biologist conduct a field survey of the affected habitats to determine the absence or presence of nesting migratory birds. Surveys must be conducted during the nesting season. The Commission should

be contacted immediately for further guidance if a field survey identifies the existence of one or more active bird nests that cannot be avoided by the planned construction activities. Adherence to these guidelines will help avoid the unnecessary take of migratory birds.

Nebraska Game and Parks Commission Properties
The Commission owns two wildlife management areas and one state recreation area within 5 miles of the project area, and Fort Robinson State Park is within 10 miles of the project area. Once again, further discussion on this project would be helpful in determining if mining operations would impact these areas.

At this time, we cannot make a determination as to whether or not this project will impact state listed threatened or endangered species. As previously suggested, it would be very helpful to tour an active in-situ uranium mining operation and the proposed site. If this is not possible, I would recommend a meeting to discuss the project in detail and to gain a better understanding of mining operations so we can make an accurate determination.

All federally listed threatened and endangered species are also state listed. For assessment of potential impacts on federally listed, candidate or proposed threatened or endangered species, please contact John Cochnar, Nebraska Field Office, U.S. Fish and Wildlife Service, 203 W. Second St., Grand Island, NE 68801.

Thank you for the opportunity to comment. If you have any questions or need additional information, please feel free to contact me at (402) 471-5438 or michelle.koch@nebraska.gov.

Sincerely,

Michelle R Koch

Michelle R. Koch
Environmental Analyst Supervisor
Nebraska Natural Heritage Program
Nebraska Game and Parks Commission

CC: John Cochnar, USFWS
Jeanine Lackey, USFWS
Jennifer Abrahamson, NDEQ

References

Nebraska Game and Parks Commission. 1994. *Nebraska's Threatened and Endangered Species: Pearl, Northern Redbelly and Finescale Dace.* Nebraska Game and Parks Commission, Lincoln, Nebraska.

Schneider, R., M. Humpert, K. Stoner, G. Steinauer. 2005. *The Nebraska Natural* Legacy Project – A Comprehensive Wildlife Conservation Strategy. Nebraska Game and Parks Commission, Lincoln, Nebraska.

Tannerfeldt, M.., A. Moehrenschlager and A. Angerbjorn. 2003. *Den ecology of swift, kit and arctic foxes: A review.* In The Swift Fox: Ecology and conservation of swift foxes in a changing world, M. Sovada and L. Carbyn editors. Canadian Plains Research Center, University of Regina.

Appendix W

Marsland Expansion Area Drawdown-Distance Analysis Assumptions

Marsland Drawdown-Distance Analysis

July 25, 2013

- Assumptions
  - Consumptive Water Use
    - The consumptive water use estimates was taken from the MEA water balance for the year 2024.
    - The estimated total consumptive water use for the year is estimated at a total of 315 gpm.
      - 250 gpm RO concentrate.
      - 65 gpm of production bleed.
    - The activities for that year are as follows:
      - Mine Unit 1 is in stability.
      - Mine Unit 2 is in RO treatment
      - Mine Unit 3 is in RO treatment
      - Mine Unit 4 is in IX treatment
      - Mine Unit 5 is in IX treatment
    - Mine Units 6 through 10 in production.
    - The withdrawal of the restoration bleed and the production bleed is approximated as a line of wells equally spaced along the length of the MEA.
      - The withdrawal of the restoration bleed is from 11 wells spaced equal distance over 2.5 miles.
        - The pumping rate of the 11 wells is assumed as 22.7 gpm.
        - The restoration bleed is simulated over the RO sweep and IX restoration area.
      - The withdrawal of the production bleed is from 11 wells spaced equal distance over 2.5 miles.
        - The pumping rate of the 11 production bleed wells is 5.9 gpm.
        - The production bleed is simulated over the production area.
  - Drawdown Analysis
    - Analysis Theory
      - Analysis uses Theis (1935)
        - Aquifer has infinite extent, and is homogeneous, and isotropic. (No boundary conditions)
        - Well fully penetrates the confined aquifer resulting in horizontal flow to the well and flow is laminar.
        - Aquifer has uniform thickness
        - Aquifer is fully confined and discharge is derived from storage in the aquifer.
        - The equation for predicting drawdown (s) at the well is as follows:
          - $S = (Q/4\pi T) \times W(u)$ where

        - s is the drawdown
        - T is the transmissivity
        - Q is the pumping rate
        - W(u) is the well function
      - Time period for the calculation is assumed to be three months of continuous pumping.
    - The analysis assumes that the drawdown of interfering wells is additive because the aquifer is confined.
- Methodology
  - Hydraulic information taken from Table 3.4-7 Summary of 2011 Marsland Pumping Test Results
    - Formation data used in the analysis:
      - Avg. Transmissivity (ft^2/day): 1012
      - Avg. Hyd. Cond. (ft/day): 25
      - Avg. Storativity: $7.46x10^{-5}$
- Methodology
  - Well Drawdown calculations done using USGS Excel Spreadsheet Confined_Predict.xls
    - A series of drawdown calculations were done for various distances from the pump well.
      - Drawdown calculations were done for the restoration wells and production wells.
    - The drawdown estimates for the MEA was calculated by using a spreadsheet with the drawdown values arraigned at the proper distance on an assumed straight line and added to get the overall drawdown at the distance point.

References:

1. C. W. Fetter. 1994. Applied Hydrology, Third Edition, (Englewood Cliffs NJ, Prentice-Hall 1994) p.257-258
2. F. G. Driscoll. 1986. Ground Water and Wells, Second Edition, (St. Paul Minnesota, Johnson Filtration Systems Inc. 1986) Chapter 9, Well Hydraulics p. 205-267