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An Evaluation of Potential Impacts of Development of the Zaharias  
Property on Wildlife and Habitat Values at the Hodgson Harris  
Reservoir Open Space in Superior, Colorado

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250 Perry Lane Dacono, CO 80514 phone: 720.887.4928 fax: 720.887.4680

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## Introduction

On December 13, 2018 the Superior Open Space Advisory Committee (Committee) engaged Smith Environmental and Engineering (SMITH) to provide an independent evaluation of the potential impact of a proposed development on the Zaharias Property (Property) on wildlife and habitat values at the Boulder County Hodgson-Harris Reservoir (Reservoir) Open Space (Open Space). This document addresses topics of concern identified by the Committee during review of the proposed development plan.

## Background

The Property is located in the NW  $\frac{1}{4}$  of the NW  $\frac{1}{4}$  of Section 29, Township 1 S, Range 69 W at the southeast corner of South 88<sup>th</sup> Street overpass of U.S. 36 and encompasses approximately 24 acres within the Town of Superior, Colorado (Town). The Property abuts the Open Space to the west. The Reservoir was constructed in 1882 to store irrigation water (Spaulding and Kesler 2018). As a persistent waterbody in a semi-arid shortgrass prairie setting, the Reservoir has been a locally important habitat for migratory and resident waterfowl and shorebirds for over a century. A productive aquatic ecosystem developed over the life of the Reservoir as evidenced by the diversity of vertebrates and invertebrates known to occur (Spaulding and Kesler 2018, Jones et al. 2017).

Following construction of U.S. 36 in the early 1950s, uplands surrounding the Reservoir remained undeveloped until 1996 when the Saddlebrooke at Rock Creek development was constructed abutting the Open Space to the south. In 2003 Smith Environmental and Engineering (SMITH) was contracted by the Committee to provide assistance in evaluating undeveloped lands (including the Property) in Superior as potential open space acquisitions. SMITH evaluated wildlife habitat values on undeveloped parcels within the Town, including the Property, and developed management and purchase recommendations in support of potential future open space acquisitions. At that time the Property was a weedy vacant lot and was rated lowest of five properties characterized as “moderate” in habitat value, relative to other parcels (encompassing approximately 650 acres in total) evaluated during the study. The proximity of the Property to the Reservoir and the cattail, willow, and cottonwood wetland and riparian vegetation associated with the Reservoir and ephemeral channels at the inlet and outfall were factors contributing to the habitat value of the Property that were considered in this evaluation.

In 2013 the Reservoir was drained and dredged, and the dam was reconstructed to meet State dam safety standards. Mitigation measures were recommended by Boulder County Parks and Open Space (BCPOS) in an attempt to minimize the impact of this construction project on wildlife and habitats; however, dewatering, dredging, and dam reconstruction significantly altered habitats and the food webs that were established at the Reservoir over the prior 131 years, resulting in an apparent decrease in the abundance and diversity of aquatic vertebrates and invertebrates as well as a decrease in the abundance of diving ducks observed on the Reservoir (Spaulding and Kesler 2018).

On January 4, 2019 SMITH biologists visited the Property to assess current conditions. At present the Property is supporting a black-tailed prairie dog (*Cynomys ludovicianus*) colony. The prairie dogs have effectively removed all above ground growth of grasses and forbs. Shrubs and trees are essentially absent from the upland portion of the parcel, and habitat quality for terrestrial vertebrates is poor (Figure 1). A palustrine emergent wetland and sparse riparian shrub and tree cover exist along an unnamed ephemeral tributary of Rock Creek located near the north boundary of the Property.



Figure 1. View looking north along the west side of the Reservoir.

### Objectives

This document was prepared to respond to specific concerns identified by the Committee relative to the potential development on the Property, as follows.

- How will the proposed development affect the prairie dog colony and raptors that forage in it?
- How will increased human presence, light, noise, and stormwater runoff resulting from development of the Property affect wildlife, wildlife habitats, and water quality at the Reservoir?
- What opportunities for maintenance or enhancement of wildlife habitats within the Property that would be advantageous to maintenance of habitat values at the Reservoir are recommended?
- What setbacks and buffering strategies are recommended to minimize development impacts on the Reservoir?
- How will connectivity of the Reservoir to the open space corridor that extends to McCaslin Boulevard be affected by development of the Property, and what measures are recommended to maintain it?
- What considerations should be addressed in managing the Reservoir long-term for wildlife?

## Findings

Findings and recommendations addressing the objectives of this evaluation were developed based on review of historic topographic maps, aerial photography, the final plat site plan for the proposed development, wildlife and ecological inventories of the Open Space (Spaulding and Kesler 2018, Jones et al. 2018), information regarding reservoir operations provided by BCPOS, pertinent literature, and observations of the effects of urbanization on wildlife habitats and wildlife behavior in the shortgrass prairie ecosystem along the Colorado Front Range during the past 45 years.

### *1. Impacts of Property development on prairie dogs and raptors that forage in the existing prairie dog colony*

In accordance with Sec. 16-493 of the Superior Municipal Code, prairie dogs inhabiting portions of the Property within the limits of development must be humanely relocated by the developer before commencement of grading, excavation, or building on the Property. Based on the final plat site plan for the proposed development, development would subsume over 90 percent of the extent of habitat currently occupied by prairie dogs. In order to manage future conflicts on landscaped areas of the development, it is likely that the developer would choose to remove all prairie dogs from the Property. If removal efforts are scheduled between March 15 and October 31, Burrowing Owl surveys (Colorado Division of Wildlife 2007) will be necessary to ensure that no Burrowing Owls are present in the prairie dog colony and that federal and state requirements for their protection are met.

Removal of prairie dogs from the Property will contribute to the regional cumulative impacts of urbanization on foraging raptors that prey on them, including Red-tailed Hawks (*Buteo jamaicensis*), Ferruginous Hawks (*Buteo regalis*), Rough-legged Hawks (*Buteo lagopus*), Golden Eagles (*Aquila chrysaetos*), and Bald Eagles (*Haliaeetus leucocephalus*). The impact to foraging raptors as a result of removal of this colony would be limited in magnitude, as it is restricted to an isolated 24-acre parcel surrounded by developed lands and will not affect their regional population trends.

### *2. Effects of increased human presence, light, noise, and stormwater runoff resulting from development of the Property on wildlife, wildlife habitats, and water quality at the Reservoir*

The proposed development would result in a similar pattern of encroachment into open land on the west side of the Reservoir as the Saddlebrooke at Rock Creek development created on the east side of the Open Space. Night time illumination and noise created by the development would add cumulatively to existing levels of light and noise at the Open Space but is not likely to result in increased levels of disturbance above thresholds of tolerance (*i.e.*, disturbance resulting in avoidance or displacement) of wildlife that utilize the Open Space. The proposed site plan for the Property calls for an elevated 8-ft. concrete path along the eastern boundary of the developed area. This path would be located nominally 100 feet from the existing fence on the west side of the Open Space. The effect of human presence along this path is not likely to result in disturbance of wildlife using the Reservoir above thresholds of tolerance, particularly because human presence along the trail will be predictable with respect to location. As public access to the Open Space is prohibited, no increase in human presence in close proximity to wildlife using the Reservoir is anticipated.

ERO Resources Corp., consultants to the proponent for the proposed development, have indicated in an October 22, 2018 Memo to Allison James (Town) that stormwater from the proposed development would not be discharged to the Reservoir, and that stormwater runoff from the Property would be detained on site and directed to the existing 88<sup>th</sup> Street Detention Pond. Accordingly, no impacts to water quality in the Reservoir are anticipated as a result of increased stormwater runoff from developed areas of the Property.

3. *Opportunities for maintenance or enhancement of wildlife habitats within the Property that would be advantageous to maintenance of habitat values at the Reservoir*

At present wildlife habitat quality and the overall aesthetic value of the Property are poor. SMITH provided a range of wildlife habitat enhancement recommendations for the Property in the 2003 Wildlife Survey and Habitat Evaluation report (SMITH 2003). Several of these recommendations could be effectively implemented prior to, or in concert with, development of the Property as summarized below.

- Weed control should be implemented throughout the Open Space, specifically targeting weeds listed by the State as List A and List B Noxious Weeds. Integrated Weed Management should be utilized, which employs several control methods to effectively manage noxious weeds. Typically, mechanical, chemical, cultural, and biological control are implemented in concert. This prevents the overuse of chemical herbicides while also maximizing their effectiveness.
- Tree and shrub plantings in the upland along the west shore of the Reservoir to create a zone of riparian habitat that would significantly enhance habitat value for birds, mammals, reptiles, amphibians, as well as invertebrates. Litter (leaves and woody debris) from the riparian plantings would supplement detrital input to the Reservoir from upstream sources, thereby enhancing energy input to the aquatic food web. Ideally, these plantings would extend into the planned setback between the Open Space fence line and the footprint of the retaining walls at the east edge of the proposed development. Once established, tree and shrub plantings would provide aesthetic enhancement of the landscape as well.
- Expansion and enhancement of the existing palustrine emergent wetland along the west shoreline to improve cover for nesting waterfowl and other birds could be accomplished by manipulation of the elevation of the west bank and shoreline of the Reservoir. Management of reservoir stage to expand the zone of inundation and soil saturation could be used to support a more extensive and structurally diverse wetland.
- Planting of aquatic plants preferred by ducks in shallower depth zones of the Reservoir and sedges and bulrushes in the wetland would improve the availability of food for waterfowl and enhance habitat quality for amphibians and fish.
- Installation of bat roost and bird nest boxes in uplands adjacent to the Reservoir to enhance species diversity.

4. *Setbacks and buffering strategies recommended to minimize development impacts on the Reservoir*

Setbacks to maintain the functionality of wildlife habitats and movement corridors is a topic frequently addressed in urban planning and widely supported by biologists. Despite the frequency with which the issue arises, there is essentially no widely accepted guidance or published literature addressing it. A



recent review of the available literature conducted by SMITH revealed that setbacks of 100-150 feet are most frequently employed, although there is no evidence to support the use, or effectiveness, of such setbacks for the benefit of wildlife.

The setback between the edge of the Reservoir and the footprint of the Saddlebrooke development is less than 150 feet, and along most of the property line it is less than 100 feet (Figure 2). There are no trees or barriers to screen light and noise from this high density residential development, yet the Reservoir is still receiving significant year-round use by water birds (Jones et al. 2018).



Figure 2. View looking southeast towards the existing development southeast of the Reservoir.

The final plat site plan for the proposed development on the Property indicates that the footprint of the development will be setback 100 from the west shore of the Reservoir, and that an 8-ft. wide concrete path will be constructed atop a berm that will be created along the east edge of the development. With the addition of landscaping features including tree plantings along the east side of the trail, this layout would provide considerably more protection from noise, light, and human disturbance, as well as a more favorable aesthetic effect, than was achieved along the property boundary on the east shore. Overlooks of the Reservoir could be incorporated along the trail, and interpretative signage could be provided as well.

5. *Effects of development on connectivity of Reservoir to the open space corridor that extends to McCaslin Boulevard and measures recommended to maintain it*

Efforts to maintain and create corridors to facilitate movement of plants and animals between habitat patches in fragmented landscapes have proven worthwhile; however, evaluation of experimental results indicates that corridors are more important for movement of invertebrates, nonavian vertebrates, and

plants than they are for birds (Gilbert-Norton et al. 2010). Accordingly, avian use of the Reservoir is more likely affected by the presence and proximity of many ponds and reservoirs in southeastern Boulder and northern Jefferson County, and by the availability of food and cover at the Reservoir, than by its connection to these features by riparian corridors as posited by Jones et al. (2018).

The principal open space corridor in the vicinity of the Reservoir follows the mainstem of Rock Creek. It connects open lands west of McCaslin Boulevard with parks and greenspaces in developed areas downstream within the Town. An intact riparian zone and broad setbacks between the stream and development are present along much of the reach of Rock Creek between McCaslin Boulevard and U.S. 36. These features provide space and cover for wildlife and enhance the value of this corridor for wildlife movements. A narrower greenway along Community Ditch extends this corridor to the northwest.

The Reservoir is situated in an ephemeral tributary of Rock Creek, north of the open space corridor along the mainstem of Rock Creek. Construction of South 88<sup>th</sup> Street modified the channel of this tributary and the ephemeral tributary north of it which parallels U.S. 36, creating a barrier to aquatic and terrestrial animal movements to the Reservoir from the upstream greenspaces. Because it is situated between U.S. 36 to the north, South 88<sup>th</sup> Street to the west, and Saddlebrooke to the east, the Open Space is already a functionally isolated patch of aquatic habitat in the urban matrix. Apart from the narrow zone of wetland and riparian habitat that exists along the ephemeral channel on the north end of the Property, there is little habitat offering cover or forage that would attract wildlife. Consequentially, proposed development of the Property is not likely to have further significant adverse effect on animal movements along tributaries of Rock Creek in the vicinity of the Reservoir.

#### *6. Considerations relative to the long-term management of the Reservoir for wildlife*

The importance of annual reservoir operations on avian and non-avian wildlife at the Reservoir is well documented in the BCPOS 2018 Ecological Values Assessment (Spaulding and Kesler 2018), which provides recommendations for annual drawdown and filling of the Reservoir. As the 2011 Hodgson Harris Intergovernmental Agreement provides for adaptively managing reservoir operations to benefit wildlife as well for irrigation water storage, these recommendations should form the basis for long term management of the Reservoir.

The Ecological Values Assessment also notes anoxic conditions in the benthic sediment of the Reservoir, a “sparse” macroinvertebrate assemblage, and a decrease in invertebrate prey which may underlie the apparent decrease in diving duck presence. Excess nutrients (e.g. nitrogen, phosphorus) are frequently the cause of eutrophication leading to hypoxia in reservoirs. The underlying cause of hypoxic or anoxic conditions in the benthic sediment warrants evaluation as a basis for management actions to remedy and control it.

Dredging of the Reservoir during 2013-2014 reset the benthic community composition and food webs. The depth of the Reservoir, light penetration, and seasonal water temperatures were modified by dredging. Characteristics of the unconsolidated sediment in the bottom of the Reservoir were also modified. Sediment type (sand, silt, mud) and grain size affect benthic community composition.

because of the behavioral and morphological adaptations of the organisms that inhabit benthic environments.

Establishment of protocols to monitor the physical and chemical characteristics and biota of the Reservoir should be considered to inform management of water levels and any habitat enhancement efforts (as presented in 3, above). This presents an interesting opportunity for undergraduate research, or the BCPOS Small Grant Program, and cost-effective acquisition of data that would be very useful to staff responsible for management of the Reservoir.

### References

Colorado Division of Wildlife. 2007. Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls. Available online at: <http://cpw.state.co.us/Documents/WildlifeSpecies/LivingWithWildlife/RecommendedSurveyOwls.pdf#search=burrowing%20owl>.

Gilbert-Norton, L., R. Wilson, J. R. Stevens, and K. Beard. 2010. A Meta-Analytic Review of Corridor Effectiveness. *Conservation Biology* Volume 24, No. 3, 660-668.

Jones, S.J., Bauer, S., Hansley, and P., Mah, P. 2017. Hodgson-Harris Reservoir Breeding Bird Survey. Unpublished Report. 24 pp.

SMITH. 2003. Wildlife Survey and Habitat Evaluation for the Town of Superior. Westminster, Colorado.

Spaulding, S. and J. Kesler. 2018. Hodgson Harris Reservoir Ecological Values Assessment. Unpublished Boulder County Parks and Open Space Memorandum. 11 pp.