Washington Dept. of Fish and Wildlife

Odessa Subarea Special Study
Wildlife Survey Final Report

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October 2010

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INTRODUCTION

The Odessa Subarea Special Study (OSSS) will investigate the possibility of continuing development of the Columbia Basin Project to deliver project water to lands currently using groundwater in the Odessa Subarea. The aquifer is declining to such an extent the ability of farmers to irrigate their crops is at risk. Domestic, commercial, municipal, and industrial uses and water quality are also affected. In response to the public's concern about the declining aquifer and associated economic effects, Congress has provided funding to the Bureau of Reclamation (Reclamation) to investigate the problem. The State of Washington has agreed to partner with Reclamation, providing funding and various technical studies (U.S. Bureau of Reclamation 2009).

As part of the impact analysis, the Washington Department of Fish and Wildlife (WDFW) was requested to conduct wildlife surveys in areas that could be impacted by the alternative canal alignments. The purpose of developing the *Odessa Subarea Special Study, Wildlife Survey Final Report* is to provide information and/or recommendations that will allow Reclamation to avoid or significantly reduce potential impacts to wildlife, and/or make recommendations for mitigation of unavoidable impacts. The results of the surveys will provide an inventory of wildlife species of concern for the project area and will be used to identify and evaluate potential impacts on important resources such as migration corridors and breeding habitats.

Recommendations listed within this report were formulated using data collected and analyzed by WDFW biological experts to support the development of the Odessa Subarea Special Study.

STUDY AREA

The Odessa Subarea Special Study focuses on lands currently irrigated with groundwater in Adams and Grant Counties, and a small portion of Franklin County. The study area is within the Columbia River Basin Water Management Project boundary and is generally defined by the area bounded on the west by the Project's East Low Canal, on the east by the City of Lind and extending north to Wilson Creek and south to the Connell area (U.S. Bureau of Reclamation 2009).

METHODS

A number of survey methods were employed to evaluate the potential wildlife impacts associated with the various partial and full water replacement alternatives (U.S. Bureau of Reclamation 2009) proposed for project development. These methods include inventory-style surveys, with the objective of detecting as many wildlife species as possible: as well as species specific surveys, with the objective of detecting particular species of concern. Species specific surveys typically followed detailed protocols which were followed to the greatest extent feasible. In addition, we utilized a literature review to assess the potential presence of species not detected during wildlife surveys.

Wildlife Inventory (2009-2010)

The study area was divided into five strata: East High Canal (EHC), Black Rock Coulee Re-Regulating Reservoir (BRCRR), Black Rock Coulee Flood Storage Area (DE220), Rocky Coulee Reservoir (RCR), and East Low Canal Expansion/Extension (ELC), so that potential impacts could be tied directly to various alternatives proposed for partial and full water replacement. Transects were generated for each survey strata to ensure complete and uniform coverage during survey efforts as described below.

East High Canal (EHC).—Because the EHC alignment provided by Reclamation was considered to be accurate to within ¼ mile, we generated a ½ mile buffer around the EHC alignment (¼ mile on each side of the center line) and generated eight parallel transects within uncultivated (i.e., landscapes dominated by shrubsteppe habitats) portions of this buffer. Transects occurred on each side of the alignment and were approximately 115 meters apart.

The ‗EHC-South'[a] and ‗EHC- Black Rock Branch'[b] portions of the East High Canal Strata consist primarily of agricultural landscapes. With the exception of a handful of generalist species such as burrowing owl (*Athene cunicularia*), long-billed curlew (*Numenius americanus*), and badger (*Taxidea taxus*), agricultural landscapes are not expected to make a significant contribution of species of concern. Therefore, agriculture was considered low priority habitat and survey effort was reduced to emphasize surveys in habitat suitable for listed species. The EHC-south and EHC-Black Rock Branch areas were surveyed from points where county roads intersected the canal alignment. Spacing between survey points averaged approximately two miles.

In addition to those structures occurring within the ½-mile buffer of the EHC alignment, the EHC strata also includes Farrier Wasteway, Rocky Coulee Wasteway, Rocky Coulee N Wasteway, Weber Coulee Wasteway and Siphon, Moody Siphon and Tunnel, Rocky Coulee Branch Siphon, and an O&M facility (located approximately two miles north of the EHC alignment, in the northeast corner, at the intersection at Rd W NE and Rd 6 NE). These areas were surveyed using parallel transects with approximately 115 meter spacing within the shrubsteppe habitats of the construction footprints.

Black Rock Coulee Reregulation Reservoir (BRCRR) and Black Rock Coulee Flood Storage Area (DE220).—Parallel transects with approximately 115 meter spacing were generated within the inundation footprints and borrow pit area. These areas consisted mostly of intact shrubsteppe habitat.

Rocky Coulee Reservoir (RCR).—The RCR inundation area and easement is interspersed with shrub-steppe and cultivated fields. With the exception of a handful of generalist species

[a] The ‗EHC– South' consists of that portion of EHC extending south from Road 11, approximately 5 canal miles south of the Black Rock Coulee Reregulation Reservoir.
[b] The ‗EHC– Black Rock Branch' consists of that portion of the EHC extending to the southeast from the Black Rock Coulee Reregulation Reservoir.

such as burrowing owl, long-billed curlew, and badger, agricultural landscapes are not expected to make a significant contribution of species of concern. Therefore, agriculture was considered low priority habitat and survey effort was reduced to emphasize surveys in habitat suitable for listed species. These areas were surveyed using parallel transects with approximately 115 meter spacing within the shrubsteppe habitats of the construction footprints.

East Low Canal (ELC).—The ELC is dominated by agricultural landscapes. With the exception of a handful of generalist species such as burrowing owl, long-billed curlew, and badger, agricultural landscapes are not expected to make a significant contribution of species of concern. However, due to the importance of this area to breeding burrowing owls and long-billed curlew, we felt it necessary to survey the ELC thoroughly. The easement was ≤ 115 meters in width and the presence of suitable habitat was sporadic, so biologists strategically surveyed all available habitats located within the boundaries of the easement. In addition the O&M facility was surveyed using parallel transects with approximately 115 meter spacing. This facility is located approximately 4 miles east of the ELC alignment, in the northeast corner of the intersection at Herman and Johnson Roads.

Additional Locations.—In addition, the tentative locations of 26 canal side pumping plants, six re-lift pumping plants, and one gravity feed turnout were field visited and each was evaluated for future survey needs. Specific locations for these features were not supplied by Reclamation therefore formal surveys could not be completed. The level of follow-up survey need is determined by dominant habitat (i.e., shrubsteppe, CRP, and agriculture).

Survey transects were loaded into hand-held GPS units for field reference. Surveys occurred between 0600 and 0930 hrs and were conducted at an average walking speed of one mph. Information recorded included: species, observation type, count, coordinates (UTM NAD 83 Z11), bearing and distance offset (when necessary), and any pertinent notes. Any sign of animal activity was considered an observation. Observation types included: audio, egg, burrow, cache, carcass, deer area, dusting, foraging, migration, nest, pellets (i.e. cough pellets), roost, scat, scrape, shed skin, track, trail, and visual.

Line transect surveys that use audible, visual, and indirect signs such as tracks, scat, or diggings to determine occupancy work well for a variety of animal species; but they are likely to be inadequate for species that are not highly visible (due to their size or behavior), noisy, or occur at low densities (Sutherland 1996). Intuitively, this includes most small mammals (e.g., rodents, shrews, and voles), medium sized mammals that are mostly nocturnal (e.g., striped skunk, racoon [*Mephitis mephitis, Pyrocyon lotor*]), and nearly all reptiles. For instance, several techniques exist to adequately survey for inconspicuous wildlife species (Garden et al. 2007). For small mammals and reptiles, the most efficient survey methods typically involve trapping individuals using pitfall traps with or without drift fences (Ryan et al. 2002), Sherman traps (Williams and Braun 1983), tomahawk traps (Malcolm 1991), snap traps (Mengak and Guynn 1987), or hair tubes (Mills et al. 2002). Some form of cluster sampling design is the process by which the population is sampled and usually incorporates strategically located quadrats, transect lines, trapping grids, or some other standardized survey method. However, the specific choice of method to be utilized is often determined by the species of interest as no single approach has the

ability to adequately sample all species located within a community (Garden et al. 2007). As such, WDFW recognizes that the selection of survey method was a critical decision that was likely to affect the comprehensiveness of survey efforts during the OSSS. The survey methods that were more suitable for surveying small mammals and reptiles, occurring at low densities, that were classified as species of concern within the OSSS area would have required an unrealistic degree of effort (person hours) and cost. For example, previous efforts to survey reptiles within shrubsteppe habitats in the OSSS area using pitfall traps indicate it would have taken, on average, 21 trap nights to catch just one specimen (Steve Germaine, WDFW research scientist, personal communication). Therefore, WDFW relied on previous work relating to small mammals and reptiles that were classified as species of concern to document the likelihood of their presence in the OSSS area.

Species Specific Surveys

Due to the large size of the OSSS Project area, survey efforts were typically limited to the best available habitat for each species concerned. It is important to note that the survey efforts reported in this document do not confirm absence of the species for which we surveyed, rather a lack of evidence of presence.

Aechmophorus Grebe Survey (2009-2010)

Banks Lake was surveyed for Aechmophorus grebes [western (*Aechmophorus occidentalis*) and Clark's (*A. clarkia*)] during the typical breeding season for Banks Lake (July-August) while grebes were gathered at colonial nesting sites and brood rearing areas.

During 2009, surveys were focused on identifying nesting sites and nest abundance, and were conducted along shorelines with an emphasis on sheltered inlets with appropriate tall emergent vegetation such as cattail and bulrush. All appropriate habitat, which was located in the Osborne Bay, Jones Bay and Devils Punch Bowl areas, was surveyed for nesting grebes. Surveying was done by slowly driving a small boat along the shorelines at a minimum distance of 10 meters from nests to avoid disturbance. Species and number of nests observed was recorded. The number of adults and young-of-the-year observed was also recorded.

During 2010, the primary objective was to document which portions of Banks Lake were being used for brood rearing. In addition, nesting colonies identified during 2009 were visited to determine nest effort relative to 2009. The entire lake was surveyed for brood rearing grebes.

Bat Survey (2010)

The target species for bat surveys were the Townsend's big-eared bat (*Corynorhinus townsendii*) and the spotted bat (*Euderma maculatum*). The project area was divided into seven survey blocks which reflect land use and habitat differences: Billy Clapp-north (BCn), Hwy 28 Corridor (H28), Ribail Coulee (RbC), Black Rock Coulee (BRC), Artesian Lake (AL), Rocky Coulee (RC), and Farrier Coulee (FC) (Appendix A). Surveys were conducted during July and August. The Western Bat Working Group (WBWG) recommended survey matrix was used to determine survey methods (WBWG 2005).

Townsend's big-eared bat echolocation calls evade acoustic detection because their low amplitude require them to be much closer to an ultrasonic detector (3-4 m) than required by other bat species (50 – 100 m). The most effective survey method recommended for Townsend's big-eared bat is daytime searches for colonial roosts in caves, mines, or buildings. If no bats are found, indications of prior occupancy (e.g. use as a night roost) can include the presence of moth wings or other discarded body parts and guano (Pierson, E. D. 1999). The guano can sometimes be distinguished from other bat species by examining its physical characteristics, such as size and consistency (Greg Falxa, WDFW, personal communication). If evidence of potential Townsend's big-eared bat use was found in a structure, it was revisited at night for audio and/or visual confirmation.

Spotted bats are non-colonial cliff roosters; therefore their roosts are very difficult to find and generally inaccessible. The most effective survey method recommended for the spotted bat is listening for their echolocation calls in foraging habitat. Spotted bat echolocations are in a frequency range that is audible to most people, but an ultrasonic detector was used to increase the detection range and reliability of identification. Other species that occur in the project area can also be reliably recorded with ultrasonic detectors and identified to species. All species were recorded and identified. Detectors were placed at locations that had indications of bat use; or were near water, concrete bridges, or other habitat features likely to attract bats. Bat calls were collected both passively (remote auto record) and actively (observer triggered manual record) using Pettersson D240X full spectrum ultrasonic detectors (Pettersson Electronics, Uppsala, Sweden), and recorded into portable recorders as digital files. Sonograms of the call files were examined and compared to reference calls from known species using the SonoBat software package (SonoBat, Arcata, CA).

Additionally, bats often congregate under bridges at night between foraging bouts, so all bridges encountered were searched for evidence of use. If a bridge checked during the day had evidence of use, it was revisited at night for a visual check and audio survey.

Greater Sage Grouse Lek Survey (2008-2010)

Greater sage grouse (*Centrocercus urophasianus*) lek surveys were conducted aerially during 2008 and 2009 and by ground during 2010. For aerial surveys, a two mile buffer was generated around the EHC extending from Billy Clapp Lake to the proposed BRCRR. Within this buffer, 25 transects running north to south, spaced at half mile intervals were created. Surveys occurred from March 19-25. Transects were flown no more than 100 – 150 meters above ground level with at least one observer looking west (this allows the sun to reflect off the white chest of the displaying males) at all times. Surveys began approximately 30 minutes before sunrise and continued no more than 90 minutes after sunrise because sage grouse become increasingly difficult to detect 30 minutes after sunrise.

During 2010, ground surveys were conducted in the areas with the greatest potential for lekking. In the OSSS project area this generally occurs where relatively open fields (e.g. agriculture and CRP) are adjacent to shrubsteppe. These areas were surveyed by walking the shrubsteppe side of the shrubsteppe-agriculture transition line while scanning open areas for displaying males.

Surveys began one hour before sunrise and ended by 08:30. Surveyors stopped approximately every half mile to listen for displaying males. Locations of sage grouse and sage grouse fecal droppings would be recorded if detected.

Jackrabbit Spotlight Survey (2010)

Jackrabbit (*Lepus* spp.) spotlight survey areas were limited to those areas with road access that were located away from residential areas. Spotlight surveys were conducted between February 3 and March 31, with one additional survey conducted on August 18 after landowner access was acquired. Surveys were conducted between 19:30 and 05:20. Surveys were conducted on calm, clear nights from a vehicle travelling approximately five mph, using a spotlight in a wide arc on both sides of the vehicle. Both a Brinkmann QBeam Max Million III and a LightForce SL170 Striker spotlight were used. Jackrabbit sightings were recorded in a GPS unit and relevant data such as species and number of animals observed per detection was documented for each location.

Mussel Survey (2010)

Native freshwater floaters (*Anodonta* spp.) occur throughout the Columbia Basin, including Crab Creek and Moses Lake. One of these mussels, the California floater (*A. californiensis*), is a state candidate species and federal species of concern. Of areas to be potentially impacted by proposed water replacement alternatives, only Brook Lake has the potential for supporting freshwater mussels.

On the day of the snorkel survey (August 31), visibility in the water was zero due to a large algae bloom; however, lake-inhabiting mussels are often not visible and feeling around in the substrate is an accepted method of detection, therefore this method was used. Three surveyors searched approximately 160 meters of the northwest shoreline of Brook Lake. In addition, the team walked the shoreline looking for relic shells. The location of any mussels found would be recorded, and they would be collected for positive identification.

Northern Leopard Frog Survey (2009-2010)

Northern leopard frogs (*Rana pipiens*) are the only amphibian species of concern known to occur in the project area. Currently, BRCRR and the wetlands located northeast of Billy Clapp Lake (T23N R28E S01 and S12; T23N R29E S06 and S07) appear to be the only locations within the study area with potential for supporting leopard frogs. Two survey methods were utilized; call chorus and active season visual encounter. During 2009, call chorus surveys were conducted on April 15 and April 30 at BRCRR. In 2010, one survey was completed on April 26 at the wetlands located northeast of Billy Clapp Lake. Active season surveys were conducted on July 28, 2009 and attempted on August 17, 2010.

Call chorus surveys are conducted between dusk (½ hr after sunset) and 0100 hrs, and when air temperatures are above 5.6°C (42°F). Favorable conditions for call surveys occur when 10°C is reached (daytime temperature), relative humidity is high (during or immediately after light rain is optimal), and winds are less than Beaufort level 4 (13-18 mph). Surveys begin to be impaired at the upper end of Beaufort level 3 (8-12 mph) and are cancelled during level 4 conditions. To

thoroughly survey an area requires multiple visits over a four to five week period. Optimal coverage of an area is achieved by repeating surveys once a week during this period. When the goal of a call chorus survey is to determine occupancy of a site it is advantageous to play a one- to two-minute segment of the leopard frog breeding chorus, this method was employed during these surveys. Surveyors remained 20 – 25 meters back from the shoreline to avoid disturbing any frogs that may be present. Surveys were conducted by walking slowly and quietly along the shoreline, stopping at 100 meter intervals (maximum interval length) to initiate tape playback and listen for responses for a minimum of 5 minutes per location. In both years, high wind levels during leopard frog breeding season made it impossible to complete the necessary number of surveys; therefore, active season visual encounter surveys were conducted to increase the probability of detecting the target species.

Active season visual encounter surveys are conducted post-metamorphism, from about mid-July to mid-September. Surveys are conducted by slowly walking along shorelines concentrating efforts in flooded areas of low emergent vegetation, terrestrial areas with low emergent vegetation or herb/forb vegetation on moist to saturated soils, and floating vegetation mats. These areas are most likely to be occupied by leopard frogs at this time of year. Long-handled nets were used to ―sweep" the vegetation to the left and right of the surveyor's path to increase the chance of flushing hidden frogs. Due to a late spring in 2009, the surveyed ponds were also surveyed by dip-net to check for potential larval stage frogs.

Pygmy Rabbit Survey (2010)

Given the large size of the project area and lack of roads in some sections, pygmy rabbit (*Brachylagus idahoensis*) survey areas were prioritized using an ArcMap data layer provided by Tom Owens (WDFW, IT Specialist). This layer identified the three combined soil/shrubsteppe classes with potential to support pygmy rabbits: loam/shrubsteppe, mixed loam/shrubsteppe and stony loam shrubsteppe. Before surveys were conducted a final field check of potential sites was made to check the quality of the shrub component and surveys were prioritized accordingly.

Surveys were conducted using the methods outlined in *Surveying for Pygmy Rabbits* (Ulmschneider 2004). The original survey plan was to go out two days after fresh snowfall to take advantage of the unique track/trail pattern created by pygmy rabbits, unfortunately the appropriate snow conditions did not occur. Surveys were conducted on nine days from January 22 through March 17. Potential burrows were further monitored with Moultrie D-50 trail cameras.

Raptor Survey (2010)

Raptor surveys were limited to ferruginous hawk (*Buteo regalis*) and golden eagle (*Aquila chrysaetos*) historical nest sites and were conducted as part, and in accordance with, regularly scheduled WDFW statewide selective population surveys to assess the current status of these species.

Surveys were conducted during the early season (March 15 – April 25) when territories are established, and during the late season (June 8 – June 25) when productivity can be evaluated.

The early season surveys consisted of visiting historical nest sites (via the ground), within known territories, to determine occupancy and nest status (i.e. repaired, disrepair, etc.). The objectives during the late season surveys were related to determining nest success and population productivity; therefore, they were restricted to only those nests where potential for occupancy by target species was noted during the early season. The timing of late season surveys was scheduled such that nests were visited when fledglings were 40 days old. A nest was not classified as being successful until a fledgling that was ≥ 40 days old was observed. Biologists also documented use of historical territories and/or nest sites by raptor species other than ferruginous hawk or golden eagle.

Surveyors used GPS units to navigate to historical nest locations and observe them using binoculars and spotting scopes to determine status. If raptor activity was confirmed, species and activity were recorded.

Whipsnake Survey (2010)

Striped whipsnake (*Masticophis taeniatus*) surveys were conducted in accordance with survey protocols that have been established for this species in its core range near Vantage, Washington (Lisa Hallock, WDFW, personal communication). Surveys were conducted in November to coincide with the time of year when striped whipsnakes gather at communal hibernacula and undergo ecdysis (skin-shedding). Because striped whipsnakes occur at extremely low densities, they are rarely observed and their presence is most often documented by locating shed skins rather than by direct observation. Therefore, conducting surveys during this time of year increases the probability of detecting this species because a greater number of individuals (i.e. shed skins) are concentrated in a relatively small area.

There are no known striped whipsnake hibernacula in the OSSS area so we used ArcGIS 9.3 to identify areas that had the greatest potential to provide adequate hibernacula for striped whipsnakes. These areas are located in shrubsteppe habitats (preferably with sandy soils) that are adjacent to talus slopes, cliffs, or other similar rock structures. After the boundaries of these areas were identified, biologists visited each site one time and strategically searched for shed snake skins. When a skin was located, it was either identified to species in the field or collected for future identification. Any shed skin that was suspected to be from a striped whipsnake was collected for confirmation of field identification.

RESULTS AND DISCUSSION

Wildlife Inventory

The following results summarize wildlife presence within the OSSS project area. The following tables are only intended to list which species were encountered. Species presence does not confirm that impacts are imminent, nor does species absence confirm that impacts will not occur. Expected impacts are described in the ‗Impact Assessment' section of this document.

Species Richness

A total of 107 different species of birds, 20 species of mammals, and seven species of herpetofauna were observed during wildlife surveys (Table 1).

Table 1. Species richness, number of federal status species, and number of state status species detected by strata 2009-2010.

Taxa	Strata	Total # species	# Federal Status[a]	# State Status[b]
Avian	Black Rock Coulee Flood Storage (DE220)	47	1 FCo	3 SC, 4 SM
Avian	Black Rock Coulee Reregulation Reservoir	68	1 FCo	2 SC, 5 SM
Avian	East High Canal	86	4 FCo	2 SE, 2 SS, 5 SC, 9 SM
Avian	East Low Canal Expansion/Extension	80	2 FCo	1 SE, 3SC, 8 SM
Avian	Rocky Coulee Reservoir	42	1 FCo	2 SC, 3 SM
Mammal	Black Rock Coulee Flood Storage (DE220)	10	1 FC	1 SC, 3 SM
Mammal	Black Rock Coulee Reregulation Reservoir	10	1 FC	1 SC, 3 SM
Mammal	East High Canal	18	1 FC	6 SM, 2 SC
Mammal	East Low Canal Expansion/Extension	8		1 SM
Mammal	Rocky Coulee Reservoir	7	1 FC	1 SC, 1 SM
Herptiles	Black Rock Coulee Flood Storage (DE220)	3		1 SM
Herptiles	Black Rock Coulee Reregulation Reservoir	0		
Herptiles	East High Canal	5	1 FCo	1 SC, 1 SM
Herptiles	East Low Canal Expansion/Extension	4		
Herptiles	Rocky Coulee Reservoir	2		1 SM

[a] FC = Federal Candidate, FCo = Federal species of concern
[b] SE = State endangered species, SS = State sensitive species, SC = State candidate species, SM = State monitored species

Species of Concern

A total of 21 species of concern were observed during the wildlife inventory surveys. Species of concern are reported by strata in Table 2. Nests of species of concern and the strata in which they occur are described in Table 3.

Table 2. List of species of concern detected by strata 2009-2010.

Common Name	Scientific Name	Federal Status[a]	State Status[b]	DE220[c]	BRCRR	EHC	ELC	RCR
American White Pelican	*Pelecanus erythrorhynchos*	none	SE			X		
Badger	*Taxidea taxus*	none	SM	X	X	X	X	X
Bald Eagle	*Haliaeetus leucocephalus*	FCo	SS			X		
Black-crowned Night-Heron	*Nycticorax nycticorax*	none	SM				X	
Black-necked Stilt	*Himantopus mexicanus*	none	SM		X	X	X	
Burrowing Owl	*Athene cunicularia*	FCo	SC			X	X	
Canyon Bat	*Parastrellus Hesperus*	none	SM	X	X	X		
Grasshopper Sparrow	*Ammodramus savannarum*	none	SM	X	X	X	X	X
Great Blue Heron	*Ardea herodias*	none	SM		X	X	X	
Great Egret	*Ardea alba*	none	SM			X		
Hairy-winged myotis	*Myotis volans*	none	SM			X		
Loggerhead Shrike	*Lanius ludovicianus*	FCo	SC	X	X	X	X	X
Long-billed Curlew	*Numenius americanus*	none	SM	X	X	X	X	X
Osprey	*Pandion haliaetus*	none	SM			X		
Pallid Bat	*Antrozous pallidus*	none	SM			X		
Peregrine Falcon	*Falco peregrinus*	FCo	SS			X		
Prairie Falcon	*Falco mexicanus*	none	SM	X		X	X	
Pygmy Short-horned Lizard	*Phrynosoma douglasii*	none	SM	X		X		X
Sage Sparrow	*Amphispiza belli*	none	SC	X		X	X	X
Sage Thrasher	*Oreoscoptes montanus*	none	SC	X	X	X		
Sandhill Crane	*Grus canadensis*	none	SE			X	X	
Swainson's Hawk	*Buteo swainsoni*	none	SM	X	X	X	X	X
Turkey Vulture	*Cathartes aura*	none	SM			X	X	
Washington ground squirrel	*Urocitellus washingtoni*	FC	SC	X	X	X		X
Western long-eared myotis	*Myotis evotis*	none	SM			X		
Western small-footed myotis	*Myotis ciliolabrum*	none	SM	X	X	X		

[a] FC = Federal Candidate, FCo = Federal species of concern
[b] SE = State endangered species, SS = State sensitive species, SC = State candidate species, SM = State monitored species
[c] DE220 = Black Rock Coulee Flood Storage (DE220), BRCRR = Black Rock Coulee Reregulation Reservoir, EHC = East High Canal, ELC = East Low Canal Expansion/Extension, RCR = Rocky Coulee Reservoir.

Table 3. Nest observations for species of concern 2009-2010.

Strata	Common Name	Scientific Name
Artesian/Black Lake Corridor (DE220)	Sage Thrasher	*Oreoscoptes montanus*
Artesian/Black Lake Corridor (DE220)	Swainson's Hawk	*Buteo swainsoni*
East High Canal	Peregrine Falcon	*Falco peregrinus*
East High Canal	Prairie Falcon	*Falco mexicanus*
East High Canal	Swainson's Hawk	*Buteo swainsoni*
Rocky Coulee Reservoir	Swainson's Hawk	*Buteo swainsoni*

Species Specific Surveys

Aechmophorus Grebes

The two years of surveys indicate that grebe use of Banks Lake occurs primarily in the north end of the lake (from Poplars boat ramp north), where all potential breeding habitat is located (Appendix B). Annual nesting effort of Aechmophorus grebes on Banks Lake appears to be variable (Table 4), and nesting efforts occurred primarily at Osborne Bay with only individual nests observed in Jones Bay and Devil‘s Punchbowl. Nest success and causes of nest failure were not evaluated, but given the recreational activity that takes place on Banks Lake it is possible boating activity limits nest success to some degree (Gericke 2006). Due to the low production of young-of-the-year, brood rearing areas were not effectively documented.

Table 4. Aechmophorus grebe nest observations at Banks Lake during peak nesting season (July) 2009-2010.

Year	Location	Western	Clark‘s	Unidentified
2009	Osborne Bay	43	1	20
2009	Jone‘s Bay	0	0	0
2009	Devils Punch Bowl	0	0	0
2010	Osborne Bay	2	0	0
2010	Jone‘s Bay	1	0	0
2010	Devils Punch Bowl	1	0	0

Bats

There were no detections of Townsend‘s big-eared or spotted bats during the OSSS surveys; however, 11 species, including five state monitor species, were detected. Both species diversity and activity levels were distributed unevenly throughout the project area (Table 5).

Table 5. Species and location of bats detected in the OSSS Project area during 2010 acoustic surveys.

			Survey Block[1]						
Species	Scientific name	Status[2]	BCn	H28	RbC	BRC	AL	RC	FC
big brown bat	*Eptesicus fuscus*		X			X			X
California myotis	*Myotis californicus*		X						X
canyon bat	*Parastrellus hesperus*	SM	X	X	X	X			
little brown myotis	*Myotis lucifugus*		X		X		X		
hairy-winged myotis	*Myotis volans*	SM	X						
hoary bat	*Lasiurus cinereus*		X		X				
pallid bat	*Antrozous pallidus*	SM	X	X	X				
silver-haired bat	*Lasionycteris noctivagans*		X	X	X				
spotted bat	*Euderma maculatum*	SM							
Townsend‘s big-eard bat	*Corynorhinus townsendii*	SC							
western long-eared myotis	*Myotis evotis*	SM	X		X				
western small-footed myotis	*Myotis ciliolabrum*	SM	X	X	X	X	X	X	X
Yuma myotis	*Myotis yumanensis*		X	X					
25 khz Spp			X				X		

[1]BCn = Billy Clapp-north, H28 = Hwy 28 Corridor, RbC = Ribail Coulee, BRC = Black Rock Coulee, AL = Artesian Lake, RC = Rocky Coulee, FC = Farrier Coulee
[2]SC = State candidate, SM = State monitored

Species diversity and bat activity were greatest in areas with water that were adjacent to shrubsteppe habitat and nearby roosting structures (i.e. bridges or rock faces). The areas with the least activity had little to no water, generally bordered cultivated crops, and may have been too far from suitable roosting structure.

There were two unidentified 25 khz echolocation calls. The Artesian Lake call was likely a pallid bat, which would be an additional species detected in that block but not for the OSSS area. The unidentified call in the Billy Clapp-north block was likely a fringed bat, which would make it an additional (6^{th}) state monitor species detected in the OSSS area.

Twenty-three structures were searched, including 15 buildings, six concrete bridges, and two metal culverts (Appendix A). No bats were detected at buildings searched. The buildings WDFW was able to access, and subsequently search, were in late stages of deterioration or disrepair. These buildings lack the protection from weather that bats require. All concrete bridges searched were used by bats as night roosts, some extensively; and all lacked the crevices necessary for use as day roosts. Species use was confirmed by acoustic survey. No additional species were observed visually. The metal culverts did not provide suitable surfaces for roosting.

Greater Sage Grouse

Approximately 90 square miles of potential habitat was surveyed by aircraft (Cessna 182). There were no detections of sage grouse during 2008-2009 aerial lek surveys or during 2010 ground based lek surveys. An active lek within the proposed construction area is considered unlikely because these areas were thoroughly covered during three years of aerial and ground surveys. However, suitable habitat does occur throughout the project area and given the

documented movements of sage grouse (Connelly et al. 2000) it would not be unexpected for sage grouse to occur within the project area. The nearest documented lek was last active during 1974 and occurred west of Billy Clapp Lake, about 1 mile from the proposed EHC. The next closest lek was last documented during 1978 near the town of Marlin.

Jackrabbit

Most jackrabbit detections occurred during the 2010 spotlight surveys. Unfortunately, spotlight surveys could only be conducted in remote areas with road access. For this reason, survey results are biased to particular areas where surveys could be conducted.

Based on survey results and local knowledge of the Columbia Basin Irrigation Project we know that jackrabbits occur in low densities throughout shrubsteppe dominated landscapes of the project area. Though not all jackrabbits were identified to species, all species identifications were of white-tailed jackrabbits (*L. townsendii*).

Mussel

Neither live mussels nor relic shells were found during the survey. Poor water quality and lack of preferable fish hosts deems it unlikely native freshwater mussels inhabit Brook Lake (Molly Hallock, WDFW, personal communication).

Northern Leopard Frogs

There were no detections of amphibian species of concern during both the call chorus and visual encounter surveys. Non-target species heard or observed during one or both of these survey types included Pacific tree frogs (*Pseudacris regilla*) and tiger salamander (*Ambystoma tigrinum*).

Both 2009 and 2010 call chorus surveys were incomplete due to high winds. The visual encounter and dip net surveys at the wetlands located northeast of Billy Clapp Lake could not be conducted due to steep sides, deep water, and thick shoreline vegetation. In the future if call chorus and visual encounter surveys cannot be conducted, or are incomplete (and dip-netting is not possible), they should be supplemented by using minnow traps to survey for larval amphibians in late-spring and early-summer. In addition, if there are water level changes in the project area between now and time of project implementation, all water features, including those that were previously dry, should be reevaluated and surveyed for presence of leopard frogs if suitable overwintering habitat (permanent wetland) occurs within one and one half mile.

Other

Five species of small mammals, four species of reptiles, and one amphibian, that are species of concern, have potential to occur in the OSSS area despite the fact they were not detected during WDFW surveys [Table 6; Dvornich et al. (1997), Johnson and Cassidy (1997), West et al. (2007) and The Burke Museum of Natural History and Culture website (http://www.washington.edu/burkemuseum/collections/mammalogy/mamwash/)].

Table 6. List of species that have potential to occur within the Odessa Subarea Special Study Area but were not detected during survey efforts.

Group	Common Name	Scientific Name	Federal Status [a]	Sate Status [b]
Birds	Greater sage grouse	*Centrocercus urophasianus*	FCo	ST
	Sharp-tailed grouse	*Tympanuchus phasianellus*	FCo	ST
	Western bluebird	*Sialia mexicana*	none	SM
Mammals	Sagebrush vole	*Lemmiscus curtatus*	none	SM
	Northern grasshopper mouse	*Onychomys leucogaster*	none	SM
	Merriam‘s shrew	*Sorex merriami*	none	SC
	Preble‘s shrew	*Sorex preblei*	FCo	SC
	Black-tailed jackrabbit	*Lepus californicus*	none	SC
	Pygmy rabbit	*Brachylagus idahoensis*	FE	SE
	Spotted bat	*Euderma maculatum*	none	SM
	Townsend‘s big-eared bat	*Corynorhinus townsendii*	FCo	SC
Reptiles	Sagebrush lizard	*Sceloporus graciosus*	FCo	SC
	Racer	*Coluber constrictor*	none	SM
	Night snake	*Hypsiglena torquata*	none	SM
	Striped whipsnake	*Masticophis taeniatus*	none	SC
	Sharptail snake	*contia tenuis*	FCo	SC
Amphibians	Northern leopard frog	*Rana pipiens*	FCo	SE

[a] FE = Federally Endangered, FCo = Federal species of concern
[b] SE = State endangered species, ST = State threatened, SC = State candidate species, SM = State monitored species

Pygmy Rabbit

There were no detections of pygmy rabbits. One 593-acre area contained the largest tract of quality shrubsteppe known to exist in the OSSS project area and habitat appeared to be appropriate for pygmy rabbits (Appendix C). See further discussion in ‗Future Survey Needs‘ section.

Raptor

Eight known ferruginous hawk and three known golden eagle territories containing 21 and five nests, respectively, were surveyed due to their proximity to the OSSS area. One ferruginous hawk and no golden eagle territories were occupied by the target species (Table 7).

The occupied ferruginous hawk nest was located approximately one and a half miles from the EHC alignment, near the town of Wilson Creek. Although the ferruginous hawk pair still occupied the nest on June 17, fledglings were not observed and the pair did not display defensive behavior when biologists approached the nest. However, because of the position of this nest (underneath a cliff overhang, approximately 60 feet off the ground) biologists could not be absolutely certain the nest did not contain a fledgling.

Table 7. The status of ferruginous hawk and golden eagle nests in the OSSS, 2010.

Species	General Location	Territory	Nest(s)	Status
Ferruginous hawk	Black Rock Coulee	75	1, 2, 4	Destroyed
			3	Unoccupied
		122	1	Destroyed
		154	1, 2, 3	Destroyed
Ferruginous hawk	Wilson Creek	168	1, 2	Occupied by red tailed hawk
		192	1, 2	Destroyed
			3	Unoccupied
		286	1, 2	Unoccupied
			3	Not located
		290	1	Occupied
			2	Not located
			3, 4	Repaired
		363	1	Unoccupied
Golden eagle	Banks Lake	130	1	Occupied by red tailed hawk
			2	Unoccupied
		382	1, 2	Destroyed
		383	1	Destroyed

Whipsnake

No evidence of striped whipsnakes was found in the OSSS area. Surveys suggest that habitat suitability, primarily lack of sandy soils, may be a limiting factor.

Future Survey Needs

Bats

Uncertainty of the exact alignment and vastness of the study area warrants additional surveys of roosting habitat (i.e. rock faces/cliffs, bridges) within the construction footprint, prior to canal construction. With the exception of hoary and silver-haired bats, all of the species that may occur in the OSSS area will use caves or rock crevices for roosting. Spotted bats, a species that can travel > 25 miles between roosting and foraging sites, are present within 15 miles of Billy Clapp-north so it is likely that spotted bats utilize the area. The cliffs located along the shorelines of Billy Clapp Lake and adjacent shrubsteppe habitats have the potential to provide adequate roosting and foraging habitat for the spotted bat. Therefore, it is likely that increased survey efforts would detect the presence of this species in the Billy Clapp-north area.

Tentative Facilities

The tentative locations of 26 canal side pumping plants, six re-lift pumping plants, and one gravity feed turnout were visited to evaluate future survey requirements. Those facilities requiring relatively comprehensive surveys (e.g. 115 m transects) of shrubsteppe habitats are listed below in Table 8. Facilities dominated by agriculture should also be surveyed but survey

efforts can be streamlined by focusing efforts on uncultivated portions of the landscape where potential burrowing owl nest site locations, badger dens, etc. are likely to occur.

Table 8. List of proposed facilities in need of future survey effort prior to any construction activities.

	Landscape	
Structures	Shrubsteppe	Agriculture
Pumping Plants		
EHC (4, 11, 15, 19, 29, 33)	X	
BRB (2, 17)	X	
ELC (65)	X	
EHC (35, 42, 47, 50		X
BRB (7, 11, 18, 27, 28, 29)		X
ELC (47, 53, 68, 75, 80, 85)		X[1]
Gravity feed turnout		
ELCG	X	
Re-lift pumping plants		
ELC (47R, 53R, 68R, 80R, 89R1, 89R2)		X

[1]Only if disturbance is limited to east/northeast side of canal. The west/southwest side of canal is WDFW wildlife enhancement property.

Pygmy Rabbit

Given the poor winter survey conditions that occurred for pygmy rabbit surveys, we recommend that the quality shrubsteppe area identified in Appendix C, and all potentially impacted habitats from Artesian Lake to Black Rock Coulee Reregulation Reservoir, be surveyed to further support evidence suggesting absence.

IMPACT ASSESSMENT

Strata Specific Impacts

Black Rock Coulee Flood Storage Area (DE220)

The Black Rock Coulee Flood Storage Area (DE220) has potential for significant wildlife impacts. Of the species observed in this area (Table 2), all would be impacted through direct flooding impacts, loss of breeding habitat, or loss of foraging habitat. Direct mortality would be expected during a flooding event for Washington ground squirrel and pygmy short-horned lizard. The Washington ground squirrel colony located within this area extends throughout the majority of the footprint and is densely populated relative to other native habitats. In fact, this colony is probably the largest contiguous Washington ground squirrel colony currently known. Because

this colony exists within the coulee bottom where the deepest soils are located, it would likely be lost completely in a flood event. Displacement of den sites and loss of foraging habitat would be expected for badger. Loss of foraging habitat would be expected for Prairie falcon and Swainson's hawk. Loss of breeding habitat would be expected for long-billed curlew, grasshopper sparrow, loggerhead shrike, sage sparrow, and sage thrasher. If this storage area were used, direct impacts to wildlife and the habitats they depend upon would recovery slowly, if at all. In the best of circumstances, nesting shrubsteppe obligates such as loggerhead shrikes, sage sparrows, or sage thrashers, would not likely return for 30 or more years following a flood event.

Black Rock Coulee Reregulation Reservoir

The Black Rock Coulee Reregulation Reservoir has potential for significant wildlife impacts. Of the species of concern observed in this area (Table 2), all would be impacted through direct flooding impacts, loss of breeding habitat, and/or loss of foraging habitat. Direct mortality would be expected during a flooding event for several relatively small Washington ground squirrel colonies. Displacement of den sites and loss of foraging habitat would be expected for badger. Loss of foraging habitat would also be expected for prairie falcon and Swainson's hawk. Loss of breeding habitat would be expected for long-billed curlew, grasshopper sparrow, loggerhead shrike, sage thrasher, and black-necked stilt. Great blue heron would not likely be significantly affected. Pygmy short-horned lizard, though not detected, is likely to occur here and could be lost directly through flooding of the reservoir. Sage sparrow, though also not detected, is likely to occur here and would be impacted by loss of nesting habitat.

East High Canal

The East High Canal (including Black Rock Branch, EHC South, Farrier Wasteway, Moody Siphon and tunnel, Rocky Coulee Wasteway, and Weber Coulee Siphon, and O&M Facility) has potential for significant wildlife impacts. Of the species observed in this area (Table 2) most would be impacted through direct impacts resulting from construction, loss of breeding habitat, and/or loss of foraging habitat. Some direct mortality is expected as a result of construction activities for pygmy short-horned lizard and Washington ground squirrel. Badgers are expected to be displaced but not significantly impacted. Loss of breeding habitat is expected for grasshopper sparrow, loggerhead shrike, long-billed curlew, sage sparrow, and sage thrasher. Minor losses of foraging habitat for prairie falcon and Swainson's hawk are expected. Impacts to burrowing owl will be largely dependent upon canal placement but could include direct mortality, or more likely, loss and/or alteration of foraging habitat. In addition to the listed species of concern, the proposed East High Canal is expected to have devastating impacts to a migratory herd of mule deer if wildlife crossings are not constructed. See Fragmentation Effects, *Large Mammals* for more information.

The moody siphon and tunnel are proposed to run directly across a draw consisting of long and continuous habitat utilized by a variety of species. Resulting habitat degradation across this area would severely impact the connectivity of this habitat. Restoration of habitat at this site is particularly important.

The O&M facility (North Facility; at Rd W NE and Rd 6 NE) proposed to be built near the town of Ruff occurs in a coulee consisting of high quality shrubsteppe habitat that is used by a diversity of wildlife. There are many locations in the general area, outside of this coulee, consisting of poorer quality habitat that would be preferable to the proposed location. Adjacent CRP habitat or other areas of degraded habitat would be desirable alternatives (Appendix D).

Rocky Coulee Reservoir

The Rocky Coulee Reservoir has potential for wildlife impacts (Table 2) but impacts are expected to be far less than those reported for the Black Rock Coulee Flood Storage Area (DE220), Black Rock Coulee Reregulation Reservoir, and East High Canal. Direct mortality would be expected during the initial reservoir filling for Washington ground squirrel and pygmy short-horned lizard. However, if the reservoir was filled when Washington ground squirrels are active yet not nursing young (late-Feb to early-March and mid-April to June), direct mortality could be reduced, at least temporarily. It is likely however that displacement, even if timed appropriately, would result in reduced survival, likely to the point of complete colony failure. Nest site displacement is expected for burrowing owl as a result of reservoir flooding. Displacement of den sites and loss of foraging habitat would be expected for badger.

East Low Canal

The East Low Canal expansion and extension has potential for wildlife impacts (Table 2) but impacts are expected to be far less than those reported for the Black Rock Coulee Flood Storage Area (DE220), Black Rock Coulee Reregulation Reservoir, or East High Canal. Some direct mortality is expected for burrowing owl, particularly if construction occurs during spring and/or summer. Direct mortality of burrowing owls is far less likely during fall and winter but some burrows could be occupied by overwintering owls. Badger dens may be destroyed resulting in temporary displacement of badgers. Relatively low acreages of nesting habitat may be impacted for grasshopper sparrow and long-billed curlew. Significant impacts to other species observed, including loggerhead shrike, prairie falcon, and sage sparrow are not expected.

Banks Lake

Operational changes in Banks Lake water levels will likely influence reproductive effort and success of breeding Aechmophorus grebes. Results of our survey effort suggest that the peak nesting season for grebes at Banks Lake occurs during July in most years. During the one-month nesting period (three days nest building, four days egg-laying, and 23 days incubation), water level fluctuations in excess of 1 foot could potentially result in nest failure. Further, water level declines associated with annual drawdown, could result in isolation or drying of _Nesting area 1‘ (Appendix B).

Fragmentation Effects

The effects of fragmentation on wildlife populations are expected to be considerable but difficult to quantify. We have broken down anticipated impacts to large and small mammals,

herpetofauna, and avifauna in the sections below. As potential mitigation for these impacts we have provided recommendations for wildlife crossing locations.

Large Mammals

Mule deer (*Odocoileus hemionus*) are an important recreational and economic resource in Washington State. The number of deer located in the Columbia Basin varies with season. Although white-tailed deer (*O. virginianus*) also occur in this region, they do so at extremely low densities. From late-spring to early-fall mule deer are found in small numbers widely distributed across the landscape. In late-fall (October/November) however, deer begin to migrate from other regions and congregate in areas that provide cover and food (primarily winter wheat). Areas that meet these requirements are usually found along shrub-steppe and agricultural interfaces. For example, 1,500–2,000 mule deer are known to winter in areas adjacent to Billy Clapp Lake. Densities remain high throughout winter months until spring –green-up" when deer begin migrating back to their summer ranges.

Our surveys indicate areas receiving high amounts of use by mule deer occur throughout much of the proposed East High Canal alignment. Consequently, canal infrastructure along these corridors has the potential to disrupt the migratory patterns of numerous mule deer herds. Additionally, if canals significantly impede the migration of wintering deer herds, this could result in a loss of important winter habitat. Lastly, canals also have the potential to be a significant source of mule deer mortality. The inability of deer to escape from concrete lined sections of irrigation canals is well documented.

Small Mammals

Small mammals, (e.g. jackrabbits, American badgers, etc.) would be impacted by irrigation infrastructure, at least during the portion of the year when water was present. Irrigation infrastructure is likely to have genetic as well as direct consequences to most or all small mammal populations. Washington ground squirrels are of particular concern due to their life history characteristics. The active period of the Washington ground squirrel typically occurs from February through mid-June. During much of this timeframe irrigation canals are operating with full water levels. Though Washington ground squirrels are active prior to canal charging during late-March they are actively breeding and emigration to new sites is not likely during this period. Our surveys indicate considerable Washington ground squirrel activity in the vicinity of the East High Canal alignment and irrigation canals are likely to represent a significant physical barrier to Washington ground squirrel movements.

Herpetofauna

The movement of reptiles and amphibians (herptiles) in the Columbia Basin can vary from species to species and is influenced by local weather conditions. That said, herptiles emerge from hibernacula from March to mid-April and return from late September to November. Their active period coincides with the time irrigation canals are carrying water; therefore, irrigation infrastructure has the potential to impact genetic diversity as well as having direct consequences to their populations. Impacts would be greatly increased if canal alignment was to isolate and,

make unavailable, any limiting habitat (e.g. wetlands, rocky outcrops). For instance, it is possible that a population unable to reach its hibernaculum could be extirpated from the area in one season (L. Hallock, Herpetologist, WA DNR, personal communication). It is also important to note that amphibians will not remain unaffected by placement of the irrigation canal, particularly during the spring when they may be migrating to breeding areas. Amphibians can be easily swept away at high velocities, potentially carrying them to unsuitable habitats.

Avifauna

Large areas of sage steppe are important to shrubsteppe obligate species such as sage sparrow, sage thrasher, and loggerhead shrike. These species typically do not utilize small patches of habitat; rather they prefer large expanses of contiguous sage-steppe. Habitat fragmentation resulting from canal and reservoir construction would have considerable detrimental impacts to these species.

Mitigation Measures and Enhancements

Aechmophorus grebes

Conservation strategies outlined in the *Intermountain West Waterbird Conservation Plan* for Aechmophorus grebes in Washington state include, (1) maintain suitable emergent nesting habitat at major breeding sites in the region, (2) minimize human disturbance and boat wakes near nesting colonies, and, (3) maintain stable water levels through the nesting period (Ivey and Herzinger 2006). Robison et al. (2008) describe several methods for enhancing nest success such as installing and maintaining nesting platforms and protecting nesting areas from disturbance using log booms or other barriers to watercraft traffic. These techniques are reasonably well developed and could be employed at off-site locations to mitigate for potential impacts at Banks Lake. Potential off-site locations include, but are not limited to, Potholes Reservoir (Grant Co) and Sprague Lake (Adams/Lincoln Co).

Bat friendly bridges

The use of bridges as both day and night roosts by bats is well documented. According to Keeley and Tuttle (1999), there are specific _bat-friendly" designs that can be easily incorporated during initial construction. They also found that retrofitting existing bridges with day roost structure was highly successful in attracting bats, especially where bats were already using them at night. Bats typically do not use bridges with flat bottoms. Instead, they prefer bridges with inter-beam spaces (i.e. crevices) such as parallel box beam, cast in place, or those made of pre-stressed concrete girder spans. Lastly, they found parallel box beam bridges were used as day roosts more than any other kind; concrete was the preferred roost material. The American Association of State Highway and Transportation Officials (http://environment.transportation.org/) would likely be a valuable resource to consult.

Breeding birds

During construction, minimize or avoid all vegetation removal during the avian nesting season to minimize the impacts to federally protected migratory birds. Typically the nesting season in this part of Washington occurs between March and August annually.

Burrowing Owls

Tremendous potential exists to create burrowing owl nesting habitat within the construction spoils along the proposed canals (e.g. East Low Canal and East High Canal). The impacts to burrowing owls as a result of the OSSS Project are expected to be relatively minor. However, we feel that the potential benefits associated with constructing artificial nesting structures on such a relatively large scale are considerable, particularly when considering the relatively low cost for construction and installation. Burrowing owls have been known to readily occupy artificial structures and are considerably tolerant of disturbance. In fact, maintenance activities associated with canals, such as weed control, would likely benefit owls by maintaining open visibility in front of burrow entrances, which they prefer. Further, given the accessibility of these sites, monitoring and maintenance would be highly efficient and could easily be done by a local conservation organization such as the Audubon Society. WDFW would provide the latest designs and placement recommendations and assist with the implementation of such a project.

Habitat Connectivity

To reduce habitat connectivity impacts, we suggest that any culverts designed to provide drainage under the East High or East Low Canal be built to "wildlife friendly" specifications. Therefore, the culvert should be as large as possible and should not be perched. Further, we suggest filling the culvert with at least 6 inches of cobble, which would be expected to trap sediment, resulting in a semi-natural bottom, with potential for some annual vegetation.

Northern Leopard Frog

The wetland area northeast of Billy Clapp Lake (T23N R28E S01 and S12; T23N R29E S06 and S07) has potential for supporting an introduced population of northern leopard frogs. Potential for success of such a project would be increased greatly with wetland enhancements. Enhancements could include; (1) increasing the depth in portions of the pond that currently supports low emergent vegetation along its shoreline, (2) creating gradually sloping shorelines on the existing spring fed ponds or creating new appropriately designed ponds within the wetland, and (3) managing the vegetation around the ponds. It is also highly probable, due to increases in water table levels following project development, that there will be additional areas with potential for supporting leopard frog enhancements. Such intermittent wetlands occur in the coulee that begins in T22N R29E S13 and continues southwest to T21N R29E S08 and the Artesian Lake/Black Lake area located in the Black Rock Coulee Flood Storage Area. The enhancement efforts would be similar to those listed above.

To reduce the potential for northern leopard frogs to be federally listed, we recommend the establishment of an artificial propagation program in cooperation with an existing local fish

hatchery or using a newly constructed facility. In such a scenario, egg masses could be produced by captive frogs for rearing to larval and metamorph stages, or direct introduction of egg masses into suitable habitats. The newly created wetlands associated with the Middle Crab Creek Supplemental Feed Route and, if applicable, the enhancement projects described above would be likely locations for reintroduction. The Northern Leopard Frog Management Area would also likely benefit from augmentation with such stocks. WDFW would supply guidance and assistance in developing these projects.

Rocky Coulee Reservoir

Rocky Coulee Reservoir has the potential to serve as a roost site for waterfowl, particularly field feeding species such as Canada geese, mallards, and northern pintails. However, use of such an area would be largely dictated by hunting pressure. It is for this reason that WDFW would consider establishment of a ‗hunting reserve' at the eastern portion of the reservoir to enhance hunting opportunities at surrounding farm fields. A logical reserve boundary would be all Rocky Coulee Reservoir waters between roads U and W and would result in a 240 acre reserve.

Transmission Lines

All transmission lines and guy wires should be constructed to ensure birds coming in contact with them avoid electrocution and collisions. Implement techniques set forth in the Service's *Avian Protection Plan Guidelines* (USFWS 2005) to protect birds using project facilities. Ensure that treated power distribution and transmission poles are not installed in areas that have potential to leach into irrigation canals, ponds, creeks, wetlands, groundwater or any waters of the state.

Washington Ground Squirrel

Potential impacts to Washington ground squirrels associated with any of the Full Replacement alternatives are considerable and would require significant mitigation. Potential mitigation measures include monitoring the influence of fragmentation effects on genetic diversity, translocation to maintain genetic integrity between isolated populations, assistance with translocation from nuisance areas to suitable habitats (on site or off site), and habitat restoration at occupied sites on and off site.

Wildlife Crossings

To minimize the negative effects associated with canal infrastructure it will be necessary to provide crossings that insure the continuation of historical migration/movement patterns of mule deer and other mammals. Crossings are likely to be most effective if they occur every one and a half to two miles and are in areas that already serve as natural travel corridors (e.g., topographical features such as small canyons or coulees; Krausman et al. 1998). Siphons associated with the proposed canal alignment are likely to serve as crossings, but the minimal presence of these structures will require the construction of additional crossings. Preliminary data provides justification for the construction of 11 wildlife crossings. Vehicular traffic on these crossings should be excluded if possible, or at a minimum, restricted to maintenance

activities by including gates or other barriers that could be locked to prohibit unauthorized vehicles. Further, we recommend that adequate soils be placed on crossings to allow for growth of shrub and bunchgrass cover. Crossings should be built with the following criteria:

- Exclude all unauthorized vehicular traffic and fishing.
- Width should be sufficient to create an environment that would mimic a natural setting (minimum width of 9 m).
- Solid surface to support an earth covered surface of sufficient depth (3‘ minimum) to support growth of native vegetation.
- Side/edge constructed with a ≥0.3 m solid ~~li~~p” above the soil layer to provide a sight and physical barrier for small mammals and reptiles.
- Boulder placement and other habitat features (i.e., bunchgrass and small shrub/forbs plantings).
- Habitat surrounding the approach to the structure should be restored to a natural condition.

Wildlife Escape Ramps

To further minimize the negative effects associated with canal infrastructure it will be necessary to provide escape ramps within the concrete lined portions of canals. Ramps should be built with the following criteria:

- Slope no steeper than 4:1 (horizontal:vertical).
- Constructed within the canal wall to maximize an eddy effect to create a reduced water velocity on the ramp.
- Washed aggregate ramp surface.
- Cable and float directors placed in conjunction with all ramps and prior to all control structures, siphons/tunnels and lined sections.
- Located ≤15 m (+/- 50 feet) upstream from all siphons/tunnels and/or control structures in lined canal.
- One ramp every 2 km (+/- 1 mile) on alternate sides of hard lined sections.

DELIVERABLES

Contractual obligations (deliverables) occur within this document as outlined below.

- Species richness values occur in Table 1 of the _Results‘ section.
- The inventory of species of concern by strata occurs in Table 2 of the _Results‘ section.
- Recommendations for mitigation and enhancement opportunities occur in the _Mitigation Measures and Enhancements‘ section.

The remaining deliverables are provided as digital GIS data layers as described below.
All layers in coordinate system: NAD_1983_UTM_Zone_11N.

OSSS_WILDLIFESURVEYS.zip

OSSS_SpeciesOfConcern
Point locations for wildlife species of concern

OSSS_NestObservations.shp
Point locations for nests observed during inventory style surveys

OSSS_RaptorNests.shp
Point locations for raptor nests observed during Ferruginous hawk/Golden Eagle survey

OSSS_DeerObservations.shp
Point locations for deer observations[c]

OSSS_WildlifeCrossings.shp
Point locations for wildlife crossings

OSSS_GrebeNestingAreas.shp
Polygons of Aechmophorus grebe nesting areas

OSSS_BatSurveyBlocks.shp
Polygons for bat survey blocks

[c] Due to the abundance of mule deer activity encountered, and extent of cattle grazing which complicated identification of trail systems, we were not able to accurately represent deer trails and thus collected point data. We feel the point data will adequately indicate the need for crossings within the EHC alignment and the need to distribute them evenly from Billy Clapp Lake to the EHC Pumping Plant 29 (Appendix E).

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PERSONAL COMMUNICATIONS

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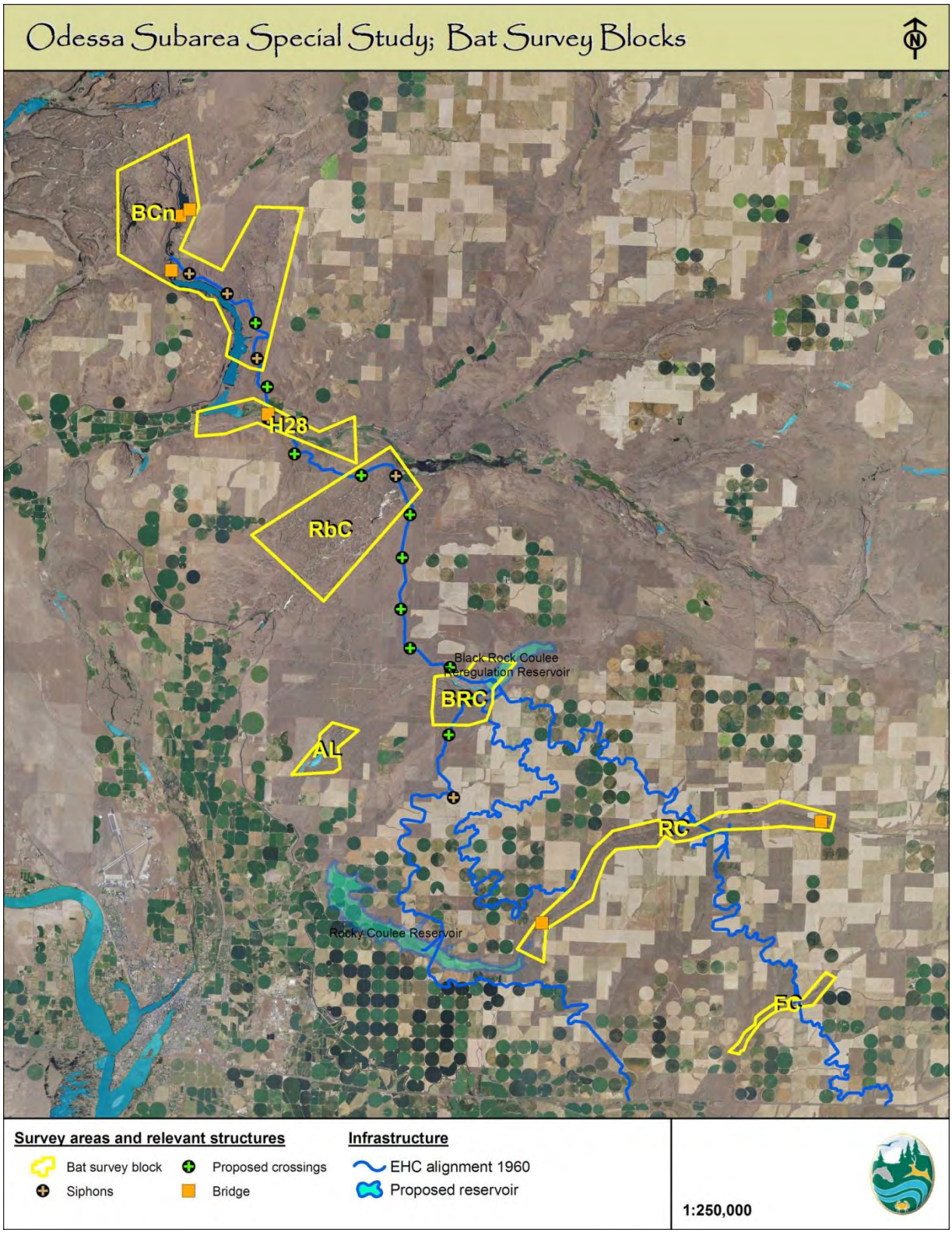
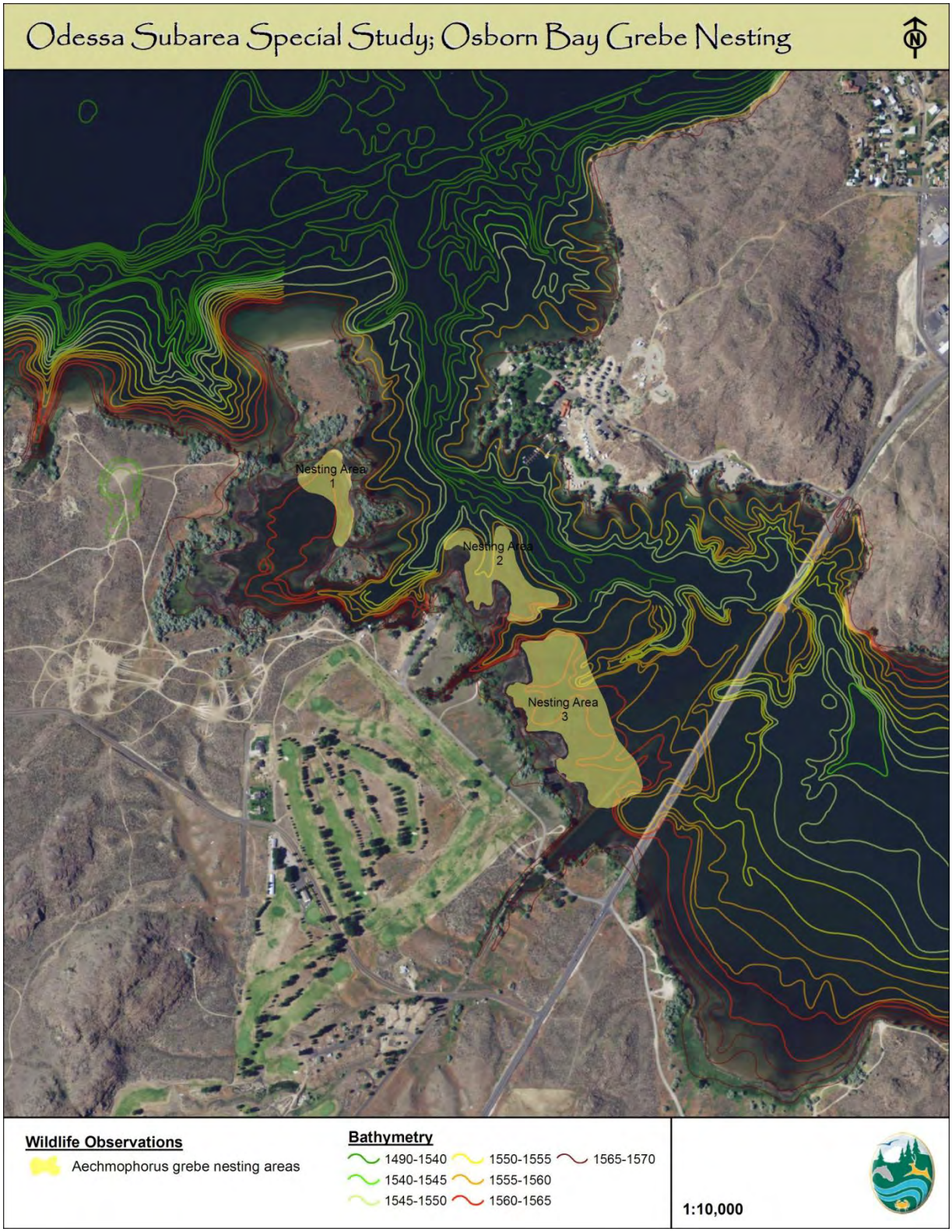
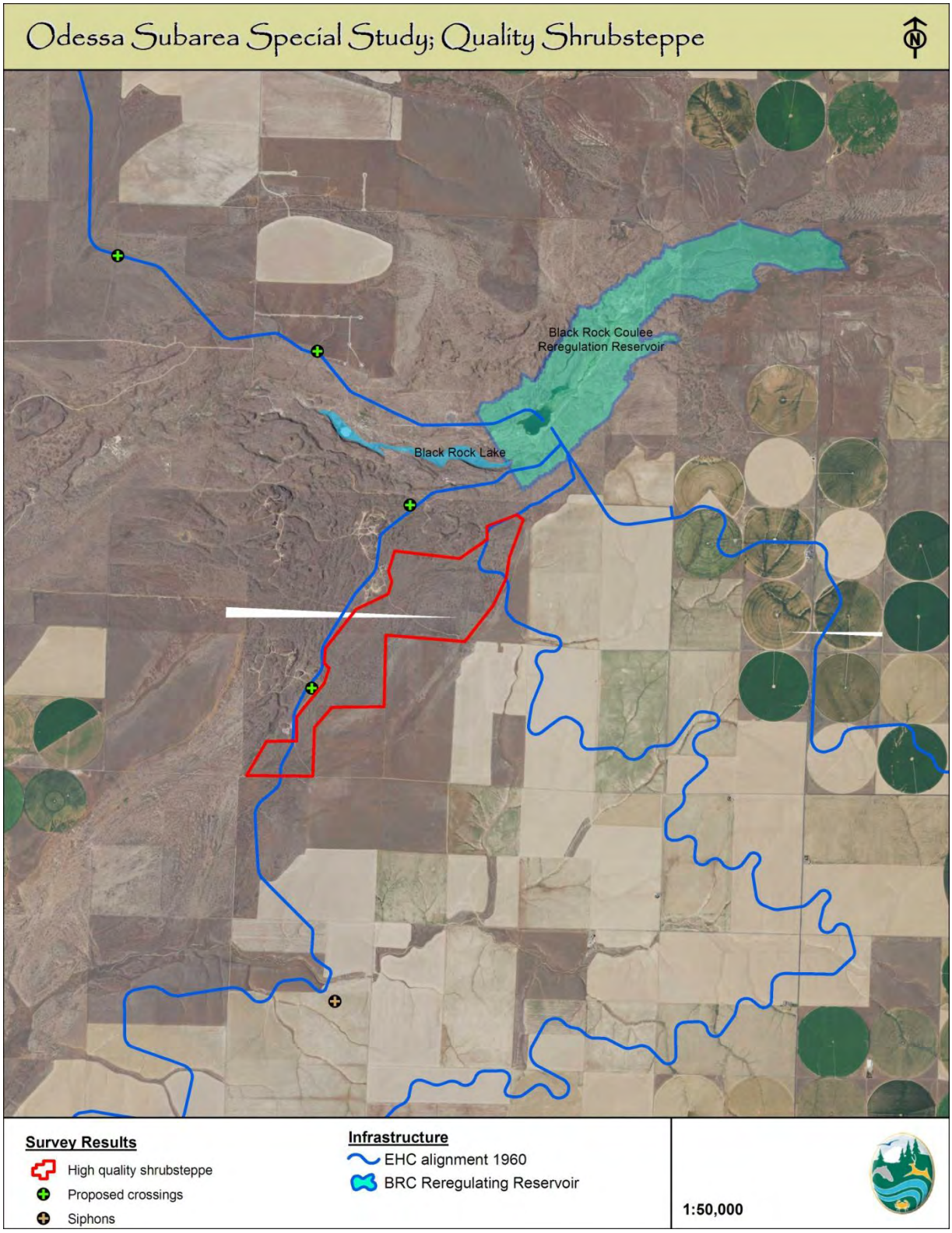
Appendix A. Locations of areas surveyed (survey blocks and locations of bridges) for bats.



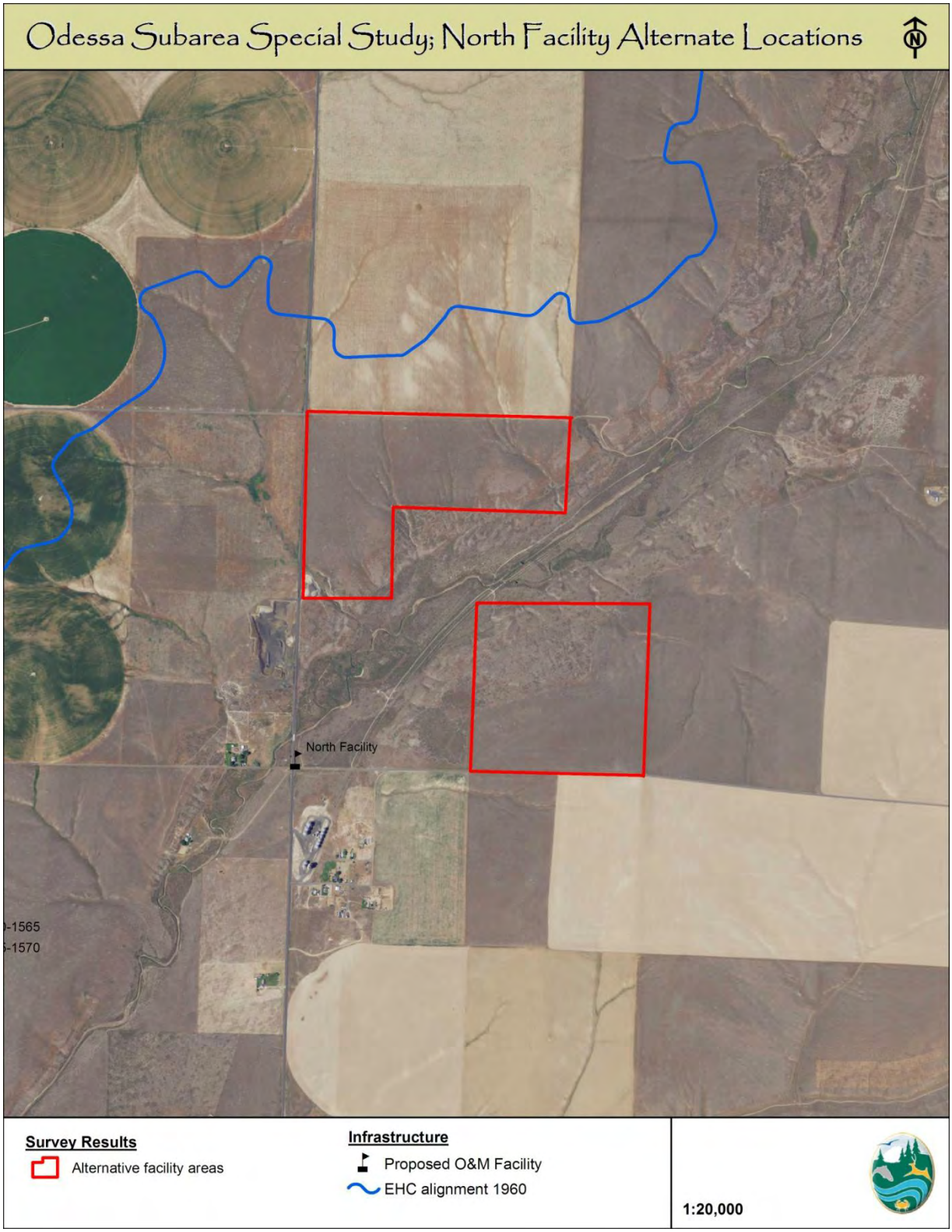
Appendix B. Aechmophorus grebe nesting areas.



Appendix C. Location of large tract of quality shrubsteppe habitat having greatest potential to support pygmy rabbits.



Appendix D. Alternate locations for the proposed North Facility.



Appendix E. Map of recommended locations for wildlife crossings for the East High Canal.