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List of Acronyms and Abbreviations

| | |
|-------------------|-----------------------------------------------------|
| °F | degrees Fahrenheit |
| AF | Air Force |
| AFB | Air Force Base |
| AFI | Air Force Instructions |
| AICUZ | Air Installation Compatible Use Zone |
| BASH | Bird Aircraft Strike Hazard |
| bgs | below ground surface |
| Census | U.S. Census Bureau |
| CEQ | Council on Environmental Quality |
| CES | Civil Engineering Squadron |
| CEV | Environmental Flight |
| CFR | Code of Federal Regulations |
| CMPs | Corrugated metal pipes |
| dB | decibel |
| DNL | Day-Night Average A-Weighted Sound Level |
| EA | Environmental Assessment |
| EO | Executive Order |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act |
| FONSI | Finding of No Significant Impact |
| MCL | Maximum Contaminant Level |
| mg/kgBW/day | milligram per kilogram of body weight per day |
| mg/L | milligrams per liter |
| NAAQS | National Ambient Air Quality Standards |
| NDA | Nebraska Department of Agriculture |
| NEPA | National Environmental Policy Act |
| NGPC | Nebraska Game and Park Commission |
| NHU | Natural Habitats Unlimited |
| NOAA | National Oceanic and Atmospheric Administration |
| PM ₁₀ | Particulate matter 10 microns or smaller |
| PM _{2.5} | Particulate matter 2.5 microns or smaller |
| ppm | parts per million |
| SGNIS | Sea Grant Non-indigenous Species Site |
| T&E | Threatened and Endangered |
| TEC | The Environmental Company |
| U.S. | United States |
| U.S.C. | United States Administrative Code |
| URS | URS Group, Inc. |
| USACE | United States Army Corps of Engineers |

List of Acronyms and Abbreviations

| | |
|-------|-----------------------------------------------|
| USEPA | United States Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |

SECTION ONE Purpose and Need for Action

1.1 Introduction

Offutt Air Force Base (AFB) is located in Sarpy County, Nebraska immediately south of the City of Bellevue (Figure 1). The Base Lake at Offutt AFB was created by the removal of fill (sand and gravel) during the construction of the main runway at the Base. Generally, the Base Lake is between 117 and 113 acres in size and has an average depth of 15 feet (URS 2006). Currently, the Lake has a surface area greater than 123 acres and contains more than 2,600 acre-feet of water. The Base Lake and the area surrounding the Lake is used by Base personnel and their families for numerous recreational activities including boating, fishing, horseback riding, camping, picnicking, hiking, bicycling, and softball. Figure 1 shows the location of the Base Lake within Offutt AFB. Figure 2 shows the location of recreational facilities at the Lake.

In early 2006, zebra mussel shells were observed on the shoreline of the Base Lake and closer examination of rocks and other hard surfaces in shallow water of the Lake documented the presence of live zebra mussels. This is the only verified population of zebra mussels in Nebraska.

Zebra mussels, *Dreissena polymorpha*, (shown at right, photograph courtesy of the U.S. Geological Survey[USGS]) are small, fingernail-sized, freshwater mollusks accidentally introduced to North America via ballast water from a transoceanic vessel. Since their introduction in the mid 1980s, they have spread rapidly to all of the Great Lakes, the Mississippi River from St. Paul, Minnesota to Louisiana, and most of the major Mississippi River tributaries, including the Ohio, Tennessee,



Cumberland, and Arkansas Rivers. By the end of 1995, zebra mussels had invaded waters in 20 of the 38 states east of the Rocky Mountains, as well as the Canadian provinces of Ontario and Quebec. Its rapid dispersal is due to the passive drifting of the larval stage (the free-floating or “pelagic” veliger), its ability to disperse during all life stages, and its ability to attach to boats navigating infested waters. (USGS 2008) They are believed to have entered the Base Lake in 2005 (or earlier) via a boat or boat trailer that came from infested waters. In 2007, the abundance of mussels in the Lake increased dramatically. Most hard surfaces in the Lake are now covered with multiple layers of zebra mussels that in many areas are 2 to 3 inches thick.

Unlike most North American freshwater bivalves, which brood their eggs within specialized gill brood pouches, the zebra mussels release sperm and eggs directly to the surrounding water for external fertilization. The fertilized egg develops into a free-swimming trocophore veliger (larva) with a ciliated velum, which is used for swimming and filtering food from the water. Generally, within 30 days, these immature forms begin to settle and attach themselves to a solid substrate (SGNIS 2008). Temperature is one of the limiting factors for the growth and reproduction of zebra mussels. When temperatures are below approximately 36 degrees Fahrenheit (°F) or above 104 °F, zebra mussels cannot survive. Poor to moderate growth (without reproduction) occurs at temperatures up to approximately 55 °F or above 84 °F, while reproduction and good growth occur at temperatures of between 55 °F to 84 °F. At the Base Lake, reproduction generally occurs from May through September, although that may vary slightly based on annual weather conditions.

Zebra mussels colonize on hard surfaces, such as docks, boat hulls, commercial fishing nets, water intake pipes and valves, native mollusks, and other zebra mussels. Known predators are limited to, some diving ducks, freshwater drum, carp, and sturgeon. In North America, these

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predators are not numerous enough to have a significant effect on zebra mussel populations. (USGS 2008)

The tendency of zebra mussels to form dense aggregates on hard surfaces (shown below, photograph courtesy of the National Oceanic and Atmospheric Administration [NOAA]) has led to serious economic impact in municipal, industrial, and private water systems. When large numbers of larvae settle in man-made raw water systems they accumulate in great numbers forming thick mats which can restrict water flow even in large diameter piping, increase sedimentation rates, and promote surface corrosion. Natural populations of 5,000 to 30,000 individuals per square meter are not uncommon. However, in waters with adequate water flow, abundant nutrients, and suitable substrates for attachment, densities have been documented as high as 700,000 individuals per square meter. (SGNIS 2008)



Additionally, zebra mussels can have profound effects on the ecosystems they invade. They primarily consume phytoplankton, but other suspended material is filtered from the water column including bacteria, protozoans, zebra mussel veligers, other microzooplankton and silt. Large populations of zebra mussels can reduce the biomass of phytoplankton by 80 to 90 percent and increase the transparency of the water by similar amounts. Increased water clarity allows light to penetrate further, potentially promoting macrophyte populations. (USGS 2008)

Effects continue through the food web to fish. Reductions in zooplankton biomass increase competition and decrease survival, which decreases the biomass of planktivorous fish. Because microzooplankton are more heavily impacted by zebra mussels, larval fish are more affected than later life stages. This may be especially important to inland lakes with population of pelagic larval fish such as bluegills. Benthic feeding fish may benefit as opposed to planktivorous fish, or behavioral shifts from pelagic to benthic-feeding may occur. In addition, proliferation of aquatic macrophytes may alter fish habitat. (USGS 2008)

Based on the presence of the zebra mussel in the Base Lake, a working group was formed that included Offutt AFB, federal and state regulatory and resource agencies, local electrical power companies, city municipal utility districts, and natural resource districts to discuss steps that could and should be taken to prevent the introduction of zebra mussels to other water bodies in Nebraska. The actions identified by the working group included closing the Lake to all boats except the rental boats that would not be removed from the Lake, the installation of concrete plugs in the two 48-inch corrugated metal pipes (CMPs) that serve as an outlet structure to the Lake, and the removal of the zebra mussels from the Base Lake. The outlet discharges to a local drainage (Bellevue Drain) that flows approximately one mile before discharging to the Missouri River. Colonization of zebra mussels in this reach of the Missouri River is of major concern due to the presence of water intake structures for several power plants and municipal water systems.

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1.2 Purpose and Scope of Document

This Environmental Assessment (EA) identifies alternatives for controlling the spread of zebra mussels from the Base Lake and the major environmental resources within the study area. The EA also discusses potential environmental impacts to these resources associated with the implementation of the proposed action. This EA provides the public and decision-makers with the information required to understand and evaluate these potential impacts.

1.3 Purpose and Need

The Base Lake zebra mussel working group, in response to their concern regarding the spread of the mussel to the Missouri River and other bodies of water, identified temporary and long-term actions that if implemented would reduce the potential for spread of the mussel. Short-term actions included restricting boat access to the Base Lake and temporarily sealing the outlet to prevent infested water from being discharged from the Lake. These two actions were implemented by Offutt AFB in 2007.

The long-term action identified was the total removal of the zebra mussel from the Base Lake. The purpose of the proposed project would be to prevent the spread of zebra mussels from the Base Lake and return recreational functions to the Lake.

Offutt AFB recognizes the need to control the spread of the zebra mussel from the Base Lake. Offutt AFB has identified the need to control the undesirable non-native aquatic species in a manner that would restore the recreational function of the Lake and reduce the potential for spread to other water bodies including the Missouri River and numerous small gravel pit lakes located in the general vicinity of the Base Lake. The spread of zebra mussels to the Missouri River is a major concern to municipalities and power companies who have water intake structures located on the river. In evaluating various control procedures, Offutt AFB, in concert with the working group, has determined that chemical application is the most practical method for removal of the mussel.

1.4 Applicable Regulatory Requirements and Coordination

The National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA [40 Code of Federal Regulations (CFR) Parts 1500 through 1508], and the Air Force regulations for NEPA compliance (32 CFR Part 989; Air Force Instruction [AFI] 32-7061) direct the Air Force (AF) and other federal agencies to fully understand, and take into consideration during decision-making, the environmental consequences of proposed federal actions. Thereby, Offutt AFB must comply with NEPA on all major federal actions. The removal of zebra mussels from the Base Lake would be considered a major action.

Executive Order (EO) 11514, Protection and Enhancement of Environmental Quality, as amended by EO 11991, sets policy for directing the federal government in providing leadership in protecting and enhancing the quality of the nation's environment. The CEQ Regulations (40 CFR - 1500 to 1508) implement the procedural provisions of NEPA. AFI 32-7061 and 32 CFR Part 989 establishes the specific AF procedural requirements for implementation of NEPA.

EO 13112, Invasive Species, addresses the prevention of the introduction of invasive species and provides for their control and minimization of the economic, ecological, and human health impacts the invasive species cause.

SECTION ONE Purpose and Need for Action

EO 12088, Federal Compliance with Pollution Control Standards, requires all Federal agencies to be in compliance with environmental laws and fully cooperate with the United States Environmental Protection Agency (USEPA), State, interstate, and local agencies to prevent, control, and abate environmental pollution.

SECTION TWO Alternative Descriptions

CEQ has developed regulations for the preparation of environmental impact documents in compliance with NEPA. The regulations require an investigation and evaluation of all reasonable alternatives as part of the EA process. In addition, NEPA requires that the No Action Alternative be retained and evaluated in the EA.

Offutt AFB evaluated measures that could be used to remove or control the spread of the zebra mussel from the Lake. This evaluation was done in concert with the working group. The following two goals need to be satisfied for an action alternative to be determined to be satisfactory and retained for further evaluation.

- Restoration of the recreational function of the Base Lake
- Reduction/elimination of the risk of zebra mussels being spread to other water bodies, especially the Missouri River

2.1 alternatives initially considered

The working group discussed a wide variety of potential alternatives to remove the mussel from the Base Lake. During these initial discussions, many of the discussed alternatives were eliminated because they could not be implemented, were not feasible, would not satisfy one or both of the identified goals, were cost prohibitive, or would not achieve the desired level of removal. Potential alternatives generally fell into one of the following five categories:

- Confinement
- Physical Removal
- Thermal Removal
- Biological Removal
- Chemical Removal

2.1.1 Confinement

2.1.1.1 Restrict Boat Usage on Base Lake

With this alternative, private boats would not be allowed on the Base Lake. Boat usage would be limited to rental boats that would not be removed from the Lake.

Although this alternative would remove one of the pathways for zebra mussels to be spread to other bodies of water, it does not remove the threat of infestation in other water bodies. As long as zebra mussels remain in the Base Lake, the threat of them being spread would remain. In addition, this alternative would have no affect on the restoration of the recreational function of the Lake.

This alternative was eliminated as an alternative because it would not satisfy the two identified goals. However, it has short-term benefits as it would reduce the risk of the spread of the zebra mussel until an alternative could be implemented that would satisfy the identified needs. In response to this identified short-term benefit, Offutt AFB restricted boat access to the Base Lake in 2007. Therefore, this action is included as part of the No Action Alternative.

SECTION TWO Alternative Descriptions

2.1.1.2 Plug Outlet Structure

This alternative involves installing a plug in the Base Lake's outlet structure (2 corrugated metal pipes) to prevent water from the Lake flowing into Bellevue Drain, which in turn flows into the Missouri River.

Although this alternative would remove one of the pathways for zebra mussels to be spread to other bodies of water, it does not remove the threat of infestation in other water bodies. As long as zebra mussels remain in the Base Lake, the potential for them to spread to other water bodies would remain. In addition, this alternative would have no effect on the restoration of the recreational function of the Lake.

This alternative was eliminated as an alternative because it would not satisfy the two identified goals. However, it has short-term benefits as it would reduce the risk of the spread of the zebra mussel until a long-term alternative could be implemented. In response to this identified short-term benefit, Offutt AFB plugged both outlet culverts with concrete in 2007. This action is included as part of the No Action Alternative.

2.1.2 Physical Removal

This alternative would involve the placement of fill into the Base Lake until the entire volume of water in the Lake has been replaced with fill and the lake and associated habitat for the zebra mussel would no longer exist. The placement of the fill would need to occur over an extended period of time to prevent the water level from rising to a level where it would flow into existing drainages, which would discharge into the Missouri River and/or its tributaries. Rough calculations indicate that in excess of 35 million cubic yards of fill would be needed to fill in the Lake. Additionally, the East Gate drainage system would need to be modified. Obtaining and transporting the volume of fill that would be needed would make the alternative cost prohibitive, would dramatically impact the stormwater management at Offutt AFB, and would prevent the recreational function of the Base Lake from being restored. For these reasons the alternative was removed from consideration.

2.1.3 Thermal Removal

Depending on acclimation levels and rate of temperature change, 100 percent mortality of zebra mussels have been reported at temperatures ranging from 95 to 104 °F. Thermal treatment has been used to remove zebra mussels from targeted surfaces associated with raw water supply systems. However, this technique has not been used to remove zebra mussels from an entire body of water. No feasible way was identified to add the amount of heat that would be required to rapidly increase the water temperature to over 95 °F. This alternative was determined to be unproven and not feasible, and was removed from consideration.

2.1.4 Biological Removal

In North America, certain diving ducks and a limited number of fish species (sturgeon, carp, and freshwater drum) have been identified as animals that will readily feed on zebra mussels. However, none of these potential predators would be expected to completely eliminate the zebra mussel from the Base Lake.. In addition, the high reproductive rate of the zebra mussels would be able to replace all individuals lost due to predation. Since this alternative would not be expected to achieve either of the identified goals, the alternative was not retained.

SECTION TWO Alternative Descriptions

2.1.5 Chemical Removal

The evaluation of chemicals that could be used to remove zebra mussels involved four criteria:

- The chemical had to be toxic to zebra mussels.
- The chemical had to be permitted or capable of being permitted in a short period of time for use against zebra mussels.
- The chemical had to be less toxic to other aquatic species than it was to zebra mussels.
- The chemical has to be licensed for use in an open water system.

Chemicals considered included Clam-Trol, Endothall, potash (potassium chloride), and copper sulfate

2.1.5.1 Chemicals Not Meeting Screening Criteria

Clam-Trol

Clam-Trol is a chemical that is labeled for the application into aquatic environments for the control of clams in open water systems. Toxicity information available for Clam-Trol indicated that it is moderately toxic to zebra mussels while being highly toxic to sensitive species such as channel catfish, which are an important game fish species in the Base Lake. Since the application rate that would be required to eradicate the zebra mussels would be expected to also result in high fish mortality, Clam-Trol was not retained as a chemical to be considered for eradication of zebra mussels from the Base Lake.

Endothall

Endothall is a chemical that is presently labeled for use in the aquatic environments for the control of aquatic vegetation and algae. Various formulations (salts) of endothall are used in aquatic pest control. Although the parent compound (endothall) is the same, characteristics of the different salt formations differ greatly. Some formulations (e.g., Hydrothol 191) are labeled for aquatic weed control in open water systems. Other formulations (e.g., EVAC) are labeled for zebra mussel use but restricted to closed water systems. While endothall is moderately toxic to mussels, in some formulations it can be moderately to highly toxic to some fish species. The open water system formulation (Hydrothol 191) is extremely toxic to fish. In addition, it has not been labeled for control of organisms such as zebra mussel. Under the authority of 24(c) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), states may register an additional use of a federally registered pesticide product, or a new end-use product to meet special local needs. The USEPA reviews these registrations, and may disapprove the state registration if, among other things, the use is not covered by necessary tolerances, or the use has been previously denied, disapproved, suspended or canceled by the USEPA Administrator, or voluntarily canceled subsequent to a notice concerning health or environmental concerns (Romary 2008). Based on this approval process, the working group believed it would be quite difficult to obtain a label for it to be used to eradicate zebra mussels from the Base Lake. Therefore, it was not retained for further evaluation.

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2.1.5.2 Chemicals Meeting Screening Criteria

Potash

Potash (potassium chloride) has been reported to have been used successfully to eradicate zebra mussels from Millbrook Quarry in Virginia. There has been no report of zebra mussels in this 12-acre lake since the eradication action in 2006. Initially in the evaluation, Offutt AFB and the working group believed that potash should be the chemical considered for the eradication of the zebra mussel from the Base Lake. However, a very high concentration (approximately 240 tons) of potash would be required to obtain the desired zebra mussel mortality. During 2007, there was in excess of a 300 percent increase in the cost of the chemical, resulting in the cost of the chemical alone for two applications would have been in excess of \$330,000. This increase in the cost of potash, coupled with the cost of transporting 240 tons of potash to the base lake and the cost of applying the potash to the base lake was projected to be in excess of 1 million dollars. Subject to the availability of appropriations, and within Administration budgetary limits, Executive Order 13112 directs Federal Agencies to detect and respond rapidly to and control populations of invasive species in a cost-effective and environmentally sound manner. Based on this directive in Executive Order 13112, the zebra mussel working group determined that Offutt AFB could not respond quickly and in a cost-effective manner using potash as the chemical of choice to eradicate the zebra mussels and prevent their spread to the Missouri and other nearby bodies of water. The zebra mussel working group was also concerned about whether there would a sufficient supply of potash available to eradicate the zebra mussels because it is also used for agricultural purposes as a fertilizer.

Even though potash was used to eradicate zebra mussels in Virginia, potash is not listed as an active ingredient in any Federally-registered pesticide. Section 18 of FIFRA authorizes the USEPA to allow states to use pesticides for an unregistered use for a limited time if USEPA determines that an emergency condition exists. The Nebraska Department of Agriculture (NDA) or a Federal agency is usually the entity that makes the Section 18 application to USEPA. Upon receipt of the application, USEPA attempts to make decisions on the request within a 50 day time frame from date of receipt. During this 50 day period, USEPA performs an evaluation of the request including an assessment of the validity of the emergency claim and economic loss, human dietary risk assessments, occupational risk assessment, ecological and environmental risk assessments, and an assessment of the progress toward registration for the use for specific or public health exemption requests (Romary 2008). The Base Lake working group concluded that the probability of potash being approved for this exemption was low because of the unknown environmental effects.

Although potash meets the screening criteria, the high cost of the alternative coupled with the uncertainty of obtaining an exemption to eradicate zebra mussels from the Base Lake resulted in the alternative being removed from consideration.

Copper Sulfate

Copper sulfate has been used for many years as a chemical tool in freshwater farm ponds and aquaculture operations, including open water systems. It is both an effective algaecide and a parasite treatment. There are no restrictions on the use of the water following treatment; however, it is desirable to wait 24 hours to let the metallic smell in the water to dissipate.

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Copper sulfate is also toxic to invertebrates, such as snails and recently has shown effectiveness against zebra mussels. Copper sulfate can be toxic to fish, especially to copper sensitive species such as trout and especially in more acidic waters. Based on the label toxicity, copper sulfate can kill goldfish at a concentration of 0.1 parts per million (ppm) for 48 hours and rainbow trout at a concentration of 0.1 ppm for 96 hours. However, most fish kills following copper sulfate treatment appear to result from heavy algae kill and accompanying oxygen depletion rather than from the chemical itself.

Copper sulfate has a fairly short period of activity. It is quickly adsorbed to soil and sediment and inorganic ions such as carbonates, and organic materials suspended in the water. These particles then fall to the bottom sediments, rendering the copper inactive.

The product Copper Sulfate Crystals, USEPA registration number 56576-1, was chosen because it is an already-registered product with USPEA and the NDA. Also, a similar species/site, “schistosome-infected freshwater snails” is listed on the label. In order to legally apply this product for zebra mussels, a section 24 (c) label would be required. The U.S. Air Force would apply for this approved use through the NDA and USEPA.

2.2 Alternatives evaluated in the EA

This section describes the No Action Alternative and the Proposed Action, which involves the application of copper sulfate to the Base Lake. Inclusion of the No Action Alternative is required under NEPA.

2.2.1 No Action Alternative

The No Action Alternative is defined as maintaining the status quo with no actions being funded or completed to remove the zebra mussels from the Base Lake. Under this alternative, Offutt AFB would continue to restrict the use of private boats on the Base Lake and the outlet pipes would remain plugged.

2.2.2 Application of Copper Sulfate

The Proposed Action would involve the treatment of the Base Lake using copper sulfate. The Proposed Action includes an initial application in September 2008 and a second application in the spring of 2009. Each application would be completed in 2 phases.

2.2.1.1 Initial Application – Treatment Methods

Copper sulfate would be applied to the Base Lake at a rate of 10.8 pounds per acre foot of water, in accordance with the Special Local Need Label (Appendix B). The surface area and volume of the Base Lake during the treatment period would determine the precise amount of copper sulfate that would need to be applied to the Base Lake. Therefore, the elevation of the Base Lake would be surveyed prior to application to determine the correct volume of water and appropriate amount of copper sulfate to be applied. The amount of copper sulfate that would need to be applied to the Base Lake is expected to be between 22,000 and 26,000 pounds based on the estimated acre-feet of water that will be in the Lake in September 2008.

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The application of copper sulfate would occur so the average concentration of the Lake would be 1 ppm over a 48 hour period, in accordance with the Special Local Need Label. Medium sized (5 to 8 millimeter diameter) copper sulfate crystals (shown at right) would be applied using a barge and vortex-type aquatic herbicide spreaders (or equivalent). It is anticipated that the copper sulfate would be spread evenly at a rate of between 1,000 to 1,500 pounds per hour. If necessary, additional watercraft would be employed to achieve the required rate of application so the appropriate amount of copper sulfate would be applied within the required 48 hour period.



In addition to treating the main portion of the Base Lake, copper sulfate would be applied to the inlet channel and ponded areas immediately upstream of the Lake on base property (Figure 3). The potential for zebra mussel migration into these areas warrants their treatment. Application of these areas would be done manually using handheld spreaders. All mixing and application would be completed by individuals that have been certified by NDA as a commercial/noncommercial pesticide applicator in the Aquatic Pest Controls Category in the State of Nebraska.

2.2.1.2 Initial Application - Post-Treatment Activities

Following the completion of the copper sulfate application, the Lake would be monitored for water quality, fish mortality, and zebra mussel mortality. The Lake would also be periodically monitored for copper concentration to evaluate when the concentration is less than 1.3 ppm in all areas of the Lake. The Lake would have usage restrictions (no fishing, swimming, or boating) in place until the highest detected concentration is less than 1 ppm.

Copper sulfate is toxic to some fish and fish kills may occur. Therefore, monitoring for fish mortality would also occur immediately following the application of the copper sulfate. If fish mortality is observed, all dead fish would be removed daily until no dead fish are observed for 48 consecutive hours. The dead fish would be taken to a local rendering plant, landfill, or other approved disposal site.

Visual analysis and monitoring would occur to determine if the zebra mussel eradication effort was effective. These analyses would include substrate sampling and veliger (larval) sampling within the water column, as well as visual inspections.

2.2.1.3 Second Application

A second application of copper sulfate, if necessary, would occur in the spring of 2009.

Special Label Use Restrictions

- The Special Local Need Labeling for the use of copper sulfate at Offutt AFB includes the following restrictions:
 - The label only applies to the Offutt AFB Base Lake.

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- The label is only valid for two applications, and expires on May 31, 2009
- The average lake concentrations of elemental copper cannot exceed 1 ppm based on the total lake volume.
- The lake area must be monitored for dead fish during daylight hours. All dead fish must be collected and disposed of by burial or landfill.
- Swimming in the lake, consumption of fish from the lake, and the use of the lake as direct or indirect source of drinking water are prohibited during and after lake treatment until the water concentration of copper is at or below 1.3 ppm.
- Warning signs must be posted at the lake.

SECTION THREE Affected Environment

This chapter describes the human and natural environment at Offutt AFB, providing information to allow for the evaluation of potential environmental impacts that could result from the alternatives described in Section 2.

During the initial environmental review process, it was determined that several environmental disciplines would not be impacted by the proposed action. These include:

- Climate and Meteorology
- Topography
- Geology and Soils
- Hydrology
- Floodplains (FEMA 2005)
- Cultural Resources
- Hazardous Materials and Wastes

To facilitate the preparation and review of the EA, these disciplines will not be discussed further in this document.

3.1 Land Use

The Base Lake provides multiple recreational opportunities to primarily Offutt AFB personnel. Recreational activities available at the Lake include horseback riding, camping, picnicking, hiking, softball, boating, and fishing. The Base Lake is posted as a no wading or swimming area and is not used as a potable water source.

Due to the presence of the zebra mussels, restrictions have been placed on boat access to the Lake. Only rental boats available at the lake are allowed.

3.2 Public Health and Safety

EO 12088, Federal Compliance with Pollution Control Standards, directs federal agencies to comply with federal, state, and local laws and regulations concerning air, water, and noise pollution, and hazardous materials and substances to the same extent as any private party.

The edges of zebra mussel shells are sharp and can cause lacerations to feet, legs, or arms that may come into contact with them. However, the Base Lake shorelines are steep and riprap has been placed to stabilize the steep shorelines.

The Base Lake is not enclosed within the perimeter fence of Offutt AFB. Therefore, the public can gain access to the Lake. However, the lake is patrolled by Offutt AFB security staff to minimize the use by non-military personnel.

3.3 Socioeconomics/Environmental Justice

EO 12898, enacted in 1993, requires that each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

Offutt AFB is an active military base with approximately 12,000 military and federal personnel assigned to the facility. Currently, there is no base-owned housing located in the vicinity of the

SECTION THREE Affected Environment

Base Lake. Therefore, for purposes of environmental justice, there are no low-income or minority populations located on Base or within the project area.

The city of Bellevue, Nebraska which is located adjacent to Offutt AFB to the north and west, has a population of approximately 44,382 people. The population is comprised of approximately 86 percent whites, 6 percent African Americans, 6 percent Hispanic or Latino, and 2 percent Asian. Approximately 4 percent of the families and 6 percent of the individuals live below the poverty level. (Census 2008)

A civilian trailer park is located less than 0.2 mile northwest of the Base Lake. According the 2000 Census, this area is comprised of approximately 6 percent Hispanics or Latinos and 4 percent African Americans. Approximately 11 percent of the families and 15 percent of the individuals in the area live below the poverty line. (Census 2008)

Since their introduction into the Great Lakes region in 1988, zebra mussels have been causing problems for power companies, steel plants, city water suppliers, and other industries by clogging water-intake systems. The United States Fish and Wildlife Service (USFWS) has estimated that the potential economic impact at \$5 billion from 2000 to 2010 to United States (U.S.) and Canadian water users within the Great Lakes region alone.

Presently, electric power and potable water for Offutt AFB and surrounding municipalities is supplied by facilities that have water intake(s) on the Missouri River. Locally, these entities include Omaha Public Power District, Omaha Metropolitan Utilities District, and Mid America Energy. The Missouri River flows from Montana to south to its confluence with the Mississippi River, near St. Louis, Missouri. Therefore, many municipalities and industries obtain needed water from the Missouri River and its tributaries.

3.4 Noise

Sounds disrupting normal activities or otherwise diminishing the quality of the environment are designated as noise. Noise events that occur during the night (10 p.m. to 7 a.m.) are more disruptive than those that occur during normal wake hours (7 a.m. to 10 p.m.). Man-made noise events within the project vicinity are primarily associated with aircraft operation.

The Offutt AFB's host unit is the 55th Wing. The Wing operates a variety of RC-135s, the EC-130, and the E-4B aircraft in support of its diverse missions, which include reconnaissance, command and control, communications, electronic attack, and international treaty verification. An average day at Offutt AFB involves approximately 135 flying events. In addition, numerous transient aircraft from other military installations land and take-off from Offutt AFB on a daily basis. Noise levels within the southwest one-fourth of the Lake (closest to the active runways) are estimated to be approximately 65 to 70 decibels (dB) Day-Night Average A-weighted Sound Level (DNL). (URS 2006, Offutt AFB 2007)

The effects of aircraft and airfield operation noise on the surrounding community are of great concern to the Air Force, as is the potential danger to humans and property from aircraft accidents. To minimize the impact of noise and danger, the Air Force participates in cooperative planning with the cities of Bellevue, Papillion, La Vista, Ralston, Plattsmouth, and Omaha along with Sarpy and Douglas counties. All of these entities have land use plans that have benefited

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from the input of Offutt AFB data concerning flight operations and Air Installation Compatible Use Zone (AICUZ) Land Use Guidelines. (URS 2006)

The Base Lake is located approximately 0.25 mile northeast of the southeastern end of the runway. The closest residential structures (which are not on the Base) are located approximately 0.2 mile northwest of the Lake.

3.5 Air Quality

The National Ambient Air Quality Standards (NAAQS) established by the USEPA define the allowable concentration of pollutants that may be reached but not exceeded in a given period to protect human health (primary standard) and welfare (secondary standard), with a reasonable margin of safety. These standards include maximum concentrations for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, particulate matter with a diameter of 10 microns or less (PM₁₀) and smaller particulates 2.5-microns or smaller (PM_{2.5}). Exceeding a concentration level is a violation and constitutes a non-attainment of the standard. In addition to the pollutants previously identified, the State of Nebraska has established additional criteria for total reduced sulfur. Standards are not to be exceeded more than once per year except for ozone and particulate matter, which are not to be exceeded more than an average of one day per year.

Offutt AFB is located in a NAAQS Attainment Area (USEPA 2008).

3.6 Water Resources

3.6.1 Surface Water

Surface water at the Base consists of the Base Lake, the golf course pond, and five drainage basins. Overland flow on base is collected in storm sewers, drainage ditches, and collection basins. All the drainage basins flow into the Papillion Creek, Platte River, or Missouri River. (URS 2006) Surface water runoff from the runway area drains through the East Gate drain and into the Base Lake.

The Base Lake is between generally between 117 and 113 acres in size and holds approximately 2,000 acre-feet of water. Due to heavy precipitation in the spring and summer of 2008, the Lake elevation had risen and the size has increased. As of July 25, 2008, the Lake size was approximately 123 acres and the lake contained more than 2,600 acre-feet of water. The Lake is fed by both surface drainages and groundwater. Because it is groundwater fed, variations in the elevation of the Missouri River can affect the water level in the lake. The Lake was formed as a result of dredging to supply materials for construction on base. Since its formation, concrete and riprap have been placed along the bank of the Lake to stabilize the shoreline. The soil composition of the banks coupled with high usage makes vegetative cover difficult to maintain. (URS 2006)

As stated in Section 1.1, concrete plugs were installed in the two 48-inch CMPs that serve as an outlet structure for the Lake. The outlet discharges to a local drainage (Bellevue Drain) that flows approximately 1 mile before discharging to the Missouri River.

The Missouri River is a major tributary to the Mississippi River and is approximately 1 mile downstream of the Base Lake. A portion of the Missouri River located along the northeastern section of Nebraska in Ponca State Park is a federally-designated "wild and scenic river." The

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Missouri River is used for recreational boating, fishing, and swimming and the transport of goods via barge. As indicated in Section 3.3, the Missouri River provides water to the municipalities and industries via intake pipes along its course from Montana to Missouri.

3.6.1.1 Surface Water Quality

The basic water quality in the Base Lake is similar to water quality of other sandpit lakes in the Platte River Valley. Due to temperature stratification during the warmer months, water below the thermocline (hypolimnion) has low dissolved oxygen levels which prevents utilization by the fish in the lake. Current temperature profiles of the Base Lake will be collected prior to chemical application.

Monitoring of the water that flows into the Base Lake is necessary to ensure water quality does not degrade. Much of the water that flows into the Lake comes from areas on the base, and due to the proximity of the runway, run off may contain petroleum contaminants. Monitoring of the water that flows into the Base Lake is necessary to ensure water quality does not degrade. Other sources of pollution include the horse stables at the Base Lake. (URS 2006)

The Base Lake is not used as a potable water source; water use is limited to recreational activities.

3.6.2 Groundwater

Groundwater at Offutt AFB may be found at depths as shallow as 10 feet. At the higher elevations of the base, groundwater is located 70 or more feet below ground surface (bgs). Groundwater generally flows from uplands to lowlands. (URS 2006) As indicated earlier, the Missouri River impacts the Base Lake water levels via groundwater action.

3.7 Biological Resources

3.7.1 Wetlands

Wetlands are defined as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are areas that are covered by water or have waterlogged soils for long periods during the growing season. Plants growing in wetlands are capable of living in saturated soil conditions for at least part of the growing season. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds. (USACE 2008)

EO 11990, Protection of Wetlands, requires federal agencies to take action to avoid or minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

A Survey of the Waters of the U.S. on Offutt AFB was completed in January 2005 (TEC 2005). The survey detailed the jurisdictional and non-jurisdictional wetlands and open water bodies found at Offutt AFB. According to this survey, there are approximately 14 jurisdictional and 51 non-jurisdictional wetlands and water bodies located on Offutt AFB property. Jurisdictional wetlands are located around the perimeter of the Base Lake. Non-jurisdictional wetlands are

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located upstream and along the shores of the Base Lake. Figure 4 shows the wetlands located in and near the Base Lake project area.

3.7.2 Threatened and Endangered Species

The Endangered Species Act (16 U.S. Administrative Code [U.S.C.] --1531 to 1544) requires federal agencies to determine the effects of their actions on threatened and endangered (T&E) species of fish, wildlife, and plants, and their critical habitats, and take steps to conserve and protect these species.

Federally-listed threatened and endangered species for Sarpy County, Nebraska include the interior least tern, the pallid sturgeon, the piping plover, and the western prairie fringed orchid (USFWS 2008). In addition to these immediate project area species, threatened and endangered species occur all along the Missouri River's course. These species include mammals, fish, birds, mussels, amphibians, and plants.

Based on consultation with USFWS and Nebraska Game and Fish Commission (NGPC) during the preparation of the current Integrated Natural Resource Management Plan (URS 2006), there are no federal or state listed threatened or endangered species within Offutt AFB.

3.7.3 Terrestrial Wildlife

Offutt AFB provides habitat for wildlife that would be typical in an urban environment. Mammals that may frequent Offutt AFB include opossum, moles, shrews, raccoons, bats, rabbits, rodents, coyotes, skunks, foxes, and deer. Reptiles and amphibians that frequent the base include various snakes, frogs, toads, lizards, and salamanders. (URS 2006)

Migratory birds are protected through International Treaties and the Migratory Bird Treaty Act. Federal regulations (50 CFR) and EO 13186 (Responsibilities for Federal Agencies to Protect Migratory Birds) provide the framework for regulation of migratory bird take and possession. Federal permits are required to take, possess, transport and dispose of migratory birds, bird parts, feathers, nests, or eggs.

Offutt AFB is located within a migratory bird corridor, and as such, several types of birds frequent the area. Songbirds (robins, swallows, sparrows, etc.) are prevalent throughout the base as both resident populations and migratory populations. Resident populations of waterfowl (ducks, geese, swans) are located around nearby grain fields and waterbodies. Migratory waterfowl travel in large flocks during spring and fall. Raptors (hawks, eagles, owls, kites, etc.) can be found at Offutt AFB and surrounding areas as migratory populations or as residents. Other bird species that may be found at Offutt AFB, as both migratory and resident populations, include pigeons, shorebirds, blackbirds, and starlings. (URS 2006)

To minimize impacts associated with birds near the runways, Offutt AFB maintains a Bird Aircraft Strike Hazard (BASH) plan. In general, birds are the primary BASH concern at Offutt AFB. It is important to note that the primary goal of natural resource management at Offutt AFB is to manage natural resources to sustain the military mission and maintain operational capability and flexibility. Therefore, management of potential BASH species is an important component of natural resources management and flight safety at Offutt AFB.

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3.7.4 Aquatic Resources

The Base Lake is a relatively small lake that provides recreational fishing for Offutt AFB personnel. Prominent game fish species found in the Base Lake, including largemouth bass, smallmouth bass, walleye, saugeye, bluegill, catfish, and white and black crappie. Non-game fish species include gizzard shad, white perch, river carpsucker, bigmouth buffalo, smallmouth buffalo, common carp, drum, and longnose gar (NHU 2006).

The primary goals of fish and wildlife management at Offutt AFB are to maintain and enhance game fish populations and their desired habitat to provide successful recreational fishing opportunities.

Aquatic macrophytes are presently limited to areas along the inlet to the Lake. Willows have become established at the normal Lake elevation in areas that do not have steep banks.

3.8 Cumulative Impacts

CEQ regulations implementing NEPA [40 CFR Part 1508.7] include the need to address potential cumulative impacts. A cumulative impact is defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions.” Cumulative effects are not wholly different effects from direct or indirect effects of an action. Cumulative effects are merely a way of placing seemingly isolated or insignificant direct and indirect effects in context with respect to overall impacts, both over time and in an area larger than that evaluated for direct and indirect effects. Cumulative effects are discussed as being additive, synergistic, or reductional.

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This chapter discusses the potential for impacts to the environmental resources described in Section 3 as a result of implementing the project alternatives described in Section 2.

4.1 Land Use

4.1.1 No Action Alternative

The No Action Alternative will have a long-term adverse impact on the recreational use of the Lake. The use restriction of privately-owned boats to minimize the potential for spread of the mussels to other water bodies would continue with this alternative. Additionally, the mussels would reduce the level of phytoplankton and zooplankton within the lake, which would adversely affect reproduction and growth of fish species in the lake. In addition, the clear water will encourage the growth of rooted aquatic macrophytes, which could create additional problems for people wanting to fish the Lake. This would be considered a significant long-term negative impact.

4.1.2 Eradication of Zebra Mussels – Offutt AFB (Proposed Action)

There would be a temporary adverse impact on the recreational use of the Lake during and immediately following the application of the copper sulfate, as access to and use of the lake would be restricted by signage and Offutt AFB security patrols until all areas of the lake have elemental copper concentrations less than 1.3 ppm which is the maximum contaminant level (MCL) for copper.

The Proposed Action would have a long-term positive impact on the use of the Lake. Eradication of the zebra mussel would allow Offutt AFB to restock and maintain a larger variety and quantity of fish for the recreational fishermen.

4.2 Public Health and Safety

4.2.1 No Action Alternative

The No Action Alternative would not have a significant impact on public health and safety. The presence of the sharp zebra mussel shells along the shoreline area would represent a minor, insignificant hazard to lake users.

4.2.2 Eradication of Zebra Mussels – Offutt AFB (Proposed Action)

Copper sulfate would be applied directly to the Base Lake according to label directions (See Appendix B). The average elemental copper concentrations will not exceed 1 ppm. Due to concerns for humans, direct contact with lake water and eating fish from the Lake would be prohibited during and after Lake treatment, until water concentrations of elemental copper at individual sampling locations is at or below 1.3 ppm. Public access to the Lake area during application of the copper sulfate would be restricted to the Lake perimeter roadway and landward. Access to the FAMCAMP, pavilion, and boathouse would be maintained during the application. Warning signs restricting use and informing Lake users about the Lake treatment would be placed at the entrance to the Lake and at all boat ramps during the application and until monitoring indicates that adequate mixing has occurred and that no portion of the Lake has water copper concentrations above 1.3 ppm. Additionally, public information sheets would be

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prepared and distributed to base personnel and users of the Base stables. Offutt AFB would also increase security patrols of the Lake area.

All mixing and application would be completed by individuals that have been certified as a Pesticide Applicator #5 (Aquatics) in the State of Nebraska. The work crews would be required to wear dust masks, full eye protection, long-sleeve shirts, full-length pants, and boots.

During and after application of the copper sulfate, the lake would be monitored for dead fish. Dead fish would be collected and disposed of at a local rendering plant until no dead fish are found for a 48-hour period.

With the precautions presented above, the proposed action would have no significant impact on public health and safety.

4.3 Socioeconomics/Environmental Justice

4.3.1 No Action Alternative

The No Action Alternative would not have a disproportional adverse impact on low-income or minority populations.

The No Action Alternative could result in negative economic impacts within the general project area. The current restrictions on the Base Lake could result in decreased use of the recreation area by military personnel over time due to the decreased quality of recreational fishing. This would have a negative economic impact on the businesses that derive their income from the Lake.

Additionally, given the aggressive colonizing ability of zebra mussels, if the zebra mussels were to gain access to surface waters outside the Base Lake, the potential exists for economic impacts to the Bellevue metro area and beyond because the zebra mussels could plug intakes for municipal water and power companies along the Missouri River. The colonization of the municipal utilities would result in increased operation and maintenance costs which could be significant and could result in increase utilities fees for end users.

4.3.2 Eradication of Zebra Mussels – Offutt AFB (Proposed Action)

Potential impacts to the trailer park and other surrounding areas would be related to noise and air quality, which are discussed in Sections 4.4 and 4.5, respectively. The impacts associated with these environmental resources would not be disproportionate to any low-income or minority populations.

The Proposed Action Alternative would not result in a negative economic impact within the general project area. Economic activity associated with the Base Lake would be expected to continue post-project as recreational fishing would be maintained as part of this alternative. See also Sections 4.4 and 4.5.

4.4 Noise

4.4.1 No Action Alternative

The No Action Alternative would not impact local noise levels.

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4.4.2 Eradication of Zebra Mussels – Offutt AFB (Proposed Action)

There would be a temporary increase in noise levels in the immediate project area during application of the copper sulfate (approximately 2 days). However, since Offutt AFB is an active military base with daily airfield operations (landings and takeoffs), a temporary, localized increase in noise would not result in a significant adverse impact to the base or adjacent communities. The proposed project activities would not impact the Offutt AFB AICUZ guidelines.

4.5 Air Quality

4.5.1 No Action Alternative

The No Action Alternative would not impact local air quality.

4.5.2 Eradication of Zebra Mussels – Offutt AFB (Proposed Action)

Short-term, localized impacts to air quality may occur immediately downwind of the application activities. Copper sulfate would be applied in a crystal form limiting to the extent possible the production of dust. Any impacts would be considered minor and would be limited to the immediate vicinity of the Base Lake. Once application has been completed (2 days), air quality at the Base Lake would return to pre-project conditions. See also Section 4.2 for Public Health and Safety.

4.6 Water Resources

4.6.1 No Action Alternative

The No Action Alternative would have no impact on groundwater.

The No Action Alternative would have a long-term negative impact on the quality of water in the Base Lake. Without intervention, the zebra mussels would continue to rapidly multiply within the Lake. The presence of the zebra mussel would change the nutrient balance in the Lake resulting in clearer water due to filter feeding and the remove of phytoplankton and zooplankton. The full ecosystem effects would pertain to the aquatic resources in the Lake and are discussed in Section 4.7.4. Additionally, potential would remain for the mussel to gain access to other local water bodies, impacting intake and outlet structures and industries connected to those water bodies.

With this alternative, the Lake outlets to Bellevue Drain would remain plugged to control the spread of the zebra mussel. During times of heavy precipitation, Offutt AFB would be unable to release water from the Lake impacting Base surface water drainage. As the Lake level rises, recreational facilities surrounding the lake and land upstream from the Lake will flood.

4.6.2 Eradication of Zebra Mussels – Offutt AFB (Proposed Action)

The copper would bind to soil and other particles in the water column and fall to the bottom sediments, removing the copper from the water column. The copper would remain bound to the sediments and become immobile. Therefore, the copper would not impact surface or groundwater.

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With the proposed action, copper sulfate would be applied to the Lake resulting in the death of adult and larval zebra mussels. This activity would have a short-term negative impact on the water quality in the Lake. However, with adequate mixing copper levels would equalize below 1.3 ppm, which is the MCL for copper. In the long-term, the proposed action would have a positive impact on the water quality in the Lake as it relates to the aquatic resources (see Section 4.7.4).

As indicated earlier, the copper would remain in the water for a few days, then precipitate to the bottom of the Lake where it would be bound and rendered biologically inert in the sediment (Haller 2007). Copper is a heavy metal and heavy metals are not highly mobile in soil/sediment or groundwater, especially under basic (alkaline) conditions. The Base Lake pH ranges from 7.2 to 8.5, which is a fairly neutral to slightly alkaline environment. Therefore, it is anticipated that the copper would be bound to bottom sediments and would not impact groundwater quality.

As part of the temporary measures in response to the identification of zebra mussel in the Base Lake, the outflow pipes from the Base Lake to the Bellevue Drain were plugged. The pipes remain plugged at this time; therefore, the Base Lake does not have any connection to other surface water bodies in the area. Therefore, no downstream water bodies, including the Bellevue Drain and the Missouri River would be impacted by the proposed action.

Copper sulfate would also be applied to the Lake inlet and upstream ponded areas. These areas are upstream of the Base Lake and since the Base Lake has no connection to other surface water bodies, application of the copper sulfate to these areas would not impact other surface water bodies downstream. Impact to wetlands are discussed in Section 4.7.

With this alternative, the Base Lake outlets to the Bellevue Drain would be reopened allowing surface water drainage on the Base to return to normal conditions. Therefore, the risk of flooding of upgradient land be reduced and recreational functions of the lake could return.

4.7 Biological Resources

4.7.1 Wetlands

4.7.1.1 No Action Alternative

The No Action Alternative would not impact any wetlands at Offutt AFB. Although zebra mussels may gain access to wetlands from loss of containment in the Base Lake, this would not be considered a significant impact to wetlands. Zebra mussels like to colonize on hard surfaces. Cattails and reeds would be the predominant hard surface in a wetlands and it is not likely that zebra mussels would colonize on plants to the extent that they colonize on other hard surfaces. Additionally, the cattails and reeds derive their nutrients from the soil and not from other organisms in the water. Therefore, wetland quality and function would not be impacted by zebra mussel colonization.

4.7.1.2 Eradication of Zebra Mussel - Offutt AFB (Proposed Action)

The proposed action would have a short-term negative impact on wetland vegetation within the project area. The copper sulfate may kill most of the wetland vegetation exposed to the chemical. However, the wetland vegetation would return to pre-project levels by the next growing season. Therefore, no long-term impacts would occur to wetland vegetation.

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Additionally, since the project requires no fill material be placed in a wetland, no Section 404 would be required from the U.S. Army Corps of Engineers (USACE). The USACE was contacted regarding the project and expressed no concerns about the project (USACE telephone memorandum 23 June 08, Appendix A).

4.7.2 Threatened, Endangered, and State Sensitive Species

4.7.2.1 No Action Alternative

The No Action Alternative has the potential to impact any federal-listed and state-listed T&E species if the zebra mussel gains access to the Missouri River. Overtime, the zebra mussel population would continue to grow and the Missouri River ecosystem would be negatively affected. Therefore, the potential exists for the pallid sturgeon, interior least tern, and piping plover to be negatively impacted by the No Action alternative.

4.7.2.2 Eradication of Zebra Mussels - Offutt AFB (Proposed Action)

As indicated in Section 3.7.2, no federal-listed or state-listed species are permanent residents at Offutt AFB. The bald eagle (a state-listed species) has the potential to fly over the Lake and take fish. However, with the collection and disposal of fish killed by the copper sulfate, potential impacts to the bald eagle would be minimized. Therefore, the proposed action would not impact any threatened, endangered, or state sensitive species. USFWS concurred with this determination in a telephone conversation on 12 June 2008 (Appendix A). NGPC, in telephone memorandums dated 23 June 2008 (Appendix A), also concurred that no state-listed or sensitive species would be impacted by the project. Both the USFWS and NGPC were part of the zebra mussel working group and both agencies support the project (USFWS and NGPC telephone memorandums, see Appendix A).

4.7.3 Terrestrial Wildlife

4.7.3.1 No Action Alternative

The No Action Alternative would not impact wildlife at Offutt AFB.

4.7.3.2 Eradication of Zebra Mussels – Offutt AFB (Proposed Action)

The Base Lake is used by a variety of terrestrial wildlife species as a source of water and food. Therefore, an acceptable surface water concentration of copper was estimated for representative species to show that the application of copper sulfate would not pose an unacceptable risk to terrestrial species. Table 4-1 shows the estimated acceptable surface water concentrations of copper. The calculations assumed that the Lake was the only source of drinking water for the species and used a 35 day exposure period. These are conservative assumptions because it is anticipated that the Lake concentration of copper would not exceed 1 ppm at any location by approximately 2 weeks post-application. Additionally, most wildlife have a home range in which they roam; therefore, they have more than one source of water. The lowest estimated acceptable concentration was 4.6 ppm for white-tailed deer. Although during application and immediately following application some locations in the Lake may have copper concentrations greater than 4.6 ppm, wave-action and mixing would quickly lower the concentrations. It is anticipated that the concentration of copper throughout the Lake would be 1 ppm or less within 7 to 10 days. Therefore, is unlikely that the proposed project would have a negative impact on any terrestrial

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species. The complete methodology for the calculation of the surface water concentrations is included in Appendix C.

4.8 Aquatic Resources

4.8.1.1 No Action Alternative

The No Action Alternative would have a long-term negative impact on aquatic resources at Offutt AFB. As the zebra mussels continue to multiply, they would change the nutrient balance of the water feeding on the microzooplankton, bacteria, and protozoans. The lower biomass would lead to clearer water. Clearer water would allow sunlight to penetrate deeper into the Lake. These impacts would change the aquatic ecosystem and fish habitat within the Lake, making the Lake less acceptable for many fish species.

Under the No Action alternative, the possibility exists that zebra mussels could gain access to other water bodies in the area via flooding, transportation on fishing equipment, or bait water. If this were to occur, there would be a negative impact on all infested aquatic ecosystems. For some systems, this impact could be significant resulting in a change in the types and numbers of aquatic organisms present.

4.8.1.2 Eradication of Zebra Mussels –Offutt AFB (Proposed Action)

The proposed action would have a short-term adverse impact on the aquatic resources in the Base Lake. The purpose of the project is to eradicate the zebra mussels; however, a side effect of this action is the death of bottom dwelling organisms, invertebrates, snails, crawfish, vegetation, and potentially some fish.

As indicated earlier in the EA, rainbow trout is the most sensitive species to copper. No rainbow trout occur in the Lake. Other fish species, especially carp and catfish which are bottom dwellers are more tolerant of changes in their environments. Native invertebrate populations should return to pre-treatment levels within a few months (Haller 2007).

In the unlikely of a significant die-off of aquatic organisms, a rapid decrease in the dissolved oxygen content of the Lake water could occur, particularly in areas where there is little circulation with the rest of the water body. This is a potential negative impact of the chemical application.

The proposed action would have a long-term beneficial impact on the aquatic resources at Offutt AFB. By removing the zebra mussels from the food chain, the Lake ecosystem would return to its pre-zebra mussel state and provide acceptable habitat for a wide variety of fish species. This would allow the fish and wildlife management personnel on base to meet their mission.

For purposes of this project, zebra mussels would be considered an un-named target pest; therefore, the Chem One Special Local Need Label (**See Appendix B**) for Offutt AFB allows for the treatment of the Base Lake without requiring any additional permits from USEPA (Haller 2007).

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4.8.2 Cumulative Impacts

4.8.2.1 No Action Alternative

The No Action Alternative would not produce any cumulative impacts greater in scope or magnitude than those described for each individual environmental resource.

4.8.2.2 Eradication of Zebra Mussels – Offutt AFB (Proposed Action)

No other activities were identified in the project and surrounding area which would have additional impacts on the natural resources in the Lake area. Therefore, cumulative impacts would not be expected to be greater in scope or magnitude than those described for each individual environmental resource.

SECTION FIVE Comparison of the Environmental Consequences of the Alternatives

5.1 Comparison of the Environmental Consequences of the Alternatives

The Proposed Action would be expected to have a long-term positive effect on the Base Lake ecosystem and recreational use of the Lake. A more detailed comparison of the potential effects of the alternatives on environmental resources is presented in Table 5-1.

5.2 Conclusions

As discussed above, all of the potential impacts associated with the proposed action were determined to be insignificant. These determinations support a Finding of No Significant Impact (FONSI) for the Proposed Action (Alternative 1).

SECTION FIVE Comparison of the Environmental
Consequences of the Alternatives

**TABLE 5-1
ENVIRONMENTAL EFFECTS OF ALTERNATIVES EVALUATED
Zebra mussel eradication project**

| Discipline | Alternative 1 No Action | Alternative 2 Proposed Action |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Land Use | Long-term negative impact on recreational use of the lake. | Land use classification would not change with this alternative. Short-term negative impact due to use restrictions during and immediately following chemical application. Long-term positive impact on recreational use of the lake. |
| Public Health and Safety | No impact. | Potential short-term impacts during chemical application. |
| Socioeconomics/Environmental Justice | Potential long-term negative economic impact to Base Lake businesses. Potential long-term negative impact if zebra mussels gain access to other water bodies and utility intakes. | No impact. |
| Noise | No impact. | Short-term increase in project area noise levels during application of the chemical. |
| Air Quality | No impact. | Short-term, localized adverse impacts to air quality during application of the chemical. |
| Water Resources | No impact on groundwater. Long-term negative impact on the quality of water in the Base Lake. Potential long-term impacts to other surface water bodies if the mussel gains access to them. | No impact on groundwater. Short-term negative impact on Base Lake water quality due to the addition of the chemical. Long-term positive impact on water quality in the lake. |
| Biological Resources | No impact on wetlands. No impact on federal or state-listed species. No impact on terrestrial wildlife. Long-term negative impact on aquatic resources. | Short-term impact on vegetation. Vegetation would return to normal by next growing season. No impact on federal or state-listed species. No impact on terrestrial wildlife Short-term adverse impact on aquatic resources. Long-term positive impact on aquatic resources in the Base Lake. |
| Cultural Resources | No impact. | No impact |
| Geology and Soils | No impact. | No impact |
| Climate and Meteorology | No impact. | No impact |
| Topography | No impact. | No impact |
| Hydrology | No impact. | No impact |
| Floodplains | No impact. | No impact |
| Hazardous Materials and Waste | No impact. | No impact |
| | | |

SECTION SIX

Public Involvement

Offutt AFB will publish a public notice in a local newspaper informing the public of the proposed project and allowing the public 30 days to comment on the action. Relevant comments received during this comment period will be addressed in this section prior to issuing the Final EA and FONSI.

SECTION SEVEN Agencies and Individuals Contacted

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <p>Robert Harms U.S. Fish and Wildlife Service Grand Island Ecological Field Office 203 West Second Street Federal Building, Second Floor Grand Island, Nebraska 68801</p> | <p>Steven Schainost Nebraska Game and Parks Commission District 1 Office 299 Husker Road Alliance, Nebraska 69301</p> |
| <p>Ken Bazata Nebraska Department of Environmental Quality 1200 "N" Street, Suite 400 Lincoln, Nebraska 68509</p> | <p>Larry Shepard U.S. Environmental Protection Agency – Region 7 901 North Fifth Street Kansas City, Kansas 66101</p> |
| <p>Tim Creger Nebraska Department of Agriculture 301 Centennial Mall South Lincoln, Nebraska 68509</p> | <p>Justin King Nebraska Public Power District 1414 15th Street Columbus, Nebraska 68602</p> |
| <p>Gerry Mackie 23 Avra Court Guelph, ON N1H 7B2</p> | <p>L. Robert Puschendorf Deputy SHPO P.O. Box 82554 1500 "R" Street Lincoln, NE 68501</p> |
| <p>Karl Morris Technical Project Manager 55 CEV/CES 106 Peacekeeper Drive Offutt AFB, Nebraska 68113-4019</p> | <p>Krystal Stoner Nebraska Game and Parks Commission 2200 N. 33rd St. Lincoln, NE 68503</p> |
| <p>Mick Sandine U.S. Army Corps of Engineers 106 S. 15th Street Omaha, NE 68102</p> | |

SECTION EIGHT

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SECTION NINE

List of Preparers

This EA was prepared by URS Group, Inc., for Offutt AFB in Bellevue, NE.

URS Group staff includes:

Mr. Quentin Bliss, Senior Environmental Planner - Over 40 years of progressive experience in the environmental field and has been involved with NEPA since it was enacted in 1969. Has extensive experience with all aspects of NEPA, including: the scoping process, identification and evaluation of alternatives, identification of appropriate mitigation, and agency coordination. Project experience includes over 100 multidiscipline projects that involved NEPA compliance.

Ms. Susan Volkmer, Environmental Planner - Over 15 years of experience with environmental assessments involving human and ecological resources. Project experience includes over 85 multidiscipline projects that involved NEPA compliance.

Mr. Brian Osborn, Environmental Planner – Over 11 years of experience in the environmental field. Specialized expertise in environmental planning and NEPA compliance studies, including environmental document preparation. Project experience includes over 40 multidiscipline projects that involved NEPA compliance.

APPENDIX A

Agency Correspondence

APPENDIX B Copper Sulfate Pentahydrate Label and MSDS Sheets

APPENDIX C Calculation of Acceptable Concentrations of Copper in Surface Water

No comments have been received at this time.

-- FINDING OF NO SIGNIFICANT IMPACT --

10.0 NAME OF ACTION: Eradication of Zebra Mussels from the base lake at Offutt Air Force Base (Offutt AFB).

11.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVE(S)

Offutt AFB has prepared an Environmental Assessment (EA) to identify and evaluate the potential environmental effects associated with the chemical eradication of zebra mussels from the base lake.

11.1 Proposed Action

The Proposed Action would involve treating the base lake with copper sulfate. This action includes an initial application in September 2008 and a second application in May of 2009.

11.2 Alternative Actions

Offutt AFB considered a wide range of alternatives to using copper sulfate. These alternatives included confinement by restricting boat access to the lake and plugging the drainage tubes from the lake, filling in the lake, introducing predators to control the zebra mussels, thermal removal by heating the lake water, and the use of other chemicals to eradicate the zebra mussels. Many of these alternatives were not carried forward for further analysis because they failed to satisfactorily restore the recreational function of the lake and/or reduce/eliminate the risk of zebra mussels being spread to other water bodies, especially the Missouri River. Other chemicals such as Clam-Trol and Endothal were not carried forward for analysis because they were highly toxic to the zebra mussels and also the fish in lake. These chemicals would have had an adverse impact on the recreational quality of the base lake. Finally, Potash was not carried forward for further analysis because the increase in the cost of potash, coupled with the cost of transporting and applying 240 tons of potash to the lake was projected to be in excess of 1 million dollars. Based on the requirements in Executive Order 13112, the zebra mussel working group determined that Offutt AFB could not respond quickly and in a cost-effective manner using potash as the chemical of choice to eradicate the zebra mussels and prevent their spread to the Missouri and other nearby bodies of water. The zebra mussel working group was also concerned about whether there would a sufficient supply of potash available to eradicate the zebra mussels because it is also used for agricultural purposes as a fertilizer. Therefore, no other alternatives other than the proposed action and the no-action alternatives were examined in the EA.

11.3 No-Action Alternative

The No Action Alternative is defined as maintaining the status quo with no actions being funded or completed to remove the zebra mussels from the base lake. Under this alternative, Offutt AFB would continue to restrict the use of private boats on the lake and the outlet pipes, which drain to the Bellevue drainage ditch and eventually to the Missouri River, would remain plugged. Consequently, maintaining status quo conditions would adversely impact the environment because during times of heavy precipitation, Offutt AFB would be unable to release water from

the lake impacting its surface water drainage. As the lake level rises, recreational facilities surrounding the lake and land upstream from the lake would flood. Additionally, given the aggressive colonizing ability of zebra mussels, if the zebra mussels were to gain access to surface waters outside the lake, the potential exists for adverse economic impacts to the Bellevue metro area and beyond. The zebra mussels could plug intakes for municipal water and power companies along the Missouri River. The infestation of power and utility companies would result in increased operation and maintenance costs. These costs could be significant and would result in higher fees for end users.

12.0 SUMMARY OF ENVIRONMENTAL IMPACTS

12.1 Proposed Action

12.1.1 Land Use

There would be a temporary adverse impact on the recreational use of the lake during and immediately following the application of the copper sulfate, as access to and use of the lake would be restricted until all areas of the lake have elemental copper concentrations less than 1.3 ppm which is the maximum contaminant level (MCL) for copper. The Proposed Action would have a long-term positive impact on the use of the lake. Eradication of the zebra mussels would allow Offutt AFB to restock and maintain a larger variety and quantity of fish for fishermen.

12.1.2 Public Health and Safety

Public access to the lake area during application of the copper sulfate would be restricted to the lake perimeter roadway and landward. Access to the FAMCAMP, pavilion, and boathouse would be allowed during the application. Warning signs restricting use and informing lake users about the lake treatment would be placed at the entrance to the lake and at all boat ramps during the application and until monitoring indicates that adequate mixing has occurred and that no portion of the lake has water copper concentrations above 1.3 ppm. Additionally, public information sheets would be prepared and distributed to base personnel and users of the base stables. Offutt AFB would also increase security patrols in the lake area. During and after application of the copper sulfate, the lake would be monitored for dead fish. Dead fish would be collected and disposed of at a local rendering plant until no dead fish are found for a 48-hour period. With the precautions presented above, the proposed action would have no significant impact on public health and safety.

12.1.3 Socioeconomics and Environmental Justice

A trailer park is located near the base lake. The impacts associated with the Proposed Action Alternative on low-income or minority populations in the trailer park would be related to noise and air quality. However, these impacts are expected to be minor and would be localized in the immediate vicinity of the base lake. This alternative would not result in a negative economic impact within the general project area. Economic activity associated with the lake would continue post-project as recreational fishing would be maintained as part of this alternative.

12.1.4 Noise

There would be a temporary increase in noise levels near the lake area during application of the copper sulfate (approximately 2 days). However, because Offutt AFB is an active military base

with daily airfield operations (landings and takeoffs), a temporary and localized increase in noise would not result in a significant adverse impact to the base or adjacent communities.

12.1.5 Air Quality

Short-term, localized impacts to air quality may occur immediately downwind of the application activities. Copper sulfate would be applied in a crystal form limiting to the extent possible the production of dust. Any impacts would be considered minor and would be limited to the immediate vicinity of the base lake. Once application has been completed (2 days), air quality at the lake would return to pre-project conditions.

3.1.6. Water Resources

With the proposed action, copper sulfate would be applied to the lake resulting in the death of adult and larval zebra mussels. This activity would have a short-term negative impact on the water quality in the lake. However, with adequate mixing, copper levels would equalize below 1.3 ppm, which is the MCL for copper. In the long-term, the proposed action would have a positive impact on the aquatic resources at Offutt AFB. By removing the zebra mussels from the food chain, the lake ecosystem would return to its pre-zebra mussel state and provide acceptable habitat for a wide variety of fish species. This would allow the fish and wildlife management personnel on base to meet their mission.

3.1.7. Biological Resources

The proposed action would have a short-term negative impact on wetland vegetation within the project area. The copper sulfate may kill most of the wetland vegetation exposed to the chemical. However, the wetland vegetation would return to pre-project levels by the next growing season. Therefore, no long-term impacts would occur to wetland vegetation. No federal-listed or state-listed species are permanent residents at Offutt AFB. The bald eagle (a state-listed species) has the potential to fly over the lake and take fish. However, with the collection and disposal of fish killed by the copper sulfate, potential impacts to the bald eagle would be minimized. Therefore, the proposed action would not impact any threatened, endangered, or state sensitive species. It is also unlikely that the proposed project would have a negative impact on any terrestrial species. Most wildlife roam across a home range and have more than one source of water. The lowest estimated acceptable concentration of copper was 4.6 ppm for white-tailed deer. Although during application and immediately following application some locations in the lake may have copper concentrations greater than 4.6 ppm, wave-action and mixing would quickly lower the concentrations. It is anticipated that the concentration of copper throughout the lake would be 1 ppm or less within 7 to 10 days.

3.1.8. Cumulative Impacts

No other activities were identified in the project and surrounding area which would have additional impacts on the natural resources in the lake area. Therefore, cumulative impacts would not be expected to be greater in scope or magnitude than those described for each individual environmental resource.

12.2 No Action Alternative

12.2.1 Land Use

The No Action Alternative will have a long-term adverse impact on the recreational use of the lake. The use restriction on privately-owned boats to minimize the potential spread of the mussels to other water bodies would continue with this alternative. Additionally, the mussels would reduce the level of phytoplankton and zooplankton within the lake, which would adversely affect reproduction and growth of fish species in the lake. The mussels would filter the water and make it clearer, which would encourage the growth of rooted aquatic macrophytes. These macrophytes could create additional problems for people wanting to fish the lake. This would be considered a significant long-term negative impact. With this alternative, the base lake outlets to the Bellevue Drain would remain plugged increasing the risk of flooding on base land.

12.2.2 Public Health and Safety

The No Action Alternative would not have a significant impact on public health and safety. The presence of the sharp zebra mussel shells along the shoreline area would represent a minor, insignificant hazard to lake users.

12.2.3 Socioeconomics and Environmental Justice

The No Action Alternative would not have a disproportional adverse impact on low-income or minority populations. This alternative could result in negative economic impacts within the general project area. The current restrictions on the base lake could result in decreased use of the recreation area by military personnel over time due to the decreased quality of recreational fishing. This would have a negative economic impact on the businesses that derive their income from the lake. Additionally, given the aggressive colonizing ability of zebra mussels, if the zebra mussels were to gain access to surface waters outside the base lake, the potential exists for economic impacts to the Bellevue metro area and beyond because the zebra mussels could plug intakes for municipal water and power companies along the Missouri River. The colonization of the municipal utilities would result in increased operation and maintenance costs which could be significant and could result in increase utilities fees for end users.

12.2.4 Noise

The No Action Alternative would not impact local noise levels.

12.2.5 Air Quality

The No Action Alternative would not impact local air quality.

12.2.6 Water Resources

The No Action Alternative would have a long-term negative impact on the quality of water in the base lake. Without intervention, the zebra mussels would continue to rapidly multiply within the lake. The presence of the zebra mussel would change the nutrient balance in the lake resulting in clearer water due to filter feeding and the removal of phytoplankton and zooplankton. Additionally, the potential would remain for the mussels to gain access to other local water bodies, where they could adversely impact the quality of water in those nearby resources and interfere with their use and enjoyment by the public.

12.2.7 Biological Resources

The No Action Alternative would not impact any wetlands at Offutt AFB. Although zebra mussels may gain access to wetlands from loss of containment in the base lake, this would not be considered a significant impact to wetlands. Zebra mussels like to colonize on hard surfaces. Cattails and reeds would be the predominant hard surface in a wetlands and it is not likely that zebra mussels would colonize on plants to the extent that they colonize on other hard surfaces. Additionally, the cattails and reeds derive their nutrients from the soil and not from other organisms in the water. Therefore, wetland quality and function would not be impacted by zebra mussel colonization. The No Action Alternative has the potential to impact any federal-listed and state-listed species if the zebra mussel gains access to the Missouri River. Overtime, the zebra mussel population would continue to grow and the Missouri River ecosystem would be negatively affected. Therefore, the potential exists for the pallid sturgeon, interior least tern, and piping plover to be negatively impacted by the No Action alternative. The No Action Alternative would not impact wildlife at Offutt AFB.

12.2.8 Cumulative Impacts

The No Action Alternative would not produce any cumulative impacts greater in scope or magnitude than those described for each individual environmental resource.

13.0 PUBLIC COMMENTS

The public was offered an opportunity to comment on this EA and the unsigned FONSI and FONPA. This public comment ran from. Public comments were/were not received.

14.0 CONCLUSION

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

After review of the Environmental Assessment, I have concluded that the proposed action will not have a significant adverse impact of a long-term nature to the quality of the human or natural environment. A Finding of No Significant Impact is appropriate. Therefore, no Environmental Impact Statement will be prepared. This analysis fulfills the requirements of the National Environmental Policy Act, The President's Council on Environmental quality, and 32 CFR 989.

FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA)

After review of the Environmental Assessment, I have concluded that the proposed action is the only practical alternative for eradicating the zebra mussels and controlling their spread to the Missouri River and other nearby bodies of water. The proposed action would have a short-term negative impact on wetland vegetation within the project area. The copper sulfate would kill most of the wetland vegetation exposed to the chemical. However, the wetland vegetation would return to pre-project levels by the next growing season. Therefore, no long-term impacts would occur to wetland vegetation. All the chemicals considered would have killed some or most of the wetland vegetation exposed to the chemical. No action would also be unacceptable. If the zebra mussels were to gain access to the Missouri River, then adverse economic impacts to the

Bellevue metro area and beyond would be substantial because the zebra mussels could plug intakes for municipal water and power companies along the river causing increased costs for the companies and their customers.

TIMOTHY A. BYERS
Brigadier General, USAF

Date